AWIPS-2 Application Focal Point Course

CAVE & EDEX Configuration Module

Step-By-Step Exercises

Warning Decision Training Branch

National Weather Service Training Division

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Introduction

This document contains exercises consisting of step-by-step instructions of particular customizations that can be performed using EDEX and/or CAVE. These instructions build upon the concepts presented in the AWIPS-2 Overview, the EDEX Overview, and the CAVE Overview modules. To help you understand the procedures, each exercise has a background section to provide objectives, context, and the reasoning or strategy behind the instructions. To help you apply the instructions to additional situations, the instructions are divided into concepts and actions. The concepts describe the basic procedure and the actions provide the series of steps to follow.

Document Conventions:

These instructions employ a few conventions that are intended to help you distinguish various typed commands and options.

When a command is to be typed at a terminal prompt, it is written in a **`bold Courier (monospaced)`** font, and each new line of input begins with a dollar prompt ($). In some of these lines, long commands may wrap to multiple lines on the page, but you should enter every command that begins with a $ prompt on one line. In this example, there are two commands:

```
$ cd /awips2/static/database.maps
$ ./importShapeFiles.sh /home/awips/shapes/urban_bounds.shp mapdata urbanbounds
0.064,0.016,0.004,0.001 awips
```

When the document references a keyword which may require you to substitute your own information, it is written using curly braces {} and a gray background. For example, the section of the Localization Store that contains some of your site's override files is often referenced as cave_static/site/{your site}/bundles/. Thus, if your site is Wichita, you would substitute ICT for {your_site}, so the directory path would be cave_static/site/ICT/bundles/.

In most cases, this document references machines by their logical function rather than by their name. For example, it mentions {edex_server} rather than DX3 or {database_server} rather than DX1. This was done to help make these exercises a bit more portable as well as to survive potential changes to the AWIPS-2 hardware architecture. For more information on the functions of particular machines, you might wish to consult the ***AWIPS-2 System Managers Manual*** or the AWIPS-2 System Administration training course materials.

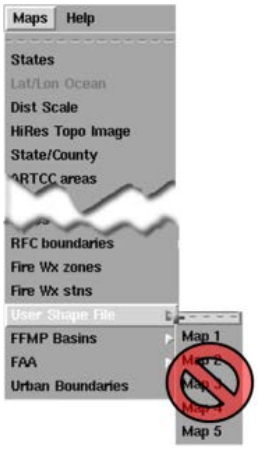
Note: Exercises 1,3, and 4 suggest using a few external files for an urban boundaries shapefile, another WFO's scale maps, and some spotters.dat files. An ExerciseResources.zip file alongside this PDF contains sample files in case you cannot obtain your own files.

Exercise 1: Maps — Import Urban Boundaries Shapefile

Objectives: In this exercise, you will perform the following procedures:

- Import a new geographic shapefile into the AWIPS-2 maps database.
- Create a display bundle for the new shapefile, so it is displayable from the Maps menu of the D2D perspective in CAVE.
- Optionally add constraints to filter the shapefile data prior to display.

Background. AWIPS-2 uses the PostGIS extension to the PostgreSQL database to manage many of the map backgrounds. In this design, shapefiles are actually loaded into the Maps database and are not directly accessed from files. One benefit from this approach is that AWIPS-2 can access attributes in the shapefiles that AWIPS-1 ignored. Both Exercise 1 and Exercise 2 illustrate how to use these attributes.



AWIPS-1 had a User Shapefile capability where you could simply rename up to 3 vector shapefiles and 2 point shapefiles to userFile#.shp, userFile#.shx and userFile#.dbf, where # was 1 through 5, and place these files in $FXA_HOME/data or in your localizationDataSets/$FXA_LOCAL_SITE. While the User Shapefile function does not exist in AWIPS-2, two methods do exist to access shapefiles in AWIPS-2. The first method, described in this exercise, adds the shapefile to the database and the Maps menu. The second method, the Import GIS data function accessible from the CAVE menu, interactively accesses shapefiles from disk. This second process is described in the AWIPS-2 Variance Training modules.

This exercise steps you through importing your own shapefiles into the AWIPS-2 Maps database. The specific example uses an urban boundaries shapefile from AWIPS-1 called urbanBounds. In particular, this exercise uses the importShapeFile.sh script that's located in /awips2/database/sqlScripts/share/sql/maps/ on your database server (normally DX1). The arguments for importShapeFile.sh are:

```
importShapeFile.sh shapefile schema table simplev dbUser
```

For a complex shapefile, running the importShapeFile.sh script may take several minutes. (Note: some large FFMP shapefiles have resulted in out of memory errors; the AWIPS Network Control Facility can provide assistance in this situation, because it requires temporarily adjusting certain settings in the database itself.) After importing the shapefile, we need to

create a display bundle and make the map accessible from the maps menu. We'll use the Localization Perspective for part of these steps.

This exercise will take 30 minutes or less to complete.

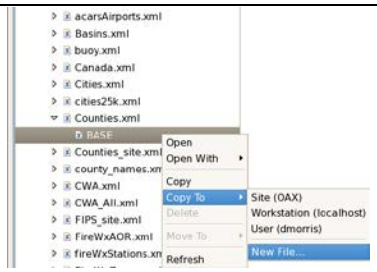
Concept	Actions
Part 1: Import Urban Bounds Shapefile	
1. Place the urbanBounds shapefiles someplace accessible by DX1 or DX2. You would probably obtain the shapefiles from AWIPS-1 or the NOAA1 ftp server.	In this example, the three files that make up the urbanBounds shapefile are located in /home/awips/shapes on the database server: • /home/awips/shapes/urban_bounds.shp • /home/awips/shapes/urban_bounds.shx • /home/awips/shapes/urban_bounds.dbf
2. Import the shapefile into the database.	On the database server (DX1), open a terminal window **as the awips user.** Go to the directory that contains the importShapeFile.sh script and run the import script. The new map database table will be called mapdata.urbanbounds. The importShapeFile.sh command below is to be typed on one single line. **`$ cd /awips2/database/sqlScripts/share/sql/maps`** **`$ ./importShapeFile.sh /home/awips/shapes/urban_bounds.shp mapdata urbanbounds 0.064,0.016,0.004,0.001 awips`** Note that /home/awips/shapes/urban_bounds.shp in the command above needs to refer to the location of your shapefile.

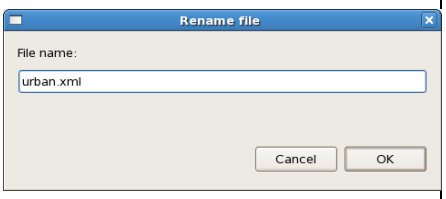
3. Create a site-level urban.xml bundle starting with the base-level counties.xml bundle.

   Note: Before attempting to create a SITE-level configuration file, the user performing the configuration must have permissions enabled in the userRoles.xml file. For example, this new entry was added to a site override version of userRoles.xml located in common_static/site/OAX/roles/ userRoles.xml to enable the user "dmorris" to make site-level configuration changes.

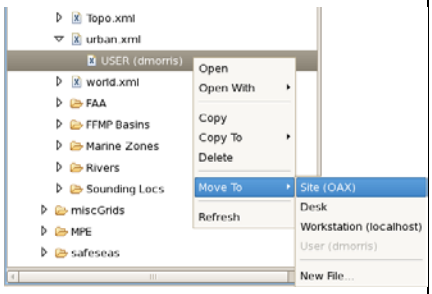
```
<permission id="com.raytheon.localization.site/common_static/shef"/>
<permission id="com.raytheon.localization.site/common_static/roles"/>
<permission id="com.raytheon.localization.site/common_static/datadelivery"/>
<permission id="com.raytheon.localization.site/common_static/archive"/>
<permission id="com.raytheon.localization.site.OAX/cave_static"/>
<permission id="com.raytheon.localization.site.OAX/common_static"/>

<user userId="dmorris">
        <userPermission>com.raytheon.localization.site.OAX/cave_static"</userPermission>
        <userPermission>com.raytheon.localization.site.OAX/common_static"</userPermission>
</user>
```

In the Localization Perspective file browser, open **CAVE » Bundles » maps » Counties.xml**. Right-click the **BASE** icon then **Copy To ►New File...** Call the new file **urban.xml**.



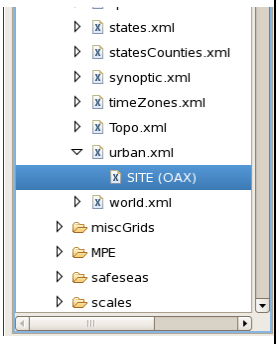


The new urban.xml file probably defaulted as a new user-level file. We want this to be a site-level override, so right-click the new **USER** icon under **urban.xml** and click **Move To ►Site**.



4. Make edits to urban.xml. Change the table name from mapdata.county to mapdata.urbanbounds and the menu entry label from County Boundaries to Urban Boundaries.

In the Localization Perspective file browser, navigate to your new urban.xml file (it's possible that the file browser has automatically navigated there for you). It should appear under **CAVE » Bundles » maps**. When you find urban.xml, open it and edit the new SITE version you just created by double-clicking on it. Click on the Source tab at the bottom of the editor window to edit the XML.

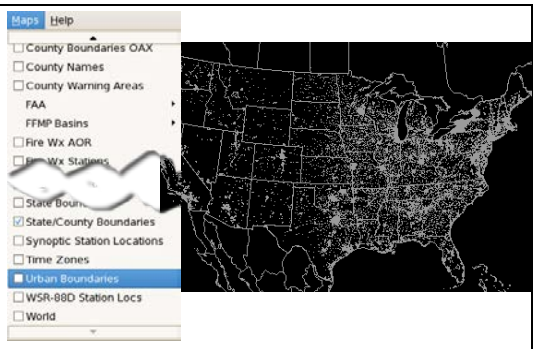


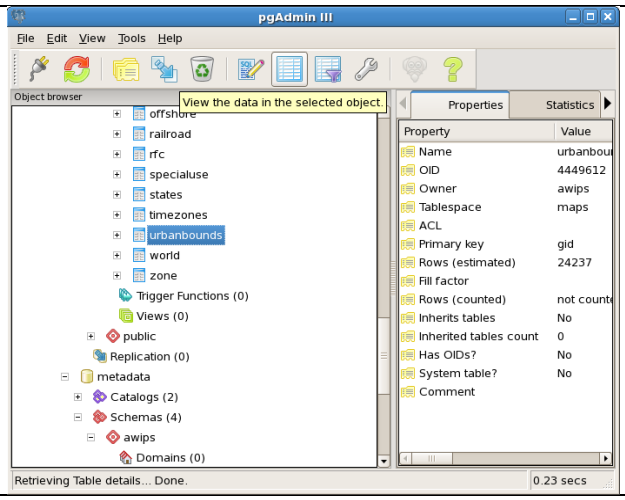
Make these edits to the ResourceData tag (shown in **Figure 1**), and the save urban.xml file when you're finished.

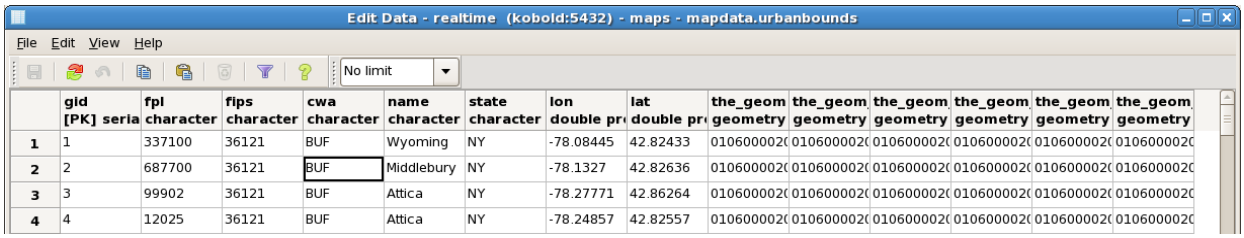
- Change the table to mapdata.urbanbounds
- Change the mapName to Urban Boundaries
- Delete the two lines indicated by the red box in **Figure 1**.

```
<bundle>
    <displayList>
        <displays xsi:type="mapRenderableDisplay" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
            <descriptor xsi:type="mapDescriptor">
                <resource>
                    <loadProperties>
                        <capabilities>
                            <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true"
                                outlineWidth="1" />
                            <capability xsi:type="colorableCapability" colorAsString="#9b9b9b" />
                        </capabilities>
                        <resourceType>PLAN_VIEW</resourceType>
                    </loadProperties>
                    <properties isSystemResource="false" isBlinking="false" isMapLayer="true" isHoverOn="false"
                        isVisible="true">
                        <pdProps maxDisplayWidth="100000000" minDisplayWidth="0" />
                    </properties>
                    <resourceData xsi:type="dbMapResourceData">
                        <column name ="EDITAREA" expression="state || 'C' || substr(fips,3)"/>
                        <column name="wfo" expression="cwa"/>
                        <table>mapdata.urbanbounds</table>
                        <mapName>Urban Boundaries</mapName>
                    </resourceData>
                </resource>
            </descriptor>
        </displays>
    </displayList>
```

Figure 1. Edits to urban.xml

5. Restart CAVE and load the new urban boundaries in the D2D perspective. The Maps menu is unusual in that CAVE dynamically builds the menu when CAVE starts up by scanning bundles in /awips2/cave/etc/bundles/maps or in the Localization Store in bundles/maps in cave_static under site, user, or workstation.	Click the **Maps** menu and load **Urban Boundaries**. 
Part 2: Add Optional Constraints	
6. Optional: Add constraints based on shapefile attributes. Open the urbanbounds table in pgadmin3 so you can see the attributes and their datatypes. You need to know the datatypes so you can make the appropriate queries with correct syntax. NOTE: Beginning with OB13.4, an AWIPS-2 version of pgadmin3, a graphical interface for PostgreSQL, has been distributed as an RPM (awips2-pgadmin3). Once installed on your system, this version of pgadmin3 can be started in a terminal window using /awips2/pgadmin3/bin/pgadmin3.	Start pgadmin3. Open the maps database. Open the mapdata schema. Open the Tables tab and navigate to urbanbounds. Click on the view table icon. An excerpt of the urbanbounds table is shown in **Figure 2**.





	gid [PK] seria	fpl character	fips character	cwa character	name character	state character	lon double pr	lat double pr	the_geom geometry	the_geom geometry	the_geom geometry	the_geom geometry	the_geom geometry	the_geom geometry
1	1	337100	36121	BUF	Wyoming	NY	-78.08445	42.82433	010600002(	010600002(	010600002(	010600002(	010600002(	010600002(
2	2	687700	36121	BUF	Middlebury	NY	-78.1327	42.82636	010600002(	010600002(	010600002(	010600002(	010600002(	010600002(
3	3	99902	36121	BUF	Attica	NY	-78.27771	42.86264	010600002(	010600002(	010600002(	010600002(	010600002(	010600002(
4	4	12025	36121	BUF	Attica	NY	-78.24857	42.82557	010600002(	010600002(	010600002(	010600002(	010600002(	010600002(

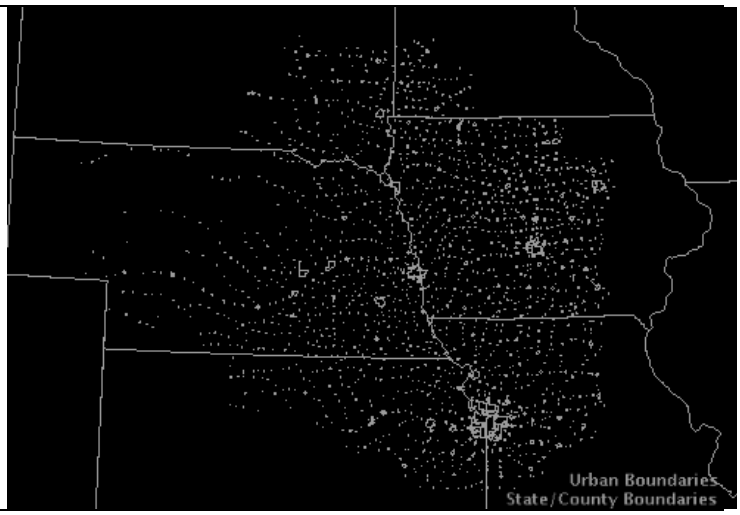
Figure 2. Excerpt of urbanbounds table in the maps database.

7. Optional: Add constraints based on the OAX CWA and these neighboring CWAs: OAX, FSD, DMX, EAX, TOP, GID, LBF. In this case we used single quotes around the CWAs because they are character fields. Exercise 2 will show another example of adding a constraint.	Re-open the localization perspective and navigate to urban.xml and edit it. Add the following constraint to the end of the same resourceData we edited above: **<constraint> cwa in ('OAX','FSD','DMX','EAX','TOP','GID','LBF') </constraint>** This entry should be on one line to match the structure of the rest of the XML file (as shown in **Figure 3**). There's no need to add the line breaks that were added here for clarity. Also see how the Localization Perspective editor automatically adds closing tags, closing parenthesis, and closing quote marks for your convenience.

```
<bundle>
    <displayList>
        <displays xsi:type="mapRenderableDisplay" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
            <descriptor xsi:type="mapDescriptor">
                <resource>
                    <loadProperties>
                        <capabilities>
                            <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true"
                                outlineWidth="1" />
                            <capability xsi:type="colorableCapability" colorAsString="#9b9b9b" />
                        </capabilities>
                        <resourceType>PLAN_VIEW</resourceType>
                    </loadProperties>
                    <properties isSystemResource="false" isBlinking="false" isMapLayer="true" isHoverOn="false"
                        isVisible="true">
                        <pdProps maxDisplayWidth="100000000" minDisplayWidth="0" />
                    </properties>
                    <resourceData xsi:type="dbMapResourceData">
                        <table>mapdata.urbanbounds</table>
                        <mapName>Urban Boundaries</mapName>
                        <constraint>cwa in ('OAX','FSD','DMX','EAX','TOP','GID','LBF')</constraint>
                    </resourceData>
                </resource>
            </descriptor>
        </displays>
    </displayList>
</bundle>
```

Figure 3. Final edits to urban.xml to add cwa constraint.

8. Optional: Switch to the D2D perspective and reload the Urban Boundaries map. It's not necessary to restart CAVE here because we are not modifying the menu in any way in this step.



Exercise 2: Maps — Database Constraints
Cities with Population > 25,000

Objectives: In this exercise, you will perform these procedures:

- Create a display bundle that pulls city locations from the maps database
- Add a constraint to the database query to limit the cities to those with population greater than 25,000.

Background. As illustrated at the end of Exercise 1, AWIPS-2 can access various attributes included in shapefiles to filter the display. Map bundles can include various constraints to limit the data as it is queried from the database.

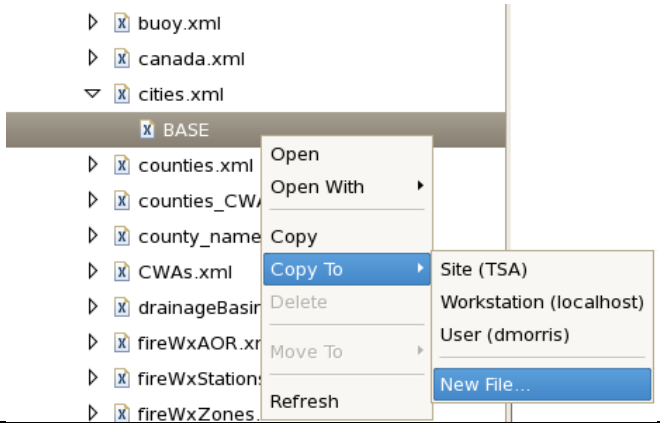
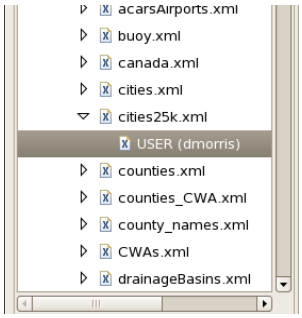
In this example, we're going to create a user-level map bundle to display city locations, but only for cities with populations over 25,000. We can do this because the baseline maps database contains a city table that includes a number of attributes, including population. The normal Cities overlay in the Maps menu uses this database table. You can verify this yourself by looking at the following bundle file: /awips2/cave/etc/bundles/maps/Cities.xml. You can look at this file using the Localization Perspective by navigating the file browser to **CAVE** » **Bundles** » **maps** » **Cities.xml** and opening the **BASE** file. So to do this task, we'll start with the cities.xml file and make the necessary modifications for a new bundle to plot cities over 25,000 population.

Troubleshooting Tip

Earlier builds of AWIPS-2 implemented the cities overlay using the cities.lpi file (in /awips2/cave/etc/basemaps) rather than using the cities table in the database. So in the earlier versions, the cities displayed on the map could be changed simply by editing the cities.lpi file. Current builds still include the cities.lpi file but because the display bundle references the database rather than cities.lpi, different methods would be used to modify the cities on the map. When making modifications in AWIPS-2 configurations, it is a good practice to verify whether or not the default CAVE display bundles have changed, especially when multiple methods exist that generate similar displays.

Note: In the previous versions, the bundle which used cities.lpi had a resourceData tag of xsi:type="lpiResourceData". The database version uses xsi:type=" dbPointMapResourceData". Other bundles utilizing dbPointMapResourceData were found in the FAA directory.

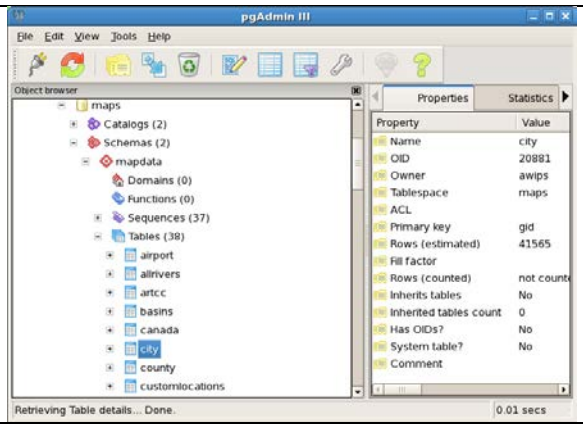
This exercise will take about 15 minutes or less to complete.

Concept	Actions
1. Create a user-level cities25k.xml bundle starting with the base-level cities.xml bundle	In the Localization Perspective file browser, open **CAVE** » **Bundles** » **maps** » **Cities.xml**. Right-click **BASE** and **Copy To ► New File…** Call the new file **cities25k.xml.** 
2. Make edits to cities25k.xml. Change the menu entry label from Cities to Cities > 25,000	In the Localization Perspective file browser, navigate to your new cities25k.xml file. It should appear under **CAVE** » **Bundles** » **maps**. When you find cities25k.xml, open it, and edit the new user version by double-clicking on it. Click on the Source tab at the bottom of the editor window to edit the XML.  Make this edits to the ResourceData tag (shown in **Figure 1**), and the save cities25k.xml file when you're finished. • Change the mapName to Cities >25,000 We use > for the > symbol in the mapName tag to not interfere with the syntax of the XML that also uses < and > to delimit tags. Save your changes.

```
<bundle>
    <displayList>
        <displays xsi:type="mapRenderableDisplay" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
            <descriptor xsi:type="mapDescriptor">
                <resource>
                    <loadProperties>
                        <capabilities>
                            <capability xsi:type="colorableCapability" colorAsString="#9b9b9b" />
                            <capability xsi:type="labelableCapability" labelField="name" />
                            <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true"
                                outlineWidth="1" />
                        </capabilities>
                        <resourceType>PLAN_VIEW</resourceType>
                    </loadProperties>
                    <properties isSystemResource="false" isBlinking="false" isMapLayer="true" isHoverOn="fa
                        isVisible="true">
                        <pdProps maxDisplayWidth="100000000" minDisplayWidth="0" />
                    </properties>
                    <resourceData xsi:type="dbPointMapResourceData">
                        <table>mapdata.city</table>
                        <mapName>Cities &gt; 25,000</mapName>
                    </resourceData>
                </resource>
            </descriptor>
        </displays>
    </displayList>
</bundle>
```

Figure 1. Edits to cities25k.xml.

3. Restart CAVE and load the new Cities >25,000 map in the D2D perspective. Of course, at this stage, the bundle has no constraints, so all cities in the database table are displayed, subject to progressive disclosure.	Click the Maps menu and load Cities > 25,000. 
4. Add constraints based on the population attribute. Open the city table in pgadmin3 so you can see the attributes and their datatypes. You need to know the datatypes so you can make the	Start pgadmin3. Open the maps database. Open the mapdata schema. Open the Tables tab and navigate to city. Click on the view table icon. An excerpt of the city table is shown in **Figure 2**.

appropriate queries with correct syntax.	

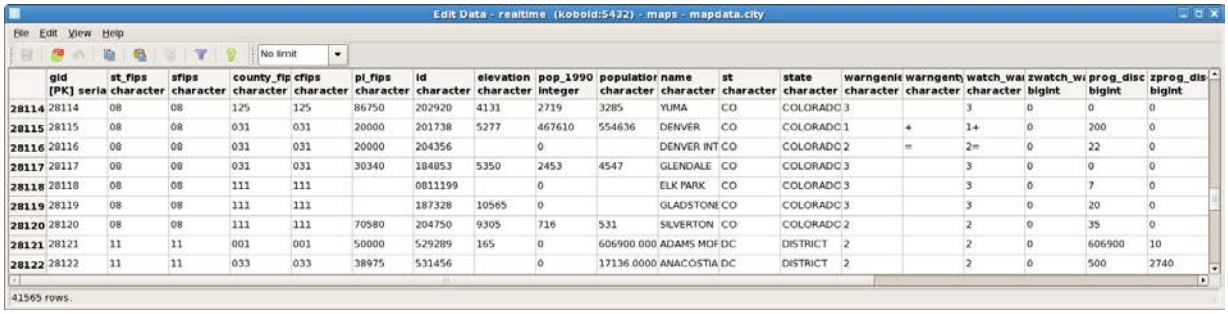


Figure 2. Excerpt of the city table in the maps database. Notice that population is stored as a character field, and also that a few locations in the District of Columbia have a decimal point in the population field.

5. Add a constraint based on the population field. Normal intuition would suggest the constraint to be population > 25000. Because the datatype is character, the field needs to be typecast to a numeric field; otherwise the filter would be done in an alphabetic sense rather than numerical. Also,	Re-open the localization perspective and navigate to cities25k.xml and edit it. Add the following constraint to the end of the resourceData we edited above (shown in **Figure 3**): **<constraint> population not like '%Null%' and population::numeric > 25000 </constraint>** The first part of the constraint (population not like '%Null%') filters out several records where the population field contains the string "<Null>". This filter is required to prevent the inline conversion of the character field to number (described below) from failing on these values. The double colon notation does an inline conversion of the character data to numeric before doing the comparison. Had we not done the typecast, the (incorrect) constraint should have read population > '25000' to be syntactically correct because of the character datatype. Save your changes.

the numeric typecast in this case takes care of the decimal values; an integer typecast generates an exception when encountering a decimal point.	

```
<bundle>
    <displayList>
        <displays xsi:type="mapRenderableDisplay" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
            <descriptor xsi:type="mapDescriptor">
                <resource>
                    <loadProperties>
                        <capabilities>
                            <capability xsi:type="colorableCapability" colorAsString="#9b9b9b" />
                            <capability xsi:type="labelableCapability" labelField="name" />
                            <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true"
                                outlineWidth="1" />
                        </capabilities>
                        <resourceType>PLAN_VIEW</resourceType>
                    </loadProperties>
                    <properties isSystemResource="false" isBlinking="false" isMapLayer="true" isHoverOn="false"
                        isVisible="true">
                        <pdProps maxDisplayWidth="100000000" minDisplayWidth="0" />
                    </properties>
                    <resourceData xsi:type="dbPointMapResourceData">
                        <table>mapdata.city</table>
                        <mapName>Cities &gt;25,000</mapName>
                        <constraint>population not like '%Null%' and population::numeric &gt; 25000</constraint>
                    </resourceData>
                </resource>
            </descriptor>
        </displays>
    </displayList>
</bundle>
```

Figure 3. cities25k.xml with the population constraint.

6. Switch to the D2D perspective and reload the Cities > 25,000 map.	

Exercise 3: Maps — Spotter Readout Data and Other Adaptive Plots

Objective: In this exercise, you will perform the following procedure:

- Import a properly-formatted text file to enable the spotter readout functionality.

Background. In AWIPS-1, the spotter readout map was created by having a spotters.dat text file in your $FXA_CUSTOM_FILES and running a –station localization with mainScript.csh. This localization step created a special netCDF file that contained the spotter information. In addition, AWIPS-1 harnessed the same infrastructure to allow other types of data to be displayed in a similar fashion, so long as the text .DAT file was formatted correctly and the proper data keys were created.

```
id: A123
spotterName | Ken Waters
spotterAddr |123 Toad Rd
spotterCity | Somewhere TX
spotterPhone | 817-560-8755
latitude | 32.7
longitude | -97.5

id: D111
spotterName | Sam Iam
spotterAddr | 5 Live Dr
spotterCity | Rhyme CO
spotterPhone | 970-444-4444
latitude | 39.0
longitude | -104.0
```

AWIPS-2 contains the importAdaptivePlot.py command-line script located in /awips2/fxa/bin. The arguments for importAdaptivePlot.py are

```
importAdaptivePlot.py –f {path_to_file.dat} –s edex_host_name:9581/services –n 'Menu Name'
```

When this command runs, the .dat file is uploaded to the EDEX server and is stored in the Utility Tree under cave_static/configured/{SITE}/basemaps/adaptivePlots. A corresponding display bundle is created and written to cave_static/configured/{SITE}/bundles/maps. Occasionally, edits to either the bundle or the .dat file may be required to enable the functionality to work, but the edits can be performed in the localization perspective. These situations are covered below.

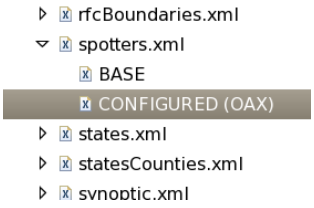
NOTE: AWIPS-2 expects the file format for the .dat file to be exactly like the example shown above, except that it wants the address field to **not** be abbreviated, so it is like "spotterAddress", or "coopAddress". There should not be any blank lines between any of the fields in any one spotter entry, but there can be blank lines between individual entries. Some editing of existing .dat files may be required to make them conform to the AWIPS-2 expectations. This editing can be done after the files are imported to the EDEX server using the localization perspective. Alternatively, the files can be edited using any other text editor prior to uploading them to the EDEX server. AWIPS-2 also expects the field name to match the filename (so that field names like venueName must be in a venue.dat file and not venues.dat)

This exercise should take about 10 minutes to complete.

<table>
<tr><th>Concept</th><th>Actions</th></tr>
<tr><td>1. Locate your spotters.dat file and place it in an accessible location on an AWIPS-2 workstation.</td><td>In this example, the spotters.dat file is located at /home/awips/spotters.dat.</td></tr>
<tr><td>2. Upload the spotters.dat file to the EDEX server.</td><td>On your CAVE workstation, open a terminal window and go to the directory that contains the importAdaptivePlot.py script and run it. This script can need not be run by the awips user. The importAdaptivePlot.py command below needs to be typed on one single line, and {edex_server} refers to the machine name of your EDEX server (normally DX3 or EC if an operational AWIPS machine).

$ cd /awips2/fxa/bin
$ ./importAdaptivePlot.py -f /home/awips/spotters.dat –s {edex_server}:9581/services –n “Spotters Readout”</td></tr>
<tr><td rowspan="2">3. Inspect the bundle and the data file to ensure consistency.

NOTE: later versions of the importAdaptive Plot.py script corrects for some of the data inconsistencies if the input file is spotters.dat. It still a good idea to check the file, and is absolutely necessary if the adaptive plot is something other than spotters.dat.</td><td>In the Localization Perspective, open the spotters.xml bundle by clicking CAVE » Bundles » maps » spotters.xml, and then double-clicking CONFIGURED. This file is shown in Figure 1. There is also a BASE version of spotters.xml, and it’s explained below in a Troubleshooting Tip. Notice the value of the name tag. If you used “spotters.dat” in Step 2, this value should be “spotters” because it comes from the filename. If the file were coop.dat, the name would be “coop”. This name must be consistent with the field names in the .dat file.

 
</td></tr>
<tr><td>Open the spotters.dat file by clicking CAVE » Basemaps » adaptivePlots » spotters.dat, and double-clicking on CONFIGURED. An excerpt of a sample (and redacted) spotters.dat file is shown in Figure 2. In this case, the data fields are named spotterName, spotterAddr, spotterCity, and spotterPhone.

This file has two problems. Because the value of name in the bundle is “spotters”, CAVE expects these field names to be spottersName, spottersAddress, spottersCity, and spottersPhone. To fix these issues, we can change the bundle to say “spotter” rather than “spotters”, and we can change the spotters.dat file to say “spotterAddress”, rather than</td></tr>
</table>

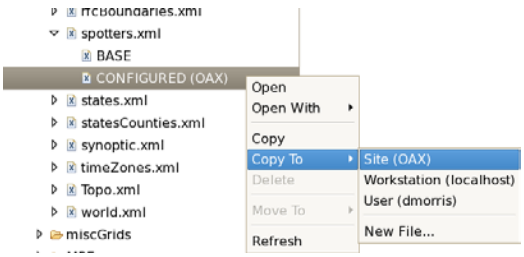
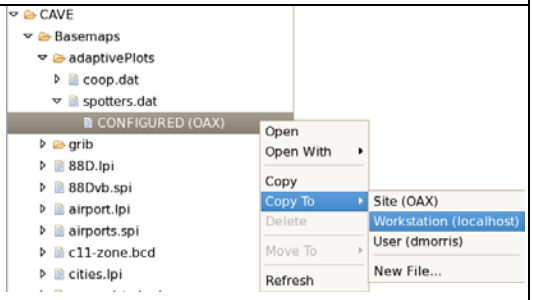
	“spotterAddr”. If the original file was named “spotter.dat”, rather than “spotters.dat”, then the only issue would be “Address” vs “Addr”. Admittedly, in this exercise, “spotters” vs “spotter” is extremely confusing. Remember that if the filename that is passed into importAdaptivePlot.py is spotter.dat, then the field names would be spotterName and spotterAddress. If the filename is spotter**s**.dat, then the field names need to be spotter**s**Name and spotter**s**Address.

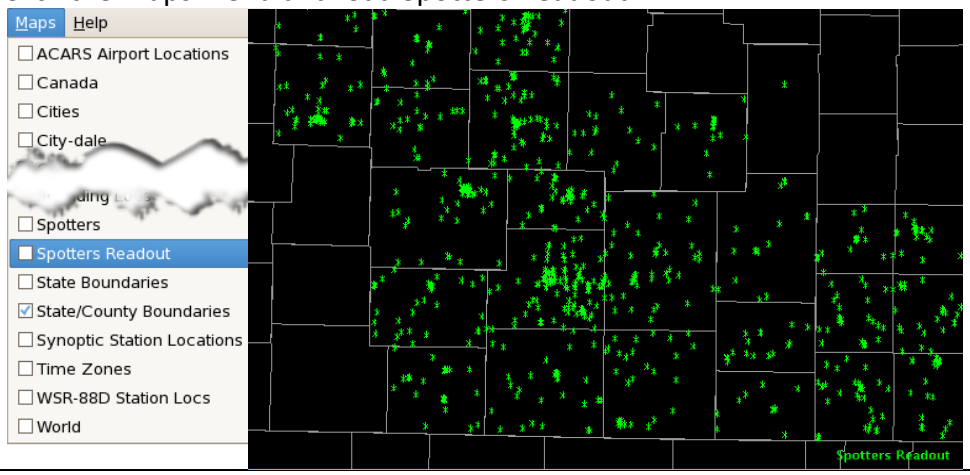
```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<bundle xmlns:ns2="http://www.example.org/productType" xmlns:ns3="group">
    <displayList>
        <displays xsi:type="mapRenderableDisplay" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
            <descriptor xsi:type="mapDescriptor">
                <resource>
                    <loadProperties loadWithoutData="true"/>
                    <properties isSystemResource="false" isBlinking="false" isMapLayer="false" isHoverOn="false" isVisible="true"/>
                    <resourceData xsi:type="adaptivePlotResourceData" filePath="basemaps/adaptivePlots/spotters.dat" name="spotters" plotName="Spotters Readout"/>
                </resource>
            </descriptor>
        </displays>
    </displayList>
</bundle>
```

Figure 1. CONFIGURED version of spotters.xml after uploading spotters.dat file to EDEX server using importAdaptivePlots.py.

```
id: I001102
spotterName | [redacted]
spotterAddr | [redacted]
spotterCity | [redacted]
spotterPhone | [redacted]
latitude | 39.9488
longitude | -91.362

id: I001112
spotterName | [redacted]
spotterAddr | [redacted]
spotterCity | [redacted]
spotterPhone | [redacted]
latitude | 39.9148
longitude | -91.3857

id: I001113
spotterName | [redacted]
spotterAddr | [redacted]
spotterCity | [redacted]
spotterPhone | [redacted]
latitude | 39.9156
longitude | -91.3857

id: I001129
spotterName | [redacted]
spotterAddr | [redacted]
spotterCity | [redacted]
spotterPhone | [redacted]
latitude | 39.9391
longitude | -91.3749
```

Figure 2. Sample spotters.dat file.

4. Fix the spotters.xml bundle by making a site-level override.	In the Localization Perspective, click on the tab containing the CONFIGURED spotters.xml. If you have the Link with Editor button enabled, the file browser should automatically reposition itself with the CONFIGURED version of spotters.xml highlighted. Right-click on **CONFIGURED** and choose **Copy To ►Site**. 
	Double-click the new SITE version of spotters.xml and change the tag from name="spotters" to name="spotter" in the SITE version and save the changes.
5. Fix the spotters.dat file using a site override version.	In the Localization Perspective, click on the tab containing the CONFIGURED spotters.dat. The file browser should automatically reposition itself with the CONFIGURED version of spotters.dat highlighted. Right-click on **CONFIGURED** and choose **Copy To ►Site**. It's possible or likely AlertViz may be flooded with messages that can be ignored, but will have to be acknowledged. 

	Double-click on the new **SITE** version and type **CTRL-F** to call up the Find/Replace dialog box. Type **SpotterAddr |** in the **Find** box and **Spotter Address |** in the **Replace** box, and click **Replace All**. Save your changes.  NOTE: Because we've modified the SITE version of spotters.dat, any future edits either need to be done through the localization perspective to the SITE version. If edits were made to the original version of spotters.dat and reimported using the importAdaptivePlot.py script, CAVE would never see the new CONFIGURED version because the SITE version always overrides the CONFIGURED version.
6. Restart CAVE, and load the Spotters Readout overlay from the Maps menu.	Click the Maps menu and load Spotters Readout. 

Troubleshooting Tips

Sometimes importing the .dat files for Adaptive Plan plots works with no problem. This is the case when the name of the file matches the name of the data fields (e.g., the filename is coop.dat and the data fields are coopName, coopAddress, etc.)

If AlertViz gives error messages about the field names, there are two likely reasons:

- The field names are not complete (e.g., Addr vs. Address), or
- There's a mismatch between the name tag in the bundle and the field names.

Be careful with filenames that might match other map menu entries. The process of importing spotters.dat resulted in a CONFIGURED version of spotters.xml, which overrides the BASE version of spotters.xml, shown here. This makes CAVE never able to access the spotter data contained in spotters.lpi. One way to fix this would be to use a name other than spotters.dat for the original file. An alternate way would be to copy the BASE spotters.xml bundle to a different name as a SITE override.

```
<bundle>
    <displayList>
        <displays xsi:type="mapRenderableDisplay" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
            <descriptor xsi:type="mapDescriptor">
                <resource>
                    <loadProperties>
                        <capabilities>
                            <capability xsi:type="colorableCapability" colorAsString="#9b9b9b" />
                            <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true"
                                outlineWidth="1" />
                        </capabilities>
                        <resourceType>PLAN_VIEW</resourceType>
                    </loadProperties>
                    <properties isSystemResource="false" isBlinking="false" isMapLayer="true" isHoverOn="false"
                        opacity="1.0" isVisible="true">
                        <pdProps maxDisplayWidth="100000000" minDisplayWidth="0" />
                    </properties>
                    <resourceData xsi:type="lpiResourceData">
                        <filename>spotters.lpi</filename>
                        <mapName>Spotters</mapName>
                    </resourceData>
                </resource>
            </descriptor>
        </displays>
    </displayList>
</bundle>
```

Exercise 4: Customizing Default Scale Map Backgrounds

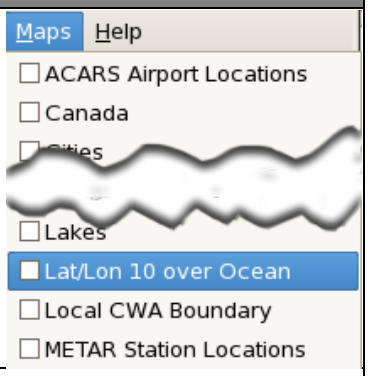
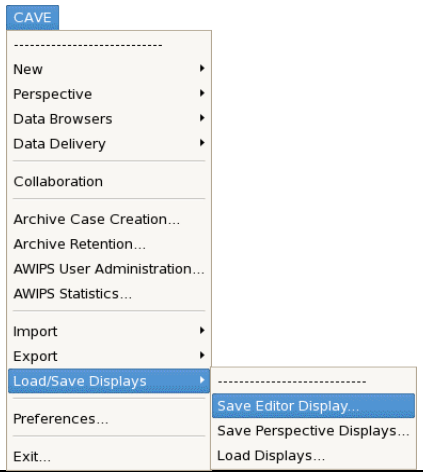
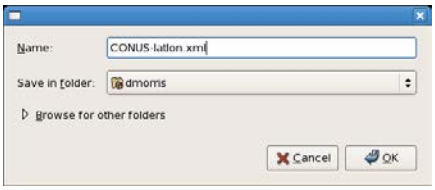
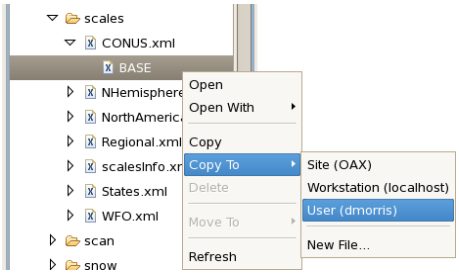
Objectives: In this exercise, you will perform the following procedures:

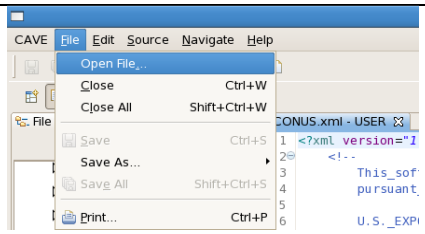
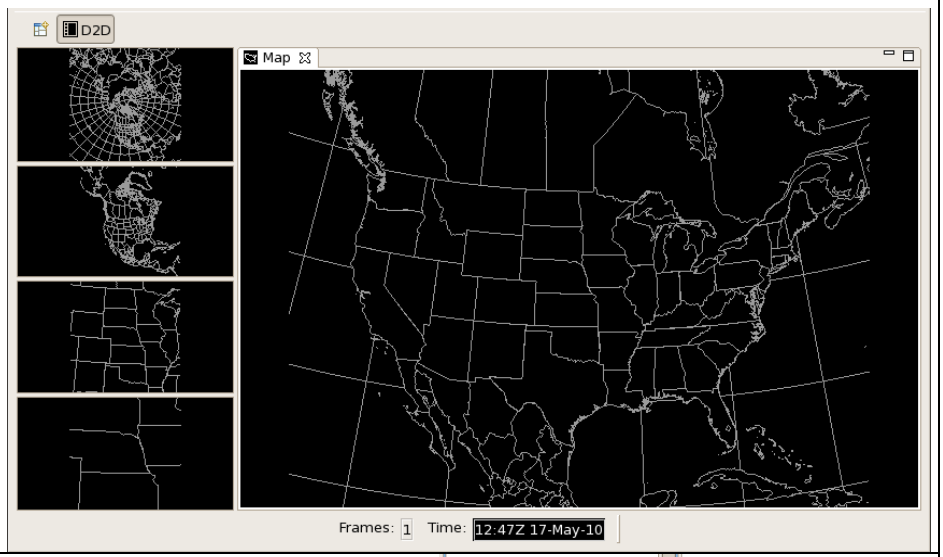
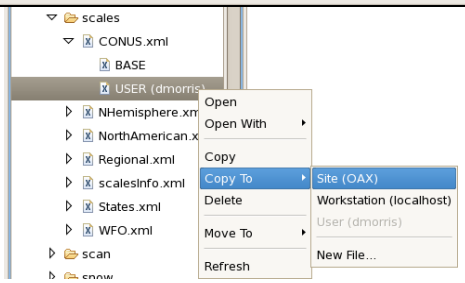
- Add Lat/Lon lines over the ocean to the default CONUS scale map as a site override.
- Customize map overlays on your WFO scale map as a user override.
- Customize the maps that initially populate your D2D side panels as a user override.
- Add another WFO's map scale to your scale pull-down menu.

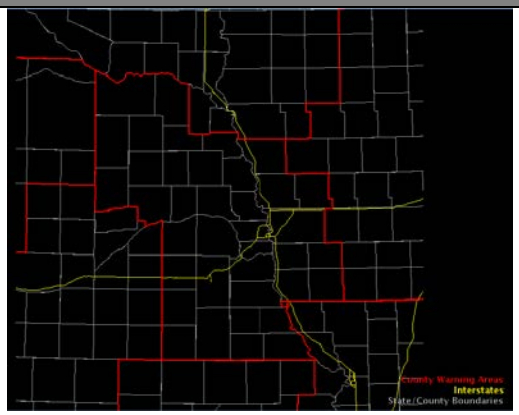
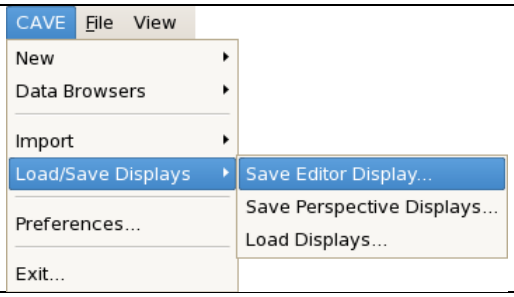
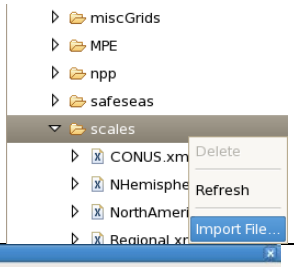
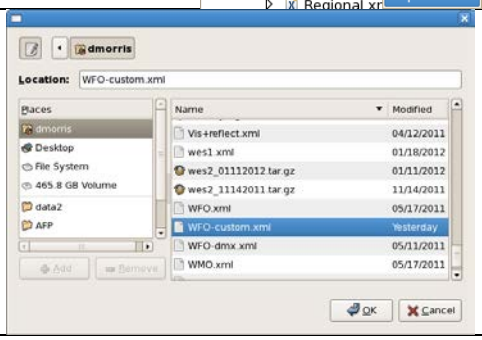
Background. In CAVE, the map displays that initially populate the D2D panes are .XML bundle files that contain only map background layers. The default versions of the files are located in cave/etc/bundles/scales; these BASE files are accessible through the localization perspective. This directory also contains a scalesInfo.xml file that specifies which D2D pane is initially loaded with each scale bundle. (The automated localization tool developed by Raytheon includes site override versions of state, regional, and WFO-scale background map bundles which are placed in appropriate locations in the Localization Store on the EDEX server.) Because the panes are populated with bundles, the maps in the bundles are easily customized with various display options (colors, thickness, line styles, etc.) as well as multiple map overlays per bundle, if so desired.

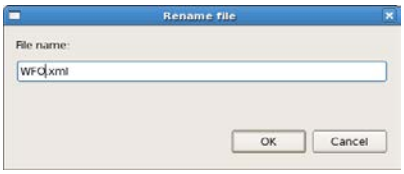
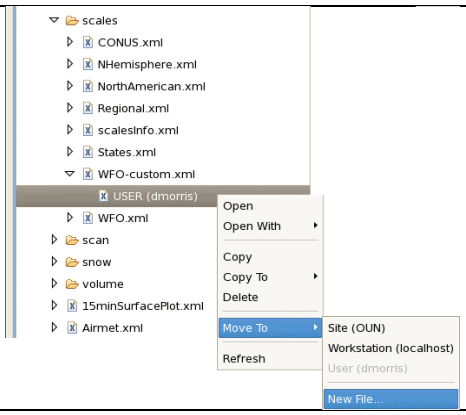
In this exercise, we'll start with the default CONUS map and add the Lat/Lon grid over the oceans. We will use the default line styles (gray, thin lines) and use this display bundle as a site-level override. Then we'll move on to adding interstate highways and your CWA border to your WFO scale map using various line thicknesses and colors as a user-level override. Finally, we'll rearrange the scales that are loaded into the D2D panes by default by replacing the Northern Hemisphere Scale with the WFO scale and also having the large pane loaded with the regional map by default rather than the CONUS map. We'll also do this customization at the user level so as to not disturb any other user's default layout. Both of these customizations involve saving the D2D display bundles that contain only customized map overlays, placing the bundles as site or user overrides in cave_static, and editing scalesInfo.xml, if necessary. For the CWA boundary, we'll add a database constraint to limit the boundary to your particular WFO using the concepts outlined in Exercise 2. Finally, to add another WFO's local WFO-scale map to your scale menu, we'll obtain the map bundle, copy it to the correct location, and edit the site-level scalesInfo.xml.

This exercise should probably take about 15 minutes to complete.

Concept	Actions
Part 1: CONUS Map Customizations	
1. To add the Lat/Lon grid to the CONUS map, load a blank CONUS map in the main D2D pane and add the Lat/Lon grid map overlay.	On your CAVE workstation in the D2D perspective, clear and/or swap panes to get a blank CONUS map. Then load the Lat/Lon 10 over Ocean overlay from the Maps menu. 
2. Save the resulting bundle display to CONUS-latlon.xml in your home directory.	From the CAVE menu, click Load/Save Displays followed by Save Editor Display. In the resulting dialog box, name the file **`CONUS-latlon.xml`** . By default, the file will likely be saved in your home directory.  
3. Make a user-level override for CONUS.xml and put the contents of CONUS-latlon.xml in CONUS.xml. Note: There are two methods of performing this step. The first, copying/pasting the contents of one file into another is shown here. The second method, the	In the Localization Perspective, navigate to the CONUS.xml scale bundle file. It is located under **CAVE** » **Bundles** » **scales** » **CONUS.xml**. Make a user-level override of this file, by expanding CONUS.xml, right-clicking on **BASE**, and choose **Copy To ►User**. 
	Open the user override of CONUS.xml by double-clicking on your user's version. With CONUS.xml still open, open the CONUS-latlon.xml in a new tab by clicking on the **File** menu followed by the **Open File…** option, and

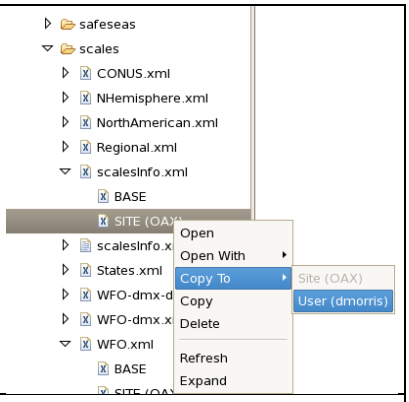
import file function in the Localization Perspective, is demonstrated below in Step 8.	then by choosing CONUS-latlon.xml in the resulting dialog box.   At this point, both CONUS.xml and CONUS-latlon.xml should be open in their own individual tabs in the Localization Perspective. Click on the tab for CONUS.xml and delete the contents of that tab (a shortcut to do this is **CTRL-A** followed by the **Delete** key). Click on the tab for CONUS-latlon.xml and copy/paste its entire contents into the tab for CONUS.xml and save it (**CTRL-A** » **CTRL-C** » click on the CONUS.xml tab » **CTRL-V** » **CTRL-S**.).
4. Restart CAVE so it will reload the localization. The site level CONUS map should include the lat/lon grid.	
5. The CONUS.xml with the lat/lon grid is only a user-level override. Promote your user-level file to site (if you've been granted	Right-click on your user version of CONUS.xml. Then choose **Copy To ►Site**.  Note: Now that you have both SITE and USER copies of this file, be aware any future changes to the SITE version will not be seen by your user because your

permissions to do so.)	USER file overrides the SITE file. If you had used **Move To ► Site**, then this potential conflict would be moot.
Part 2: WFO scale map customizations	
6. Customize the main pane with the WFO scale map, with yellow interstate highways and red CWA boundaries.	
7. Save the display bundle to WFO-custom.xml in your home directory.	
8. Import the new WFO-custom.xml bundle file into the **CAVE** » **Bundles** » **Scales** area of the Localization Perspective and rename it to a **USER** version of WFO.xml.	In the Localization Perspective, navigate to **CAVE** » **Bundles** » **Scales**) and right-click on **Scales**. Choose the **Import File...** option. 
	Navigate to the WFO-custom.xml bundle file that is likely stored in your home directory and click the **OK** button. 
	After the import, you should have a new WFO-custom.xml file located under scales. Open its tab and right-click on the **USER** version that should have been created. Choose the **Move To ► New File...** option.

	In the resulting Rename File dialog box, enter WFO.xml. If you already have a USER version of WFO.xml, this file will overwrite the previous version. 	
9. Make a further edit in your new user version of the WFO.xml bundle to add the constraint WFO={your_site} and modify the overlay label.	In the WFO.xml (USER) tab, make the edits according to **Figure 1**: • To change the map label, change the <mapName> entry. In this example, this entry is OAX CWA. • Add the constraint: <constraint>CWA='OAX'</constraint> Save your changes.	

```
                <properties renderingOrderId="MAP_OUTLINE" isSystemResource="false" isBlinking="false" isMapLayer="true" isHoverOn="false" isVisit
                    <pdProps maxDisplayWidth="100000000" minDisplayWidth="0"/>
                </properties>
                <resourceData xsi:type="dbMapResourceData">
                    <mapName>Interstates</mapName>
                    <table>mapdata.interstate</table>
                    <geomField>the_geom</geomField>
                </resourceData>
            </resource>
            <resource>
                <loadProperties loadWithoutData="false">
                    <resourceType>PLAN_VIEW</resourceType>
                    <capabilities>
                        <capability xsi:type="labelableCapability" yOffset="0" xOffset="0"/>
                        <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true" outlineWidth="2"/>
                        <capability xsi:type="colorableCapability" colorAsString="orange red"/>
                        <capability xsi:type="shadeableCapability"/>
                        <capability xsi:type="magnificationCapability" magnification="1.0"/>
                    </capabilities>
                </loadProperties>
                <properties renderingOrderId="MAP_OUTLINE" isSystemResource="false" isBlinking="false" isMapLayer="true" isHoverOn="false" isVisit
                    <pdProps maxDisplayWidth="100000000" minDisplayWidth="0"/>
                </properties>
                <resourceData xsi:type="dbMapResourceData">
                    <mapName>OAX CWA</mapName>
                    <table>mapdata.cwa</table>
                    <geomField>the_geom</geomField>
                    <constraint>CWA='OAX'</constraint>
                </resourceData>
            </resource>
            <limitedNumberOfFrames>2147483647</limitedNumberOfFrames>
            <currentAnimationMode>Latest</currentAnimationMode>
            <numberOfFrames>12</numberOfFrames>
            <timeMatcher xsi:type="d2DTimeMatcher" loadMode="VALID_TIME_SEQ" deltaFilter="0" forecastFilter="0"/>
            <gridGeometry envelopeMaxY="230048.65549884734" envelopeMinY="-230041.72068797084" envelopeMaxX="230042.41692510553" envelopeMinX="-23
```

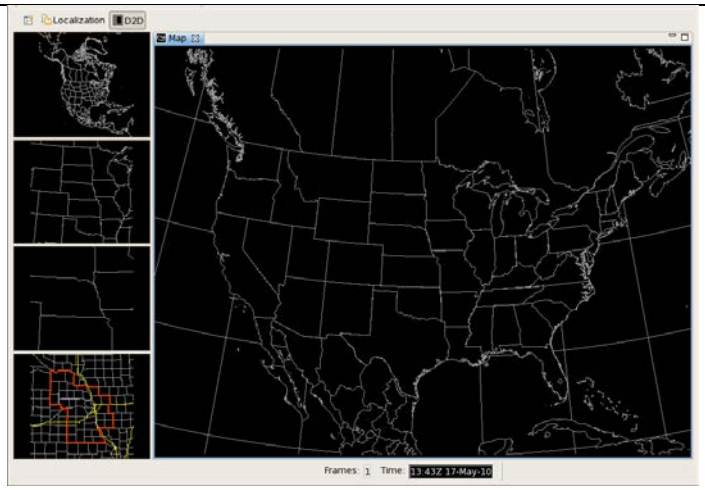
Figure 1. Edits to user version of WFO.xml to add CWA constraint.

10. Use the localization perspective to edit a user version of scalesInfo.xml.	In the Localization Perspective, open **scalesInfo.xml,** and right-click on either **SITE** or **BASE** and **Copy To ► User**. 
	Make the edits according to Figure 2: • Remove the <partId> line from the N. Hemisphere mapScale. • Change NorthAmerican partId to sideView1 • Change Regional partId to sideView2 • Change States partId to sideView3 • Add a partId tag to WFO by copying the partId tag from States and pasting it in the WFO mapScale. Change the WFO partID sideView to 4.

```
<mapScales>
    <mapScale displayName="N. Hemisphere" fileName="NHemisphere.xml">
    </mapScale>
    <mapScale displayName="North American" fileName="NorthAmerican.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView1"/>
    </mapScale>
    <mapScale displayName="CONUS" fileName="CONUS.xml">
        <partId view="false" id="com.raytheon.viz.ui.glmap.GLMapEditor"/>
    </mapScale>
    <mapScale displayName="Regional" fileName="Regional.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView2"/>
    </mapScale>
    <mapScale displayName="State(s)" fileName="States.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView3"/>
    </mapScale>
    <mapScale displayName="WFO" fileName="WFO.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView4"/>
    </mapScale>
</mapScales>
```

Figure 2. Edits to user version of scaleinfo.xml.

11. Restart CAVE. The new default D2D layout should include the new WFO map in the fourth small pane. If you swap the WFO map into the main pane and display the map legend, you should see the new CWA map label.



Part 3: Add another WFO's local WFO scale map

12. Obtain another WFO's local WFO scale map and place it in your site's cave_static with a name like WFO-{xxx}.xml, where {xxx} is the other WFO's ID.

This example uses OAX's neighbor, DMX. We obtain the DMX WFO.xml file from the cave_static_site.tar.gz file that's included in the AWIPSII_AUTOMATION_TOOL.tgz file that is part of the ADAM configuration. In an EDEX terminal, go to the directory that contains AWIPSII_AUTOMATION_TOOL.tgz and extract the cave_static_site.tar.gz file. Then extract the DMX WFO.xml file.

```
$ tar xvfz AWIPSII_AUTOMATION_TOOL.tgz cave_static_site.tar.gz
$ tar xvfz cave_static_site.tar.gz ./DMX/bundles/scales/WFO.xml
```

Move the DMX WFO.xml file to your site's cave_static:

```
$ mv ./DMX/bundles/scales/WFO.xml
/awips2/edex/data/utility/cave_static/site/{your_site}/bundles/
scales/WFO-dmx.xml
```

13. Edit your site's scalesInfo.xml file to include the additional WFO's scale in your WFO's menu.	Open your site's scalesInfo.xml file in the Localization Perspective. Make the edits according to **Figure 3**: • Copy and paste the mapScale that references the WFO.xml to make a duplicate version. • Change the second version so that the displayName says "WFO (DMX)" and fileName is WFO-dmx.xml.

```
<mapScales>
    <mapScale displayName="N. Hemisphere" fileName="NHemisphere.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView1"/>
    </mapScale>
    <mapScale displayName="North American" fileName="NorthAmerican.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView2"/>
    </mapScale>
    <mapScale displayName="CONUS" fileName="CONUS.xml">
        <partId view="false" id="com.raytheon.viz.ui.glmap.GLMapEditor"/>
    </mapScale>
    <mapScale displayName="Regional" fileName="Regional.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView3"/>
    </mapScale>
    <mapScale displayName="State(s)" fileName="States.xml">
        <partId id="com.raytheon.uf.viz.d2d.ui.map.SideView:sideView4"/>
    </mapScale>
    <mapScale displayName="WFO" fileName="WFO.xml">
    </mapScale>
    <mapScale displayName="WFO (DMX)" fileName="WFO-dmx.xml">
    </mapScale>
</mapScales>
```

Figure 3. Edits to scalesInfo.xml to add another WFO's scale map to your scale menu. The new lines to add are indicated by the red box.

Exercise 5: Plot Models — Customized Multicolored Fire Weather Station Plot

Objectives: In this exercise, you will perform the following procedures:

- Create new plot models based on existing plot models and specify a font other than the default font
- Create a new display bundle based on an existing Station Plot bundle that displays each parameter in its own color
- Add a new menu entry with associated bundle to a user version of the Obs menu
- Harness the PlotDelegate function in a plot model to customize the cursor readout

Background. This exercise illustrates several configurable capabilities of AWIPS-2. Among these is the ability to have user-level customizations of various plots as well as user versions of menus. Once these user-level customizations are performed, they can be promoted to a site-level where they are available to every user.

The example here is to create a station model plot for a fire weather map with temperature, relative humidity, winds, and apparent temperature (heat index or wind chill). The process is to create a set of plot models (.svg files) along with a corresponding bundle and menu entry. To make the station plot multicolored, we are creating multiple plot models that are referenced in a single bundle. Each plot has its own color (temperature in red, relative humidity in green, winds in purple, and heat index/wind chill in white). If a single color for the plot were desired, then a single plot model would include all the displayed parameters.

The general strategy to perform these types of customizations is to start with something that is known to work, make small edits, and test them out individually. This "build a little, test a little" process helps to isolate problems to individual edits or changes. In this exercise, we'll start with making a new station plot with a single parameter and a corresponding menu entry. Then we'll add new parameters one-by-one.

Speaking about adding parameters, the plot models can reference meteorological and other variables that are in the database, in the processed HDF5 files, or some derived parameters. (Not all database parameters are available to the .svg plot models. Only those parameters imported by a software construct named pointDataDbDescription are available; check the AWIPS-2 Application Development Environment, or ADE, for more details.) This example uses parameters from all three sources. To know what parameter names can be used in the plot model files, you need to view the available parameter names from each of the three sources. In

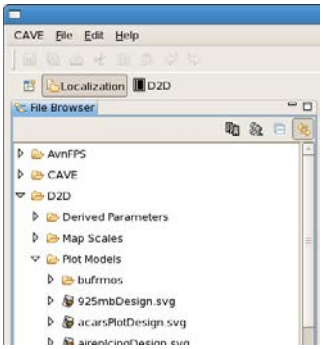
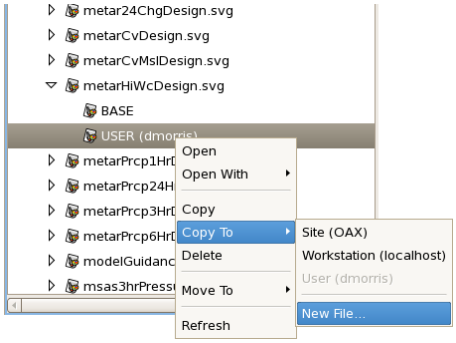
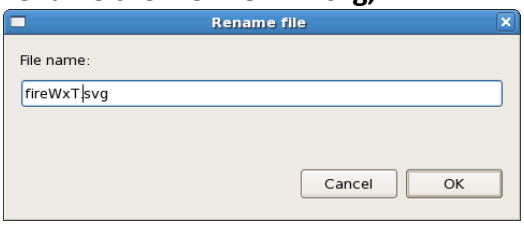
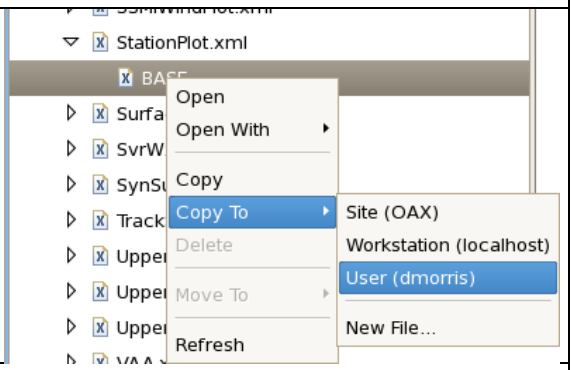
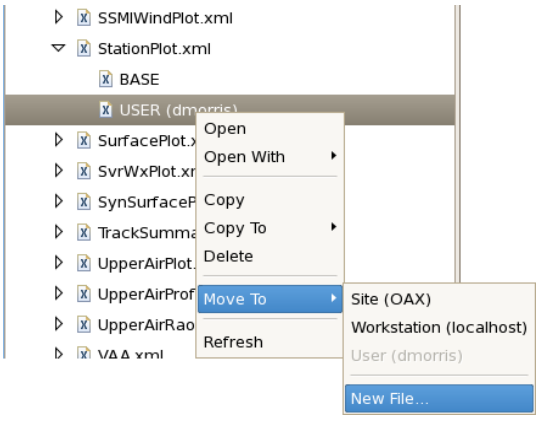
this exercise, the wind and rawMETAR parameters come directly from the HDF files. To view the parameters in a HDF file, use the h5dump command in /awips2/tools. For example:

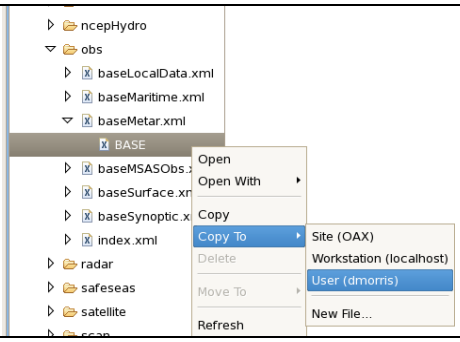
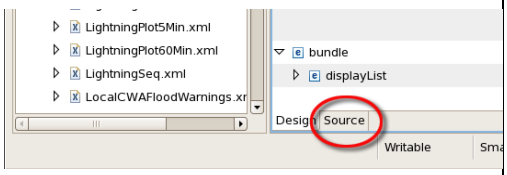
```
$ cd /awips2/edex/data/hdf5/obs
$ /awips2/tools/bin/h5dump {metar-yyyy-mm-dd-hh.h5} | grep DATASET
```

A similar command would be used to identify parameters contained in other point data files, such as a local mesonet. Use database tools like pgadmin3 to examine the fields in a metadata database table. The process is similar to looking at the city table as shown in Exercise 2, but perusing the metadata database rather than the maps database. Finally, plot models can reference some derived parameters; some derived parameters work with point data while others are exclusive to gridded or other datasets. In this exercise, the T parameter is a derived parameter. If it were specified as "temperature", the data would have been obtained directly from the HDF file since that's the name of the parameter in the HDF file. The baseline derived parameters are included in /awips2/cave/plugins/com.raytheon.uf.viz.derivparam_{version}/localization/derivedParameters and /awips2/cave/plugins/com.raytheon.uf.viz.derivparam.python_{version}/localization/derivedParameters, while local derived parameters would be found in the Localization Store. The definitions and functions for all derived parameters are viewable in the Localization Perspective.

In this exercise, we'll start by creating a plot model file for temperature by copying the normal Heat Index/Wind Chill plot model because it's designed to display a single parameter. Then we'll create a duplicate bundle and menu entry for the station plot. Then for each additional parameter (relative humidity and winds, and apparent temperature), we'll successively modify the station plot bundle and create corresponding plot models.

This exercise will take about an hour to complete.

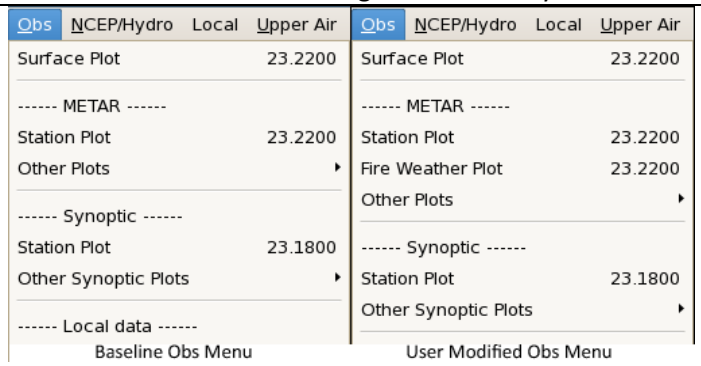
Concept	Actions
1. Create the first Fire Wx Plot Model (svg) file for T. The remaining svgs for RH, Winds, and Heat Index/Wind Chill are created in later steps. We start with the baseline HiWc plot to make the fireWxT.xvg file because the HiWc plot contains only one parameter.	In the Localization Perspective file browser, open **D2D** » **Plot Models** » **metarHiWcDesign.svg**. Right-click **BASE** and **Copy To** ► **New File…** . This puts a user-editable version of this file in the Localization Store.   Rename the file **fireWxT.svg,** 
2. Create a Fire Wx Plot bundle. Start with StationPlot.xml and make a fire weather version named FireWxPlot.xml.	In the Localization Perspective file browser, open **CAVE** » **Bundles** » **StationPlot.xml**. Right-click **BASE** and **Copy To** ► **User.**  Rename your new user version of the StationPlot.xml bundle file to a new bundle to be edited in the localization perspective. Right-click **USER** and **Move To** ► **New File…** Name the new file FireWxPlot.xml. 

3. Create a menu entry for the bundle. We will place this entry in the Obs menu (in its top section). This menu is defined in baseMetar.xml. We'll use the localization perspective to make a user-level override of this menu.	In the Localization Perspective file browser, open **CAVE** » **Menus** » **obs** » **baseMetar.xml**. Right-click **BASE** and choose **Copy To ► User**.	
	Edit the menu file to add the bundle. In the file browser, double-click **USER** under baseMetar.xml. We'll add the Fire Weather Plot entry at the top of the menu. See **Figure 1** to see what to add in the edit. The Localization Perspective editor may appear in either a design mode or a source mode. To follow these instructions, click the **Source** tab at the bottom of the editor window.	

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
    <!--
        This_software_was_developed_and_/_or_modified_by_Raytheon_Company,
        pursuant_to_Contract_DG133W-05-CQ-1067_with_the_US_Government.

        U.S._EXPORT_CONTROLLED_TECHNICAL_DATA
        This_software_product_contains_export-restricted_data_whose
        export/transfer/disclosure_is_restricted_by_U.S._law._Dissemination
        to_non-U.S._persons_whether_in_the_United_States_or_abroad_requires
        an_export_license_or_other_authorization.

        Contractor_Name:_____Raytheon_Company
        Contractor_Address:_____6825_Pine_Street,_Suite_340
        _____Mail_Stop_B8
        _____Omaha,_NE_68106
        _____402.291.0100

        See_the_AWIPS_II_Master_Rights_File_("Master_Rights_File.pdf")_for
        further_licensing_information.
    -->
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="bundleItem" file="bundles/StationPlot.xml"
            menuText="Station Plot" id="StationPlot">
            <dataURI>/obs/%</dataURI>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/FireWxPlot.xml"
            menuText="Fire Weather Plot" id="FireWxPlot">
            <dataURI>/obs/%</dataURI>
    </contribute>
    <contribute xsi:type="subMenu" menuText="Other Plots">
        <contribute xsi:type="bundleItem" file="bundles/15minSurfacePlot.xml"
            menuText="15 min Plot" id="15MinSurfacePlot">
            <dataURI>/obs/%</dataURI>
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/MetarPlot.xml"
               menuText="24Hr Chg" id="24HrChg">
            <dataURI>/obs/%</dataURI>
            <substitute key="svg" value="metar24ChgDesign.svg"/>
            <substitute key="legend" value="METAR 24H Change"/>
            <substitute key="posOffset" value="1800"/>
            <substitute key="negOffset" value="1800"/>
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/MetarPlot.xml"
               menuText="Ceil/Vis Plot (AGL)" id="CeilVisPlotAGL">
            <dataURI>/obs/%</dataURI>
```

Figure 1. baseMetar.xml with needed changes identified by the red box.

4. Restart CAVE. At this point, our actions have just duplicated the standard METAR plot so that we can edit it and not disturb the original.



In CAVE, load the new Fire Weather plot to verify that it produces a standard METAR plot.

5. Edit the FireWxPlot.xml bundle to reference our new fireWxT.svg plot model file.	Find the FireWxPlot.xml bundle in the Localization Perspective. It is located under **CAVE** » **Bundles** » **FireWxPlot.xml.** Double-click **USER**, and reference **Figure 2** to make the edits. Copy the colorableCapability line from the METAR Station Locations section (line 31) and paste it into Box A. Change the colorAsString value to “#FF1111” (dark red). Change plotSource to “Temperature” in Box B. This is the legend label for this resource. Change plotModelFile to “fireWxT.svg” in Box C. This connects the menu item to our new plot model.

Figure 2. FireWxPlot.xml edits to change the existing bundle to now reference the new fireWxT.svg plot model.

6. Edit the fireWxT.svg plot model file.	In the Localization Perspective, find the fireWxT.svg plot. It is located under **D2D** » **Plot Models** » **fireWxT.svg**. Double-click **USER**, and reference **Figure 3** to make the edits. Change plotParam from “StationName” to “T” in line A. Add the plotFormat and the plotUnit as shown. (Hint: Copy and paste the plotUnit and plotFormat tags from line B and add

	"Temperature" just in front of "%3.0f". The order of the two tags is not important.) Change id from "hiWcText" to "TText" in line B. Change plotParam from "HIWC" to "T". Change y from "0" to "-10". This puts the temperature 10 pixels up from the center of the plot model (in AWIPS-2 plots, y increases towards the south). At the top of the file, edit the font information in the CSS section, according to **Figure 4**. In this and in other Localization Perspective edits, be sure to save your changes by pressing <CTRL>-S.

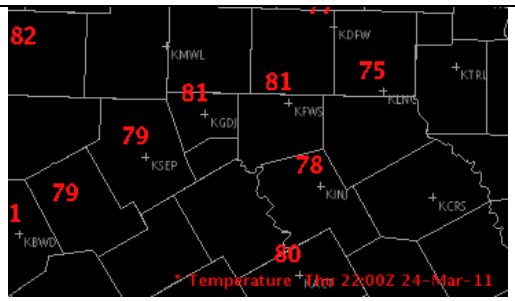
```
28
29 <symbol overflow="visible" id="plotData" class="info">
30   <text id="lat" plotMode="null" class="text" plotParam="latitude" x="0" y="0">0</text>
31   <text id="lon" plotMode="null" class="text" plotParam="longitude" x="0" y="0">0</text>
32 A <text id="sample" plotMode="sample" class="text" plotParam="T" plotFormat="Air Temperature: %3.0f" plotUnit="°F" x="0" y="0">0</text>
33 B <text id="TText" plotMode="text" plotParam="T" plotUnit="°F" plotFormat="%3.0f" style="text-anchor: end;" x="0" y="-10">75</text>
34 </symbol>
35 </defs>
36 <use id="wind" x="40" y="40" width="80" height="80" visibility="visible" xlink:href="#plotData"/>
37 </svg>
38
```

Figure 3. fireWxT.svg edits to change existing Wind Chill parameters to Temperature.

```
18          text.text
19              {
20                  fill: #FFFFFF;
21                  font-size: 12pt;
22
23                  font-family: Arial;
```

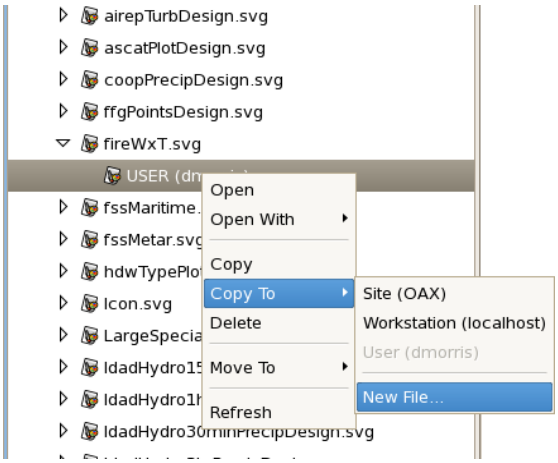
Figure 4. fireWxT.svg edits to modify font settings.

7. Load the Fire Weather Plot from the CAVE Obs Menu to see the plot constructed thus far.



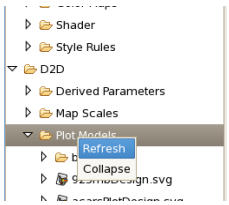
8. Copy the fireWxT.svg model and modify it for RH.

In the Localization Perspective, find the fireWxT.svg plot. It is located under **D2D** » **Plot Models** » **fireWxT.svg**. Right-click **USER** and **Copy To ► New File…**



Name the file fireWxRH.svg.

Find **fireWxRH.svg** under **D2D** and **PlotModels**, and edit it, referencing **Figure 5** (your line numbers may be slightly different than those shown in the accompanying figures).



In Line A, change plotParam from “T” to “RH”, the plotUnit to “%”, and the plotFormat as shown. Note the double %% in the plotFormat string. Because % denotes a format specifier, %% represents a literal percent sign. This format causes a line in the cursor sampling that reads, for example, “RH: 86 %”.

In Line B, change id to “RHText”, plotUnit to “%” and y to “10”. Keep the font as it is already specified.

```
28
29 <symbol overflow="visible" id="plotData" class="info">
30   <text id="lat" plotMode="null" class="text" plotParam="latitude" x="0" y="0">0</text>
31   <text id="lon" plotMode="null" class="text" plotParam="longitude" x="0" y="0">0</text>
32 A <text id="sample" plotMode="sample" class="text" plotParam="RH" plotFormat="RH: %3.0f %%" x="0" y="0">0</text>
33 B <text id="RHText" plotMode="text" plotParam="RH" plotUnit="%" plotFormat="%3.0f" style="text-anchor: end;" x="0" y="10">75</te
34 </symbol>
35 </defs>
36 <use id="wind" x="40" y="40" width="80" height="80" visibility="visible" xlink:href="#plotData"/>
37 </svg>
38
```

Figure 5. fireWxRH.svg edits to change Temperature to RH.

9. Edit the FireWxPlot.xml bundle to add a

In the Localization Perspective, go back to edit FireWxPlot.xml. Make these changes, referencing **Figure 6.**

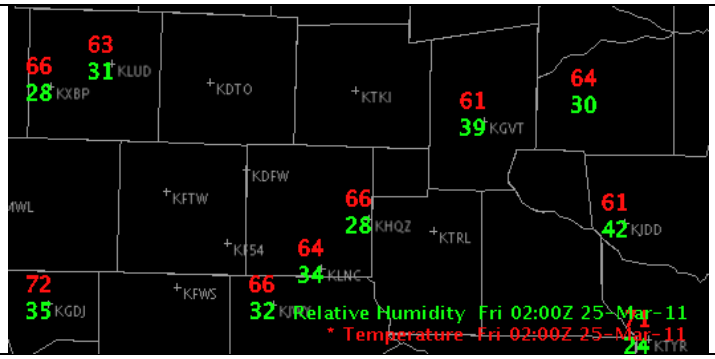
resource for RH.	Select the entire Temperature Resource and copy/paste it below the temperature </resource> tag. This section will be the red box in **Figure 6.** Change colorAsString in Box A to “#11FF11” (dark green). Change plotSource to “Relative Humidity” and plotModelFile to “fireWxRH.svg” in Box B and Box C, respectively.

FireWxPlot.xml - USER

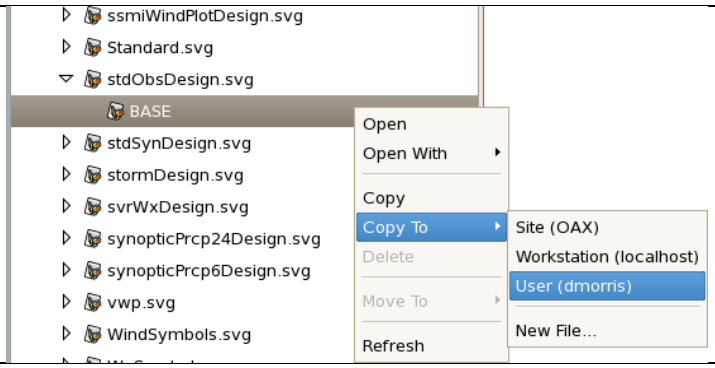
```
52                      isMapLayer="false" isHoverOn="false"
53                      isVisible="true" />
54                  <resourceData xsi:type="plotResourceData" plotSource="Temperature"
55                      plotModelFile="fireWxT.svg" spiFile="MTR.spi"
56                      isUpdatingOnMetadataOnly="true" retrieveData="false"
57                      isRequeryNecessaryOnTimeMatch="true" pixelSizeHint="45">
58                      <binOffset posOffset="1800" negOffset="1800" virtualOffset="0"/>
59                      <metadataMap>
60                          <mapping key="reportType">
61                              <constraint constraintValue="METAR" constraintType="EQUALS" />
62                          </mapping>
63                          <mapping key="pluginName">
64                              <constraint constraintValue="obs" constraintType="EQUALS" />
65                          </mapping>
66                      </metadataMap>
67                  </resourceData>
68              </resource>
69              <resource>
70                  <loadProperties loadWithoutData="true">
71                      <capabilities>
72                          <capability xsi:type="colorableCapability" colorAsString="#11FF11" />
73
74                      </capabilities>
75                  </loadProperties>
76                  <properties isSystemResource="false" isBlinking="false"
77                      isMapLayer="false" isHoverOn="false"
78                      isVisible="true" />
79                  <resourceData xsi:type="plotResourceData" plotSource="Relative Humidity" B
80                  C plotModelFile="fireWxRH.svg" spiFile="MTR.spi"
81                      isUpdatingOnMetadataOnly="true" retrieveData="false"
82                      isRequeryNecessaryOnTimeMatch="true" pixelSizeHint="45">
83                      <binOffset posOffset="1800" negOffset="1800" virtualOffset="0"/>
84                      <metadataMap>
85                          <mapping key="reportType">
86                              <constraint constraintValue="METAR" constraintType="EQUALS" />
87                          </mapping>
88                          <mapping key="pluginName">
89                              <constraint constraintValue="obs" constraintType="EQUALS" />
90                          </mapping>
91                      </metadataMap>
92                  </resourceData>
93              </resource>
```

A

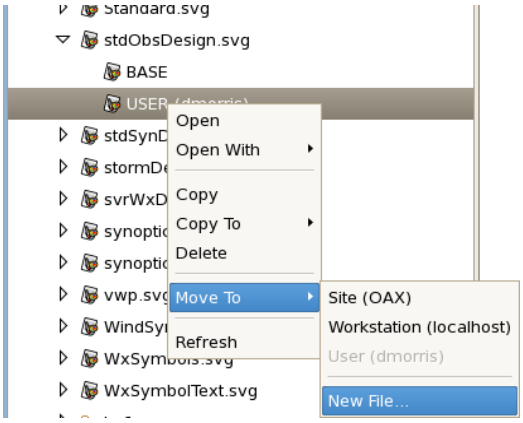
Figure 6. FireWxPlot.xml edits to add RH to the bundle.

10. Reload the Fire Weather Plot in CAVE to see the RH added to the plot.	
11. Use the StdObsDesign.svg plot model file	In the Localization Perspective, find StdObsDesign.svg and copy to user as in Step 1 (**D2D** » **Plot Models**, then right-click **BASE** and **Copy To ► User).**

as a starting point for edits for the wind barbs. This plot model illustrates the plotDelegate function which is an embedded Python script for more sophisticated formatting in the cursor readout. Note that the plot mode for the cursor sampled parameters is "null". This setting allows the plot model to pull in the parameters so they are available to the plotDelegate function.



Rename your new user version of the stdObsDesign.svg. Right-click **User** and **Move To ► New File…**



Name the new file fireWxWind.svg.

Edit fireWxWind.svg.

The first edits are for the wind barbs, referencing **Figures 7 and 8**.

Delete the lines in **Figure 7** highlighted by the red box.

Add the lines highlighted in **Figure 8** by the black box.

```
<symbol overflow="visible" id="plotData" class="info">
  <text id="rawMETARText" plotMode="sample" class="text" plotParam="rawMETAR" x="0" y="0">0</text>
  <g id="windVaneText" plotMode="barb" plotParam="windSpeed,windDir,windGust" plotUnit="kts" x="0" y="0" transform="rotate(0,0,0)">
    <text id="windVaneText" class="arrow" x="0" y="0">0</text>
    <text id="windArrowText" class="barb" x="0" y="0">arrow</text>
    <text id="windGustText" class="text" x="0" y="32" style="text-anchor: middle">0</text>
  </g>
  <text id="chngCharText" plotMode="table" class="weather" plotLookupTable="press_change_char_lookup.txt" plotParam="pressChangeChar" style="text-anchor: start;" x="35px" y="0">0</text>
  <text id="visText" plotMode="range" class="text" plotLookupTable="fractions_lookup.txt" plotParam="visibility" plotUnit="mi" style="text-anchor: start;" plotFormat="%3.5f" x="0" y="10">59</text>
  <text id="pressChngText" plotMode="text" plotParam="pressChange3Hour" plotFormat="%02.0f" plotUnit="Pa" style="text-anchor: start;" x="10px" y="0">018</text>
  <text id="dewText" plotMode="text" plotParam="DpT" plotUnit="°F" plotFormat="%3.0f" style="text-anchor: end;" x="-10px" y="10px">59</text>
  <text id="tempText" plotMode="text" plotParam="T" plotUnit="°F" plotFormat="%3.0f" style="text-anchor: end;" x="-10px" y="-10px">75</text>
  <text id="pressure" plotMode="text" plotParam="seaLevelPress" plotUnit="dPa" plotFormat="%5.0f" plotTrim="2" style="text-anchor: start;" x="10px" y="-10px">018</text>
  <text id="cloudText" plotMode="table" class="special" plotFunctionTable="cloud_select.txt" plotLookupTable="cloud_chars.txt" plotParam="skyCover" style="text-anchor: start" x="0" y="0">0</text>
  <text id="presentWxText" plotMode="recursive_translation" class="weather" plotLookupTable="wx_symbol_trans.txt" plotParam="presWeather" style="text-anchor: end" x="-16" y="0">0</text>
  <text id="peakWind" plotMode="text" plotParam="pkwndSpeed" plotUnit="kts" plotFormat="PK%.0f" style="text-anchor: end;" x="-10px" y="20px">59</text>
</symbol>
</defs>
<use id="wind" x="40" y="40" width="80" height="80" visibility="visible" xlink:href="#plotData"/>
</svg>
```

Figure 7. Initial edits for fireWxWind.svg to remove unneeded parameters.

```
<symbol overflow="visible" id="plotData" class="info">
  <text id="rawMETARText" plotMode="sample" class="text" plotParam="rawMETAR" x="0" y="0">0</text>
  <text id="WindSample1" plotMode="null" class="text" plotParam="windDir" x="0" y="0">0</text>
  <text id="WindSample2" plotMode="null" class="text" plotParam="windSpeed" plotUnit="mph" x="0" y="0">0</text>
  <text id="WindSample3" plotMode="null" class="text" plotParam="windGust" plotUnit="mph" x="0" y="0">0</text>

  <g id="windVaneText" plotMode="barb" plotParam="windSpeed,windDir,windGust" plotUnit="kts" x="0" y="0" transform="rotate(0,0,0)">
    <text id="windVaneText" class="arrow" x="0" y="0">0</text>
    <text id="windArrowText" class="barb" x="0" y="0">arrow</text>
    <text id="windGustText" class="text" x="0" y="32" style="text-anchor: middle">0</text>
  </g>
  <text id="peakWind" plotMode="text" plotParam="pkwndSpeed" plotUnit="kts" plotFormat="PK%.0f" style="text-anchor: end;" x="-10px" y="20px">59</text>
</symbol>
</defs>
<use id="wind" x="40" y="40" width="80" height="80" visibility="visible" xlink:href="#plotData"/>
</svg>
```

Figure 8. Additional edits to fireWxWind.svg to add the parameters for cursor sampling.

12. Edit the FireWxPlot.xml bundle to add a resource for Wind.	In the Localization Perspective, go back to edit FireWxPlot.xml. Make these changes, referencing **Figure 9.** Select the entire RH resource and copy/paste it below the RH </resource> tag. This section will be the red box in **Figure 9.** Change colorAsString in Box A to “#FF33FF” (purple). Change plotSource to “Winds” and plotModelFile to “fireWxWind.svg” in Box B and Box C, respectively.

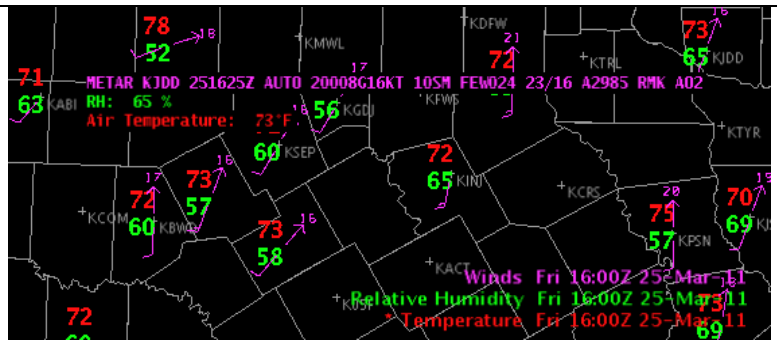
FireWxPlot.xml - USER

```
77                      isMapLayer="false" isHoverOn="false"
78                      isVisible="true" />
79                  <resourceData xsi:type="plotResourceData" plotSource="Relative Humidity"
80                      plotModelFile="fireWxRH.svg" spiFile="MTR.spi"
81                      isUpdatingOnMetadataOnly="true" retrieveData="false"
82                      isRequeryNecessaryOnTimeMatch="true" pixelSizeHint="45">
83                      <binOffset posOffset="1800" negOffset="1800" virtualOffset="0"/>
84                      <metadataMap>
85                          <mapping key="reportType">
86                              <constraint constraintValue="METAR" constraintType="EQUALS" />
87                          </mapping>
88                          <mapping key="pluginName">
89                              <constraint constraintValue="obs" constraintType="EQUALS" />
90                          </mapping>
91                      </metadataMap>
92                  </resourceData>
93              </resource>
94                      <resource>
95                  <loadProperties loadWithoutData="true">
96                      <capabilities>
97                          <capability xsi:type="colorableCapability" colorAsString="#FF33FF" />
98
99                      </capabilities>
100                 </loadProperties>
101                 <properties isSystemResource="false" isBlinking="false"
102                     isMapLayer="false" isHoverOn="false"
103                     isVisible="true" />
104                 <resourceData xsi:type="plotResourceData" plotSource="Winds"
105                     plotModelFile="fireWxWind.svg" spiFile="MTR.spi"
106                     isUpdatingOnMetadataOnly="true" retrieveData="false"
107                     isRequeryNecessaryOnTimeMatch="true" pixelSizeHint="45">
108                     <binOffset posOffset="1800" negOffset="1800" virtualOffset="0"/>
109                     <metadataMap>
110                         <mapping key="reportType">
111                             <constraint constraintValue="METAR" constraintType="EQUALS" />
112                         </mapping>
113                         <mapping key="pluginName">
114                             <constraint constraintValue="obs" constraintType="EQUALS" />
115                         </mapping>
116                     </metadataMap>
117                 </resourceData>
118             </resource>
```

A B C

Figure 9. FireWxPlot.xml bundle edits to add the wind resource.

13. Reload the Fire Weather Plot in CAVE to see the wind barbs added to the plot. Notice the formatted cursor sampling. The default version of the plotDelegate function in the fireWxWind.svg file provides the METAR readout.

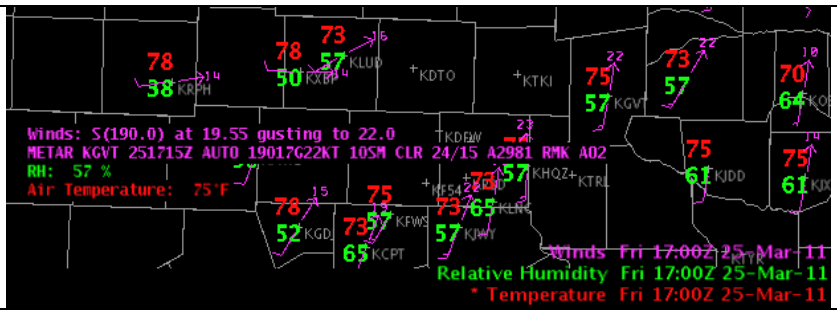


14. Edit the plotDelegate function to add more formatted wind information to the cursor readout.	Referencing **Figure 10**, make the edits indicated in the black box. Because this is an embedded Python script, pay special attention to the indentation (use spaces and not tabs), which is how Python determines if/then/else blocks. Additional notes about the Python script: • The rec.getFloat and rec.getString functions retrieve the specified parameters from the database or the HDF files. • Unit conversions are not automatically applied in the plotDelegate script (as opposed to the parameters in the plot models that use the plotMode = sample), so the script explicitly converts knots to mph. Also note that the unit conversion for gust appears later in the script than the conversion for speed in order to handle the missing value for gust. • The if statements contain < to represent < because the svg interpreter assumes a < sign starts new svg tags even if embedded in a script. • The original plotDelegate script stripped the first two lines from the rawMETAR report (the WMO header and site ID). The output from the final script is the formatted wind followed by the METAR report on the next line.

```
<?xml version="1.0"?>
<svg width="80" height="80"
viewBox="0 0 80 80"
overflow="visible"
xmlns="http://www.w3.org/2000/svg"
xmlns:xlink="http://www.w3.org/1999/xlink" style="stroke: rgb(255,255,255);">
   <defs>
<script type="text/python" plotDelegate="plotDelegate">
import re


class ObsPlotDelegate(PlotDelegate):
    def __init__(self):
        PlotDelegate.__init__(self)

    def getSampleText(self, rec):
        sampleString = rec.getString("rawMETAR")
        #strip WMO header
        sampleString = re.sub("(\\s|\\S)+(METAR)", "\\2", sampleString)
        #strip all multiple spaces and replace newlines with spaces
        sampleString = re.sub("(\\s)+", " ", sampleString)

        windDir=rec.getFloat("windDir")
        windSpd=rec.getFloat("windSpeed") * 1.15
        windGust=rec.getFloat("windGust")

        if windDir >=0 and windDir &lt;=22:
            DString = "N"
        elif windDir >22 and windDir &lt;=67:
            DString = "NE"
        elif windDir >67 and windDir &lt;=112:
            DString = "E"
        elif windDir >112 and windDir &lt;=157:
            DString="SE"
        elif windDir >157 and windDir &lt;=202:
            DString="S"
        elif windDir >202 and windDir &lt;=247:
            DString="SW"
        elif windDir >247 and windDir &lt;=292:
            DString="W"
        elif windDir >292 and windDir &lt;=337:
            DString="NW"
        else:
            DString="N"

        windString = "Winds: " + DString + "("+ str(windDir).format("%3f") + ") at "

        windString = windString + str(windSpd).format("%3f")

        if (windGust != -9999):
             windString = windString + " gusting to " + str(windGust*1.15).format("%3f")


        sampleString = windString + "\n" + sampleString

        return sampleString

plotDelegate = ObsPlotDelegate()

</script>
<style type="text/css">
```

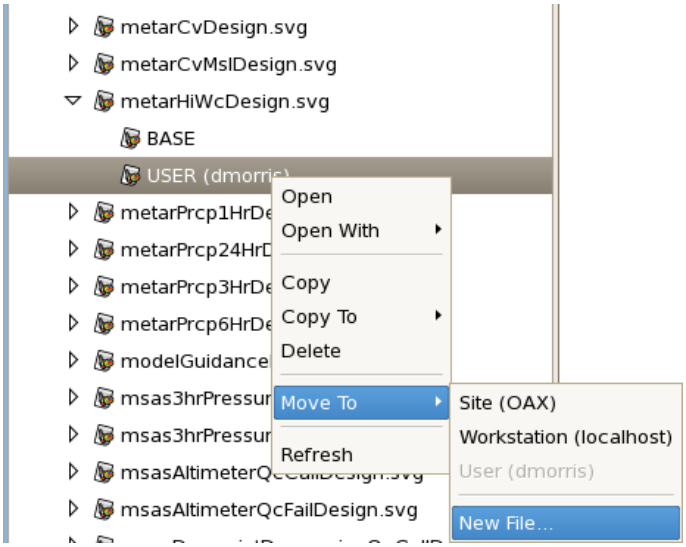
Figure 10. Additional edits to fireWxWind.svg to customize the PlotDelegate function for advanced formatting of the cursor readout for wind.

15. Reload the plot to examine the cursor sampling readout.



16. Copy and use the original HiWc plot model to use it for Apparent Temperature.

Rename your new user version of metarHiWcDesign.svg. Right-click **User** and **Move To ► New File…**



Name the new file fireWxHiWc.svg. If we didn't make a copy, the edits we'd make to the file would be reflected in your user's version of the standard Heat Index/Wind Chill plot.

Edit the fireWxHiWc.svg file, referencing **Figure 11**.

Make the indicated changes to PlotFormat in the sampling line and change x to "-15" in the hiWcText line. Also, make similar font changes as in **Figure 4.**

```
<symbol overflow="visible" id="plotData" class="info">
  <text id="lat" plotMode="null" class="text" plotParam="latitude" x="0" y="0">0</text>
  <text id="lon" plotMode="null" class="text" plotParam="longitude" x="0" y="0">0</text>
  <text id="sample" plotMode="sample" class="text" plotParam="HIWC" plotUnit="°F" plotFormat="Apparent Temp: %3.0f°F" x="0" y="0">0</text>
  <text id="hiWcText" plotMode="text" plotParam="HIWC" plotUnit="°F" plotFormat="%3.0f" style="text-anchor: end;" x="-15" y="0">75</text>
</symbol>
</defs>
<use id="wind" x="40" y="40" width="80" height="80" visibility="visible" xlink:href="#plotData"/>
</svg>
```

Figure 11. fireWxHiWc.svg edits.

17. Edit the

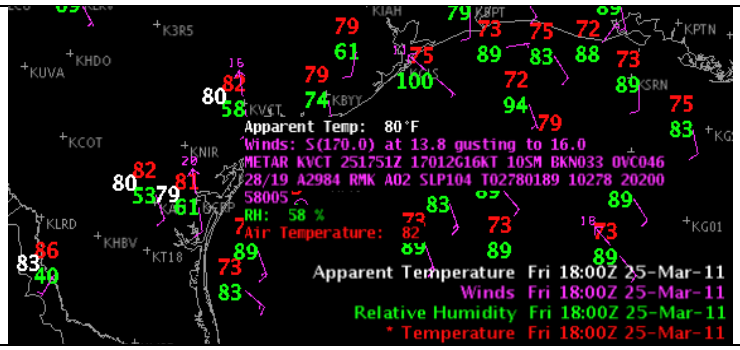
In the Localization Perspective, go back to make final edits to

FireWxPlot.xml bundle to add a resource for Apparent Temperature.	FireWxPlot.xml. Make these changes, referencing **Figure 12**. Select the entire Wind Resource and copy/paste it below the Wind </resource> tag. This section corresponds to the red box in **Figure 12**. Change colorAsString in Box A to "#FFFFFF" (white). Change plotSource to "Apparent Temperature" and plotModelFile to "fireWxHiWc.svg" in Box B and Box C, respectively.

FireWxPlot.xml - USER

```
102                     isMapLayer="false" isHoverOn="false"
103                     isVisible="true" />
104                 <resourceData xsi:type="plotResourceData" plotSource="Winds"
105                     plotModelFile="fireWxWind.svg" spiFile="MTR.spi"
106                     isUpdatingOnMetadataOnly="true" retrieveData="false"
107                     isRequeryNecessaryOnTimeMatch="true" pixelSizeHint="45">
108                     <binOffset posOffset="1800" negOffset="1800" virtualOffset="0"/>
109                     <metadataMap>
110                         <mapping key="reportType">
111                             <constraint constraintValue="METAR" constraintType="EQUALS" />
112                         </mapping>
113                         <mapping key="pluginName">
114                             <constraint constraintValue="obs" constraintType="EQUALS" />
115                         </mapping>
116                     </metadataMap>
117                 </resourceData>
118             </resource>
119                     <resource>
120                 <loadProperties loadWithoutData="true">
121                     <capabilities>
122                         <capability xsi:type="colorableCapability" colorAsString="#FFFFFF" />
123
124                     </capabilities>
125                 </loadProperties>
126                 <properties isSystemResource="false" isBlinking="false"
127                     isMapLayer="false" isHoverOn="false"
128                     isVisible="true" />
129                 <resourceData xsi:type="plotResourceData" plotSource="Apparent Temperature"
130                     plotModelFile="fireWxHiWc.svg" spiFile="MTR.spi"
131                     isUpdatingOnMetadataOnly="true" retrieveData="false"
132                     isRequeryNecessaryOnTimeMatch="true" pixelSizeHint="45">
133                     <binOffset posOffset="1800" negOffset="1800" virtualOffset="0"/>
134                     <metadataMap>
135                         <mapping key="reportType">
136                             <constraint constraintValue="METAR" constraintType="EQUALS" />
137                         </mapping>
138                         <mapping key="pluginName">
139                             <constraint constraintValue="obs" constraintType="EQUALS" />
140                         </mapping>
141                     </metadataMap>
142                 </resourceData>
143             </resource>
```

Figure 12. Final edits to the FireWxPlot.xml bundle.

18. Reload the Fire Weather Plot to examine the finished product.	

Exercise 6: Radar Mosaics — Adding Default and Additional Mosaics

Objectives: In this exercise, you will perform the following procedures:

- Determine the list of radars closest to an arbitrary lat/lon coordinate.
- Modify the radar menu for a given WFO's desired radar mosaics.

Background. This exercise illustrates how to customize CAVE to display radar mosaics. By default, CAVE will display a set of mosaics based on only one set of radars. AWIPS-1 had the capability to specify any number of mosaics that were based on either a list of radars or up to eight radars closest to a lat/lon point. The AWIPS-1 customization was specified using the mosaicInfo.txt file in FXA_CUSTOM_FILES. The menu from AWIPS-1 shown here added four additional mosaics (titled West, North, South, and East).

This example customizes CAVE to display the mosaics specified in the mosaicInfo.txt for the Indianapolis (IND) WFO, shown in **Figure 1.** The first mosaic in this mosaicInfo.txt file is the default mosaic for IND while the next two mosaics are additional mosaics (specified using a lat/lon point). In AWIPS-2, the customization is different for the additional mosaics than for the default mosaic, so this exercise has two parts: one for the default and one for additional mosaics. In addition, the CAVE menu system only works with lists of radar sites to make the mosaics, so we will first have to use the AWIPS-2 metadata database to obtain the list(s) of desired radars. We'll use pgadmin3 to illustrate our database operations; however, you can optionally use psql, if you prefer.

CAVE is customized for the default mosaic by editing the radarsInUse.txt file in common_static/site/{your site}/radar. When CAVE is restarted, it triggers EDEX to rebuild any CONFIGURED menus, if necessary. As part of this process, EDEX uses radarsInUse.txt to construct the CAVE radar menus for the AWIPS site that is specified as AW_SITE_IDENTIFIER in /awips2/edex/bin/setup.env.

We will modify the menus for the additional mosaics by first duplicating the mosaic menu entries in baseRadarMenu.xml in a new menu template file. Second, we'll modify baseRadarMenu.xml to include the new menu template file with a substitute key for

mosaicIcaoList for each of the additional mosaics we need to include. By modifying the menu in this manner, the Radar menu should survive re-creation by EDEX when CAVE is restarted. After these modifications, the original mosaics in baseRadarMenu.xml are for the default set of radars specified using radarsInUse.txt. The additional mosaics are in pull-out menus below the default set to mimic the AWIPS-1 behavior.

Note: In AWIPS-2, ICAO often refers to a site ID for an observational platform.

This exercise should take about 20 minutes to complete.

```
// This file controls each radar mosaic that can be generated.
// Each line represents one mosaic.  Here is a model of each line:
//
// scales | file/list | count | center | title
//
// Here is the meaning of each column:
//
// scales : A space delimited list of scale indices to use for this mosaic.
//          Defaults to the contents of mosaicScales.txt.
// file/list : A space delimited list of radars to use in this mosaic, or
//             alternatively, a file where this list is.  If not supplied
//             defaults to radarsInUse.txt.
// count : Max number of radars to include in the mosaic.  If this is an RFC
//         or national center, this can be any number and will default to
//         all available radars.  Otherwise, this will default to nine, and
//         will arbitrarily be limited to nine.
// center : Takes the radars in the list closest to this point, up to the
//          value in the `count' column.  This is a lat/lon, which defaults
//          to the contents of CenterPoint.dat, which should be the center
//          of the area of responsibility.
// title : Should be unique for each line.  A line without a title will
//         appear directly on the main `Radar' menu, others will be in
//         a pull right.
//
// If a version of this file is not supplied for the localization, a
// default version will be created with one entry that looks like this:
//
//      | radarsOnMenu.txt | | |
//
//
5 4 | kind kiwx klvx kilx kvwx kpah klot kiln kgrr |   |         |
//3   |                          | 8 | 40 -109 | West
//3   |                          | 8 | 35 -95  | South
~
~
```

Figure 1. AWIPS-1 mosaicInfo.txt for the Indianapolis (IND) WFO.

Concept	Actions
Part 1: Customizing the Default Mosaic	
1. Edit radarsInUse.txt to specify the list of radars for the default mosaic.	In a terminal window on the EDEX server as the **awips** user, go to your site's radar directory in common_static: **$ cd /awips2/edex/data/utility/common_static** **$ cd site/{your_site}/radar** It's possible that your site's directory or the radar directories don't exist. If this is the case, go ahead and create them: **$ mkdir site/{your_site}** **$ mkdir site/{your_site}/radar** **$ cd site/{your_site}/radar**
	Edit radarsInUse.txt. If it doesn't already exist, copy one from the OAX localization. NOTE: The OAX localization is delivered as an RPM with the AWIPS-2 software, and it may be manually installed. The RPM is typically located in the noarch section of the software delivery (e.g., noarch/awips2-localization-OAX-13.4.1-1.noarch.rpm). **$ vi radarsInUse.txt** Change the radar sites listed under the MOSAIC_RADARS comment line. In our example for the IND default mosaic, we would change the list of radars to be **kind kiwx klvx kilx kvwx kpah klot kiln kgrr** (each on a line by itself). Save your changes and quit: **<esc> :wq**
2. Restart CAVE server to trigger EDEX to recreate the radar menu files in cave_static/site/{your site}/menus/radar.	Restart CAVE.
3. Examine the radarindex.xml file to verify your list of radars.	In the Localization Perspective file browser, open **CAVE** » **Menus** » **radar** » **radarindex.xml**. Double-click **CONFIGURED** to view the radarindex.xml file. If no CONFIGURED file appears, then the site ID in CAVE Preferences may be set incorrectly.

	You should see your list of radars specified as mosaicIcaoList (our example is shown in **Figure 2**).

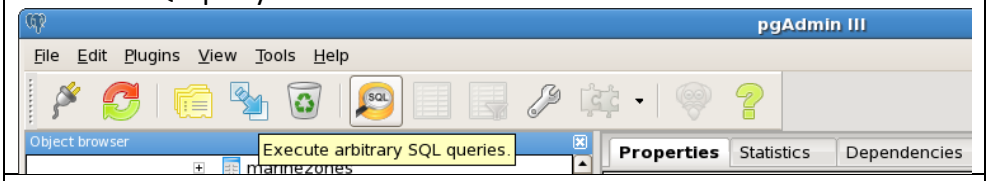
```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<menuContributionFile xmlns:ns2="group">
    <include installTo="menu:radar?after=RADAR_MENU_START" fileName="menus/radar/baseRadarMenu.xml">
        <substitute value="kind,kiwx,klvx,kilx,kvwx,kpah,klot,kiln,kgrr" key="mosaicIcaoList"/>
    </include>
</menuContributionFile>
```

Figure 2. radarindex.xml for default mosaic.

Part 2: Specifying Additional Mosaics

4. Start pgadmin3 and perform the SQL queries to obtain the list of radars closest to specific lat/lon coordinates. The lat/lon point we are using here is (109W, 40N).

Start pgadmin3. Open the metadata database and the awips schema. Click the SQL query button.

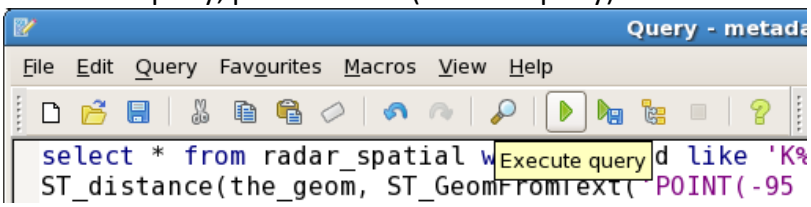


Enter the SQL query as shown in **Figure 3**.

```
select * from radar_spatial where rda_id like 'K%%%' order
by ST_distance(the_geom, ST_GeomFromText('POINT(-109
40)',4326)) LIMIT 8;
```

In this query, we included the "where radar_id like 'K%%%" clause because the radar_spatial table includes geographical information for a number of FAA radars that the NWS currently doesn't access. Thus, this clause restricts the results to WSR-88D units within the CONUS. Sites outside the CONUS probably already know their relatively small list of radars and could probably skip the step of running these queries. Also in the above query, the 4326 refers to the Spatial Reference system ID (SRID) the database uses.

To run the query, press the run (execute query) button.



The results are shown in **Figure 4.**

For our example, we'll run another version of the query for the south mosaic:

```
select * from radar_spatial where rda_id like 'K%%%' order
by ST_distance(the_geom, ST_GeomFromText('POINT(-95
35)',4326)) LIMIT 9;
```

	We used LIMIT 9 because one of the returned radars was KCRI, the test radar operated by the Radar Operations Center. We'll omit this radar in our list so we needed an extra radar to take its place. (By the way, AWIPS-1 arbitrarily limited the number of radars in a mosaic for a WFO to nine. There is no such limit in AWIPS-2. It's unknown if a large number of radars to construct a mosaic will result in performance issues). The results of this query are shown in **Figure 5.**

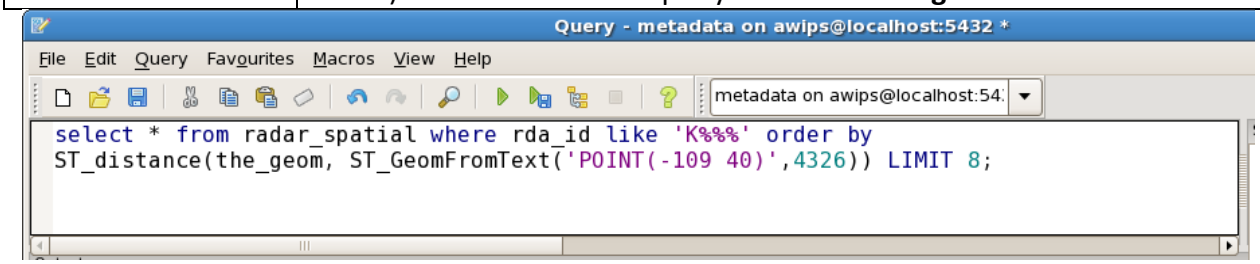


Figure 3. SQL query in pgadmin3 to determine 8 closest radars to a lat/lon point.

Data Output | Explain | Messages | History

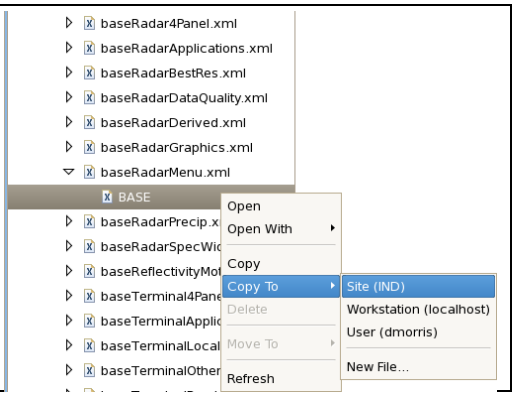
	rda_id character varying(255)	elevmeter real	eqp_elv real	immutablex real	lat real	lon real	name character varying(255)	rpg_id_dec character varying(255)	the_geom geometry	wfo_id character varying(255)
1	KGJX	3077.91	10098.	145	39.	-10	Grand Mesa	368	0101000(	GJT
2	KRIW	1716.39	5631.2	147	43.	-10	Riverton	392	0101000(	RIW
3	KMTX	2009.19	6591.8	22	41.	-11	Promontory Pt	537	0101000(	SLC
4	KCYS	1887.03	6191.0	144	41.	-10	Cheyenne	335	0101000(	CYS
5	KFTG	1709.75	5609.4	0	39.	-10	Front Range Arpt	347	0101000(	BOU
6	KICX	3277.86	10754.	20	37.	-11	Blowhead Mtn	330	0101000(	SLC
7	KSFX	1383.03	4537.4	153	43.	-11	Springfield	546	0101000(	PIH
8	KPUX	1634.28	5361.8	146	38.	-10	Boone Highland Rds	529	0101000(	PUB

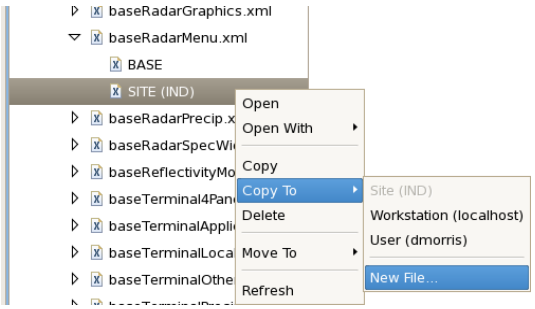
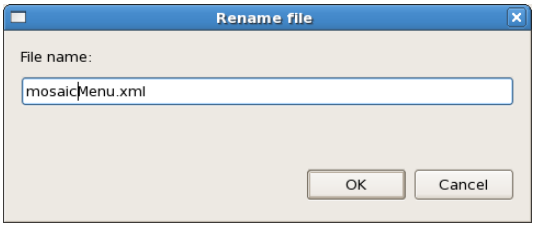
Figure 4. Results of SQL query for 8 closest radars to lat/lon point for the west mosaic.

Data Output | Explain | Messages | History

	rda_id character varying(255)	elevmeter real	eqp_elv real	immutablex real	lat real	lon real	name character varying(255)	rpg_id_dec character varying(255)	the_geom geometry	wfo_id character varying(255)
1	KSRX	224.642	737.01	161	35.	-94	Ft. Smith	825	0101000(	TSA
2	KINX	228.252	748.85	21	36.	-95	Inola	557	0101000(	TSA
3	KTLX	389.32	1277.3	24	35.	-97	Twin Lakes	001	0101000(	OUN
4	KCRI	394.716	1295	26	35.	-97	OSF	520	0101000(	ROC
5	KLZK	197.779	648.88	110	34.	-92	North Little Rock	395	0101000(	LZK
6	KSGF	419.123	1375.0	77	37.	-93	Springfield	548	0101000(	SGF
7	KSHV	117.88	386.74	97	32.	-93	Shreveport	543	0101000(	SHV
8	KFWS	236.639	776.37	34	32.	-97	Fort Worth	345	0101000(	FWD
9	KVNX	383.412	1257.9	27	36.	-98	Jet	558	0101000(	OUN

Figure 5. Results of SQL query for 9 closest radars to lat/lon point for the south mosaic.

5. We need to make a SITE version of baseRadarMenu.xml in the Localization Perspective.	On a workstation with CAVE, open the Localization Perspective file browser and navigate to **CAVE** » **Menus**» **radar** » **baseRadarMenu.xml**. Make a SITE version by right-clicking BASE and choosing **Copy To ►Site.**	

6. Copy the baseRadarMenu.xml file to mosaicMenu.xml.	Copy the SITE version of the baseRadarMenu.xml file that you just obtained to mosaicMenu.xml. Right-click **SITE** under **baseRadarMenu.xml** and choose **Copy To ►New File.**  Call the new file mosaicMenu.xml. 
7. Edit mosaicMenu.xml so it contains only mosaic menu entries.	Find the new mosaicMenu.xml in the localization perspective. Edit the new site version by double-clicking **SITE**. At the top of the file, delete the lines indicated by the red box in **Figure 6.** Move to the bottom of the file and delete the lines indicated by the red box in **Figure 7.** Save the changes to the file and quit.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<!-- This_software_was_developed_and_/_or_modified_by_Raytheon_Company, pursuant_to_Contract_DG133W-05-CQ-106
    U.S._EXPORT_CONTROLLED_TECHNICAL_DATA This_software_product_contains_export-restricted_data_whose
    export/transfer/disclosure_is_restricted_by_U.S._law._Dissemination to_non-U.S._persons_whether_in_the_Un
    an_export_license_or_other_authorization. Contractor_Name:_____Raytheon_Company
    Contractor_Address:_____6825_Pine_Street,_Suite_340 _____Mail_Stop_B8
    _____Omaha,_NE_68106 _____402.291.0100
    See_the_AWIPS_II_Master_Rights_File_("Master_Rights_File.pdf")_for further_licensing_information. -->
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarCodedMessage.xml"
        menuText="10km Radar Coded Msg" id="10kmRadarCodedMsg">
        <dataURI>/grib/%/301</dataURI>
    </contribute>
    <contribute xsi:type="subinclude" fileName="menus/radar/airportRadars.xml" />
    <contribute xsi:type="titleItem" titleText="------ Mosaic ------"
        id="RadarMosaic" />
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaicBestRes.xml"
        menuText="0.5 Reflectivity" id="Radar05Reflectivity">
        <substitute key="product1" value="94" />
        <substitute key="product2" value="19" />
        <substitute key="product3" value="20" />
        <substitute key="product4" value="" />
        <substitute key="elevation" value="0.5" />
        <substitute key="name" value="0.5 Reflectivity" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Hybrid Scan Refl" id="RadarHybridScanRefl">
        <substitute key="product" value="33" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Hybrid Scan Refl" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Composite Refl" id="RadarCompositeRefl">
        <substitute key="product" value="37" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Composite Refl" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarMosaicVILCompRefl.xml" menuText="VIL/Comp Ref"
        id="RadarVILCompRef">
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Vert integrated Liquid" id="RadarVertIntegratedLiquid">
        <substitute key="product" value="57" />
        <substitute key="elevation" value="0.0" />
```

Figure 6. First edits to mosaicMenu.xml to delete lines (indicated by the red box) before the mosaic entries.

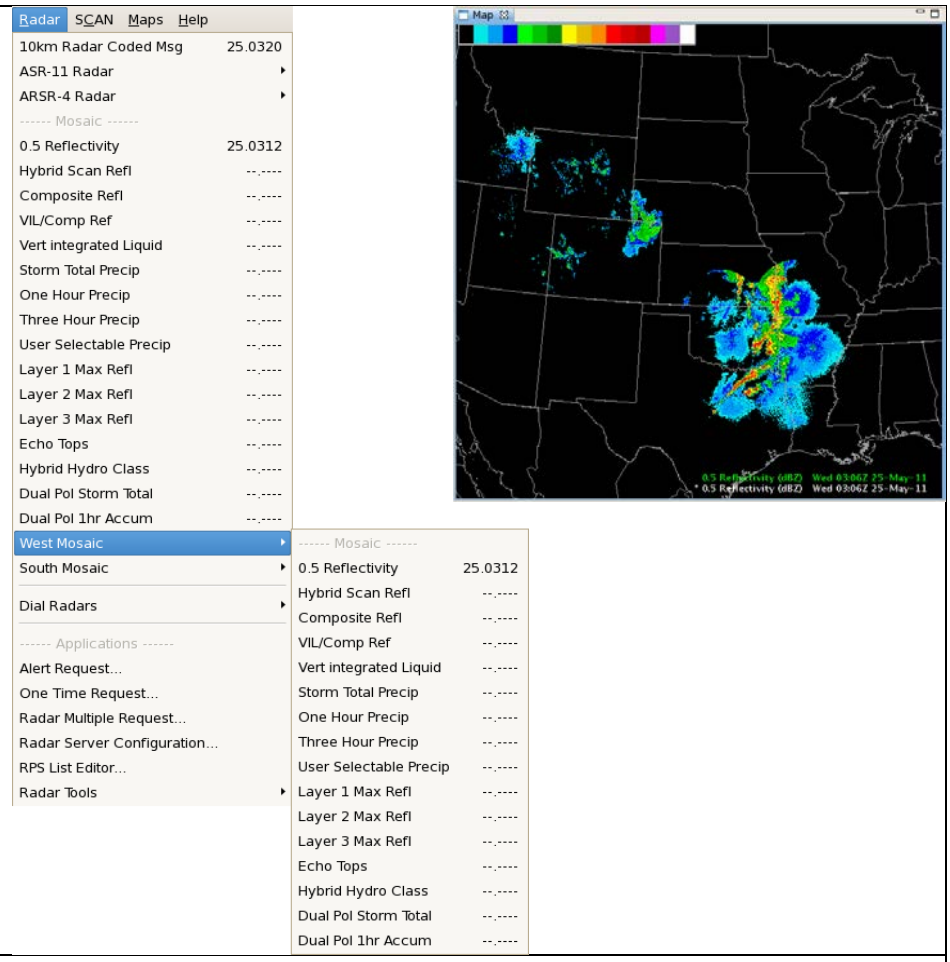
```
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Layer 2 Max Refl" id="RadarLayer2MaxRefl">
        <substitute key="product" value="66" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Layer 2 Max Refl" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Layer 3 Max Refl" id="RadarLayer3MaxRefl">
        <substitute key="product" value="67" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Layer 3 Max Refl" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Echo Tops" id="RadarEchoTops">
        <substitute key="product" value="41" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Echo Tops" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Hybrid Hydro Class" id="RadarHybridHydroClass">
        <substitute key="product" value="177" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Hybrid Hydro Class" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Dual Pol Storm Total" id="RadarDualPolStormTotal">
        <substitute key="product" value="172" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Dual Pol Storm Total" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Dual Pol 1hr Accum" id="RadarDualPol1hrAccum">
        <substitute key="product" value="170" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Dual Pol 1hr Accum" />
    </contribute>
    <contribute xsi:type="separator" id="belowRadarMosaics" />
    <contribute xsi:type="subMenu" menuText="Dial Radars"
        id="RadarMenuDialRadarsSubMenu">
        <contribute xsi:type="subinclude" fileName="menus/radar/dialRadars.xml" />
    </contribute>
    <contribute xsi:type="separator" id="belowDialRadars" />
    <contribute xsi:type="subinclude" fileName="menus/radar/baseRadarApplications.xml" />
</menuTemplate>
```

Figure 7. Edits to the bottom of mosaicMenu.xml to delete lines (indicated by the red box) after the mosaic entries.

8. Edit baseRadarMenu.xml to include mosaicMenu.xml for each new mosaic we wish to add. Preserve the existing mosaic entries in baseRadarMenu.xml because those entries control the default mosaics.	Open the site version of baseRadarMenu.xml by double-clicking **SITE**. Near the bottom of the file, add the lines in **Figure 8** indicated by the red box. These lines add references to mosaicMenu.xml for both the West Mosaic and the South Mosaic. When you're done editing, save your changes.

```
91          menuText="Echo Tops" id="RadarEchoTops">
92          <substitute key="product" value="41" />
93          <substitute key="elevation" value="0.0" />
94          <substitute key="name" value="Echo Tops" />
95      </contribute>
96      <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
97          menuText="Hybrid Hydro Class" id="RadarHybridHydroClass">
98          <substitute key="product" value="177" />
99          <substitute key="elevation" value="0.0" />
100         <substitute key="name" value="Hybrid Hydro Class" />
101     </contribute>
102     <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
103         menuText="Dual Pol Storm Total" id="RadarDualPolStormTotal">
104         <substitute key="product" value="172" />
105         <substitute key="elevation" value="0.0" />
106         <substitute key="name" value="Dual Pol Storm Total" />
107     </contribute>
108     <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
109         menuText="Dual Pol 1hr Accum" id="RadarDualPol1hrAccum">
110         <substitute key="product" value="170" />
111         <substitute key="elevation" value="0.0" />
112         <substitute key="name" value="Dual Pol 1hr Accum" />
113     </contribute>
114
115     <contribute xsi:type="subMenu" menuText="West Mosaic" id="westMosaic">
116         <contribute xsi:type="subinclude" fileName="menus/radar/mosaicMenu.xml">
117         <substitute key="mosaicIcaoList" value="kgjx,kriw,kmtx,kcys,kftg,kicx,ksfx,kpux"/>
118         </contribute>
119     </contribute>
120
121     <contribute xsi:type="subMenu" menuText="South Mosaic" id="southMosaic">
122         <contribute xsi:type="subinclude" fileName="menus/radar/mosaicMenu.xml">
123         <substitute key="mosaicIcaoList" value="ksrx,kinx,ktlx,klzk,ksgf,kshv,kfws,kvnx"/>
124         </contribute>
125     </contribute>
126
127
128     <contribute xsi:type="separator" id="belowRadarMosaics" />
129     <contribute xsi:type="subMenu" menuText="Dial Radars"
130         id="RadarMenuDialRadarsSubMenu">
131         <contribute xsi:type="subinclude" fileName="menus/radar/dialRadars.xml" />
132     </contribute>
133     <contribute xsi:type="separator" id="belowDialRadars" />
134     <contribute xsi:type="subinclude" fileName="menus/radar/baseRadarApplications.xml" />
135 </menuTemplate>
```

Figure 8. Final edits near the bottom of baseRadarMenu.xml for the additional mosaics.

9. Restart CAVE and verify the Radar menu reflects the changes and that the mosaics display in CAVE.	
10. Verify regular expression patterns in the distribution radar.xml and/or the LDM pqact.conf.	If your mosaics do not display, particularly due to the lack of data, you may need to verify that the radars specified in our versions of mosaicIcaoList in the baseRadarMenu.xml and the radars listed in radarsInUse.txt are actually being ingested. Verify that the patterns in the EDEX distribution radar.xml file (base and site versions) and the LDM pqact.conf match the WMO headers for the SBN radars.

Exercise 7: Radar Mosaics — Adding New Products for Mosaicking

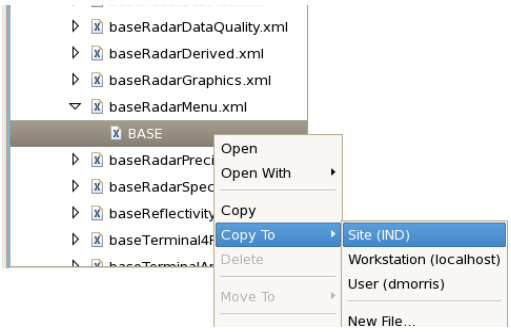
Objective: In this exercise, you will perform the following procedures:

- Modify the radar menu to add a mosaic for a new radar product.

Background. This exercise illustrates how to customize CAVE to add a new radar mosaic to the Radar menu. As shown in Exercise 6, the baseRadarMenu.xml file is found in the Localization perspective under **CAVE** » **Menus** » **radar** (the actual file is located in the CAVE radar plugin, in its localization/menus/radar directory). Examination of this file shows that mosaics are produced using the DefaultRadarMosaic.xml bundle.

For this exercise, we'll add a mosaic of a Dual-Polarization base product called Correlation Coefficient (CC) at 0.5° elevation. The process is to make a site or user override of baseRadarMenu.xml and add another entry for our mosaic.

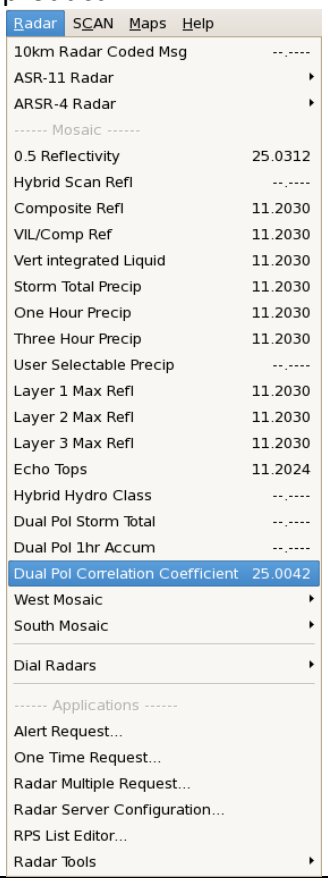
This exercise should take about 10 minutes or less to complete.

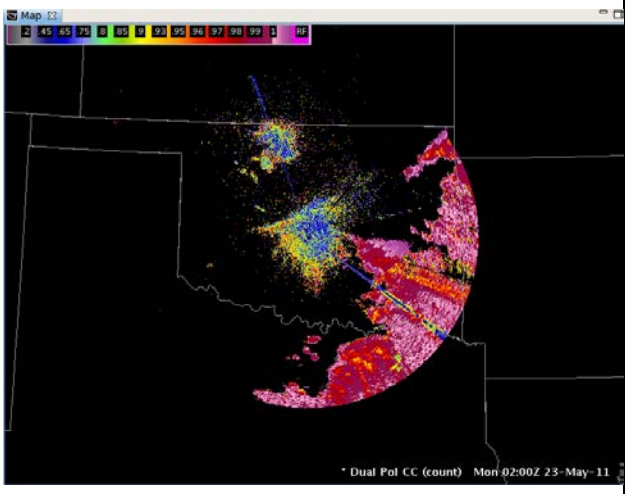
Concept	Actions
1. If you don't already have a SITE version of baseRadarMenu.xml, make one in the Localization Perspective. If you've completed Exercise 6, you will have already done this step.	On a workstation with CAVE, open the Localization Perspective file browser and navigate to **CAVE** » **Menus** » **radar** » **baseRadarMenu.xml**. Make a SITE version by right-clicking BASE and choosing **Copy To ► Site.** 
2. Edit baseRadarMenu.xml to add a mosaic for 0.5° CC. We'll use the 8-bit version of CC, which is product number 161.	Open the site version of baseRadarMenu.xml by double-clicking **SITE**. Near the bottom of the file, add the lines in **Figure 1** indicated by the red box. When you're done editing, save your changes. NOTE: If you've added custom mosaics (for example, like the one in Exercise 6), you may need to make similar edits to other menu files (e.g., mosaicMenu.xml which was created in Exercise 6).

```
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Layer 2 Max Refl" id="RadarLayer2MaxRefl">
        <substitute key="product" value="66" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Layer 2 Max Refl" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Layer 3 Max Refl" id="RadarLayer3MaxRefl">
        <substitute key="product" value="67" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Layer 3 Max Refl" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Echo Tops" id="RadarEchoTops">
        <substitute key="product" value="41" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Echo Tops" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Hybrid Hydro Class" id="RadarHybridHydroClass">
        <substitute key="product" value="177" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Hybrid Hydro Class" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Dual Pol Storm Total" id="RadarDualPolStormTotal">
        <substitute key="product" value="172" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Dual Pol Storm Total" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Dual Pol 1hr Accum" id="RadarDualPol1hrAccum">
        <substitute key="product" value="170" />
        <substitute key="elevation" value="0.0" />
        <substitute key="name" value="Dual Pol 1hr Accum" />
    </contribute>

    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarMosaic.xml"
        menuText="Dual Pol Correlation Coefficient" id="RadarDualPolCC">
        <substitute key="product" value="161" />
        <substitute key="elevation" value="0.5" />
        <substitute key="name" value="Dual Pol CC" />
    </contribute>

```

Figure 1. Edits to baseRadarMenu.xml to add a menu entry for 0.5 Correlation Coefficient.

3. Verify that the Radar menu was updated with the new mosaic.	Restart CAVE, click the **Radar** menu, and load the Dual Pol Correlation Coefficient mosaic product.





Exercise 8: Customizing Individual Radar Menus

Objective: In this exercise, you will perform the following procedures:

- Rearrange the individual radar menus to place most used products near the top of the menus.

Background. AWIPS-1 provided the ability to customize the local radar menus by modifying the radarDataMenus.template file in your localization/LLL directory. Several WFOs have taken advantage of this capability by putting more frequently used products near the top of the menu and lesser used products closer to the bottom. This exercise demonstrates how to perform similar configurations in AWIPS-2.

In addition, the baseline radar menus were reorganized with the deployment of dual-polarization radars. Hence, the CAVE radar plugin actually contains two sets of menus. The legacy version of the radar menus is located in /awips2/cave/plugins/com.raytheon.viz.radar_{version}/localization/menus/radar and the dual-pol version is in /awips2/cave/plugins/com.raytheon.viz.radar_{version}/localization/menus/radar/dualPol. Accordingly, the localization perspective contains both sets of files (**CAVE** » **Menus** » **radar** and **CAVE** » **Menus** » **radar** » **dualPol**).

Before starting on this customization, it is helpful to review how the local radar and dial radar menus are created. When CAVE starts up, it triggers EDEX to read common_static/site/{siteID}/radar/radarsInUse.txt, for whichever site is specified in CAVE's localization preference. If EDEX detects a change in radarsInUse.txt, then it builds index.xml in cave_static/configured/{siteID}/menus/radar. For each WSR-88D, this index.xml includes menus/radar/dualPol/baseLocalRadarMenu.xml, and for each TDWR, it includes menus/radar/dualPol/baseTerminalLocalRadarMenu.xml. The default versions of these files are located in the plugin's menus/radar/dualPol directories as specified above. Like other D2D perspective menus, local customizations of baseLocalRadarMenu.xml and baseTerminalLocalRadarMenu.xml can be either site or user overrides in cave_static/…/menus/radar/dualPol. Additional custom menus can be created, so long as they are referenced in baseLocalRadarMenu.xml or baseTerminalLocalRadarMenu.xml. As with most other CAVE configuration files, these menus can be viewed and edited using the Localization Perspective. Be aware that similarly named files exist both in menus/radar and in menus/radar/dualPol. Be sure to edit the correct file!

NOTE: To perform this exercise, your user must have SITE editing privileges (primarily for com.raytheon.localization.site/cave_static/ or com.raytheon.localization.site/cave_static/menus). For more information on this, see the Foundational lesson on the Localization Perspective.

Because of the complexity of the radar menus, it will be helpful to reference **Figure 1**, which illustrates which menu .xml files contribute to the particular sections of the default radar menus as specified in baseLocalRadarMenu.xml. We will use some of these menu .xml files as-is. We will copy and paste from some of the menus as well. We will use the Localization Perspective to perform all of the menu editing.

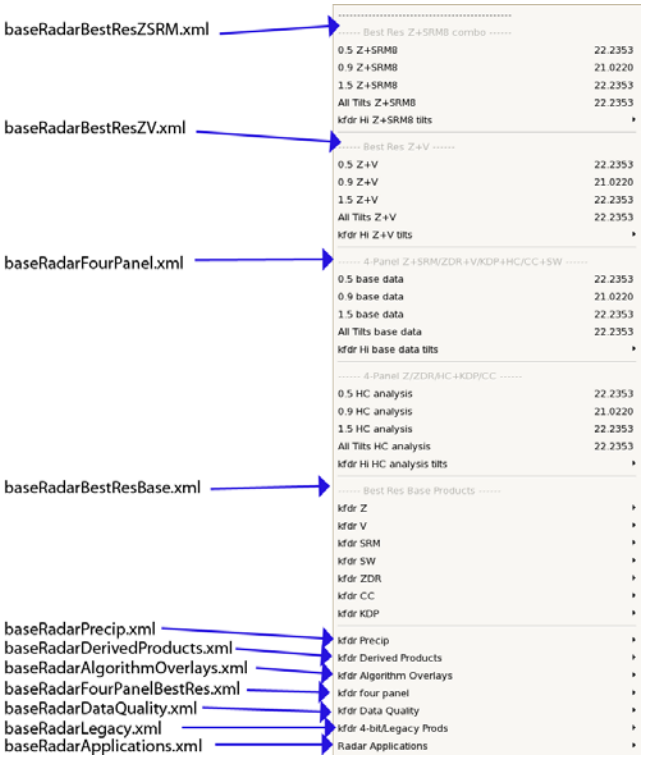


Figure 1. Default local radar menu in AWIPS-2 along with the menu xml files that contribute to the menu layout. All the files listed here are referenced by baseLocalRadarMenu.xml

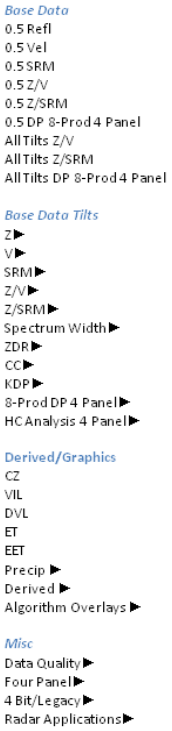
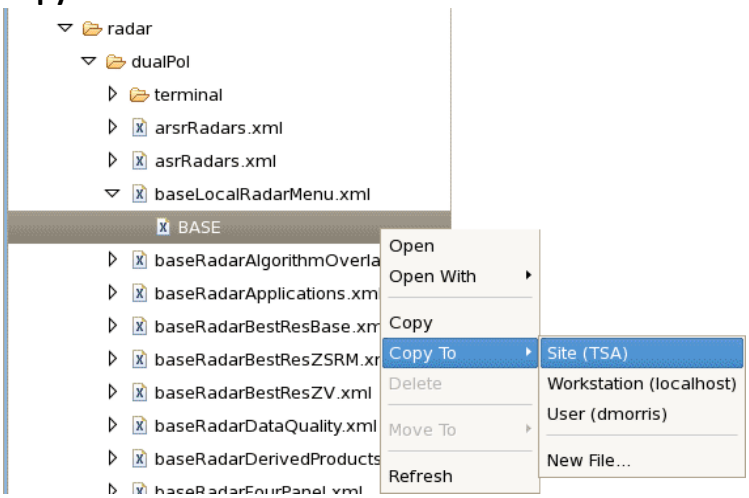


Figure 2. Custom menu layout created in this exercise.

Our goal is to create the menu layouts as shown in **Figure 2**. Owing to this menu complexity, we will use a "build-a-little, test-a-little" process. We will start by creating a custom version of baseLocalRadarMenu.xml, and making brand new menu files for the baseData and the baseDataTilts sections.

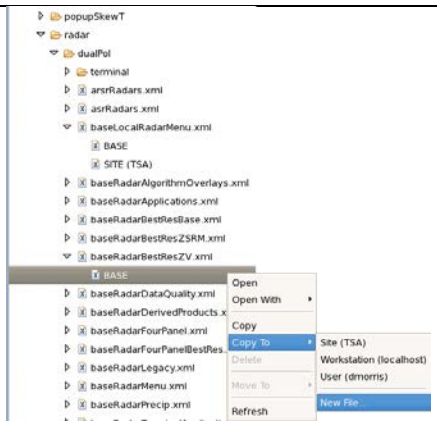
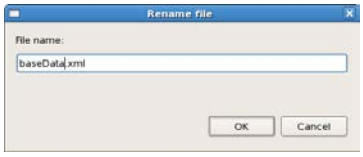
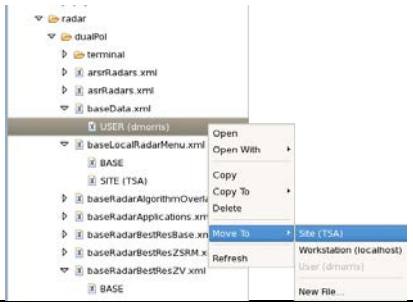
This exercise will probably take about 1.5 hours to complete.

Concept	Actions
1. If you don't already have a site version of baseLocalRadarMenu.xml, make a site override of the dualPol version using the Localization Perspective.	In the file browser, open **CAVE** » **Menus** » **radar** » **dualPol** » **baseLocalRadarMenu.xml.** Right-click **BASE** and select **Copy To ▶ Site.** 
2. Edit baseLocalRadarMenu.xml to add a contribution from a new baseData.xml menu we'll create in the next step. Comment out all other menu contributions.	Edit the baseLocalRadarMenu.xml file by double-clicking on **SITE**. Make it look like **Figure 3**. The first contribute line is changed to reference baseData.xml. The second line was changed so it starts with a <!-- to specify a comment, and the comment ends with --> just after the contribution for Radar Applications. When you're done editing, save your changes.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<contribute xsi:type="subMenu" menuText="${icao}">
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseData.xml"/>

    <!--
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarBestResZSRM.xml" />
    <contribute xsi:type="separator" id="${icao}BestResZV" />
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarBestResZV.xml" />
    <contribute xsi:type="separator" id="${icao}4PanelZSRM_ZDRV_KDP_HC_CCSW" />
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarFourPanel.xml" />
    <contribute xsi:type="separator" id="${icao}BestResBase" />
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarBestResBase.xml" />
    <contribute xsi:type="separator" id="${icao}RadarPrecip" />
    <contribute xsi:type="subinclude" subMenu="${icao} Precip" fileName="menus/radar/dualPol/baseRadarPrecip.xml" />
    <contribute xsi:type="subinclude" subMenu="${icao} Derived Products" fileName="menus/radar/dualPol/baseRadarDerivedProducts.xml" />
    <contribute xsi:type="subinclude" subMenu="${icao} Algorithm Overlays" fileName="menus/radar/dualPol/baseRadarAlgorithmOverlays.xml" />
    <contribute xsi:type="subinclude" subMenu="${icao} four panel" fileName="menus/radar/dualPol/baseRadarFourPanelBestRes.xml" />
    <contribute xsi:type="subinclude" subMenu="${icao} Data Quality" fileName="menus/radar/dualPol/baseRadarDataQuality.xml" />
    <contribute xsi:type="subinclude" subMenu="${icao} 4-bit/Legacy Prods" fileName="menus/radar/dualPol/baseRadarLegacy.xml" />
    <contribute xsi:type="subinclude" subMenu="Radar Applications" fileName="menus/radar/dualPol/baseRadarApplications.xml" />

    -->


</contribute>
</menuTemplate>
```

Figure 3. Edits to baseLocalRadarMenu.xml to include the menu contribution for baseData.xml and comment out the rest of the menu contributions.

3. This new baseData.xml will	In the file browser, open **CAVE** » **Menus** » **radar** » **dualPol** »

be the top section of the new menu, labeled “Base Data”, with six 0.5 entries (0.5 Refl through 0.5 DP 8-Prod 4 Panel) and three All-Tilts entries (Z/V, S/SRM, and DP 8-Prod 4 Panel). Create baseData.xml from baseRadarBestResZV.xml. We’re using baseRadarBestResZV.xml because it already contains the 0.5 and All Tilts entries for Z/V. We’ll manually add other 0.5 menu entries and the All Tilts entries for Z/SRM and the DP 8-Prod 4 Panel in a later step.	**baseRadarBestResZV.xml.** Right-click **BASE** and select **Copy To ►New File.** Name the file **baseData.xml**. baseData.xml should be a User version by default. Move it to Site by right-clicking on **USER** and choose **Move To ►Site**.   
4. Edit baseData.xml to change the first title item.	Make the following edit to baseData.xml (in the dualPol section) using the Localization Perspective. Change the titleText and id for the titleItem as shown in the black box in **Figure 4.**

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Base Data ------"
        id="BaseData" />
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.5 Z+V"
        id="${icao}058bitZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="27" />
        <substitute key="product8" value="25" />
        <substitute key="mode2" value="" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.9 Z+V"
        id="${icao}098bitZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="27" />
        <substitute key="product8" value="25" />
        <substitute key="mode2" value="" />
        <substitute key="elevation" value="0.9--0.9" />
    </contribute>
```

Figure 4. First edits to baseData.xml as described in Step 4.

5. Copy and paste the 0.5 Refl entry from baseRadarBestResBase.xml into baseData.xml	In the Localization Perspective, open the **BASE** version of baseRadarBestResBase.xml. It should open into a new tab. Copy the lines that reference the “0.5 Z best res” (the bundle item and not the subMenu above it) from near the top of the file as shown by the red box in **Figure 5**. Paste these into the baseData.xml tab just below the BaseData titleItem we created in Step 4. Change the menuText in baseData.xml from “0.5 Z best res” to “0.5 Refl” Close the baseRadarBestResBase.xml file. The resulting baseData.xml is shown in the top section of Figure 6.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Best Res Base Products ------"
        id="${icao}BestResBaseProducts" />
    <contribute xsi:type="subMenu" menuText="${icao} Z" id="${icao}BestResRfl">
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 Z best res" id="${icao}05Refl">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="153" />
            <substitute key="product2" value="94" />
            <substitute key="product3" value="19" />
            <substitute key="product4" value="20" />
            <substitute key="elevation" value="0.5--0.5" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.9 Z best res" id="${icao}09Refl">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="153" />
            <substitute key="product2" value="94" />
            <substitute key="product3" value="19" />
            <substitute key="product4" value="20" />
            <substitute key="elevation" value="0.9--0.9" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="1.5 Z best res" id="${icao}15Refl">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="153" />
            <substitute key="product2" value="94" />
            <substitute key="product3" value="19" />
            <substitute key="product4" value="20" />
            <substitute key="elevation" value="1.5--1.5" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
```

Figure 5. Lines in baseRadarBestResBase.xml to paste into baseData.xml.

6. In baseData.xml, duplicate the lines just pasted and modify them for the 0.5 Velocity.	Select and copy the lines for the 0.5 Refl bundle and paste them just below the bundle. Modify the second bundle contribution as shown in **Figure 6.** Change the menuText to 0.5 Vel and the id to ${icao}05Vel (Box A). Change product1 to 154, product2 to 99, product3 to 27, and product4 to 25 (Box B). These values were based on the 0.5 Vel entry that was specified in baseRadarBestResBase.xml. NOTE: The product numbers referenced in these bundle files are also field values in the radar table of the metadata database, and form part of the dataURI for radar data. These numbers are identical to the WSR-88D product numbers defined in Table III of the WSR-88D Interface Control Document for the RPG to Class 1 User, available from the Radar Operations Center (http://www.roc.noaa.gov).

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Base Data ------"
        id="BaseData" />
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 Refl" id="${icao}05Refl">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="153" />
            <substitute key="product2" value="94" />
            <substitute key="product3" value="19" />
            <substitute key="product4" value="20" />
            <substitute key="elevation" value="0.5--0.5" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 Vel" id="${icao}05Vel">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="154" />
            <substitute key="product2" value="99" />
            <substitute key="product3" value="27" />
            <substitute key="product4" value="25" />
            <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.5 Z+V"
        id="${icao}058bitZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="27" />
        <substitute key="product8" value="25" />
        <substitute key="mode2" value="" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.9 Z+V"
        id="${icao}098bitZV">
```

Figure 6. Edits to baseData.xml for the 0.5 Vel menu entry.

7. Duplicate the lines in the 0.5 Vel section for the 0.5 SRM menu entry.	Look at the **BASE** version of the dualPol baseRadarBestResBase.xml file to see the entry for the 0.5 SRM entry (it's located near line 370). Notice that it's very similar to the lines we just modified for the 0.5 Vel entry, so we'll use them again. In baseData.xml, duplicate them in a similar manner as in the previous step. Close baseRadarBestResBase.xml. As shown in **Figure 7**, change the menuText to "0.5 SRM" and the id to "${icao}05SRM" (Box A). Change both product3 and product4 to "" and set the mode to "SRM8" (Box B). Leave product1 and product2 as-is.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Base Data ------"
        id="BaseData" />
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 Refl" id="${icao}05Refl">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="153" />
            <substitute key="product2" value="94" />
            <substitute key="product3" value="19" />
            <substitute key="product4" value="20" />
            <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 Vel" id="${icao}05Vel">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="154" />
            <substitute key="product2" value="99" />
            <substitute key="product3" value="27" />
            <substitute key="product4" value="25" />
            <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 SRM" id="${icao}05SRM"> A
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="SRM8" />
            <substitute key="product1" value="154" />
            <substitute key="product2" value="99" />
            <substitute key="product3" value="" />
            <substitute key="product4" value="" />
            <substitute key="elevation" value="0.5--0.5" />
    </contribute>  B

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.5 Z+V"
        id="${icao}058bitZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="model" value="" />
```

Figure 7. Edits to baseData.xml for the 0.5 SRM menu entry.

8. The menu item 0.5 Z/V Best Res product is already in baseData.xml. We need to modify its menuText label and then copy the entry for Z/V to make a Z/SRM8. The baseRadarBestResZSRM.xml file shows what the Z/SRM8 menu entry should look like.	Find the 0.5 Z+V entry in baseData.xml file. It should be the next entry, just after the 0.5 SRM entry we just created. Change the menuText from "0.5 Z+V" to "0.5 Z/V" as shown in the red box in **Figure 8**. Copy/paste the entire entry for 0.5 Z/V (shown in the black box in **Figure 8**) to duplicate it so the second can be used for 0.5 Z/SRM. In the new entry (**Figure 9**), change the menuText to "0.5 Z/SRM8" (Box A) and the id to "%{icao}058bitZSRM" (Box B). Change the values for product7 and product 8 to "" and mode2 to "SRM8" (Box C).

```
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 Refl" id="${icao}05Refl">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="153" />
            <substitute key="product2" value="94" />
            <substitute key="product3" value="19" />
            <substitute key="product4" value="20" />
            <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 Vel" id="${icao}05Vel">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="154" />
            <substitute key="product2" value="99" />
            <substitute key="product3" value="27" />
            <substitute key="product4" value="25" />
            <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 SRM" id="${icao}05SRM">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="SRM8" />
            <substitute key="product1" value="154" />
            <substitute key="product2" value="99" />
            <substitute key="product3" value="" />
            <substitute key="product4" value="" />
            <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.5 Z/V"
        id="${icao}058bitZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="27" />
        <substitute key="product8" value="25" />
        <substitute key="mode2" value="" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.9 Z+V"
        id="${icao}098bitZV">
        <substitute key="icao" value="${icao}" />
```

Figure 8. 0.5 Z/V section of baseData.xml to be copied to make a new 0.5 Z/SRM section.

```
            <substitute key="product4" value="25" />
            <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 SRM" id="${icao}05SRM">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="SRM8" />
            <substitute key="product1" value="154" />
            <substitute key="product2" value="99" />
            <substitute key="product3" value="" />
            <substitute key="product4" value="" />
            <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.5 Z/V"
        id="${icao}058bitZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="27" />
        <substitute key="product8" value="25" />
        <substitute key="mode2" value="" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.5 Z/SRM8" A
        id="${icao}058bitZSRM"> B
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="" />
        <substitute key="product8" value="" />
        <substitute key="mode2" value="SRM8" /> C
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.9 Z+V"
        id="${icao}098bitZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
```

Figure 9. Edits for the new 0.5 Z/SRM section of baseData.xml.

9. The next menu entry contribution to add is for the 0.5 dual pol 8-product 4 panel after the 0.5 Z/SRM. We also need to add a titleItem to separate the 0.5 and the All Tilts entries in the Base Data section.	The menu item we need to add is defined in the baseline file baseRadarFourPanel.xml. Comparing that entry with the 0.5 Z/SRM8 entry, we can see that we can duplicate the 0.5 Z/SRM8 entry but change the bundle file, the id, and the menu text plus remove the unneeded substitute keys, as shown in the black box in **Figure 10.** • Change the menuText to "0.5 DP 8-Prod 4-Panel" • Change the bundle file to "bundles/DefaultRadarDualPolBaseData.xml" • Change the id to "${icao}05dualPolBaseData"
	Add the titleItem as shown by the red box in **Figure 10.**

```
            <substitute key="product4" value="" />
            <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.5 Z/V"
        id="${icao}058bitZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="27" />
        <substitute key="product8" value="25" />
        <substitute key="mode2" value="" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.5 Z/SRM8"
        id="${icao}058bitZSRM">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="" />
        <substitute key="product8" value="" />
        <substitute key="mode2" value="SRM8" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarDualPolBaseData.xml" menuText="0.5 DP 8-Prod 4-Panel"
        id="${icao}05dualPolBaseData">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="titleItem" titleText="------ Base Data (All Tilts) ------" id="BaseDataAllTilts"/>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.9 Z+V"
        id="${icao}098bitZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
```

Figure 10. Edits to baseData.xml to add the 0.5 8-Product 4 Panel.

10. Delete the next entries in baseData.xml which we no longer need. Create a Z/SRM8 All Tilts entry. Delete the remaining unneeded entries. Create an All-Tilts version of the 8-Product Dual-Pol 4-	Move down just below the 0.5 DP 8-Prod 4 panel entry and the titleItem we just added, and delete the next two entries for 0.9 Z+V and 1.5 Z+V. The All Tilts Z+V should appear next, and we'll keep this entry, but change the menuText from "All Tilts Z+V" to "All Tilts Z/V" (black box in **Figure 11**) Copy/paste the All Tilts Z/V entry to duplicate it for the All Tilts Z/SRM entry. Make the changes indicated in red boxes in **Figure 11**:

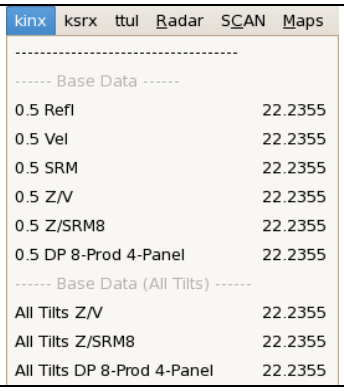
Panel.	• Change the menuText to “0.5 Z/SRM8”, • Change the id to “%{icao}058bitZSRM” • Change the values for product7 and product 8 to “” • Change the value for mode2 to “SRM8”.
	Delete the entries (for 0.5 Z+V, 0.9 Z+V, and 1.5 Z+V) until you get to the All Tilts Z+V entry. Keep the All Tilts Z+V, but change its menuText to “All Tilts Z/V”, and then delete the rest of the entries (the Hi Tilts V sub menu). Delete the separator following the Z/V entries. Just prior to the last line in the file (</menuTemplate>) copy/paste the 0.5 DP 8-Prod 4-Panel (the red box in **Figure 12**) so it appears as the black box in **Figure 12**, which illustrates the bottom portion of the file. In the black box version, • Change the menuText to “All Tilts DP 8-Prod 4 Panel” • Cange the id to ${icao}AllTiltsDualPolBaseData • Change the elevation value to “0.0--360.0” The whole baseData.xml file should probably be around 140 lines long or so, depending whether or not you added any blank lines for readability. If you haven’t done so already, save the baseData.xml file

```
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="" />
        <substitute key="product8" value="" />
        <substitute key="mode2" value="SRM8" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarDualPolBaseData.xml" menuText="0.5 DP 8-Prod 4-Panel"
        id="${icao}05dualPolBaseData">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="titleItem" titleText="------ Base Data (All Tilts) ------" id="BaseDataAllTilts"/>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="All Tilts Z/V"
        id="${icao}AllTiltsZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="27" />
        <substitute key="product8" value="25" />
        <substitute key="mode2" value="" />
        <substitute key="elevation" value="0.0--360.0" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="All Tilts Z/SRM8"
        id="${icao}AllTiltsZSRM8">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="" />
        <substitute key="product8" value="" />
        <substitute key="mode2" value="SRM8" />
        <substitute key="elevation" value="0.0--360.0" />
    </contribute>

</menuTemplate>
```

Figure 11. Edits to baseData.xml to change the menuText label for All Tilts Z/V and to add the All Tilts Z/SRM .

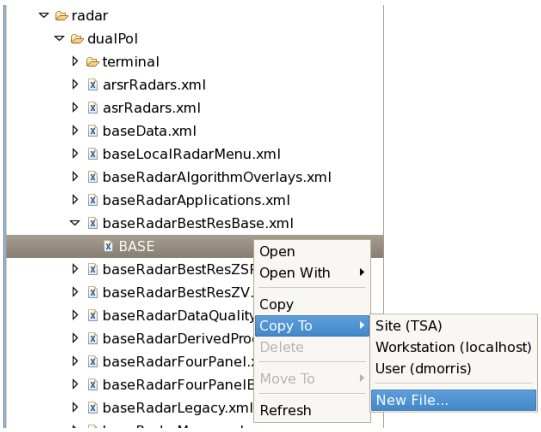
```
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarDualPolBaseData.xml" menuText="0.5 DP 8-Prod 4-Panel"
        id="${icao}05dualPolBaseData">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>

    <contribute xsi:type="titleItem" titleText="------ Base Data (All Tilts) ------" id="BaseDataAllTilts"/>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="All Tilts Z/V"
        id="${icao}AllTiltsZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="27" />
        <substitute key="product8" value="25" />
        <substitute key="mode2" value="" />
        <substitute key="elevation" value="0.0--360.0" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="All Tilts Z/SRM8"
        id="${icao}AllTiltsZSRM8">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="" />
        <substitute key="product8" value="" />
        <substitute key="mode2" value="SRM8" />
        <substitute key="elevation" value="0.0--360.0" />
    </contribute>

    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarDualPolBaseData.xml" menuText="All Tilts DP 8-Prod 4-Panel"
        id="${icao}AllTiltsdualPolBaseData">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="0.0--360.0" />
    </contribute>

</menuTemplate>
```

Figure 12. Bottom portion of baseData.xml once all edits have been performed.

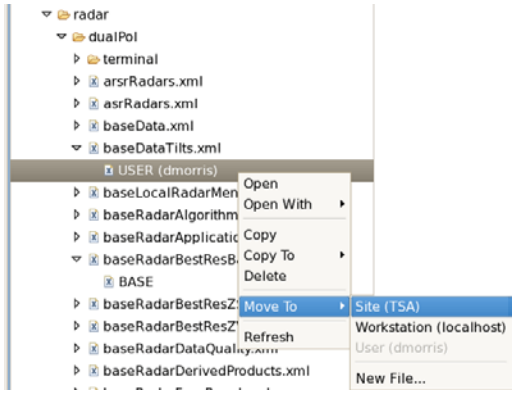
11. Restart CAVE and verify that the local radar menu shows only the 9 entries we've created plus the two title items.	
12. Now we'll work on the Base Data Tilts section. We'll use the baseRadarBestResBase.xml	In the file browser, open **CAVE** » **Menus** » **radar** » **dualPol** » **baseRadarBestResBase.xml.** Right-click **BASE** and select **Copy To ►New File.**

file in the dualPol section to create our baseDataTilts.xml. We use baseDataBestResBase.xml as a starting point because it already contains pull-out menus for most of the radar parameters we want: Z, V, SRM, SW, ZDR, CC, and KDP (see **Figure 1**).

Name the file **baseDataTilts.xml**.



Move the new user version of baseDataTilts.xml to a Site version. Right click on **USER** and choose **Move To ► Site**.



13. Open the new baseDataTilts.xml by double-clicking on its **SITE** icon. Modify the first titleItem in baseDataTilts.xml.

As shown in **Figure 13**, change the titleText in the first titleItem to "------ Base Data Tilts -----" and the id to "${icao}BaseDataTilts". Save your changes.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Base Data Tilts ------"
        id="${icao}BaseDataTilts" />
    <contribute xsi:type="subMenu" menuText="${icao} Z" id="${icao}BestResRfl">
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 Z best res" id="${icao}05Refl">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="153" />
            <substitute key="product2" value="94" />
            <substitute key="product3" value="19" />
            <substitute key="product4" value="20" />
            <substitute key="elevation" value="0.5--0.5" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.9 Z best res" id="${icao}09Refl">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="153" />
            <substitute key="product2" value="94" />
            <substitute key="product3" value="19" />
            <substitute key="product4" value="20" />
            <substitute key="elevation" value="0.9--0.9" />
        </contribute>
```

Figure 13. First edits to baseDataTilts.xml to modify the titleItem.

14. Include the baseDataTilts.xml and a new separator in the main baseLocalRadarMenu.xml menu.	In the **SITE** version of baseLocalRadarMenu.xml, add the two lines indicated in Figure 14. Save your changes.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<contribute xsi:type="subMenu" menuText="${icao}">
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseData.xml"/>
    <contribute xsi:type="separator" id="${icao}BaseDataTiltsSep" />

    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseDataTilts.xml"/>

    <!--
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarBestResZSRM.xml" />
    <contribute xsi:type="separator" id="${icao}BestResZV" />
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarBestResZV.xml" />
    <contribute xsi:type="separator" id="${icao}4PanelZSRM_ZDRV_KDP_HC_CCSW" />
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarFourPanel.xml" />
    <contribute xsi:type="separator" id="${icao}BestResBase" />
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarBestResBase.xml" />
    <contribute xsi:type="separator" id="${icao}RadarPrecip" />
    <contribute xsi:type="subinclude" subMenu="${icao} Precip" fileName="menus/radar/dualPol/baseRadarPrecip.xml" />
    <contribute xsi:type="subinclude" subMenu="${icao} Derived Products" fileName="menus/radar/dualPol/baseRadarDerivedProducts.xml"
    <contribute xsi:type="subinclude" subMenu="${icao} Algorithm Overlays" fileName="menus/radar/dualPol/baseRadarAlgorithmOverlays.x
    <contribute xsi:type="subinclude" subMenu="${icao} four panel" fileName="menus/radar/dualPol/baseRadarFourPanelBestRes.xml" />
    <contribute xsi:type="subinclude" subMenu="${icao} Data Quality" fileName="menus/radar/dualPol/baseRadarDataQuality.xml" />
    <contribute xsi:type="subinclude" subMenu="${icao} 4-bit/Legacy Prods" fileName="menus/radar/dualPol/baseRadarLegacy.xml" />
    <contribute xsi:type="subinclude" subMenu="Radar Applications" fileName="menus/radar/dualPol/baseRadarApplications.xml" />

    -->
```

Figure 14. Edits to baseLocalRadarMenu.xml to include a new separator and the new baseDataTilts.xml contribution.

15. Back in baseDataTilts.xml, make a few cosmetic changes to the menu text for the Z and V sub menus.	As shown in **Figure 15**, change the menuText for the Z sub menu from "${icao} Z" to "Refl", at approximately line 24. Similarly, at approximately line 196, change the menuText for the V subMenu from "${icao} V" to "Vel" (**Figure 16**).

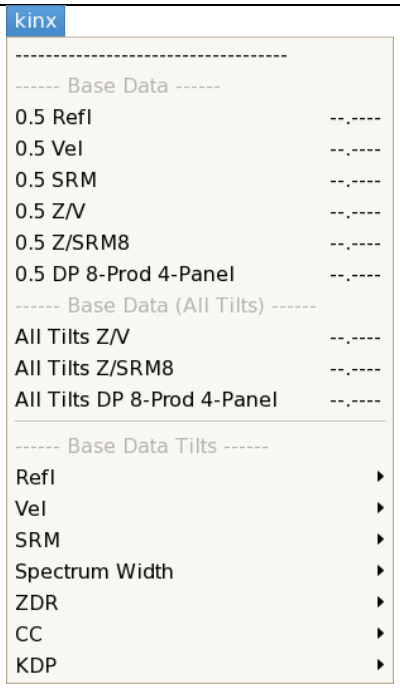
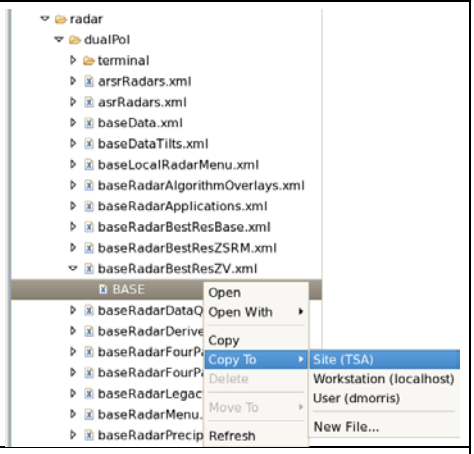
```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Base Data Tilts ------"
        id="${icao}BaseDataTilts" />
    <contribute xsi:type="subMenu" menuText="Refl" id="${icao}BestResRfl">
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 Z best res" id="${icao}05Refl">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="153" />
            <substitute key="product2" value="94" />
            <substitute key="product3" value="19" />
            <substitute key="product4" value="20" />
            <substitute key="elevation" value="0.5--0.5" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.9 Z best res" id="${icao}09Refl">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="153" />
            <substitute key="product2" value="94" />
            <substitute key="product3" value="19" />
            <substitute key="product4" value="20" />
            <substitute key="elevation" value="0.9--0.9" />
        </contribute>
```

Figure 15. Edit to baseDataTilts.xml to change the menuText of the Z subMenu.

```
174         </contribute>
175         <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
176             menuText="19.5 Z best res" id="${icao}195Refl">
177             <substitute key="icao" value="${icao}" />
178             <substitute key="mode" value="" />
179             <substitute key="product1" value="153" />
180             <substitute key="product2" value="94" />
181             <substitute key="product3" value="19" />
182             <substitute key="product4" value="20" />
183             <substitute key="elevation" value="19.5--19.5" />
184         </contribute>
185         <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
186             menuText="Z (All)" id="${icao}ReflAll">
187             <substitute key="icao" value="${icao}" />
188             <substitute key="mode" value="" />
189             <substitute key="product1" value="153" />
190             <substitute key="product2" value="94" />
191             <substitute key="product3" value="19" />
192             <substitute key="product4" value="20" />
193             <substitute key="elevation" value="0.0--360.0" />
194         </contribute>
195     </contribute>
196     <contribute xsi:type="subMenu" menuText="Vel" id="${icao}BestResRfl">
197         <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
198             menuText="0.5 V best res" id="${icao}05Vel">
199             <substitute key="icao" value="${icao}" />
200             <substitute key="mode" value="" />
201             <substitute key="product1" value="154" />
202             <substitute key="product2" value="99" />
203             <substitute key="product3" value="27" />
204             <substitute key="product4" value="25" />
205             <substitute key="elevation" value="0.5--0.5" />
206         </contribute>
207         <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
208             menuText="0.9 V best res" id="${icao}09Vel">
209             <substitute key="icao" value="${icao}" />
210             <substitute key="mode" value="" />
```

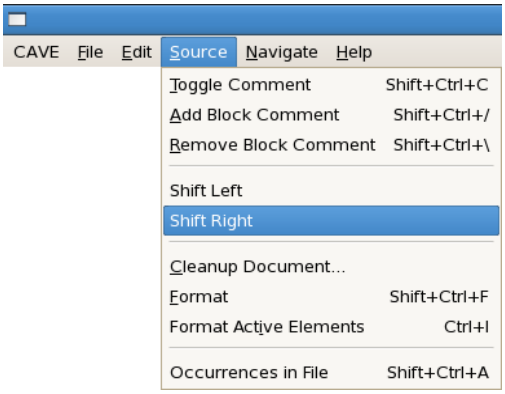
Figure 16. Edit to baseDataTilts.xml to change the menuText of the V subMenu.

16. Make additional cosmetic changes to the menuText of the remaining subMenus	At the following places in baseDataTilts.xml, change the menuText accordingly: • Line 368: "${icao} SRM" to "SRM" • Line 541: "${icao} SW" to "Spectrum Width" • Line 714: "${icao} ZDR" to "ZDR" • Line 887: "${icao} CC" to "CC" • Line 1060: "${icao} KDP" to "KDP"

17. Test our changes. Restart CAVE and look at a local radar menu.	
18. The next pullout menu to add is for Z/V. Looking at Figure 1, we can see that the baseline Z/V pull out is in baseRadarBestResZV.xml. We'll make a SITE copy of that file, and make a few modifications.	Right-click on **BASE** under **baseRadarBestResZV.xml** and choose **Copy To ► Site**. 
19. Edit the SITE version of baseRadarBestResZV.xml to remove the titleItem, and slightly rearrange the Z/V menu. The Z/V menu has the 0.5, 0.9, and 1.5 entries, then the All Tilts, followed by a submenu with the remaining tilts. We will remove the submenu but save its contents. We also move the All Tilts to the bottom of the file so that the tilt	Delete the titleItem contribution near the top of the file (lines shown in **Figure 17**). Move (cut/paste or copy/paste/delete) the All Tilts contribution (black box in **Figure 18**) to near the bottom of the file (just after the 19.5 entry shown in **Figure 19**). Delete the contribution for the **Hi Tilts Z+V** submenu (red box in **Figure 18**). Delete the </contribute> tag in **Figure 19** (red box) that was the closing tag for the Hi Tilts Z+V submenu contribution. Verify the bottom of the file matches **Figure 20.**

sequence is correct (e.g., 1.5, 1.8, 2.4, …, 19.5, All Tilts).

Note: Consider improving the indentation (alignment) of the menu entries that were inside the submenu, for improved readability. The Localization Perspective text editor has some tools to help with indentation, including the **Shift Right** and **Shift Left** options under the **Source** menu.




```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Best Res Z+V ------"
        id="BestResZV" />
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.5 Z+V"
        id="${icao}058bitZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="27" />
        <substitute key="product8" value="25" />
        <substitute key="mode2" value="" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.9 Z+V"
        id="${icao}098bitZV">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
```

Figure 17. Title item to be deleted from the SITE version of baseRadarBestResZV.xml.

```
58          <substitute key="product1" value="153" />
59          <substitute key="product2" value="94" />
60          <substitute key="product3" value="19" />
61          <substitute key="product4" value="20" />
62          <substitute key="mode1" value="" />
63          <substitute key="product5" value="154" />
64          <substitute key="product6" value="99" />
65          <substitute key="product7" value="27" />
66          <substitute key="product8" value="25" />
67          <substitute key="mode2" value="" />
68          <substitute key="elevation" value="1.5--1.5" />
69      </contribute>
70      <contribute xsi:type="bundleItem"
71          file="bundles/DefaultRadarBlendedBestRes.xml" menuText="All Tilts Z+V"
72          id="${icao}AllTiltsZV">
73          <substitute key="icao" value="${icao}" />
74          <substitute key="product1" value="153" />
75          <substitute key="product2" value="94" />
76          <substitute key="product3" value="19" />
77          <substitute key="product4" value="20" />
78          <substitute key="mode1" value="" />
79          <substitute key="product5" value="154" />
80          <substitute key="product6" value="99" />
81          <substitute key="product7" value="27" />
82          <substitute key="product8" value="25" />
83          <substitute key="mode2" value="" />
84          <substitute key="elevation" value="0.0--360.0" />
85      </contribute>
86      <contribute xsi:type="subMenu" menuText="${icao} Hi Z+V tilts">
87          <contribute xsi:type="bundleItem"
88              file="bundles/DefaultRadarBlendedBestRes.xml" menuText="1.8 Z+V"
89              id="${icao}184bit8bitZV">
90              <substitute key="icao" value="${icao}" />
91              <substitute key="product1" value="153" />
92              <substitute key="product2" value="94" />
93              <substitute key="product3" value="19" />
94              <substitute key="product4" value="20" />
95              <substitute key="mode1" value="" />
96              <substitute key="product5" value="154" />
97              <substitute key="product6" value="99" />
98              <substitute key="product7" value="27" />
99              <substitute key="product8" value="25" />
100             <substitute key="mode2" value="" />
101             <substitute key="elevation" value="1.8--1.8" />
102         </contribute>
103         <contribute xsi:type="bundleItem"
104             file="bundles/DefaultRadarBlendedBestRes.xml" menuText="2.4 Z+V"
```

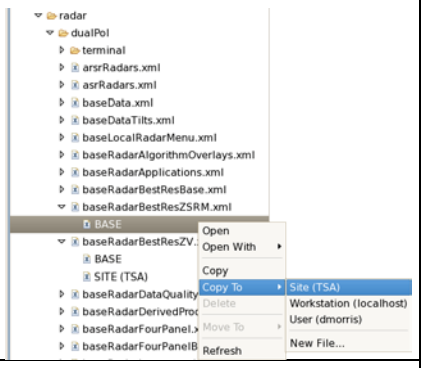
Figure 18. All Tilts contribution in the SITE version of baseRadarBestResZV.xml to be moved to the end of the file and submenu contribution to be deleted.

```
278         </contribute>
279         <contribute xsi:type="bundleItem"
280             file="bundles/DefaultRadarBlendedBestRes.xml" menuText="19.5 Z+V"
281             id="${icao}1954bit8bitZV">
282             <substitute key="icao" value="${icao}" />
283             <substitute key="product1" value="153" />
284             <substitute key="product2" value="94" />
285             <substitute key="product3" value="19" />
286             <substitute key="product4" value="20" />
287             <substitute key="mode1" value="" />
288             <substitute key="product5" value="154" />
289             <substitute key="product6" value="99" />
290             <substitute key="product7" value="27" />
291             <substitute key="product8" value="25" />
292             <substitute key="mode2" value="" />
293             <substitute key="elevation" value="19.5--19.5" />
294         </contribute>
295     <contribute xsi:type="bundleItem"
296         file="bundles/DefaultRadarBlendedBestRes.xml" menuText="All Tilts Z+V"
297         id="${icao}AllTiltsZV">
298         <substitute key="icao" value="${icao}" />
299         <substitute key="product1" value="153" />
300         <substitute key="product2" value="94" />
301         <substitute key="product3" value="19" />
302         <substitute key="product4" value="20" />
303         <substitute key="mode1" value="" />
304         <substitute key="product5" value="154" />
305         <substitute key="product6" value="99" />
306         <substitute key="product7" value="27" />
307         <substitute key="product8" value="25" />
308         <substitute key="mode2" value="" />
309         <substitute key="elevation" value="0.0--360.0" />
310     </contribute>
311     </contribute>
312 </menuTemplate>
313
```

Figure 19. Tag to be deleted in the SITE version of bestRadarBestResZV.xml.

```
273             <substitute key="product7" value="27" />
274             <substitute key="product8" value="25" />
275             <substitute key="mode2" value="" />
276             <substitute key="elevation" value="16.7--16.7" />
277         </contribute>
278         <contribute xsi:type="bundleItem"
279             file="bundles/DefaultRadarBlendedBestRes.xml" menuText="19.5 Z+V"
280             id="${icao}1954bit8bitZV">
281             <substitute key="icao" value="${icao}" />
282             <substitute key="product1" value="153" />
283             <substitute key="product2" value="94" />
284             <substitute key="product3" value="19" />
285             <substitute key="product4" value="20" />
286             <substitute key="mode1" value="" />
287             <substitute key="product5" value="154" />
288             <substitute key="product6" value="99" />
289             <substitute key="product7" value="27" />
290             <substitute key="product8" value="25" />
291             <substitute key="mode2" value="" />
292             <substitute key="elevation" value="19.5--19.5" />
293         </contribute>
294     <contribute xsi:type="bundleItem"
295         file="bundles/DefaultRadarBlendedBestRes.xml" menuText="Z+V (All)"
296         id="${icao}AllTiltsZV">
297         <substitute key="icao" value="${icao}" />
298         <substitute key="product1" value="153" />
299         <substitute key="product2" value="94" />
300         <substitute key="product3" value="19" />
301         <substitute key="product4" value="20" />
302         <substitute key="mode1" value="" />
303         <substitute key="product5" value="154" />
304         <substitute key="product6" value="99" />
305         <substitute key="product7" value="27" />
306         <substitute key="product8" value="25" />
307         <substitute key="mode2" value="" />
308         <substitute key="elevation" value="0.0--360.0" />
309     </contribute>
310 </menuTemplate>
311
```

Figure 20. Bottom portion of the SITE version of bestRadarBestResZV.xml once all edits have been completed.

20. Make a Site version of baseRadarBestResZSRM.	Right-click on **BASE** under **baseRadarBestResZSRM.xml** and choose **Copy To ► Site**. Edit the Site version of baseRadarBestResZSRM.xml. 
21. Perform similar edits in baseRadarBestResZSRM.xml as we just did in baseRadarBestResZV.xml.	Edit the **SITE** version of baseRadarBestResZSRM.xml and perform the following edits: • Delete the “Best Res Z+SRM8 combo” titleItem near the top of the the file (**Figure 21**). • Move the All Tilts entry (black box in **Figure 22**) to the bottom of the file (just before the very last </contribute> tag). • Delete the “Hi Z+SRM8 tilts” subMenu contribute entry just below where the All Tilts entry was (red box in **Figure 22**). • Delete the very last </contribute> tag in the file (this would be the closing tag for the subMenu contribute we just deleted). • Save the file.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Best Res Z+SRM8 combo ------"
        id="BestResZSRM8" />
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.5 Z+SRM8"
        id="${icao}05ZSRM8">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="" />
        <substitute key="product8" value="" />
        <substitute key="mode2" value="SRM8" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="0.9 Z+SRM8"
        id="${icao}09ZSRM8">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
```

Figure 21. TitleItem to be deleted from baseRadarBestResZSRM.xml.

```
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="1.5 Z+SRM8"
        id="${icao}15ZSRM8">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="" />
        <substitute key="product8" value="" />
        <substitute key="mode2" value="SRM8" />
        <substitute key="elevation" value="1.5--1.5" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarBlendedBestRes.xml" menuText="All Tilts Z+SRM8"
        id="${icao}AllTiltsZSRM8">
        <substitute key="icao" value="${icao}" />
        <substitute key="product1" value="153" />
        <substitute key="product2" value="94" />
        <substitute key="product3" value="19" />
        <substitute key="product4" value="20" />
        <substitute key="mode1" value="" />
        <substitute key="product5" value="154" />
        <substitute key="product6" value="99" />
        <substitute key="product7" value="" />
        <substitute key="product8" value="" />
        <substitute key="mode2" value="SRM8" />
        <substitute key="elevation" value="0.0--360.0" />
    </contribute>
    <contribute xsi:type="subMenu" menuText="${icao} Hi Z+SRM8 tilts">
        <contribute xsi:type="bundleItem"
            file="bundles/DefaultRadarBlendedBestRes.xml" menuText="1.8 Z+SRM"
            id="${icao}188bitZSRM">
            <substitute key="icao" value="${icao}" />
            <substitute key="product1" value="153" />
```

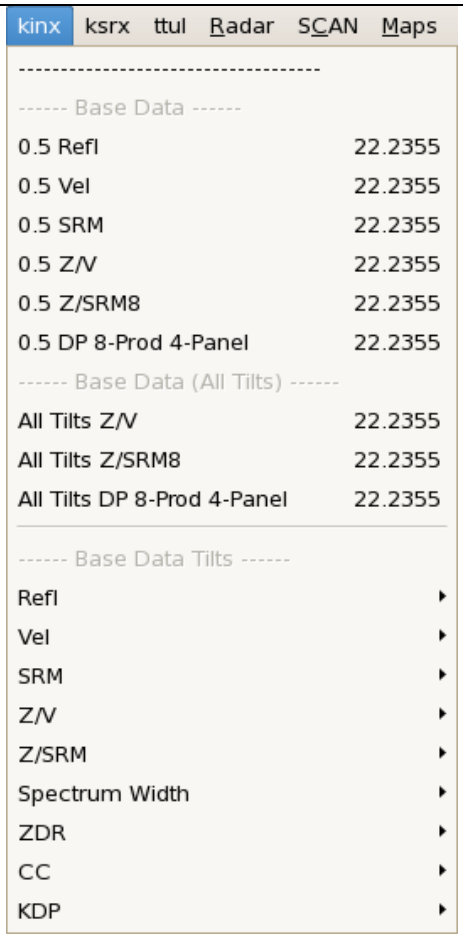
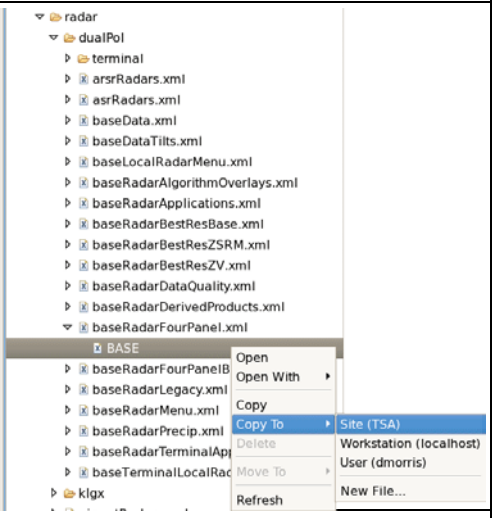
Figure 22. Edits in baseRadarBestResZSRM.xml to move the All Tilts to near the bottom of the file and to delete the “Hi Z+SRM8 tilts” submenu.

22. Attach the Z/V and Z/SRM files as pullout submenus to	In baseDataTilts.xml, add the two contribute lines indicated in **Figure 23.** They go between the SRM and the Spectrum

the baseDataTilts.xml file.	Width portions of the file. Save the baseDataTilts.xml file.

```
514             <substitute key="product2" value="99" />
515             <substitute key="product3" value="" />
516             <substitute key="product4" value="" />
517             <substitute key="mode" value="SRM8" />
518             <substitute key="elevation" value="16.7--16.7" />
519         </contribute>
520         <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
521             menuText="19.5 SRM best res" id="${icao}1958bitSRM">
522             <substitute key="icao" value="${icao}" />
523             <substitute key="product1" value="154" />
524             <substitute key="product2" value="99" />
525             <substitute key="product3" value="" />
526             <substitute key="product4" value="" />
527             <substitute key="mode" value="SRM8" />
528             <substitute key="elevation" value="19.5--19.5" />
529         </contribute>
530         <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
531             menuText="SRM (All)" id="${icao}8bitSRMAll">
532             <substitute key="icao" value="${icao}" />
533             <substitute key="product1" value="154" />
534             <substitute key="product2" value="99" />
535             <substitute key="product3" value="" />
536             <substitute key="product4" value="" />
537             <substitute key="mode" value="SRM8" />
538             <substitute key="elevation" value="0.0--360.0" />
539         </contribute>
540     </contribute>
541     <contribute xsi:type="subinclude" subMenu="Z/V" fileName="menus/radar/dualPol/baseRadarBestResZV.xml"/>
542     <contribute xsi:type="subinclude" subMenu="Z/SRM" fileName="menus/radar/dualPol/baseRadarBestResZSRM.xml"/>
543     <contribute xsi:type="subMenu" menuText="Spectrum Width"
544         id="${icao}BestResSpecWidth">
545         <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
546             menuText="0.5 SW best res" id="${icao}05BestResSpecWidth">
547             <substitute key="icao" value="${icao}" />
548             <substitute key="product1" value="155" />
549             <substitute key="product2" value="28" />
550             <substitute key="product3" value="29" />
551             <substitute key="product4" value="30" />
552             <substitute key="mode" value="" />
553             <substitute key="elevation" value="0.5--0.5" />
554         </contribute>
555         <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
556             menuText="0.9 SW best res" id="${icao}09BestResSpecWidth">
557             <substitute key="icao" value="${icao}" />
558             <substitute key="product1" value="155" />
559             <substitute key="product2" value="28" />
560             <substitute key="product3" value="29" />
561             <substitute key="product4" value="30" />
```

Figure 23. Edits to baseDataTilts.xml to attach the baseRadarBestResZV.xml baseRadarBestResZSRM.xml files as submenus.

23. Test the progress so far by restarting CAVE and looking at a local radar menu.	
24. We still need to add pullout menus for the 8-Prod DP 4 Panel and the HC Analysis 4 Panel. To do this, we'll make SITE versions of baseRadarFourPanel.xml (which contains the baseline menus for the two Four Panels; see Figure 1) and rearrange them slightly, similar to the Z/SRM and Z/V submenus.	Right-click on **BASE** under baseRadarFourPanel.xml in the dualPol section and select **Copy To ► Site.** Double-click on the SITE icon to open the file. 
25. This file contains two sections, one for the 8-Product 4 Panel and the	In the Site version of baseRadarFourPanel.xml, make the following changes: • change the titleItem contribute (black box in **Figure**

other for the HC analysis 4 Panel. We'll do similar edits for both, starting with the 8-Product 4 Panel, near the top. We'll change the titleItem contribute to a submenu contribute, move the All Tilts entry to the end of the 8-Prod section, delete the opening subMenu contribute for the Hi tilts, but leave the closing contribute (previously used for the Hi Tilts submenu) and re-use it to put the entire 8-Prod section in a self-contained submenu.	**24**) to submenu by changing the xsi:type from "titleItem" to "subMenu", changing the entire titleText="------ 4 Panel Z+SRM/ZDR+V/KDP+HC/CC+SW ------" tag to menuText = "8-Prod DP 4 Panel", and deleting the closing forward slash (/) before the closing angle bracket so it reads: <contribute xsi:type="subMenu" id="${icao}4PanelZ+SRMZDR+VKDP+HCCC+SW" menuText="8-Prod DP 4 Panel" >. The closing tag will be the </contribute> from the pre-existing Hi Tilts submenu. • Move the All Tilts entry (red box in **Figure 24**) to just after the closing </contribute> tag for the 19.5 base data entry (approximately line 120 as shown by the black box in **Figure 25**) • Delete the Hi base data tilts submenu contribute (blue box in **Figure 24**).

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" id="${icao}4PanelZ+SRMZDR+VKDP+HCCC+SW"
        titleText="------ 4-Panel Z+SRM/ZDR+V/KDP+HC/CC+SW ------" />
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarDualPolBaseData.xml" menuText="0.5 base data"
        id="05dualpolbasedata">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarDualPolBaseData.xml" menuText="0.9 base data"
        id="09dualpolbasedata">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="0.9--0.9" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarDualPolBaseData.xml" menuText="1.5 base data"
        id="15dualpolbasedata">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="1.5--1.5" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarDualPolBaseData.xml" menuText="All Tilts base data"
        id="AllTiltsdualpolbasedata">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="0.0--360.0" />
    </contribute>
    <contribute xsi:type="subMenu" id="${icao}HibasedatatiltsSubmenu"
        menuText="${icao} Hi base data tilts">
        <contribute xsi:type="bundleItem"
            file="bundles/DefaultRadarDualPolBaseData.xml" menuText="1.8 base data"
            id="18dualpolbasedata">
```

Figure 24. Edits to the 8-Product 4-Panel section of the SITE version of baseRadarFourPanel.xml.

```
            <substitute key="icao" value="${icao}" />
            <substitute key="elevation" value="12.0--12.0" />
        </contribute>
        <contribute xsi:type="bundleItem"
            file="bundles/DefaultRadarDualPolBaseData.xml" menuText="14.0 base data"
            id="140dualpolbasedata">
            <substitute key="icao" value="${icao}" />
            <substitute key="elevation" value="14.0--14.0" />
        </contribute>
        <contribute xsi:type="bundleItem"
            file="bundles/DefaultRadarDualPolBaseData.xml" menuText="16.7 base data"
            id="167dualpolbasedata">
            <substitute key="icao" value="${icao}" />
            <substitute key="elevation" value="16.7--16.7" />
        </contribute>
        <contribute xsi:type="bundleItem"
            file="bundles/DefaultRadarDualPolBaseData.xml" menuText="19.5 base data"
            id="195dualpolbasedata">
            <substitute key="icao" value="${icao}" />
            <substitute key="elevation" value="19.5--19.5" />
        </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarDualPolBaseData.xml" menuText="All Tilts base data"
        id="AllTiltsdualpolbasedata">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="0.0--360.0" />
    </contribute>
    </contribute>
    <contribute xsi:type="separator" id="${icao}4PanelZZDRHCKDPCC" />
    <contribute xsi:type="titleItem" id="${icao}4PanelZZDRHC+KDPCC"
        titleText="------ 4-Panel Z/ZDR/HC+KDP/CC ------" />
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarDualPolHCA.xml"
        menuText="0.5 HC analysis" id="05dualpolHCanalysis">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="0.5--0.5" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarDualPolHCA.xml"
        menuText="0.9 HC analysis" id="09dualpolHCanalysis">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="0.9--0.9" />
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarDualPolHCA.xml"
        menuText="1.5 HC analysis" id="15dualpolHCanalysis">
        <substitute key="icao" value="${icao}" />
        <substitute key="elevation" value="1.5--1.5" />
    </contribute>
```

Figure 25. Edits to the bottom of the 8-Product 4-Panel section and the top of the HC analysis section in the SITE version of baseRadarFourPanel.xml.

26. Edit the HC analysis section of baseRadarFourPanel.xml, with similar changes as just made to the 8-Product section.	Delete the separator between the 8-Product and HC analysis sections (red box in **Figure 25**). Change the titleItem contribution (blue box in **Figure 25**) to a subMenu. Make it read: <contribute xsi:type=”subMenu” id=”${icao}4PanelZZDRHC+KDPCC” menuText=”HC Analysis 4 Panel”> (Note: the closing tag is > and not />).
	Move the All Tilts HC analysis entry (black box in **Figure 26**) to just before the closing </contribute> tag in the file (just after the 19.5 entry).

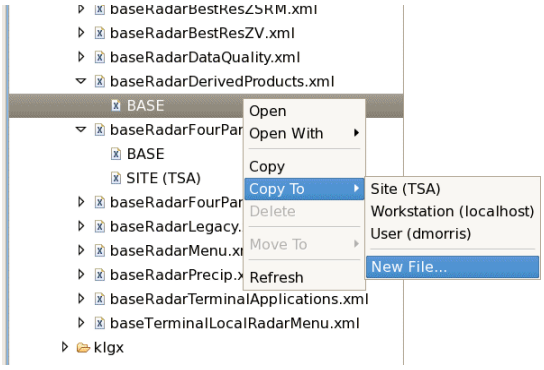
	Delete the submenu contribute for the HI HC analysis tilts (red box in Figure 26). Save the file.

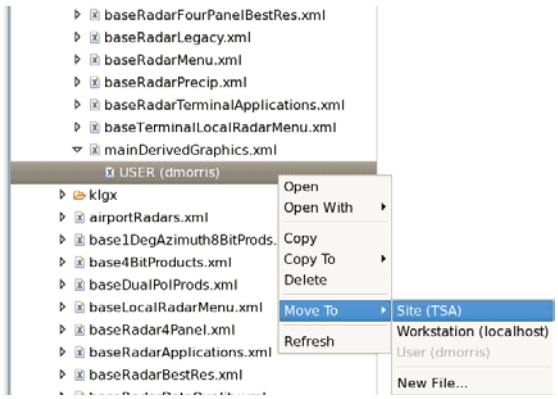
```
120     <contribute xsi:type="bundleItem"
121         file="bundles/DefaultRadarDualPolBaseData.xml" menuText="All Tilts base data"
122         id="AllTiltsdualpolbasedata">
123         <substitute key="icao" value="${icao}" />
124         <substitute key="elevation" value="0.0--360.0" />
125     </contribute>
126     </contribute>
127     <contribute xsi:type="subMenu" id="${icao}4PanelZZDRHC+KDPCC"
128         titleText="HC Analysis 4 Panel" >
129     <contribute xsi:type="bundleItem" file="bundles/DefaultRadarDualPolHCA.xml"
130         menuText="0.5 HC analysis" id="05dualpolHCanalysis">
131         <substitute key="icao" value="${icao}" />
132         <substitute key="elevation" value="0.5--0.5" />
133     </contribute>
134     <contribute xsi:type="bundleItem" file="bundles/DefaultRadarDualPolHCA.xml"
135         menuText="0.9 HC analysis" id="09dualpolHCanalysis">
136         <substitute key="icao" value="${icao}" />
137         <substitute key="elevation" value="0.9--0.9" />
138     </contribute>
139     <contribute xsi:type="bundleItem" file="bundles/DefaultRadarDualPolHCA.xml"
140         menuText="1.5 HC analysis" id="15dualpolHCanalysis">
141         <substitute key="icao" value="${icao}" />
142         <substitute key="elevation" value="1.5--1.5" />
143     </contribute>
144     <contribute xsi:type="bundleItem" file="bundles/DefaultRadarDualPolHCA.xml"
145         menuText="All Tilts HC analysis" id="AllTiltsdualpolHCanalysis">
146         <substitute key="icao" value="${icao}" />
147         <substitute key="elevation" value="0.0--360.0" />
148     </contribute>
149     <contribute xsi:type="subMenu" id="${icao}HiHCnalysistiltsSubmenu"
150         menuText="${icao} Hi HC analysis tilts">
151         <contribute xsi:type="bundleItem" file="bundles/DefaultRadarDualPolHCA.xml"
152             menuText="1.8 HC analysis" id="18dualpolHCanalysis">
153             <substitute key="icao" value="${icao}" />
154             <substitute key="elevation" value="1.8--1.8" />
155         </contribute>
156         <contribute xsi:type="bundleItem" file="bundles/DefaultRadarDualPolHCA.xml"
157             menuText="2.4 HC analysis" id="24dualpolHCanalysis">
158             <substitute key="icao" value="${icao}" />
159             <substitute key="elevation" value="2.4--2.4" />
160         </contribute>
161         <contribute xsi:type="bundleItem" file="bundles/DefaultRadarDualPolHCA.xml"
162             menuText="3.4 HC analysis" id="34dualpolHCanalysis">
163             <substitute key="icao" value="${icao}" />
164             <substitute key="elevation" value="3.4--3.4" />
165         </contribute>
```

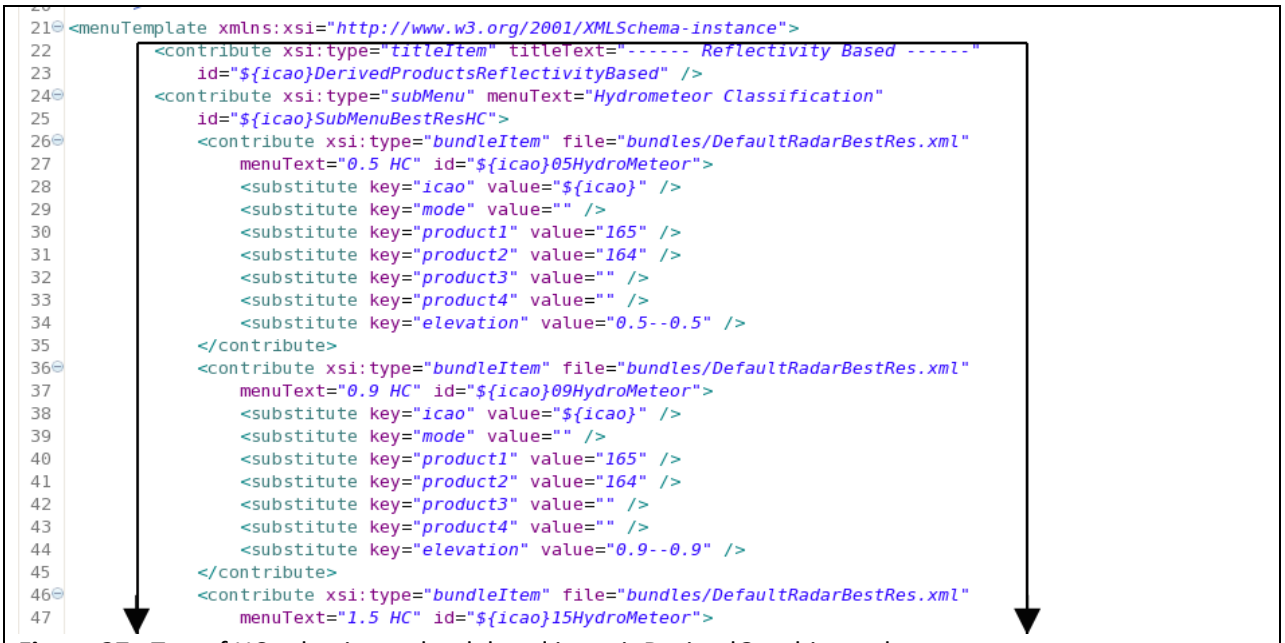
Figure 26. Edits to HC analysis section of baseRadarFourPanel.xml.

27. To add the Derived/Graphics section, we'll use a copy of baseRadarDerivedProducts.xml and call it mainDerivedGraphics.xml. The edits from here on out are much simpler, mostly deleting entries we don't need and placing submenus in the correct location.

Right-click on **BASE** under baseRadarDerivedProducts.xml in the dualPol section and select **Copy To ► New File.** Name the new file mainDerivedGraphics.xml. This file should default to a **USER** version. Make it a site version by



	right-clicking on its **USER** icon and selecting **Move To ► Site**. 
28. Delete the HC section. None of these deleted items will be unavailable because we will include the entire baseRadarDerivedProducts.xml as a pull out menu in a later step.	Delete the entire HC section which spans near the top of the file (**Figure 27**) to just before the Composite Reflectivity section (**Figure 28**) near line 196.



```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Reflectivity Based ------"
        id="${icao}DerivedProductsReflectivityBased" />
    <contribute xsi:type="subMenu" menuText="Hydrometeor Classification"
        id="${icao}SubMenuBestResHC">
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.5 HC" id="${icao}05HydroMeteor">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="165" />
            <substitute key="product2" value="164" />
            <substitute key="product3" value="" />
            <substitute key="product4" value="" />
            <substitute key="elevation" value="0.5--0.5" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="0.9 HC" id="${icao}09HydroMeteor">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="165" />
            <substitute key="product2" value="164" />
            <substitute key="product3" value="" />
            <substitute key="product4" value="" />
            <substitute key="elevation" value="0.9--0.9" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="1.5 HC" id="${icao}15HydroMeteor">
```

Figure 27. Top of HC selection to be deleted in mainDerivedGraphics.xml.

```
            <substitute key="product1" value="165" />
            <substitute key="product2" value="164" />
            <substitute key="product3" value="" />
            <substitute key="product4" value="" />
            <substitute key="elevation" value="16.7--16.7" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="19.5 HC" id="${icao}1655HydroMeteor">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="165" />
            <substitute key="product2" value="164" />
            <substitute key="product3" value="" />
            <substitute key="product4" value="" />
            <substitute key="elevation" value="19.5--19.5" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarBestRes.xml"
            menuText="HC (All)" id="${icao}HydroMeteorAll">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
            <substitute key="product1" value="165" />
            <substitute key="product2" value="164" />
            <substitute key="product3" value="" />
            <substitute key="product4" value="" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/DefaultRadarCompRefl.xml"
        menuText="1km and 4km Composite Ref (CZ)" id="${icao}CompositeRefCZ">
        <substitute key="icao" value="${icao}" />
        <substitute key="mode" value="" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarImageWithGraphic.xml" menuText="1km Composite Ref (CZ)"
        id="${icao}1kmCompositeRef">
        <substitute key="icao" value="${icao}" />
        <substitute key="product" value="37" />
        <substitute key="mode1" value="" />
        <substitute key="mode2" value="CZ-Pg" />
        <substitute key="latest" value="false" />
        <substitute key="elevation" value="0.0--360.0" />
    </contribute>
    <contribute xsi:type="bundleItem"
        file="bundles/DefaultRadarImageWithGraphic.xml" menuText="4km Composite Ref (CZ)"
        id="${icao}4kmCompositeRef">
        <substitute key="icao" value="${icao}" />
        <substitute key="product" value="38" />
```

Figure 28. Bottom of HC selection to be deleted in mainDerivedGraphics.xml.

29. Delete three bundle items that are now near the top of the file. These are the 1km Composite Reflectivity, the 4 Composite Reflectivity, and the VIL/Composite Reflectivity combination product.	Delete the lines indicated in the black box in **Figure 29**.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarCompRefl.xml"
            menuText="1km and 4km Composite Ref (CZ)" id="${icao}CompositeRefCZ">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
        </contribute>
        <contribute xsi:type="bundleItem"
            file="bundles/DefaultRadarImageWithGraphic.xml" menuText="1km Composite Ref (CZ)"
            id="${icao}1kmCompositeRef">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="37" />
            <substitute key="mode1" value="" />
            <substitute key="mode2" value="CZ-Pg" />
            <substitute key="latest" value="false" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
        <contribute xsi:type="bundleItem"
            file="bundles/DefaultRadarImageWithGraphic.xml" menuText="4km Composite Ref (CZ)"
            id="${icao}4kmCompositeRef">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="38" />
            <substitute key="mode1" value="" />
            <substitute key="mode2" value="CZ-Pg" />
            <substitute key="latest" value="false" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarVILCompRefl.xml"
            menuText="VIL/Comp Ref" id="${icao}VILCompRef">
            <substitute key="icao" value="${icao}" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadar.xml"
            menuText="Vert Integ Liquid (VIL)" id="${icao}VertIntegLiquidVIL">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="57" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadar.xml"
            menuText="Digital VIL (DVL)" id="${icao}DigitalVilDVL">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="134" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadar.xml"
```

Figure 29. Three contributions to be deleted from mainDerivedGraphics.xml

30. Keep the next four contributions for the bundles for (VIL, DVL, ET, and EET).	Delete the remaining contributions starting with the separator just below the EET bundleItem entry (**Figure 30**). Don't delete the final </menuTemplate> tag in the file. The final mainDerivedGraphics.xml file is shown in **Figure 31.** Save your changes to mainDerivedGraphics.xml.

```
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadar.xml"
            menuText="Digital VIL (DVL)" id="${icao}DigitalVilDVL">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="134" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadar.xml"
            menuText="Echo Tops (ET)" id="${icao}EchoTopsET">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="41" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadar.xml"
            menuText="Enhanced Echo Tops (EET)" id="${icao}EnhancedEchoTopsEET">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="135" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
        <contribute xsi:type="separator" id="${icao}DerivedProductsReflectivity" />
        <contribute xsi:type="titleItem" titleText="------ Velocity Based ------"
            id="${icao}DerivedProductsVelocityBased" />
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarXY.xml"
            menuText="VAD Wind Profile (VWP)" id="${icao}VADWindProfile"
            editorType="com.raytheon.viz.radar.ui.xy.RadarXYEditor">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="48" />
            <substitute key="insetMap" value="false" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarXY.xml"
            menuText="Vel Az Display (VAD)" id="${icao}VelAzDisplay"
            editorType="com.raytheon.viz.radar.ui.xy.RadarXYEditor">
            <substitute key="icao" value="${icao}" />
```

Figure 30. Top portion of remaining entries to be deleted from mainDerivedGraphics.xml.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadarCompRefl.xml"
            menuText="CZ" id="${icao}CompositeRefCZ">
            <substitute key="icao" value="${icao}" />
            <substitute key="mode" value="" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadar.xml"
            menuText="VIL" id="${icao}VertIntegLiquidVIL">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="57" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadar.xml"
            menuText="DVL" id="${icao}DigitalVilDVL">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="134" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadar.xml"
            menuText="ET" id="${icao}EchoTopsET">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="41" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/DefaultRadar.xml"
            menuText="EET" id="${icao}EnhancedEchoTopsEET">
            <substitute key="icao" value="${icao}" />
            <substitute key="product" value="135" />
            <substitute key="elevation" value="0.0--360.0" />
        </contribute>
</menuTemplate>
```

Figure 31. Final version of mainDerivedGraphics.xml

31. Edit baseLocalRadarMenu.xml to add our new FourPanel and DerivedGraphics menus and	In the baseLocalRadarMenu.xml, make these changes: • Delete the items indicated in **Figure 32.** Content from these items are included in the menus we've just worked on.

to rearrange existing submenus.	• Add the lines indicated in **Figure 33.** This adds the two Dual-Pol four panel entries, a separator and titleItem for the Derived/Graphics section, and the five non-pull-out menus in the DerivedGraphics section from mainDerivedGraphics.xml. • Uncommon the final section of the menu contributions, and add the separator and titleItem shown in **Figure 34**. **Figure 34** shows the final version of baseLocalRadarMenu.xml

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<contribute xsi:type="subMenu" menuText="${icao}">
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseData.xml"/>
    <contribute xsi:type="separator" id="${icao}BaseDataTiltsSep" />

    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseDataTilts.xml"/>

    <!--
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarBestResZSRM.xml" />
    <contribute xsi:type="separator" id="${icao}BestResZV" />
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarBestResZV.xml" />
    <contribute xsi:type="separator" id="${icao}4PanelZSRM_ZDRV_KDP_HC_CCSW" />
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarFourPanel.xml" />
    <contribute xsi:type="separator" id="${icao}BestResBase" />
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarBestResBase.xml" />
    <contribute xsi:type="separator" id="${icao}RadarPrecip" />
    <contribute xsi:type="subinclude" subMenu="${icao} Precip" fileName="menus/radar/dualPol/baseRadarPrecip.xml" />
    <contribute xsi:type="subinclude" subMenu="${icao} Derived Products" fileName="menus/radar/dualPol/baseRadarDerivedProd
    <contribute xsi:type="subinclude" subMenu="${icao} Algorithm Overlays" fileName="menus/radar/dualPol/baseRadarAlgorithm
    <contribute xsi:type="subinclude" subMenu="${icao} four panel" fileName="menus/radar/dualPol/baseRadarFourPanelBestRes.
    <contribute xsi:type="subinclude" subMenu="${icao} Data Quality" fileName="menus/radar/dualPol/baseRadarDataQuality.xml
    <contribute xsi:type="subinclude" subMenu="${icao} 4-bit/Legacy Prods" fileName="menus/radar/dualPol/baseRadarLegacy.xm
    <contribute xsi:type="subinclude" subMenu="Radar Applications" fileName="menus/radar/dualPol/baseRadarApplications.xml"

    -->
```

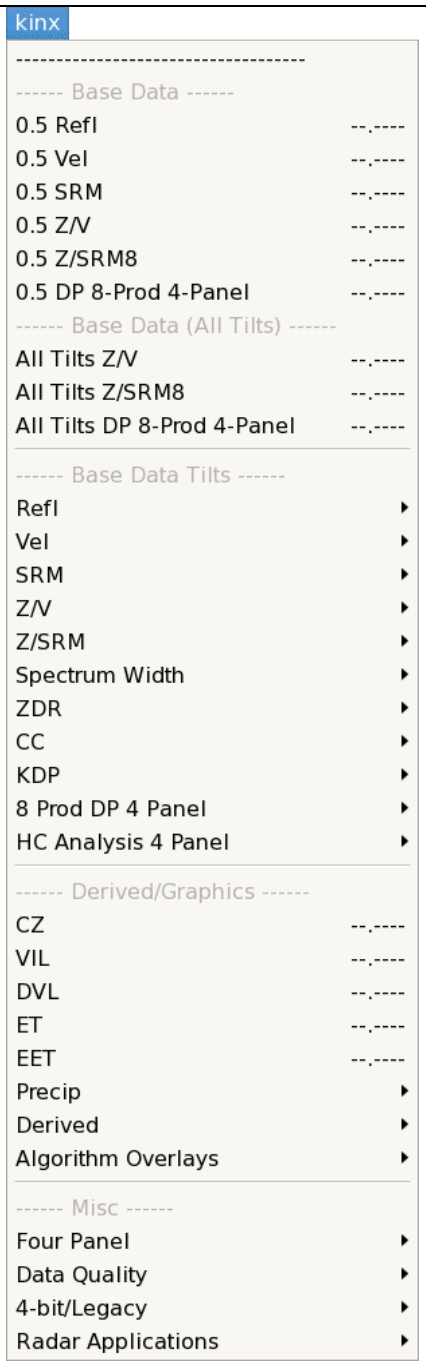
Figure 32. Items in baseLocalRadarMenu.xml to be deleted.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<contribute xsi:type="subMenu" menuText="${icao}">
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseData.xml"/>
    <contribute xsi:type="separator" id="${icao}BaseDataTiltsSep" />

    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseDataTilts.xml"/>

    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarFourPanel.xml" />

    <contribute xsi:type="separator" id="${icao}DerivedGraphicsSep" />
    <contribute xsi:type="titleItem" id="${icao}DerivedGraphics" titleText="------ Derived/Graphics ------"/>
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/mainDerivedGraphics.xml" />

<!--
    <contribute xsi:type="separator" id="${icao}RadarPrecip" />
    <contribute xsi:type="subinclude" subMenu="${icao} Precip" fileName="menus/radar/dualPol/baseRadarPrecip.xml" />
    <contribute xsi:type="subinclude" subMenu="${icao} Derived Products" fileName="menus/radar/dualPol/baseRadarDerivedProc
    <contribute xsi:type="subinclude" subMenu="${icao} Algorithm Overlays" fileName="menus/radar/dualPol/baseRadarAlgorithr
    <contribute xsi:type="subinclude" subMenu="${icao} four panel" fileName="menus/radar/dualPol/baseRadarFourPanelBestRes.
    <contribute xsi:type="subinclude" subMenu="${icao} Data Quality" fileName="menus/radar/dualPol/baseRadarDataQuality.xml
    <contribute xsi:type="subinclude" subMenu="${icao} 4-bit/Legacy Prods" fileName="menus/radar/dualPol/baseRadarLegacy.xr
    <contribute xsi:type="subinclude" subMenu="Radar Applications" fileName="menus/radar/dualPol/baseRadarApplications.xml"

    -->


</contribute>
</menuTemplate>
```

Figure 33. Items in baseLocalRadarMenu.xml to be added.

```
-->
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<contribute xsi:type="subMenu" menuText="${icao}">
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseData.xml"/>
    <contribute xsi:type="separator" id="${icao}BaseDataTiltsSep" />

    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseDataTilts.xml"/>

    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/baseRadarFourPanel.xml" />

    <contribute xsi:type="separator" id="${icao}DerivedGraphicsSep" />
    <contribute xsi:type="titleItem" id="${icao}DerivedGraphics" titleText="------ Derived/Graphics ------"/>
    <contribute xsi:type="subinclude" fileName="menus/radar/dualPol/mainDerivedGraphics.xml" />

    <contribute xsi:type="subinclude" subMenu="Precip" fileName="menus/radar/dualPol/baseRadarPrecip.xml" />
    <contribute xsi:type="subinclude" subMenu="Derived" fileName="menus/radar/dualPol/baseRadarDerivedProducts.xml" />
    <contribute xsi:type="subinclude" subMenu="Algorithm Overlays" fileName="menus/radar/dualPol/baseRadarAlgorithmOverlays

    <contribute xsi:type="separator" id="${icao}MiscSep" />
        <contribute xsi:type="titleItem" id="${icao}Misc" titleText="------ Misc ------"/>
    <contribute xsi:type="subinclude" subMenu="Four Panel" fileName="menus/radar/dualPol/baseRadarFourPanelBestRes.xml" />
    <contribute xsi:type="subinclude" subMenu="Data Quality" fileName="menus/radar/dualPol/baseRadarDataQuality.xml" />
    <contribute xsi:type="subinclude" subMenu="4-bit/Legacy" fileName="menus/radar/dualPol/baseRadarLegacy.xml" />
    <contribute xsi:type="subinclude" subMenu="Radar Applications" fileName="menus/radar/dualPol/baseRadarApplications.xml"



</contribute>
</menuTemplate>
```

Figure 34. Final edits to baseLocalRadarMenu.xml.

32. Restart CAVE to see the final result.	

Exercise 9: Implementing Custom Model Families from the AWIPS-1 Virtual Field Table

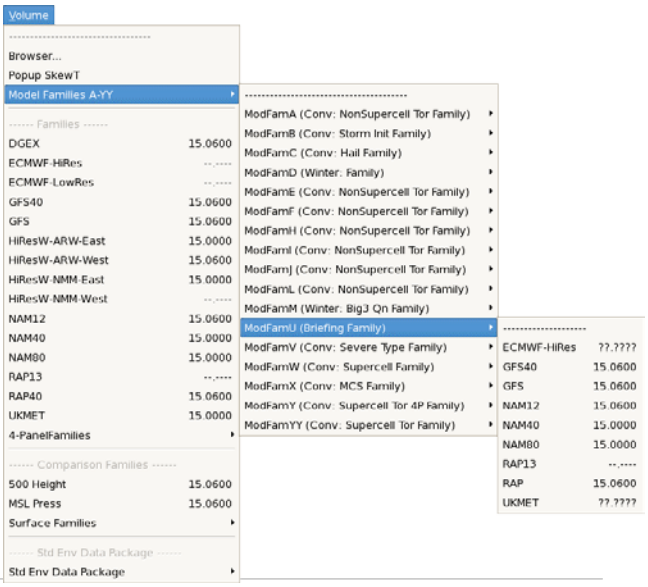
Objectives:

- Reorganize the Volume menu to implement custom Model Families. The existing default/baseline model families are preserved, but are located in various pull-out menus.
- Edit display bundles for each of the model families to be implemented, defined either in a single-pane layout or a four-panel layout.
- Use the firstAvailableResourceData bundle construct to allow the software to make a choice between alternative model fields.
- Use the blendedResourceData to make a paired image combination.

Additional Concepts Mentioned in This Exercise:

- Bundles with four-panel displays
- Panel combo rotate
- Wind barb, vector arrow, and streamline plots
- Icon plots
- Layers, levels and the Level Mapping File: fixed height above ground (FHAG or LYRFHAG), constant pressure (MB), potential vorticity (PV), potential temperature (K), equivalent potential temperature (Ke), boundary layer (BL), entire atmosphere (EA), surface (SFC), freezing level (FRZ), lifted condensation level (LCL), cloud base level (CBL)
- Colors available in CAVE

Background. In AWIPS-1, model families were implemented using the Virtual Field Table, specified in a custom virtualFieldTable.txt. Accordingly, sites could modify the volume menu and organize model output in new ways. AWIPS-2 provides similar customizable capabilities, but the process is totally different. Not only can you create model families for a WFO, you can also make new displays for particular users. This user-level configuration



capability may be handy in developing new displays, as well as evaluating new techniques prior to implementing them in a wider setting. In this exercise, we'll use a sample Virtual Field Table as a starting point to implement model families first as a user-level customization and then illustrate how to promote the changes to a site-level configuration.

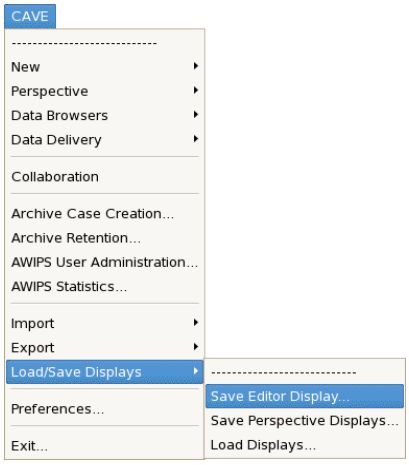
A significant number of forecast offices have utilized Dan Baumgardt's derived parameters and associated model families. This package, containing both the derived parameters and the model family configuration files, was included in the AWIPS-2 baseline. Some WFOs utilize custom families in addition to the Baumgardt package. This exercise illustrates the process of creating a different custom set of model families to illustrate various concepts required to accomplish this type of configuration. Two of the model families in this exercise are derived from Baumgardt's families.

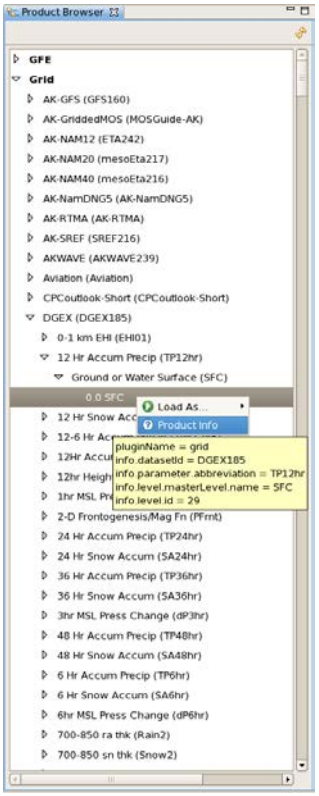
When mainScript.csh was run in AWIPS-1 to create a localization, AWIPS-1 automatically determined which model families were appropriate for a given model and built the Volume menus accordingly. In AWIPS-2, there is no logic to determine the applicability of a family for a given model; the local developer or AWIPS focal point must assign models to families manually when creating the menus. As models evolve, you need to periodically revisit which model families are appropriate and adjust the menus accordingly.

Because we're reorganizing the Volume menu, this exercise references many of the files mentioned in the CAVE Overview Module, Part 2. It may be helpful to review that module before proceeding to regain familiarity with the Volume menu structure, shown in **Figure 1**. The Volume menu and the separator named "top" is defined in /awips2/cave/plugins/com.raytheon.uf.viz.d2d.ui_*/plugin.xml. Another plugin.xml (from the volume browser plugin, /awips2/cave/plugins/com.raytheon.viz.volumebrowser_*) attaches additional separators to define more structure of the Volume Menu. Because we cannot change nor override the plugin.xml files, we have to incorporate this structure in making any changes. The target menu structure is shown in **Figure 2**. This menu structure corresponds to our sample AWIPS-1 virtualFieldTable.txt. An excerpt of this virtualFieldTable.txt containing only the names and titles of the custom model families is shown in **Figure 3**. The details of these entries are shown later throughout the exercise. The basic process of this exercise is to create the new menu organization first, and then assign menu entries for the new model families to specific display bundles that we will create later. Essentially, each model family is a bundle, and each graphical plot in the model family is a resource (or product layer) in the bundle. Each menu entry in a menu file for a particular model family references the same bundle and passes in a variable containing the particular model name.

Several of the model family plots are designed for the software to choose between one of two plots to display (depending on whether or not a particular parameter is produced by a

particular model). One example of this would be the choice between 300 mb and 250 mb wind speed (with 300 mb displayed if it's available; otherwise, 250 mb is displayed). For another example, a particular model family might want display muCape for 850-300 mb or PBE for the surface, depending on which parameter and level combination is available for a particular model. This alternative choice can be implemented in CAVE display bundles using the firstAvailableResourceData that tells the software to display a resource chosen from a group of resources. Plenty of examples follow in the exercise.





Much of this exercise involves editing display bundle (.XML) files and replacing existing or adding new metadata fields. One way to discover correct metadata fields and values for particular model fields, model layers, or levels is to use the Volume Browser or the Product Browser in the D2D perspective to load a desired parameter for a particular level or layer. Then use the **Save Editor Display** option in CAVE's **Load/Save Displays** menu to save the active display bundle into a file. Then open the saved bundle file in the localization perspective (use the **File** » **Open File** menu) to view the metadata used for that display. Another handy way to discover the metadata for a particular type of data is by using the Product Browser. If you navigate through the tree structure in the Product Browser to find a given product, you can right-click on the product to either load it or to view product info. If you choose **Product Info**, a tool-tip appears which contains much of the metadata associated with the given product.

In CAVE, the rotation of product legend colors (and corresponding colors of contours, vectors, wind barbs, and icon plots) is defined in a config.xml file in com.raytheon.viz.core. Found under Plugin Configs in the Localization Perspective's File Browser, this file can be customized by changing existing colors or adding new colors. The possible color names are defined in /awips2/cave/etc/colorfile/rgb.txt. Normally, each resource in a bundle is assigned one of the colors in this config.xml file. If

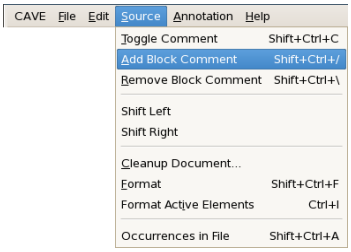
```
<configuration>
<defaultGraphicColor>green</defaultGraphicColor>
<defaultGraphicColor>coral</defaultGraphicColor>
<defaultGraphicColor>cyan</defaultGraphicColor>
<defaultGraphicColor>burlywood</defaultGraphicColor>
<defaultGraphicColor>yellow</defaultGraphicColor>
<defaultGraphicColor>violet</defaultGraphicColor>
<defaultGraphicColor>darkkhaki</defaultGraphicColor>
<defaultGraphicColor>OrangeRed</defaultGraphicColor>
<defaultGraphicColor>dodgerblue</defaultGraphicColor>
</configuration>
```

appropriate, the resource is drawn using that product (for example, contours, station plots, vectors, etc.), and its corresponding legend entry appears using that color, unless the resource itself specified a different color (which need not be one of the colors in the config.xml file). However, the firstAvailableResourceData just shows its plot and corresponding legend entry in green by default. The next resource in the bundle skips the color that the firstAvailableResourceData should have used, so the color order for all other resources is preserved. In other words, when using multiple firstAvailableResourceData resources, to make contours, wind barbs, streamlines and other non-image plots distinguishable from one another, their colors need to be manually specified in the bundle. This is done by adding a colorableCapability to each resource embedded in the firstAvailableResourceData: <capability xsi:type="colorableCapability" colorAsString= "{color}"/>. The examples illustrate adding the colorableCapability where needed (indicated using blue boxes in some of the figures). Since these colors are specified manually, the color is your preference. In these exercises, we'll just continue to cycle through the colors specified in the config.xml file.

This exercise will take 3 to 3.5 hours to complete.

Troubleshooting Tip

Occasionally when editing bundle files, you may wish to comment out whole sections of XML code. The Localization Perspective editor has commands to assist with this. To comment out offending sections, highlight the parts of the bundle you need to comment. Then click the **Source** menu followed by **Add Block Comment**. This should put XML comments ("<!- -") and ("- ->") around the entire section.



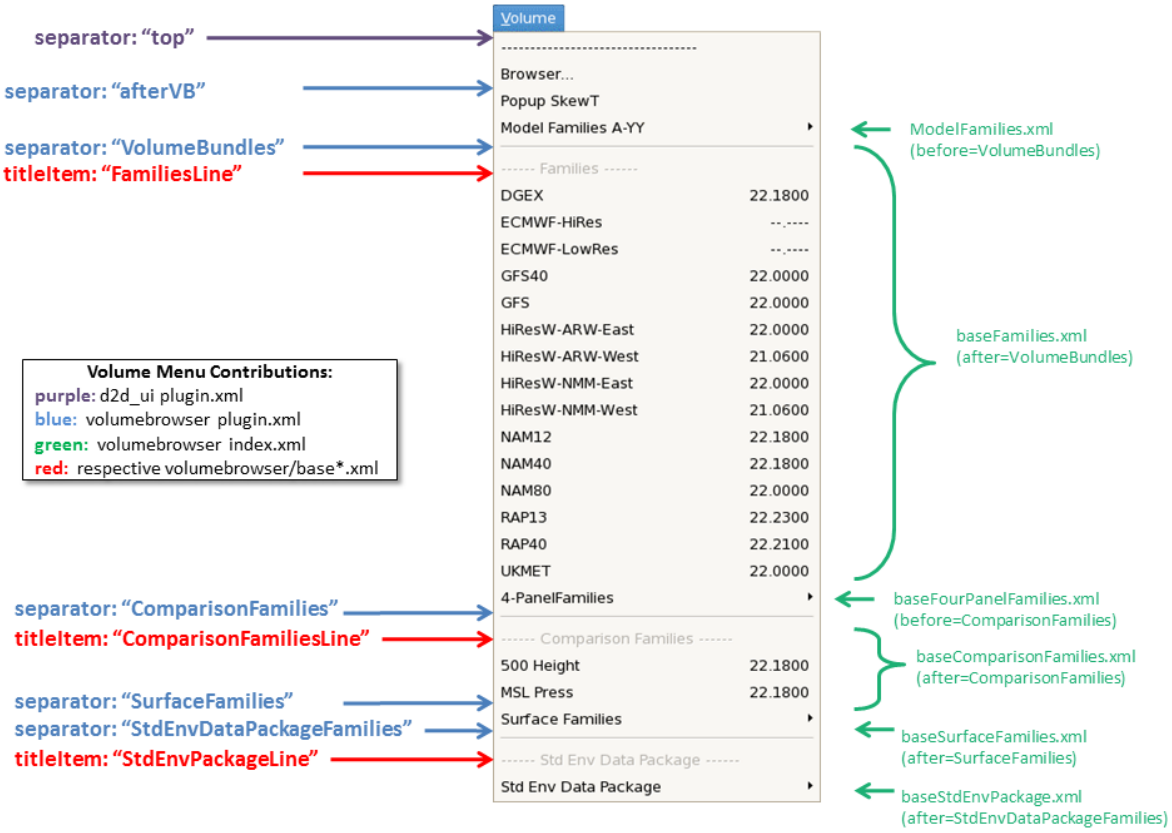


Figure 1. Baseline AWIPS-2 Volume Menu structure. Separators are defined in the d2d_ui and volumebrowser plugin.xml files, while the rest of the structure is defined in the index.xml and base*.xml files in the volumebrowser plugin's localization/menus directory.

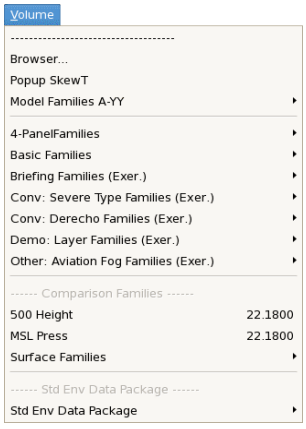
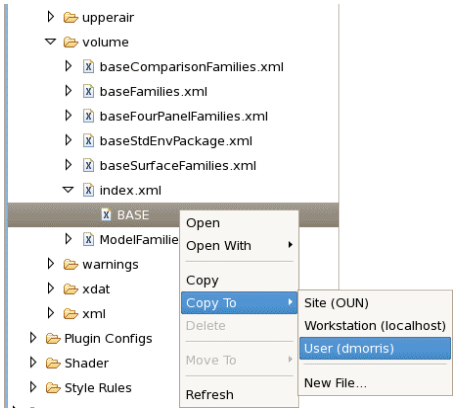
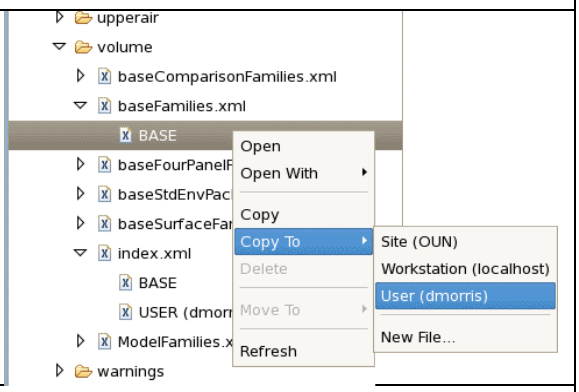


Figure 2. Custom volume menu structure to be constructed in this exercise.

```
// ===============================================================================
// Model Families Area (starts below)
// ===============================================================================
// All entries below are designed to be on the D2D Family pull-down menu.
// These will auto-post upon a -grids localization. Since they are not designed to
// be used as a procdure, their location in the virtualFieldTable.txt file is not
// important.
//
ModFamU| |N|Briefing Family| |OTHER | | \
<snip>
//
ModFamV | | N|Conv: Severe Type Family| | OTHER| | \
<snip>
//
ModFamHH| | N|Conv: Derecho Family| | OTHER| | \
<snip>
//
ModFamDM | | N|Demo: Layers Family| | OTHER| | \
<snip>
//
//
//
//
// -------------------------------------------------------------------------
// End Families Area
// -------------------------------------------------------------------------
//
```

Figure 3. Titles and Names of Model Families in custom AWIPS-1 virtualFieldTable.txt file.

Note: ModFamU and ModFamV were actually implemented into the AWIPS-2 baseline as part of the Baumgardt extensions. We're recreating them here because ModFamU illustrates most of the different types of plots that are available, and modFamV has an instance of having to choose among two parameters from different levels. ModFamHH was implemented at a few WFOs and is an example of a custom 4-panel family. Finally, the Demo: Layers Family is a family that illustrates (for learning purposes, only) a few other concepts related to using parameters on nontraditional model layers (potential vorticity, potential temperature, equivalent potential temperature, boundary layer, lifted condensation level, etc.)

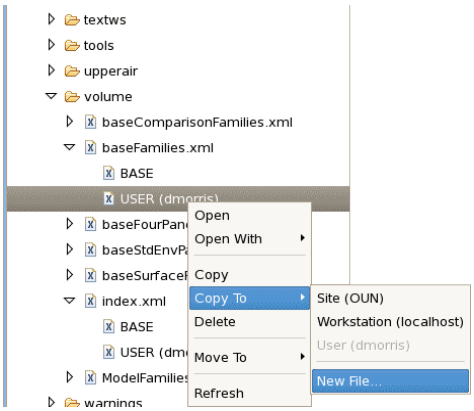
Concept	Actions
Part 1. Briefing Family: Reorganize the Volume Menu as a User-level Override	
1. Make a user-level copy of the volumebrowser index.xml menu file from which all other menus are attached.	In the Localization Perspective file browser, open **CAVE** » **Menus** » **volume**. Right-click the **BASE** icon under **index.xml** and choose **Copy To ►User.** 
2. Make a user-level copy of the baseFamilies.xml menu file. In a later step, this menu contribution will be changed from a simple include to a pull-out menu.	Right-click the **BASE** icon under **baseFamilies.xml** and choose **Copy To ►User.** 
3. Edit the index.xml file to create the model family entries above the Comparison Families separator. These are the pull-out menus for 4-Panel Families, Basic Families, and Briefing Families. **Note: You may have to use the tabs at the bottom of the Localization Perspective to alternate between the source view and the design view.**	Edit the user version of **index.xml** by double-clicking its **USER** icon. Transform the include for baseFamilies.xml into a submenu by adding the submenu tag as shown in Box A in **Figure 4**. Duplicate the include for the 4-Panel Families submenu (red box in Figure 4). In the first entry for baseFourPanelFamilies.xml, change before=Comparison Families to after=VolumeBundles, as shown in Box B in **Figure 4**. In the second baseFourPanelFamilies entry, change the subMenu to “Briefing Families” and the fileName to “menus/volume/briefingFamilies.xml” (Box C). Save your changes.

```
<menuContributionFile>
    <substitute key="DGEXmodel" value="DGEX185" />
    <substitute key="GFSmodel" value="GFS213" />
    <substitute key="NAM12model" value="ETA218" />
    <substitute key="NAM40model" value="mesoEta212" />
    <substitute key="ARWmodel1" value="HiResW-ARW-East" />
    <substitute key="ARWmodel2" value="HiResW-ARW-West" />
    <substitute key="MMMmodel1" value="HiResW-MMM-East" />
    <substitute key="MMMmodel2" value="HiResW-MMM-West" />

    <include subMenu="Basic Families" installTo="menu:volume?after=VolumeBundles"
             fileName="menus/volume/baseFamilies.xml">
    </include>

    <include subMenu="4-Panel Families" installTo="menu:volume?after=VolumeBundles"
             fileName="menus/volume/baseFourPanelFfamilies.xml">
    </include>

    <include subMenu="Briefing Families" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/briefingFamilies.xml">
    </include>

    <include installTo="menu:volume?after=ComparisonFamilies"
             fileName="menus/volume/baseComparisonFamilies.xml">
    </include>
    <include subMenu="Surface Families" installTo="menu:volume?after=SurfaceFamilies"
             fileName="menus/volume/baseSurfaceFamilies.xml">
    </include>
    <include installTo="menu:volume?after=StdEnvDataPackageFfamilies"
             fileName="menus/volume/baseStdEnvPackage.xml">
    </include>
</menuContributionFile>
```

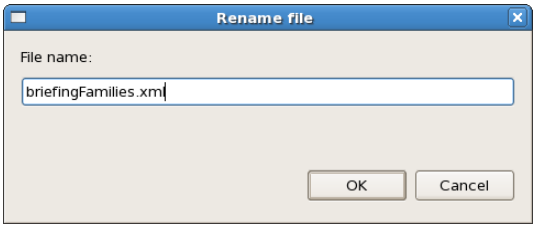
Figure 4. First edits to index.xml to create the model family entries above the ComparisonFamilies separator.

4. Use baseFamilies.xml as a template for the new Briefing Families menu.

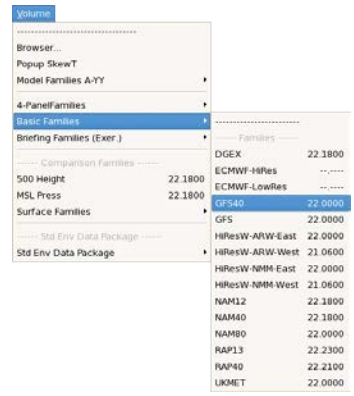
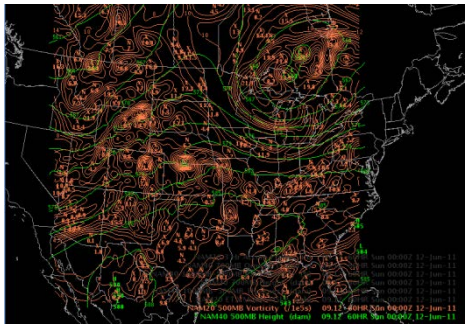
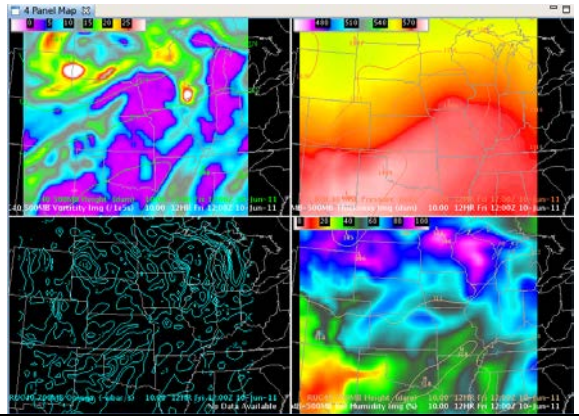
Make sure you've saved your edits to index.xml. Copy baseFamilies.xml to briefingFamilies.xml by right-clicking on the **USER** icon under **baseFamilies.xml** and choosing
Copy To ► New File.



Name the new file **briefingFamilies.xml**.

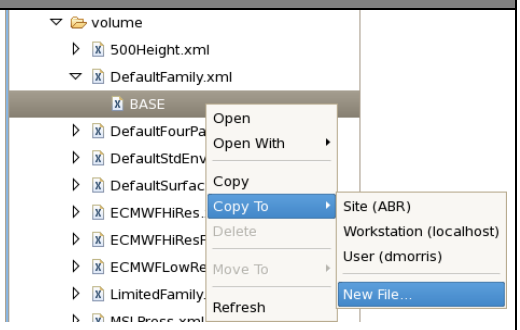


We'll change the bundle references inside briefingFamilies.xml later.

5. Restart CAVE to see your changes reflected in the Volume menu. The Basic Families and 4-panel Families menu entries should also work, since we just moved them around in the menu structure.	  
6. Change the bundle references in the new briefingFamilies.xml to be appropriate for the Briefing Families Menu. 	In the Localization Perspective, edit the briefingFamilies.xml menu file. Perform the following edits as shown in **Figure 5**. • Delete the entries for these models: o ECMWF-HiRes o ECMWF-LowRes o arwEast o arwWest o mmmEast o mmmWest o UKMET We only delete these entries to simplify this exercise. A similar process as illustrated here would be used to create appropriate bundles for these models. In reality, you would just create separate bundles for the parameters and layers those models have. • Change the name of the file for each bundleItem from DefaultFamily.xml to BriefingFamily.xml. LAPS may require considerable configuration for AWIPS-2. After LAPS is operational at your site, you can add a LAPS menu contribution by following the pattern already in the file.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Families ------"
        id="FamiliesLine" />
    <contribute xsi:type="bundleItem" file="bundles/volume/BriefingFamily.xml"
        menuText="DGEX" id="dgex" useReferenceTime="true">
        <substitute key="modelName" value="${DGEXmodel}"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="18"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/BriefingFamily.xml"
        menuText="GFS40" id="gfs40" useReferenceTime="true">
        <substitute key="modelName" value="GFS212"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="41"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/BriefingFamily.xml"
        menuText="GFS" id="gfs90" useReferenceTime="true">
        <substitute key="modelName" value="${GFSmodel}"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="41"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/BriefingFamily.xml"
        menuText="NAM12" id="nam12" useReferenceTime="true">
        <substitute key="modelName" value="${NAM12model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="29"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/BriefingFamily.xml"
        menuText="NAM40" id="nam40" useReferenceTime="true">
        <substitute key="modelName" value="${NAM40model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="29"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/BriefingFamily.xml"
        menuText="NAM80" id="nam80" useReferenceTime="true">
        <substitute key="modelName" value="ETA"/>
        <substitute key="TP" value="TP6hr"/>
        <substitute key="frameCount" value="15"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/BriefingFamily.xml"
        menuText="RAP13" id="rap13" useReferenceTime="true">
        <substitute key="modelName" value="${RAP13model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="19"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/BriefingFamily.xml"
        menuText="RAP40" id="rap" useReferenceTime="true">
        <substitute key="modelName" value="${RAPmodel}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="9"/>
    </contribute>
</menuTemplate>
```

Figure 5. Changes to briefingFamilies.xml.

Part 2. Briefing Family: Implement the display bundle	
7. Create the BriefingFamily.xml bundle. We need to make the bundle reflect the BriefingFamily as defined by the ModFamU entry in virtualFieldTable.txt (**Figure 6**) and illustrated using AWIPS-1 in **Figure 7**. Begin by creating a user-level version of a BriefingFamily.xml bundle by using the DefaultFamily.xml as a starting point.	In the Localization Perspective File Browser, open **CAVE** » **Bundles** » **volume** » **DefaultFamily.xml**. Right-click **BASE** and select **Copy To ►New File.** Name the new file **BriefingFamily.xml**. 
	Switch perspectives to the D2D perspective and verify that the Briefing Families pull-out menu from the Volume Menu actually has data (at this point, it's simply a duplicate of the Basic Family). Most often when modifying bundles (not menus), there is no need to restart CAVE to test changes in the bundle.

```
ModFamU| |N|Briefing Family| |OTHER | | \
                  *MultiLoad,Layer \
                  |0.|TP,Surface \
                  |1.|msl-P,Surface|msl-P2,Surface \
                  |10.|PTyp,Surface|Snow3,Surface\
                  |10.|PTyp,Surface|Fzra2,Surface\
                  |10.|PTyp,Surface|Mix2,Surface\
                  |10.|PTyp,Surface|Rain3,Surface\
                  |30.|Wind,Surface\
                  |0.|DivFn,1000MB-850MB|qDiv,1000MB-850MB\
                  |0.|Mmag,850MB\
                  |50.|MTV,850MB\
                  |0.|qDiv,850MB-700MB\
                  |0.|qDiv,700MB-500MB\
                  |21.|qDiv,700MB-500MB\
                  |0.|DivFn,700MB-600MB|DivFn,700MB-500MB\
                  |0.|GH,500MB\
                  |0.|RH,1000MB-500MB\
                  |0.|AV,500MB|geoVort,500MB\
                  |0.|PTvA,500MB-300MB\
                  |0.|wSp,300MB|wSp,250MB\
                  |40.|Wind,300MB|Wind,250MB\
                  |0.|wDiv,300MB|wDiv,250MB
//
```

Figure 6. Excerpt of virtualFieldTable.txt that defines the Briefing Family. The interpretation of the numeric codes preceding each field and level combination is as follows: *A non-zero value in the ones place means this overlay should be toggled on by default. The tens digit is the display type to use: 0=contour, 1=icons, 2=image, 3=barbs, 4=streamlines, 5=arrows, 6=dualarrows, 7=other. A non-zero value in the hundreds digit means start a new pane. The thousands place is number of frames to load; 0 means the same as the number of forecast times and 99 means whatever the display is currently set for* (verbatim from AWIPS-1 documentation in /awips/fxa/data/localization/documentation/families.html).

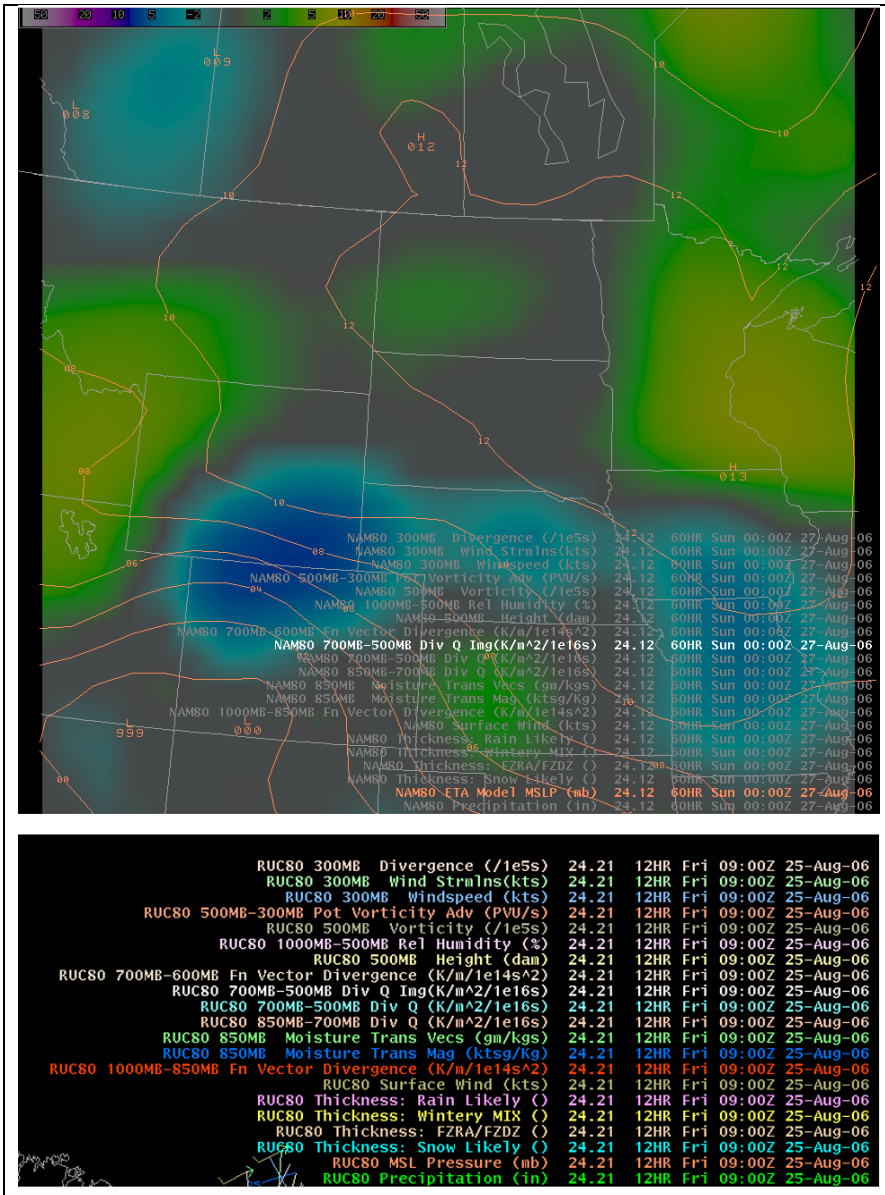
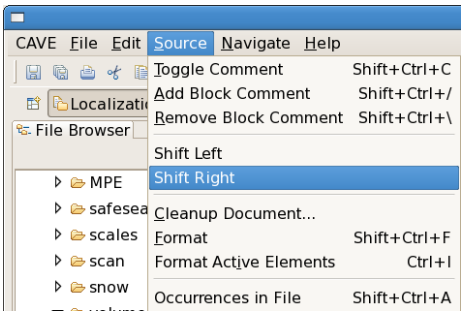


Figure 7. Example of AWIPS-1 Briefing Family display from the NAM80 (top) and an enlarged version of the product legend from the RUC80 Briefing Family (bottom).

8. Modify the BriefingFamily bundle to display the first two parameters (total precip and MSL pressure).
 	
`|0.|TP,Surface \`
`|1.|msl-P,Surface|msl-P2,Surface \`
	According to **Figure 6**, the first parameter in the Briefing Family is Total Precip (TP). It's a contour plot (tens digit is zero) that's toggled off by default (ones digit is zero). The second parameter (MSL Pressure) is a contour plot that is visible by default.
	
	Use the Localization Perspective to edit BriefingFamily.xml. In the first resource, make the following edits (**Figure 8**):
	• Change isVisible to false (Box A)
	• Change parameter to TP (Box B)
	• Change masterLevel.name to SFC (Box C)
	• Change levelonevalue to 0 (Box D)

	{TP} was defined as a substitution value in each of menu items in the BriefingFamilies.xml file (**Figure 5**). It's also a derived parameter. The substitution value is used if the bundle says {TP} and the derived parameter is used if the bundle says TP.
	
	The second parameter is a bit more complicated because the Virtual Field Table entry ("|1.|msl-P,Surface|msl-P2,Surface\") says to display the first available of the two parameters, either msl-P or msl-P2. Both of these are derived parameters. To verify the correct derived parameter name in AWIPS-2, use the File Browser in the Localization Perspective. Click **D2D** » **Derived Parameters** » **definitions**, and search through the list. Most of the AWIPS-1 derived parameters have kept similar names in AWIPS-2.
	
	In order to have the bundle choose between two parameters to display, we need to change the resourceData type from gridResourceData to firstAvailableResourceData. The structure for the firstAvailableResourceData resource is:
	
	`<resource>`
	`  <loadProperties/>`
	`  <properties/>`
	`  <resourceData xsi:type="firstAvailableResourceData">`
	`  <resource>` (first parameter)
	`  <loadProperties xsi:type="gridLoadProperties"`
	`  displayType="CONTOUR">`
	`  </loadProperties>`
	`  <resourceData xsi:type=gridResourceData … >`
	`  <metadataMap> </metadataMap>`
	`  </resourceData>`
	`  </resource>`
	`  <resource>` (second parameter)
	`  <loadProperties xsi:type="gridLoadProperties"`
	`  displayType="CONTOUR">`
	`  </loadProperties>`
	`  <resourceData xsi:type=gridResourceData … >`
	`  <metadataMap> </metadataMap>`
	`  </resourceData>`
	`  </resource>`
	`  </resourceData>`
	`</resource>`
	
	Note how there are two resources each having a resourceData (one for each parameter) embedded inside a larger resourceData, which itself is part of a resource. In this example, both embedded resources are contour plots and use gridResourceData, but the display types and associated ResourceData types need not be the same, and need not be limited to only two. In other words, in AWIPS-2, the firstAvailableResourceData could specify wind barbs, arrows or streamlines, or an image, or contour plot. The AWIPS-1 virtual field table required the plot type for any alternative to be the same.

To create this firstAvailableResourceData, add the four lines shown in the red box in **Figure 9** just below the TP resource. Note there are comments included in this file to indicate the AWIPS-1 virtual field table descriptors. Consider adding these to your file as you go along.



Indent (for readability's sake) the entirety of the next resource. This next resource is for 500 MB Absolute Vorticity, but we will change it to be msl-P. To indent the resource, select or highlight the entire resource and click the **Source** menu followed by the **Shift Right** option. The examples shown in this exercise were made by doing the Shift Right operation twice.

Change these parameters in the resource just indented (see **Figure 10)**:

- ensure isVisible is "true" (Box A)
- constraintValue for info.parameter.abbreviation to "msl-P" (Box B)
- constraintValue for info.level.masterLevel.name to "SFC" (Box C)
- constraintValue for info.level.levelonevalue to "0.0". (Box D)

Add <capability xsi:type="colorableCapability" colorAsString="coral"/> to the capabilities under loadProperties (blue box in **Figure 10**).

Use the next resource (it was originally for msl-P) to become the second <resource> of the firstAvailableResourceData. Indent this resource and make these changes:

- In the properties tag, change isVisible to true" (Box A in **Figure 11**).
- For info.parameter.abbreviation, change the constraintValue to "msl-P2". Verify the constraintType is "EQUALS" (Box B in **Figure 11**).
- For info.level.masterLevel.name, verify the constraintValue is "SFC" (Box C in **Figure 11**).
- For info.level.levelonevalue, verify the constraintValue is "0.0" (Box D in **Figure 11**).

	Add <capability xsi:type="colorableCapability" colorAsString="coral"/> to the capabilities under loadProperties (blue box in **Figure 11)**. After the closing </resource> tag of the msl-P2 resource, add closing </resourceData> and </resource> tags (for the firstAvailableResourceData; the red box in **Figure 11**).

Figure 8. Edits to the first resource in BriefingFamilies.xml to add the total precipitation (TP) parameter.

```
<bundle xmlns:ns2="group">
    <displayList>
        <displays xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="d2DMapRenderableDisplay" scale="CONUS" density="1.0" magnification="1.0" zoomLevel="1.0"
            <descriptor xsi:type="mapDescriptor">

                <!--  AWIPS1 Description:  |0.|TP,Surface\ -->
                <resource>
                    <loadProperties xsi:type="gridLoadProperties" displayType="CONTOUR" loadWithoutData="false">
                        <capabilities>
                            <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true" outlineWidth="1"/>
                        </capabilities>
                        <resourceType>PLAN_VIEW</resourceType>
                    </loadProperties>
                    <properties isSystemResource="false" isBlinking="false" isMapLayer="false" isHoverOn="false" isVisible="false">
                        <pdProps maxDisplayWidth="100000000" minDisplayWidth="0"/>
                    </properties>
                    <resourceData xsi:type="gridResourceData" retrieveData="true" isUpdatingOnMetadataOnly="false" isRequeryNecessaryOnTimeMatch="true">
                        <metadataMap>
                            <mapping key="info.parameter.abbreviation">
                                <constraint constraintValue="TP" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="info.datasetId">
                                <constraint constraintValue="${modelName}" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="info.level.leveltwovalue">
                                <constraint constraintValue="-999999" constraintType="EQUALS" />
                            </mapping>
                            <mapping key="pluginName">
                                <constraint constraintValue="grid" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="info.level.masterLevel.name">
                                <constraint constraintValue="SFC" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="info.level.levelonevalue">
                                <constraint constraintValue="0" constraintType="EQUALS"/>
                            </mapping>
                        </metadataMap>
                        <alertParser xsi:type="dataCubeAlertMessageParser"/>
                    </resourceData>
                </resource>

                <!-- AWIPS1 Description: |1.|msl-P,Surface|msl-P2,Surface\ -->

                <resource>
                    <loadProperties />
                    <properties/>
                    <resourceData xsi:type="firstAvailableResourceData">

                        <resource>
                            <loadProperties xsi:type="gridLoadProperties" displayType="CONTOUR" loadWithoutData="false">
                                <capabilities>
                                    <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true" outlineWidth="1"/>
                                    <capability xsi:type="colorableCapability" colorAsString="coral"/>
                                </capabilities>
                                <resourceType>PLAN VIEW</resourceType>
```

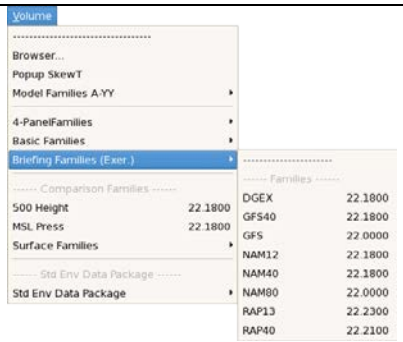
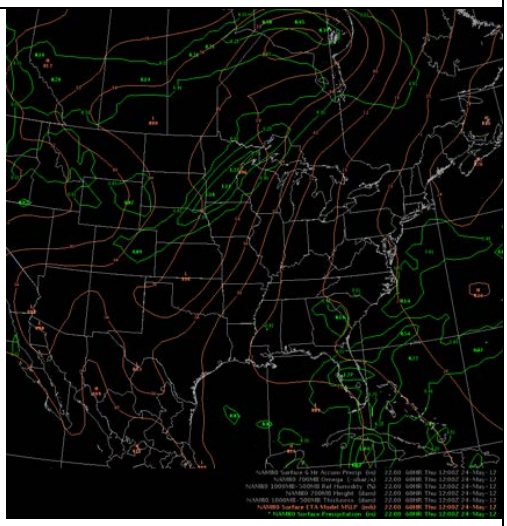
Figure 9. Four lines pre-pended to a group of resources to create a firstAvailableResourceData.

```
                <!-- AWIPS1 Description: |1.|msl-P,Surface|msl-P2,Surface\ -->

                <resource>
                    <loadProperties />
                    <properties/>
                    <resourceData xsi:type="firstAvailableResourceData">

                        <resource>
                            <loadProperties xsi:type="gridLoadProperties" displayType="CONTOUR" loadWithoutData="false">
                                <capabilities>
                                    <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true" outlineWidth="1"/>
                                    <capability xsi:type="colorableCapability" colorAsString="coral"/>
                                </capabilities>
                                <resourceType>PLAN_VIEW</resourceType>
                            </loadProperties>
                            <properties isSystemResource="false" isBlinking="false" isMapLayer="false" isHoverOn="false" isVisible="true">
                                <pdProps maxDisplayWidth="100000000" minDisplayWidth="0"/>
                            </properties>
                            <resourceData xsi:type="gridResourceData" retrieveData="true" isUpdatingOnMetadataOnly="false" isRequeryNecessaryOnTimeMatch="true">
                                <metadataMap>
                                    <mapping key="info.parameter.abbreviation">
                                        <constraint constraintValue="msl-P" constraintType="EQUALS"/>
                                    </mapping>
                                    <mapping key="info.datasetId">
                                        <constraint constraintValue="${modelName}" constraintType="EQUALS"/>
                                    </mapping>
                                    <mapping key="info.level.leveltwovalue">
                                        <constraint constraintValue="-999999" constraintType="EQUALS"/>
                                    </mapping>
                                    <mapping key="pluginName">
                                        <constraint constraintValue="grid" constraintType="EQUALS"/>
                                    </mapping>
                                    <mapping key="info.level.masterLevel.name">
                                        <constraint constraintValue="SFC" constraintType="EQUALS"/>
                                    </mapping>
                                    <mapping key="info.level.levelonevalue">
                                        <constraint constraintValue="0.0" constraintType="EQUALS"/>
                                    </mapping>
                                </metadataMap>
                                <alertParser xsi:type="dataCubeAlertMessageParser"/>
                            </resourceData>
                        </resource>
```

Figure 10. Edits to change the 500 MB AV resource into the surface MSL-P resource. This is the first resource embedded inside the firstAvailableResourceData.

```
                                <mapping key="info.level.leveltwovalue">
                                    <constraint constraintValue="-999999" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="pluginName">
                                    <constraint constraintValue="grid" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="info.level.masterLevel.name">
                                    <constraint constraintValue="SFC" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="info.level.levelonevalue">
                                    <constraint constraintValue="0.0" constraintType="EQUALS"/>
                                </mapping>
                            </metadataMap>
                            <alertParser xsi:type="dataCubeAlertMessageParser"/>
                        </resourceData>
                    </resource>
                    <resource>
                        <loadProperties xsi:type="gridLoadProperties" displayType="CONTOUR" loadWithoutData="false">
                            <capabilities>
                                <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true" outlineWidth="1"/>
                                <capability xsi:type="colorableCapability" colorAsString="coral"/>
                            </capabilities>
                            <resourceType>PLAN_VIEW</resourceType>
                        </loadProperties>
                        <properties isSystemResource="false" isBlinking="false" isMapLayer="false" isHoverOn="false" isVisible="true">
                            <pdProps maxDisplayWidth="100000000" minDisplayWidth="0"/>
                        </properties>
                        <resourceData xsi:type="gridResourceData" retrieveData="true" isUpdatingOnMetadataOnly="false" isRequeryNecessaryOnTimeMatch="true">
                            <metadataMap>
                                <mapping key="info.parameter.abbreviation">
                                    <constraint constraintValue="msl-P2" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="info.datasetId">
                                    <constraint constraintValue="${modelName}" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="pluginName">
                                    <constraint constraintValue="grid" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="info.level.masterLevel.name">
                                    <constraint constraintValue="SFC" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="info.level.levelonevalue">
                                    <constraint constraintValue="0.0" constraintType="EQUALS"/>
                                </mapping>
                            </metadataMap>
                            <alertParser xsi:type="dataCubeAlertMessageParser"/>
                        </resourceData>
                    </resource>
                </resourceData>
            </resource>
```

Figure 11. Edits to the BriefingFfamilies.xml bundle to add msl-P2 for as the second choice for the firstAvailableResourceData for the second layer of the model family.

9. Test our changes by loading the Briefing Family from the Volume menu in the D2D perspective. You may have to restart CAVE when you first test, but in many cases when you test a change to a bundle, you need only reload it from the menu.	  Tip: You may wish to test all alternatives in a firstAvailableResourceData by temporarily setting a parameter.abbreviation to a nonsensical value (e.g., NaN) to force the other alternative to display.
10. Add the third through sixth parameters to the model family, all precip-type plots.	Using the “decoder ring” in **Figure 6**, the third through sixth layers in the model families are precipitation type plots. The “10” as the plot type means that they are icon plots that are toggled off by default. Like the msl-P/msl-P2 plot we just finished, each one of precip-type

```
|10.|PTyp,Surface|Snow3,Surface\
|10.|PTyp,Surface|Fzra2,Surface\
|10.|PTyp,Surface|Mix2,Surface\
|10.|PTyp,Surface|Rain3,Surface\
```

plots can choose between either PTyp or Snow3, Fzra2, Mix2, or Rain3. This means that the plot would be created in a similar fashion as the msl-P/msl-P2 plot using the firstAvailableResourceData.

To make the PTyp|Snow3 plot, we'll re-use the resource for the previous msl-P/msl-P2 plot (it used the firstAvailableResourceData). Copy and paste that entire plot (approximately lines 42-118) to duplicate it. Make the following edits (**Figure 12)**:

- Add the isVisible="false" tag to the <properties/> of the firstAvailableResourceData container (Box A)
- In the first embedded resource,
  - Change the displayType from "CONTOUR" to "ICON" (Box B)
  - Change the colorAsString to "cyan" (Box C)
  - In the properties, add renderingOrderId="CONTOUR" (Box D). Adding this property makes CAVE treat this icon plot as a contour plot for purposes of determining the drawing (layering) order. If we had left this out, the icon plot would be placed as the top layer of the model family (i.e., drawn after all the contour plots).
  - Change isVisible to "false" (Box E)
  - Change the constraintValue for the parameter.abbreviation to "PTyp" (Box F)
  - Because the previous plot was Sea Level Pressure and this precip type is also valid at the surface, all the level parameters are unchanged.
- In the second embedded resource, make similar changes:
  - Change the displayType to "ICON" (Box G).
  - Change the colorAsString to "cyan" (Box H)
  - Add renderingOrderId="CONTOUR" to the properties (Box I)
  - Set isVisible to "false" (Box J)
  - Set the parameter.abbreviation value to "Snow3" (Box K)

NOTE: The Snow3 parameter is actually based on critical thickness values. If you wish, you can change the Snow3 resource back to CONTOUR rather than ICON if you desire a more quantitative display. This capability (having alternative plots of different types) was not possible in AWIPS-1.

For the next plot (PTyp | Frza2), duplicate the (PTyp | Snow3) plot. Make these changes in the new plot (**Figure 13**):

	• Set both instances of colorAsString to “burlywood”. • Change the parameter.abbreviation in the second embedded resource from “Snow3” to “Frza2” For the next plot (PTyp | Mix2), duplicate the (PTyp | Frza2) plot. Make these changes in the new plot: • Set both instances of colorAsString to “yellow”. • Change the parameter.abbreviation in the second embedded resource from “Frza2” to “Mix2” For the next plot (PTyp | Rain3), duplicate the (PTyp | Mix2) plot. Make these changes in the new plot: • Set both instances of colorAsString to “violet”. • Change the parameter.abbreviation in the second embedded resource from “Mix2” to “Rain3”

Figure 12. Edits to BriefingFamily.xml to add the Precip Type/Snow3 icon plot.

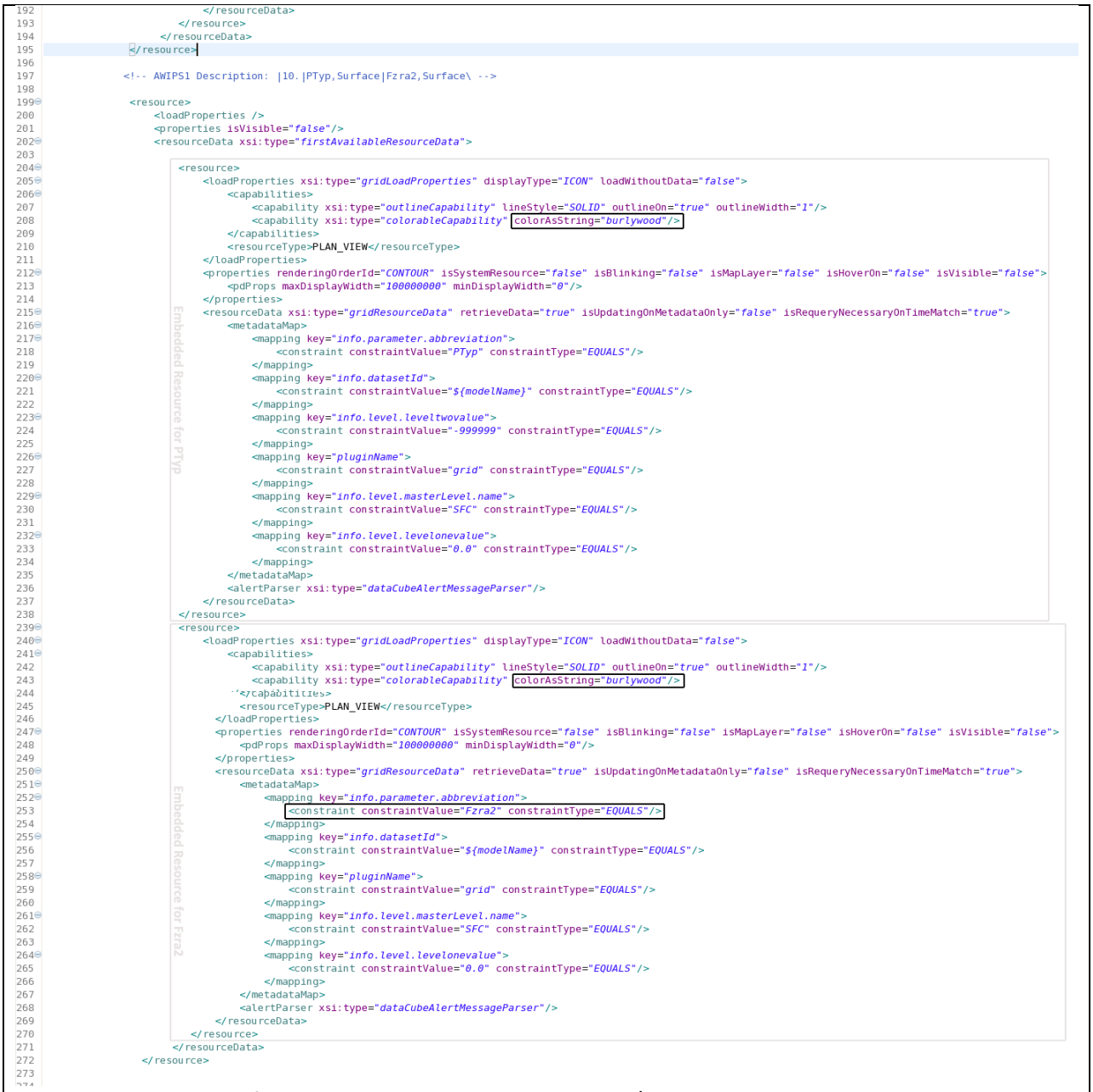


Figure 13. Edits to BriefingFamily.xml to add the Precip Type/Fzra2 icon plot.

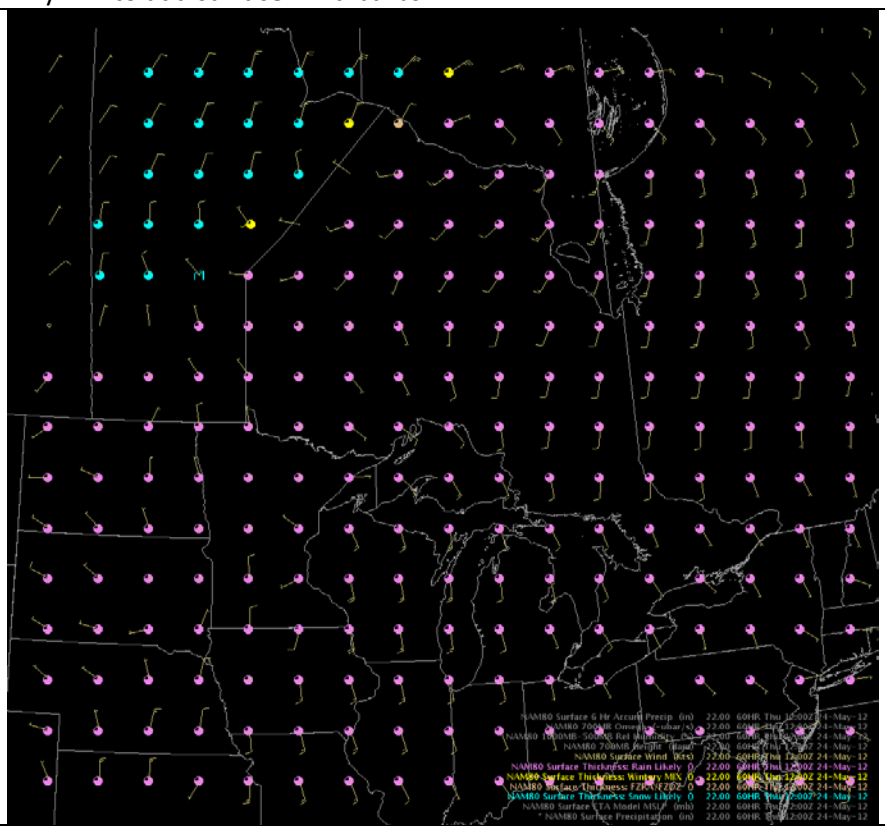
11. Add the seventh layer to the model family, surface wind barbs. `|30.|Wind,Surface\`	The next layer in the model family is a plot of surface wind barbs, toggled off by default. Creating this plot layer is a relatively simple change to the next resource in BriefingFamilies.xml (originally a contour plot for 1000-500 mb thickness, or dZ). Make the following changes as shown in **Figure 14**: • In the loadProperties, change the displayType from "CONTOUR" to "BARB" (Box A) • In the properties, ensure isVisible is "false". • In the metadataMap for info.parameter.abbreviation, change the constraintValue from "dZ" to "Wind" (Box B)

- Change the constraintValue for info.level.leveltwovalue is “-999999” (Box C)
- Change the constraintValue for info.level.masterLevel.name from “MB” to “SFC” (Box D)
- Change the constraintValue for info.level.levelonevalue to “0.0” (Box E)

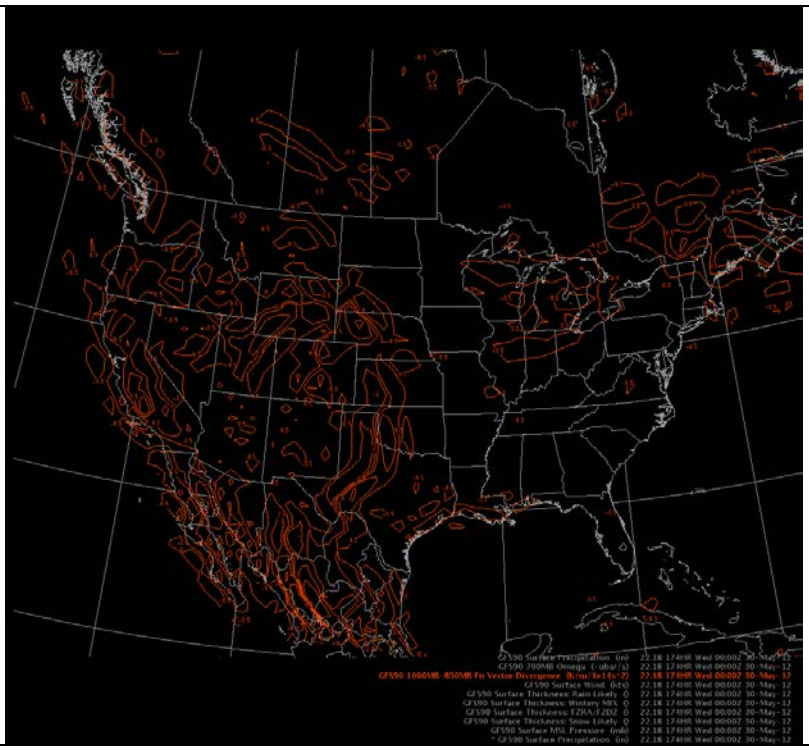
```
426             </resource>
427
428             <!-- AWIPS1 Description: |30.|Wind,Surface\ -->
429
430             <resource>                                                                    A
431                 <loadProperties xsi:type="gridLoadProperties" displayType="BARB" loadWithoutData="false">
432                     <capabilities>
433                         <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true" outlineWidth="1"/>
434                     </capabilities>
435                     <resourceType>PLAN_VIEW</resourceType>
436                 </loadProperties>
437                 <properties isSystemResource="false" isBlinking="false" isMapLayer="false" isHoverOn="false" isVisible="false">
438                     <pdProps maxDisplayWidth="100000000" minDisplayWidth="0"/>
439                 </properties>
440                 <resourceData xsi:type="gridResourceData" retrieveData="true" isUpdatingOnMetadataOnly="false" isRequeryNecessaryOnTimeMatch="true">
441                     <metadataMap>
442                         <mapping key="info.parameter.abbreviation">
443                             <constraint constraintValue="Wind" constraintType="EQUALS"/>  B
444                         </mapping>
445                         <mapping key="info.datasetId">
446                             <constraint constraintValue="${modelName}" constraintType="EQUALS"/>
447                         </mapping>
448                         <mapping key="info.level.leveltwovalue">
449                             <constraint constraintValue="-999999" constraintType="EQUALS"/>  C
450                         </mapping>
451                         <mapping key="pluginName">
452                             <constraint constraintValue="grid" constraintType="EQUALS"/>
453                         </mapping>
454                         <mapping key="info.level.masterLevel.name">
455                             <constraint constraintValue="SFC" constraintType="EQUALS"/>  D
456                         </mapping>
457                         <mapping key="info.level.levelonevalue">
458                             <constraint constraintValue="0.0" constraintType="EQUALS"/>  E
459                         </mapping>
460                     </metadataMap>
461                     <alertParser xsi:type="dataCubeAlertMessageParser"/>
462                 </resourceData>
463             </resource>
464
465
```

Figure 14. Edits to BriefingFamily.xml to add surface wind barbs.

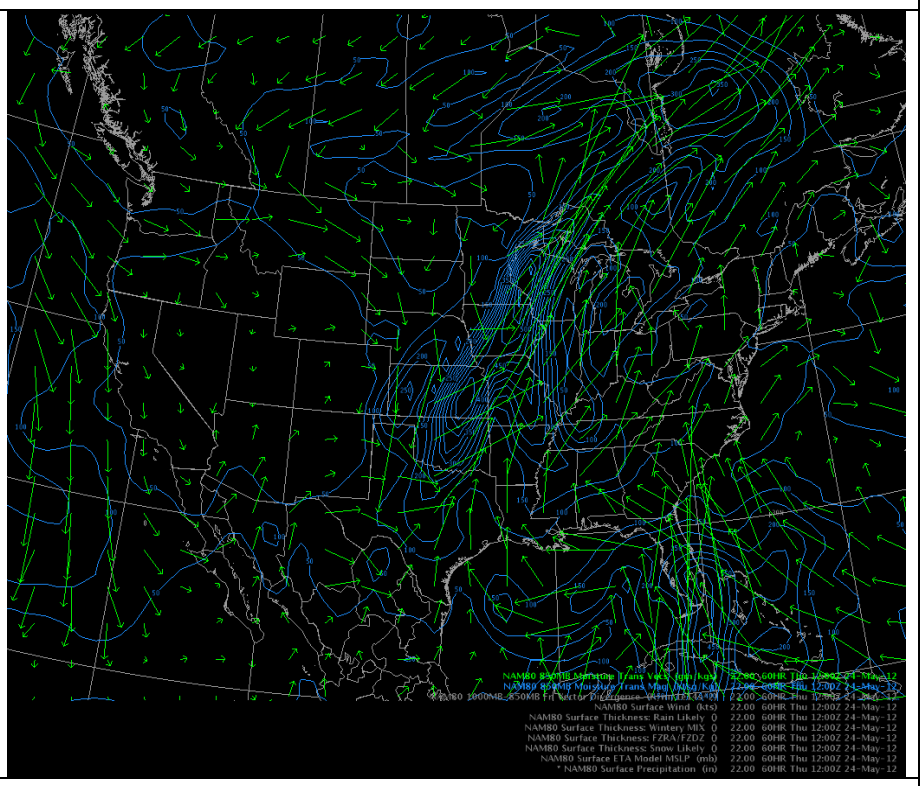
12. Test by reloading the Briefing Family option from the Volume menu for an available model.



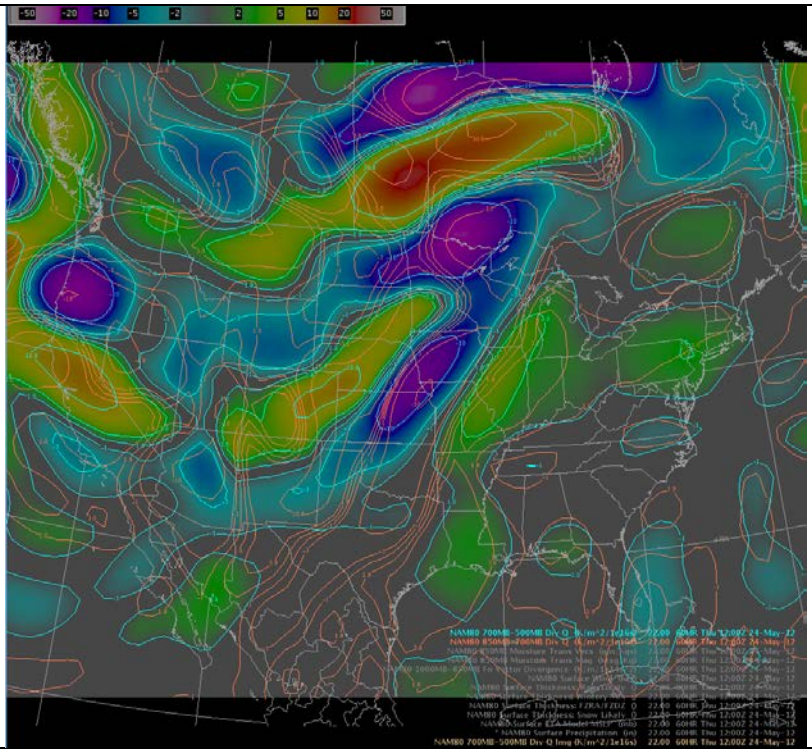
13. Add the 1000-850 mb Fn Vector or Q-vector divergence plots. This is a contour plot, and is defaulted to be invisible. This plot should use the firstAvailableResourceData to choose between DivFn and qDiv.
 	
`|0.|DivFn,1000MB-850MB|qDiv,1000MB-850MB\`
	Just below the resource in **Figure 13** for the Surface Wind Barbs, add the four lines indicated in **Figure 9** that begin a resource containing a firstAvailableResourceData.
	
	Because this contour plot should initially not be visible, change properties of the firstAvailableResourceData like the following:
	
	`<resource>`
	`  <loadProperties/>`
	`  <properties isVisible="false"/>`
	`  <resourceData xsi:type="firstAvailableResourceData">`
	
	Transform the next pre-existing resource (700 mb height, or GH) into the resource for 1000-850 mb DivFn by doing the following:
	
	• Indent the entire 700 mb GH resource.
	• Change the constraintValue for minfo.parameter.abbreviation to “DivFn”
	• Ensure the constraintValue for info.level.masterLevel.name is “MB”
	• Change the constraintValue for info.level.levelonevalue is “1000.0”
	• Set the constraintValue for the info.level.leveltwovalue to “850.0”
	
	Add <capability xsi:type=“colorableCapability” colorAsString=“OrangeRed”/> to the capabilities under loadProperties.
	
	Use the next resource (1000-500 mb RH) for the qDiv resource.
	• Indent the entire 1000-500 mb RH resource.
	• Change the constraintValue for info.parameter.abbreviation to “qDiv”
	• Ensure the constraintValue for info.level.masterLevel.name is “MB”
	• Verify the constraintValue for info.level.levelonevalue to “1000.0”
	• Set the constraintValue for the info.level.leveltwovalue to “850.0”
	
	Add <capability xsi:type=“colorableCapability” colorAsString=“OrangeRed”/> to the capabilities under loadProperties.
	
	Add closing </resourceData> and </resource> tags below the closing </resource> tag for the qDiv resource.

14. Test	

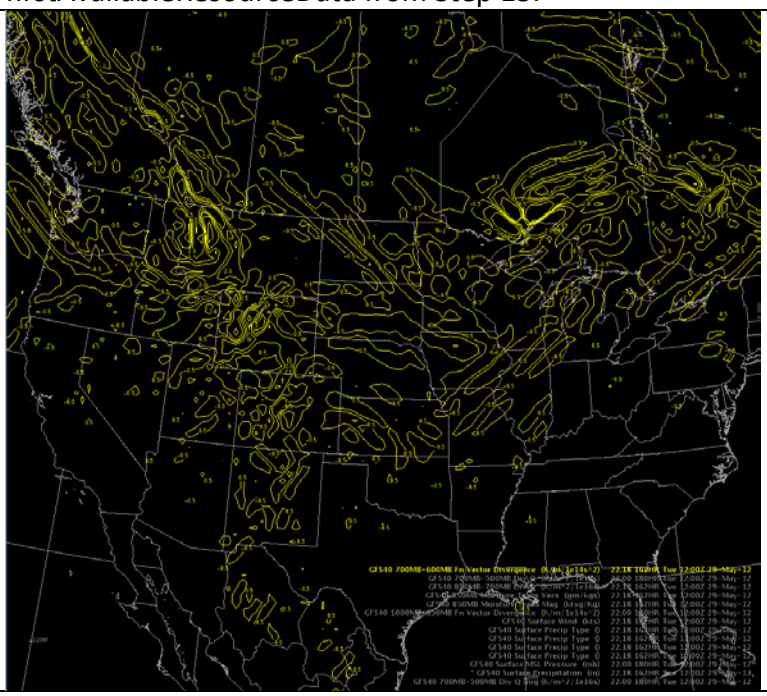
15. Add the 850 mb Mmag and MTV plots. The MTV (Moisture Transport Vectors) plot is represented as an arrow plot, so the displayType for that resource is changed from CONTOUR to ARROW.
 	
`|0.|Mmag,850MB\`
`|50.|MTV,850MB\`
	The next pre-existing resource in the BriefingFamilies.xml should be 700 mb PVV. Make the following changes to that resource to create the 850 mb Mmag (Moisture Transport Magnitude) contour plot:
	• Change the constraintValue for the info.parameter.abbreviation to “Mmag”
	• Change the constraintValue for the info.level.levelonevalue to “850.0”
	• Ensure that the value for info.level.leveltwovalue is “-999999”.
	• Ensure that the value for the info.level.masterLevel.name is “MB”.
	
	The next (last) resource in the BriefingFamilies.xml bundle should be {TP} (total precipitation at the surface). Make the following changes to the {TP} resource:
	• In the loadProperties, change the displayType from “CONTOUR” to “ARROW”.
	• Change the constraintValue for the info.parameter.abbreviation from “{TP}” to “MTV”.
	• Change the constraintValue for the info.level.levelonevalue to “850.0”.
	• Change the constraintValue for the info.level.masterLevel.name from “SFC” to “MB”.
	• Add a constraint for info.level.leveltwovalue, by copying and

	pasting the three lines that constitute the levelonevalue, changing it to leveltwovalue, and setting the constraintValue to "-999999". At this point, we have run out of the pre-existing resources in BriefingFamilies.xml, so we'll just keep copying and pasting existing resources to the bottom of the resource list (just above the timeMatcher tag).
16. Test	

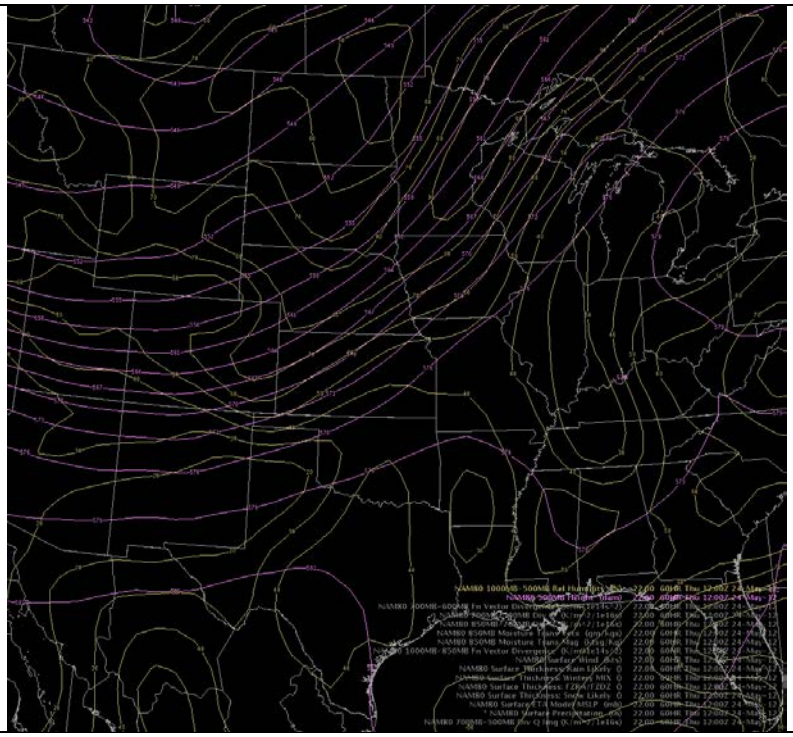
17. Add the next three layers to the modelFamily (qDiv contours for 850-700 mb, qDiv contours for 700-500 mb, and a qDiv image for 700-500 mb with the image visible by default.
 	
`|0.|qDiv,850MB-700MB\`
`|0.|qDiv,700MB-500MB\`
`|21.|qDiv,700MB-500MB\`
	Since we're run out of pre-existing resources to modify, we'll copy/paste a copy of the Mmag resource to use for the 850-700 mb qDiv contour plot. We use the Mmag because it's already an invisible contour plot just like what's needed for the next plot. Make these changes to the new resource:
	• Change the constraintValue for the info.parameter.abbreviation to "qDiv".
	• Change the constraintValue for the info.level.leveltwovalue to "700.0".
	• Ensure the constraintValue for the info.level.levelonevalue is "850.0".
	
	Paste a copy of the 850-700 mb qDiv resource we just made to use for the 700-500 mb qDiv contour plot, and make these changes:
	• Change the constraintValue for the info.level.levelonevalue

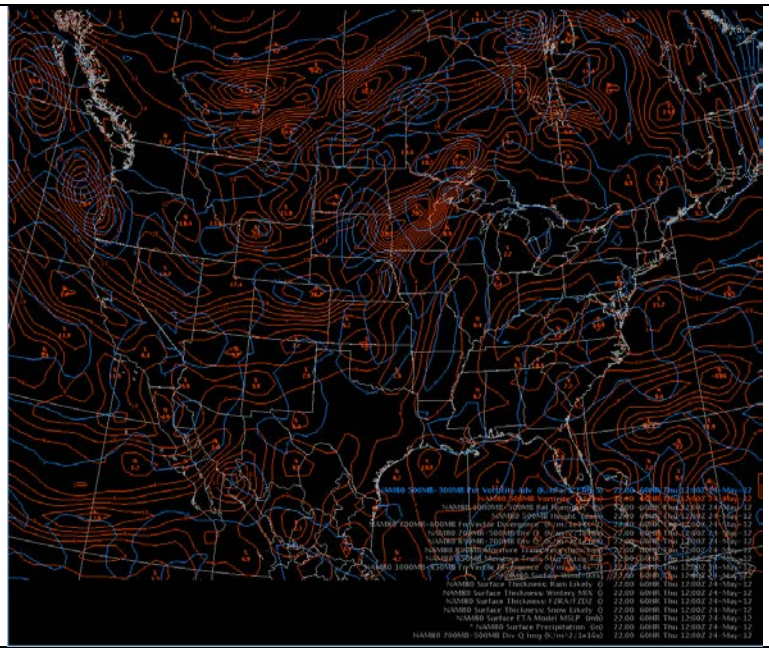
	to “700.0”. • Change the constraintValue for the info.level.leveltwovalue to “500.0”. To make the 700-500 mb qDiv image plot, copy and paste the entire 700-500 mb qDiv resource we just edited. In the second version, change the displayType from “CONTOUR” to “IMAGE”, and isVisible to “true”. Note: One difference between AWIPS-1 (**Figure 7)** and AWIPS-2 is that the qDiv image in AWIPS-1 could be in the middle of the product legend and still be drawn at the bottom of the plot (so that the map background and other contour, icon, arrow, and streamline plots were still visible on top of the image). The AWIPS-2 product legend is essentially a representation of the drawing order of the graphic, so the image is automatically placed at the bottom of the legend, unless a renderingOrderId value other than “IMAGE_REGION” is specified in the image properties. If you desire the image to not be at the bottom, then you may need to specify alpha channel (transparency) settings so that plots under the image can be seen.
18.Test	

19. Add a firstAvailableResourceData to implement the next DivFn contour plot.
 	
`|0.|DivFn,700MB-600MB|DivFn,700MB-500MB\`
	Copy the previous firstAvailableResourceData used to make the 1000-850 mb DivFn / qDiv plot in Step 13 (it's at approximately lines 465-544) and paste it just below the resource you just edited for the 700-500 mb qDiv image.
	
	In the first embedded resource, make these changes:
	• Change leveltwovalue to "600.0".
	• Change levelonevalue to "700.0".
	• Verify the other fields are correct:
	  o parameter.abbreviation = DivFn
	  o masterLevel.name = MB
	• In the colorableCapability, set the colorAsString to "yellow".
	
	In the second resource, make these changes:
	• Change parameter.abbreviation to "DivFn".
	• Change leveltwovalue to "500.0".
	• Change levelonevalue to "700.0".
	• Verify that masterLevel.name = "MB".
	• In the colorableCapability, set the colorAsString to "yellow".
	
	Note: This DivFn contour plot is to be invisible by default. Thus, the properties of the firstAvailableResourceData and the two embedded resources all should include an isVisible="false" tag, which should automatically occur by virtue of reusing the firstAvailableResourceData from Step 13.

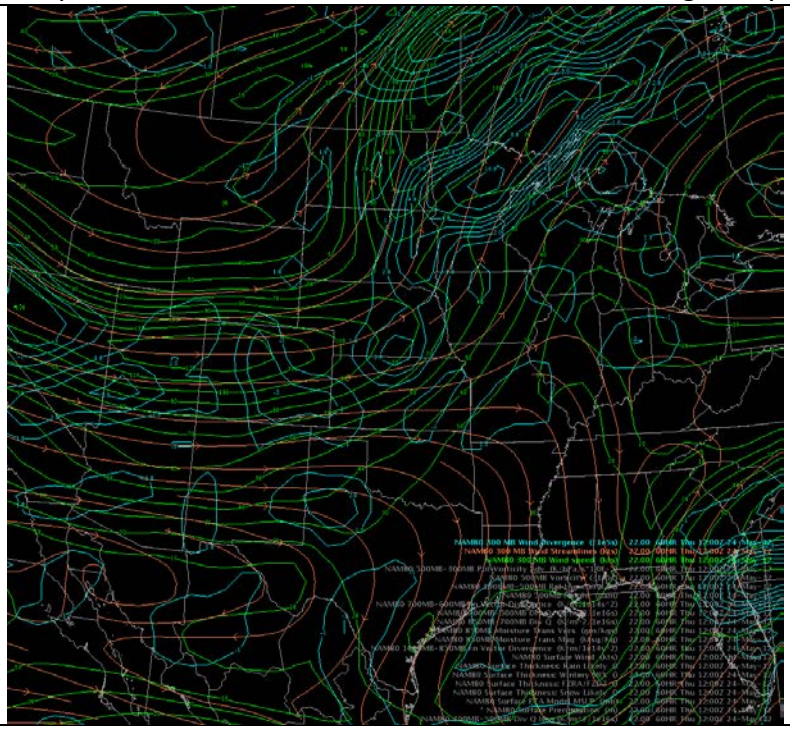
20. Test	

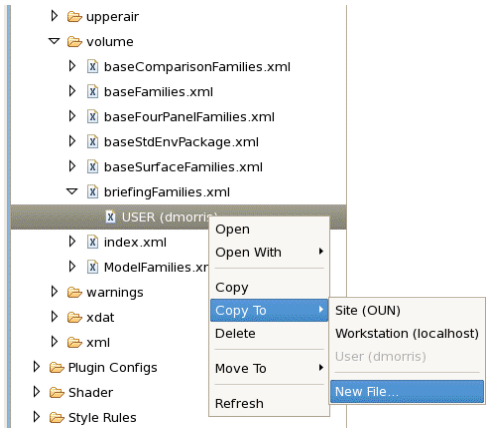
21. Add the next two plots (500 mb GH, and 1000-500 mb RH).
`|0.|GH,500MB\`
`|0.|RH,1000MB-500MB\`
	To make the 500 mb GH contour plot, copy and paste the last regular resource (the 700-500 mb qDiv image) above the firstAvailableResourceData resource from Step 19, and make the following changes:
	• Change the displayType from "IMAGE" to "CONTOUR"
	• Change isVisible to "false"
	• Change the parameter.abbreviation to "GH"
	• Change the levelonevalue to "500.0"
	• Change the leveltwovalue to "-999999"
	
	Copy and paste the 500 mb height contour plot we just made. In the new copy, make the following changes to make the 1000-500 mb RH contour plot:
	• Change the parameter.abbreviation to "RH"
	• Change levelonevalue to "1000.0"
	• Change leveltwovalue to "500.0"

22. Test	
23. Implement the next plot in the bundle which is either 500 mb absolute vorticity (AV) or 500 mb geostrophic vorticity (geoVort). This plot has to use the	Copy and paste the last resource that used firstAvailableResourceData (it was for DivFn for either the 700-600 MB or 700-500 mb layers at approximately lines 731 to 810). Make the following changes: • Ensure the isVisible tag is set to "false" in the <properties/> line of the firstAvailableResourceData. • In the first (DivFn for 700 - 600 MB) resource:

firstAvailableResource Data. `|0.|AV,500MB|geoVort,500MB\`	o Ensure isVisible="false" o Change the parameter.abbreviation to "AV" o Ensure the masterLevel.name is "MB" o Change the levelonevalue to "500.0" o Set the leveltwovalue to "-999999". o Set the colorAsString to "OrangeRed"/> in the colorableCapability under loadProperties. • In the second (DivFn for 700-500 MB) resource: o Ensure isVisible="false" o Change the parameter.abbreviation to "geoVort" o Ensure the masterLevel.name is "MB" o Change the levelonevalue to "500.0" o Set the leveltwovalue to "-999999". o Set the colorAsString to "OrangeRed"/> in the colorableCapability under loadProperties.
24. Make the 500-300 mb PTvA (Potential Vorticity Advection) plot. Since this a simple resource, we'll reuse the 1000-500 mb RH contour plot. `|0.|PTvA,500MB-300MB\`	Copy and paste the resource for the 1000-500 mb RH plot (this may be at approximately lines 850-884). Place it just below the resource for the 500 mb AV/geoVort plot. Make the following changes: • Change the parameter.abbreviation to "PTvA" • Change levelonevalue to "500.0" • Change leveltwovalue to "300.0"
25. Test	

26. Make the final three wind plots (wind speed, wind vectors, and divergence for either 300 or 250 mb). All three of these have to use firstAvailableResourceData, and all three are initially set to not visible, similar to the the 500 mb AV/geoVort plots.
 	
`|0.|wSp,300MB|wSp,250MB\`
`|40.|Wind,300MB|Wind,250MB\`
`|0.|wDiv,300MB|wDiv,250MB`
	Copy and paste the entire resource used for the 500 mb AV/geoVort contour plot (it's at approximately lines 887-966). Make the following changes:
	• In the first embedded (AV) resource:
	o Change the parameter.abbreviation to "wSp"
	o Change the levelonevalue to "300.0"
	o Set the colorAsString to "green" in the colorableCapability under loadProperties.
	
	• In the second (geoVort) metadata map:
	o Change the parameter.abbreviation to "wSp"
	o Change the levelonevalue to "250.0"
	o Set the colorAsString to "green" in the colorableCapability under loadProperties.
	
	Test this addition by reloading the bundle in CAVE. For the next plot, it is a streamline plot of the vector wind. Copy and paste the entire wSp plot we just created. In the second copy, change the two instances of displayType from "CONTOUR" to "STREAMLINE", the two instances of "wSp" to "Wind", and the two instances of colorAsString to "coral".
	
	To make the final plot of divergence, copy and paste the wSp contour plot again. In this version, just change both instances of "wSp" to "wDiv", and both instances of colorAsString to "cyan".

27. Test	

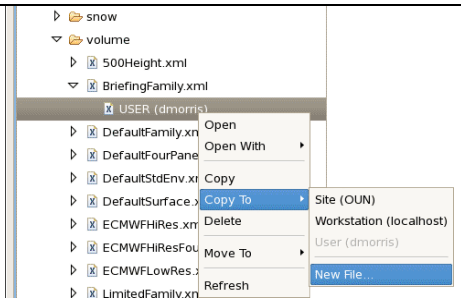
28. Optional: Add bundles for the UKMET and the ECMWF	For further practice, consider adding bundles for the UKMET and ECMWF models. The names of the bundles are already defined in our briefingFamilies.xml menu file (**Figure 5**). Use the Product Browser to find the available products from these models that are analogous to the parameters specified in the BriefingFamily.xml bundle file we just edited. You'll likely find parameters or levels that are not available. The specific model (e.g., ECMF1, ECMF2, etc) used will depend on your specific geographic sector.
Part 3. Conv: Severe Type Families Menu	
29. Use the briefingFamilies.xml menu as a template for the Conv: Severe Type Families menu to be called convSvrTypeFamilies.xml. Add the new menu to the Volume menu. Change the bundle references in the new convSvrTypeFamilies.xml to be appropriate for the Severe Type Families Menu.	In the Localization Perspective file browser, open **CAVE** » **Menus** » **volume**. Copy briefingFamilies.xml to convSvrTypeFamilies.xml, by clicking the **USER** icon under briefingFamilies.xml and choosing **Copy To ► New File**. Name the new file **convSvrTypeFamilies.xml**. 
	Edit the user version of the index.xml menu file (**CAVE** » **Menus** » **Volume** » **index.xml**) by double-clicking its **USER** icon. Add an entry for the Conv: Severe Type Families as indicated in **Figure 15**. Save your changes. We'll change the bundle references next.
	Edit convSvrTypeFamilies.xml and change the menuText in the subMenu from "Briefing Families" to "Conv: Severe Type Families". Change the name of the file for each bundleItem from BriefingFamily.xml to ConvSvrTypeFamily.xml (see **Figure 16**). Save your changes.

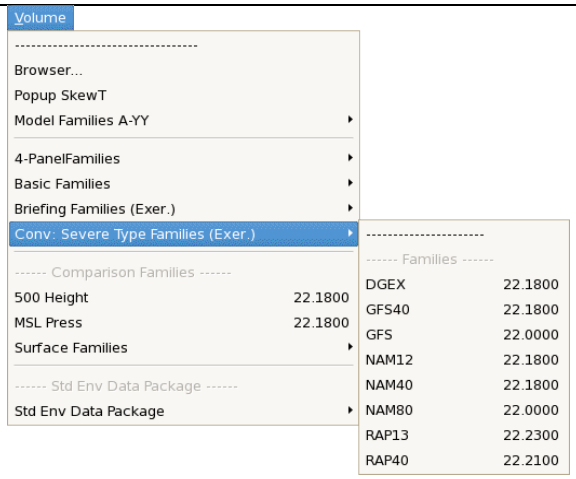
```
<menuContributionFile>
    <substitute key="DGEXmodel" value="DGEX185" />
    <substitute key="GFSmodel" value="GFS213" />
    <substitute key="NAM12model" value="ETA218" />
    <substitute key="NAM40model" value="mesoEta212" />
    <substitute key="ARWmodel1" value="HiResW-ARW-East" />
    <substitute key="ARWmodel2" value="HiResW-ARW-West" />
    <substitute key="MMMmodel1" value="HiResW-NMM-East" />
    <substitute key="MMMmodel2" value="HiResW-NMM-West" />
    <substitute key="RAP13model" value="RUC130" />
    <substitute key="RAPmodel" value="RUC236" />
    <include subMenu="Basic Families" installTo="menu:volume?after=VolumeBundles"
             fileName="menus/volume/baseFamilies.xml">
    </include>
    <include installTo="menu:volume?before=VolumeBundles"
             fileName="menus/volume/ModelFamilies.xml">
    </include>
    <include subMenu="4-PanelFamilies" installTo="menu:volume?after=VolumeBundles"
             fileName="menus/volume/baseFourPanelFamilies.xml">
    </include>

    <include subMenu="Briefing Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/briefingFamilies.xml">
    </include>

    <include subMenu="Conv: Severe Type Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/convSvrTypeFamilies.xml">
    </include>

    <include installTo="menu:volume?after=ComparisonFamilies"
             fileName="menus/volume/baseComparisonFamilies.xml">
    </include>
    <include subMenu="Surface Families" installTo="menu:volume?after=SurfaceFamilies"
             fileName="menus/volume/baseSurfaceFamilies.xml">
    </include>
    <include installTo="menu:volume?after=StdEnvDataPackageFamilies"
             fileName="menus/volume/baseStdEnvPackage.xml">
    </include>
</menuContributionFile>
```

Figure 15. Changes to index.xml to add the Conv: Severe Type Family submenu.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Families ------"
        id="FamiliesLine" />
    <contribute xsi:type="bundleItem" file="bundles/volume/ConvSvrTypeFamily.xml"
        menuText="DGEX" id="dgex" useReferenceTime="true">
        <substitute key="modelName" value="${DGEXmodel}"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="18"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/ConvSvrTypeFamily.xml"
        menuText="GFS40" id="gfs40" useReferenceTime="true">
        <substitute key="modelName" value="GFS212"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="41"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/ConvSvrTypeFamily.xml"
        menuText="GFS" id="gfs90" useReferenceTime="true">
        <substitute key="modelName" value="${GFSmodel}"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="41"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/ConvSvrTypeFamily.xml"
        menuText="NAM12" id="nam12" useReferenceTime="true">
        <substitute key="modelName" value="${NAM12model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="29"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/ConvSvrTypeFamily.xml"
        menuText="NAM40" id="nam40" useReferenceTime="true">
        <substitute key="modelName" value="${NAM40model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="29"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/ConvSvrTypeFamily.xml"
        menuText="NAM80" id="nam80" useReferenceTime="true">
        <substitute key="modelName" value="ETA"/>
        <substitute key="TP" value="TP6hr"/>
        <substitute key="frameCount" value="15"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/ConvSvrTypeFamily.xml"
        menuText="RAP13" id="rap13" useReferenceTime="true">
        <substitute key="modelName" value="${RAP13model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="19"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/ConvSvrTypeFamily.xml"
        menuText="RAP40" id="rap" useReferenceTime="true">
        <substitute key="modelName" value="${RAPmodel}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="9"/>
    </contribute>
</menuTemplate>
```

Figure 16. Changes to the ConvSvrTypeFamilies.xml menu file.

30. Duplicate the BriefingFamily.xml *bundle* file created in Part 2 as ConvSvrTypeFamily.xml, so that the menu entries created above will work.	In the File Browser, scroll up to the **CAVE** » **Bundles** section. Open **volume** and **BriefingFamily.xml**. Right-click the **USER** icon and choose **Copy To ►New File**. Call the new file ConvSvrTypeFamily.xml	

31. Restart CAVE to see your changes reflected in the Volume menu. The Conv: Severe Type Families menu should be located above Surface Families and should display the models declared in the convSvrTypeFamilies.xml menu file.	
Part 4. Implement the Conv: Severe Type Families Bundle	

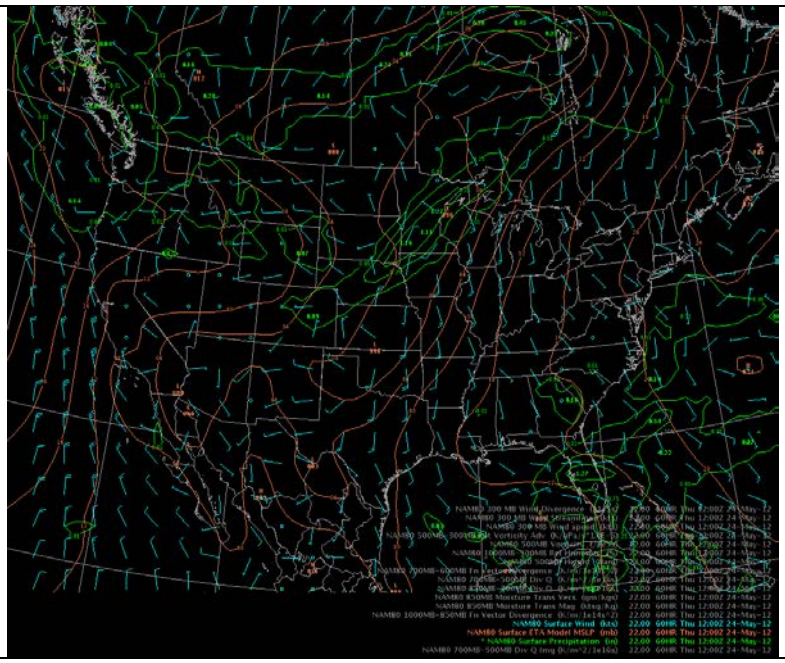
32. We need to make the bundle reflect the Conv: Severe Type Family as defined by the ModFamV entry in virtualFieldTable.txt (**Figure 17**). We'll start by modifying the bundle to display the first three parameters (total precipitation, MSL pressure, and wind).
 	
`|0.|TP,Surface \`
`|0.|msl-P,Surface\`
`|30.|Wind,Surface\`
	Edit the new USER version of the ConvSvrTypeFamily.xml bundle. The first resource in the bundle for TP needs no changes.
	
	It's probably also acceptable to leave the second (firstAvailableResourceData for msl-P and msl-P2) resource alone, except to change the two instances of isVisible to "false" and to add isVisible="false" to the firstAvailableResourceData properties.
	
	`<resource>`
	`<loadProperties/>`
	`<properties isVisible="false"/>`
	`<resourceData xsi:type="firstAvailableResourceData">`
	
	Optional: If you want to make the bundle only reference msl-P rather than including the msl-P2 in the firstAvailableResourceData, then delete the lines indicated in **Figure 18**.
	
	The next four resources in the bundle are all PTyp icon plots. After that the next resource is surface wind barbs which is the next plot needed for the Convective Severe Type Family bundle, so delete the entire set of PTyp resources.

```
//
ModFamV | | N|Conv: Severe Type Family| | OTHER| | \
      *MultiLoad,Layer\
      |0.|TP,Surface \
      |0.|msl-P,Surface\
      |30.|Wind,Surface\
      |0.|cCape,ML\
      |0.|cCin,ML|NBE,Surface\
      |0.|PBE,Surface\
      |0.|BlkMag,0-6kmAgl\
      |21.|BlkMag,0-6kmAgl\
      |0.|BlkMag,0-3kmAgl|EHI,0-3kmAgl\
      |0.|BlkMag,3-6kmAgl\
      |0.|BlkMag,1-3kmAgl\
      |51.|BlkShr,0-6kmAgl\
      |50.|BlkShr,0-3kmAgl\
      |50.|BlkShr,3-6kmAgl\
      |50.|BlkShr,0-1kmAgl\
      |50.|BlkShr,1-3kmAgl\
      |0.|VGP,0-2kmAgl\
      |0.|muCape,0-4kmAgl\
//
```

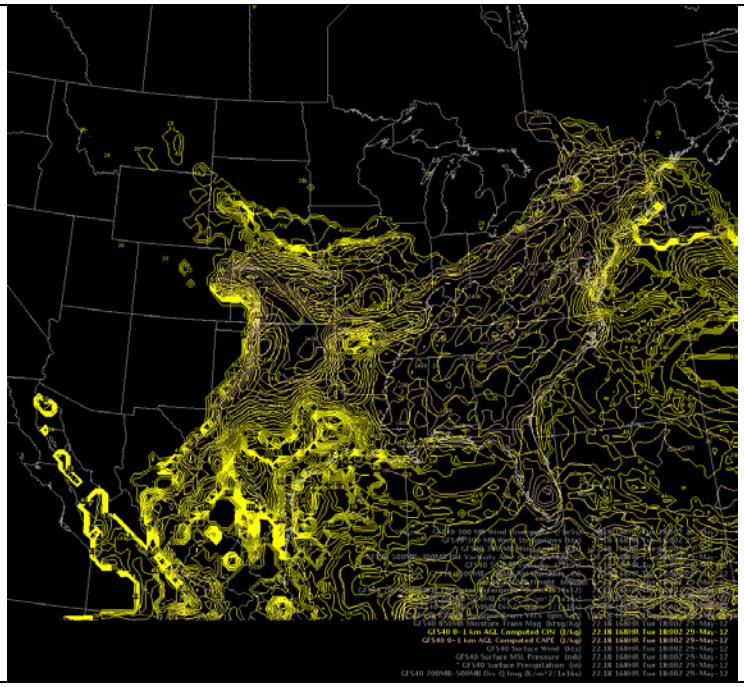
Figure 17. Excerpt of virtualFieldTable.txt that defines the Conv: Severe Type Family. The interpretation of the numeric codes preceding each field and level combination is as follows: *A non-zero value in the ones place means this overlay should be toggled on by default. The tens digit is the display type to use: 0=contour, 1=icons, 2=image, 3=barbs, 4=streamlines, 5=arrows, 6=dualarrows, 7=other. A non-zero value in the hundreds digit means start a new pane. The thousands place is number of frames to load; 0 means the same as the number of forecast times and 99 means whatever the display is currently set for* (verbatim from AWIPS-1 documentation in /awips/fxa/data/localization/documentation/families.html).

```
                    </mapping>
                    <mapping key="info.level.leveltwovalue">
                        <constraint constraintValue="-999999" constraintType="EQUALS" />
                    </mapping>
                    <mapping key="pluginName">
                        <constraint constraintValue="grid" constraintType="EQUALS"/>
                    </mapping>
                    <mapping key="info.level.masterLevel.name">
                        <constraint constraintValue="SFC" constraintType="EQUALS"/>
                    </mapping>
                    <mapping key="info.level.levelonevalue">
                        <constraint constraintValue="0" constraintType="EQUALS"/>
                    </mapping>
                </metadataMap>
                <alertParser xsi:type="dataCubeAlertMessageParser"/>
            </resourceData>
        </resource>

        <!-- AWIPS1 Description: |1.|msl-P,Surface|msl-P2,Surface\ -->

        <resource>
            <loadProperties />
            <properties/>
            <resourceData xsi:type="firstAvailableResourceData">

                <resource>
                    <loadProperties xsi:type="gridLoadProperties" displayType="CONTOUR" loadWithoutData="false">
                        <capabilities>
                            <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true" outlineWidth="1"/>
                            <capability xsi:type="colorableCapability" colorAsString="coral"/>
                        </capabilities>
                        <resourceType>PLAN_VIEW</resourceType>
                    </loadProperties>
                    <properties isSystemResource="false" isBlinking="false" isMapLayer="false" isHoverOn="false" isVisible="true">
                        <pdProps maxDisplayWidth="100000000" minDisplayWidth="0"/>
                    </properties>
                    <resourceData xsi:type="gridResourceData" retrieveData="true" isUpdatingOnMetadataOnly="false" isRequeryNecessaryOnTimeMatch="true">
                        <metadataMap>
                            <mapping key="info.parameter.abbreviation">
                                <constraint constraintValue="msl-P" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="info.datasetId">
                                <constraint constraintValue="${modelName}" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="info.level.leveltwovalue">
                                <constraint constraintValue="-999999" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="pluginName">
                                <constraint constraintValue="grid" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="info.level.masterLevel.name">
                                <constraint constraintValue="SFC" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="info.level.levelonevalue">
                                <constraint constraintValue="0.0" constraintType="EQUALS"/>
                            </mapping>
                        </metadataMap>
                        <alertParser xsi:type="dataCubeAlertMessageParser"/>
                    </resourceData>
                </resource>
                <resource>
                    <loadProperties xsi:type="gridLoadProperties" displayType="CONTOUR" loadWithoutData="false">
                        <capabilities>
                            <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true" outlineWidth="1"/>
                            <capability xsi:type="colorableCapability" colorAsString="coral"/>
                        </capabilities>
                        <resourceType>PLAN_VIEW</resourceType>
                    </loadProperties>
                    <properties isSystemResource="false" isBlinking="false" isMapLayer="false" isHoverOn="false" isVisible="true">
                        <pdProps maxDisplayWidth="100000000" minDisplayWidth="0"/>
                    </properties>
                    <resourceData xsi:type="gridResourceData" retrieveData="true" isUpdatingOnMetadataOnly="false" isRequeryNecessaryOnTimeMatch="true">
                        <metadataMap>
                            <mapping key="info.parameter.abbreviation">
                                <constraint constraintValue="msl-P2" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="info.datasetId">
                                <constraint constraintValue="${modelName}" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="pluginName">
                                <constraint constraintValue="grid" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="info.level.masterLevel.name">
                                <constraint constraintValue="SFC" constraintType="EQUALS"/>
                            </mapping>
                            <mapping key="info.level.levelonevalue">
                                <constraint constraintValue="0.0" constraintType="EQUALS"/>
                            </mapping>
                        </metadataMap>
                        <alertParser xsi:type="dataCubeAlertMessageParser"/>
                    </resourceData>
                </resource>
            </resourceData>
        </resource>

        <!-- AWIPS1 Description: |10.|PTyp,Surface|Snow3,Surface\ -->

        <resource>
```

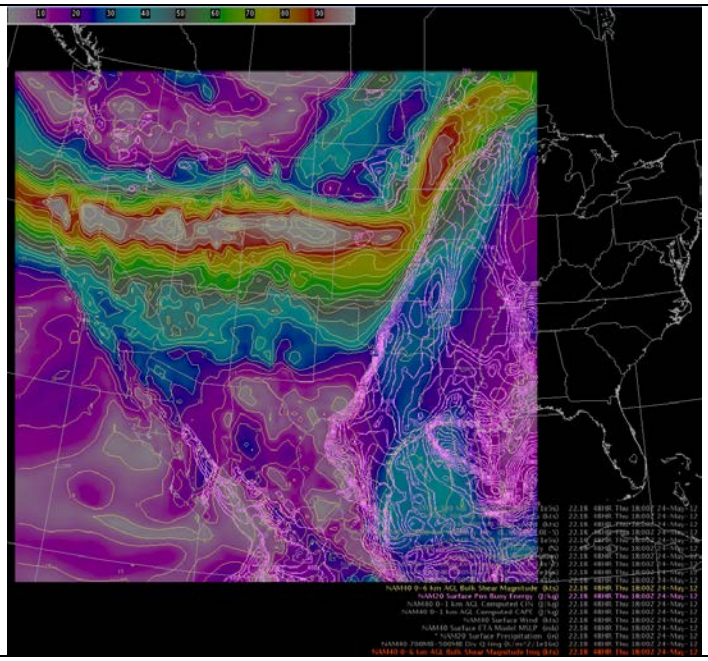
Figure 18. Optional lines to delete from msl-P/msl-P2 firstAvailableResourceData to make it a simple msl-P resource.

33. Test	

34. Add the next two resources to the model family (cCape for the mixed layer and either cCin for the mixed layer or negative buoyant energy for the surface).
`|0.|cCape,ML\`
`|0.|cCin,ML|NBE,Surface\`
	The next resource already present in the bundle file is a firstAvailableResourceData for DivFn or qDiv. We have a simple resource to do first, so we'll copy/paste the Wind resource just above and change it for cCape. Then we'll use the firstAvailableResourceData for the cCin/NBE resource.
	
	Duplicate the wind barb resource by copying and pasting it. As of OB13.5.1, the ML designation doesn't work (***AWIPS2_DR_13194;*** trying to use that layer results in a No Data Available message in AlertViz), so we'll use a 0-1 km FHAG (Fixed Height Above Ground) layer instead. Make these changes to the bundle:
	• Change the displayType from "BARB" to "CONTOUR".
	• Change the constraintValue for the info.parameter.abbreviation from "Wind" to "cCape"
	• Change the constraintValue for the info.level.leveltwovalue from "-999999" to "1000.0"
	• Change the constraintValue for the info.level.masterLevel.name from "SFC" to "FHAG"
	• Ensure the constraintValue for the info.level.levelonevalue is "0.0"
	
	Now change the next (firstAvailableResourceData) resource to choose between 0-1km FHAG cCin or NBE at the surface . In the first embedded resource:
	• Change the colorAsString to "yellow"
	• Change the constraintValue for the info.parameter.abbreviation from "DivFn" to "cCin"

	• Change the constraintValue for the info.level.leveltwovalue from “850.0” to “1000.0” • Change the constraintValue for the info.level.masterLevel.name from “MB” to “FHAG” • Change the constraintValue for the info.level.levelonevalue from “1000.0” to “0.0” In the second embedded resource: • Change the colorAsString to “yellow” • Change the constraintValue for the info.parameter.abbreviation from “qDiv” to “NBE” • Change the constraintValue for the info.level.leveltwovalue from “850.0” to “-999999” • Change the constraintValue for the info.level.masterLevel.name from “MB” to “SFC” • Change the constraintValue for the info.level.levelonevalue from “1000.0” to “0.0”
35. Test	

36. Add the next three resources, for PBE at the surface, and then a contour and image of 0-6km Bulk Shear Magnitude.
`|0.|PBE,Surface\`
`|0.|BlkMag,0-6kmAgl\`
`|21.|BlkMag,0-6kmAgl\`
	First, we’ll change the next existing resource in the file (850 Mmag) to Surface PBE.
	• Change the constraintValue for the info.parameter.abbreviation from “Mmag” to “PBE”
	• Change the constraintValue for info.level.masterLevel.name from “MB” to “SFC”
	• Change the constraintValue for the info.level.levelonevalue from “850.0” to “0.0”
	• Verify the constraintValue for the info.level.leveltwovalue is

	"-999999". Now, we will add the 0-6 km bulk shear contours to the D2D display. The existing plot was an arrow plot for 850 mb moisture transport vectors. • Change the displayType from "ARROW" to "CONTOUR" • Change the constraintValue for the info.parameter.abbreviation from "MTV" to "BlkMag" • Change the constraintValue for the info.level.masterLevel.name from "MB" to "FHAG" • Change the constraintValue for the info.level.levelonevalue from "850.0" to "0.0" • Change the constraintValue for the info.level.leveltwovalue from "-999999" to "6000.0" The next plot we need is an image version of the contour plot we just made, so just copy/paste the previous resource, and make these two changes: • Change the displayType from "CONTOUR" to "IMAGE" • Change isVisible to "true"
37. Test	

38. Now add the three layers of BlkMag and/or EHI contours.

```
|0.|BlkMag,0-3kmAgl|EHI,0-3kmAgl\
|0.|BlkMag,3-6kmAgl\
|0.|BlkMag,1-3kmAgl\
```

The next layer we need to construct is a firstAvailableResourceData to choose between either Bulk Shear Magnitude contours or EHI contours for 0-3 km AGL. We will encapsulate the next two existing resources in our bundle in the firstAvailableResourceData.

Add the four lines indicated by the black box in **Figure 19** between the 0-6km AGL BlkMag image we just did and the next pre-existing resource in the bundle (850-700MB qDiv contours).

Indent the two resources to be embedded inside the firstAvailableResourceData (currently 850-700MB qDiv contours and 700-500MB qDiv contours).

Add closing </resourceData> and </resource> tags after the resource for 700-500MB qDiv contours.

In the first embedded resource (850-700MB qDiv contours), make the following changes:

- Add <capability xsi:type="colorableCapability" colorAsString="OrangeRed"/> to the capabilities under loadProperties
- Change the constraintValue for the info.parameter.abbreviation from "qDiv" to "BlkMag"
- Change the constraintValue for the info.level.masterLevel.name from "MB" to "FHAG"
- Change the constraintValue for the info.level.levelonevalue from "850.0" to "0.0"
- Change the constraintValue for the info.level.leveltwovalue from "700.0" to "3000.0"

In the second embedded resource (700-500MB qDiv contours), make the following changes:

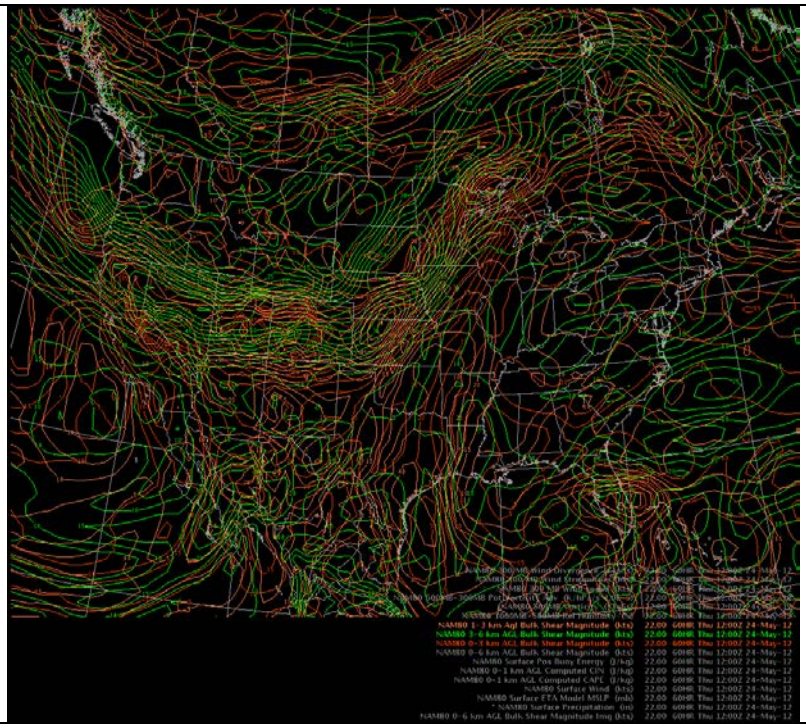
- Add <capability xsi:type="colorableCapability" colorAsString="OrangeRed"/> to the capabilities under loadProperties
- Change the constraintValue for the info.parameter.abbreviation from "qDiv" to "EHI"
- Change the constraintValue for the info.level.masterLevel.name from "MB" to "FHAG"
- Change the constraintValue for the info.level.levelonevalue from "700.0" to "0.0"
- Change the constraintValue for the info.level.leveltwovalue from "500.0" to "3000.0"

	Use the next pre-existing resource (700-500 MB qDiv image) for 3-6km AGL BlkMag contours. Make these changes: • Change the displayType from “IMAGE” to “CONTOUR” • Change isVisible to “false” • Change the constraintValue for the info.parameter.abbreviation from “qDiv” to “BlkMag” • Change the constraintValue for the info.level.masterLevel.name from “MB” to “LYRFHAG” • Change the constraintValue for the info.level.levelonevalue from “700.0” to “3000.0” • Change the constraintValue for the info.level.leveltwovalue from “500.0” to “6000.0” Note: For a layer product (AGL), look in the LevelMappingFile.xml (seen in the Localization Perspective under **D2D** » **Volume Browser**) file to determine if the masterLevel.name constraintValue should be FHAG (fixed height above ground) or LYRFHAG. If the layer coordinate is specified incorrectly, a “No Data Available” message will likely appear in AlertViz when CAVE tries to load the bundle.
	The next pre-existing resource in the bundle should be a firstAvailableResourceData that includes 600-700 MB DivFn and 500-700 MB DivFn. Delete the entirety of the firstAvailableResourceData including the two embedded DivFn plots. Use the next pre-existing resource (500 MB GH contours) for 1-3km AGL BlkMag contours. Make these changes: • Change the constraintValue for the info.parameter.abbreviation from “GH” to “BlkMag” • Change the constraintValue for the info.level.masterLevel.name from “MB” to “LYRFHAG” • Change the constraintValue for the info.level.levelonevalue from “500.0” to “1000.0” • Change the constraintValue for the info.level.leveltwovalue from “-999999” to “3000.0”

```
                        <constraint constraintValue="FHAG" constraintType="EQUALS"/>
                    </mapping>
                    <mapping key="info.level.levelonevalue">
                        <constraint constraintValue="0.0" constraintType="EQUALS"/>
                    </mapping>
                    <mapping key="info.level.leveltwovalue">
                        <constraint constraintValue="6000.0" constraintType="EQUALS"/>
                    </mapping>

                </metadataMap>
                <alertParser xsi:type="dataCubeAlertMessageParser"/>
            </resourceData>
        </resource>


         <!-- AWIPS1 Description: |0.|BlkMag,0-3kmAgl|EHI,0-3kmAgl\ -->

        <resource>
            <loadProperties/>
            <properties isVisible="false"/>
            <resourceData xsi:type="firstAvailableResourceData">

        <resource>
            <loadProperties xsi:type="gridLoadProperties" displayType="CONTOUR" loadWithoutData="false">
                <capabilities>
                    <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true" outlineWidth="1"/>
                </capabilities>
                <resourceType>PLAN_VIEW</resourceType>
            </loadProperties>
            <properties isSystemResource="false" isBlinking="false" isMapLayer="false" isHoverOn="false" isVisible="false">
                <pdProps maxDisplayWidth="100000000" minDisplayWidth="0"/>
            </properties>
            <resourceData xsi:type="gridResourceData" retrieveData="true" isUpdatingOnMetadataOnly="false" isRequeryNecessaryOnTimeMatch="true">
                <metadataMap>
                    <mapping key="info.parameter.abbreviation">
                        <constraint constraintValue="qDiv" constraintType="EQUALS"/>
                    </mapping>
                    <mapping key="info.datasetId">
                        <constraint constraintValue="${modelName}" constraintType="EQUALS"/>
                    </mapping>
                    <mapping key="info.level.leveltwovalue">
                        <constraint constraintValue="700.0" constraintType="EQUALS"/>
                    </mapping>
                    <mapping key="pluginName">
                        <constraint constraintValue="grid" constraintType="EQUALS"/>
                    </mapping>
                    <mapping key="info.level.masterLevel.name">
                        <constraint constraintValue="MB" constraintType="EQUALS"/>
                    </mapping>
                    <mapping key="info.level.levelonevalue">
                        <constraint constraintValue="850.0" constraintType="EQUALS"/>
                    </mapping>
                </metadataMap>
                <alertParser xsi:type="dataCubeAlertMessageParser"/>
```

Figure 19. Lines added to begin the firstAvailableResourceData needed for the BlkMag/EHI contours in Step 38.

39. Test



40. Add the next five layers: Bulk Shear vectors for 0-6 km, 0-3 km, 3-6 km, 0-1 km, and 1-3 km.

```
|51.|BlkShr,0-6kmAgl\
|50.|BlkShr,0-3kmAgl\
|50.|BlkShr,3-6kmAgl\
|50.|BlkShr,0-1kmAgl\
|50.|BlkShr,1-3kmAgl\
```

Use the next pre-existing resource (1000-500 MB RH) and make the following changes:

- Change the displayType from “CONTOUR” to “ARROW”
- Change isVisible to “true”
- Change the constraintValue for the info.parameter.abbreviation from “RH” to “BlkShr”
- Change the constraintValue for the info.level.masterLevel.name from “MB” to “FHAG”
- Change the constraintValue for the info.level.levelonevalue from “1000.0” to “0.0”
- Change the constraintValue for the info.level.leveltwovalue from “500.0” to “6000.0”

The next pre-existing resource is a firstAvailableResourceData for 500 MB AV/geoVort. Delete the first four lines (<resource>, <loadProperties>, <properties>, and <resourceData> tags), and un-indent the 500 MB AV resource. Make these changes to the 500 MB AV resource:

- Change the displayType from “CONTOUR” to “ARROW”
- Delete the entire colorableCapability line.
- Change the constraintValue for the info.parameter.abbreviation from “AV” to “BlkShr”
- Change the constraintValue for the info.level.masterLevel.name from “MB” to “FHAG”
- Change the constraintValue for the info.level.levelonevalue from “500.0” to “0.0”
- Change the constraintValue for the info.level.leveltwovalue from “-999999” to “3000.0”

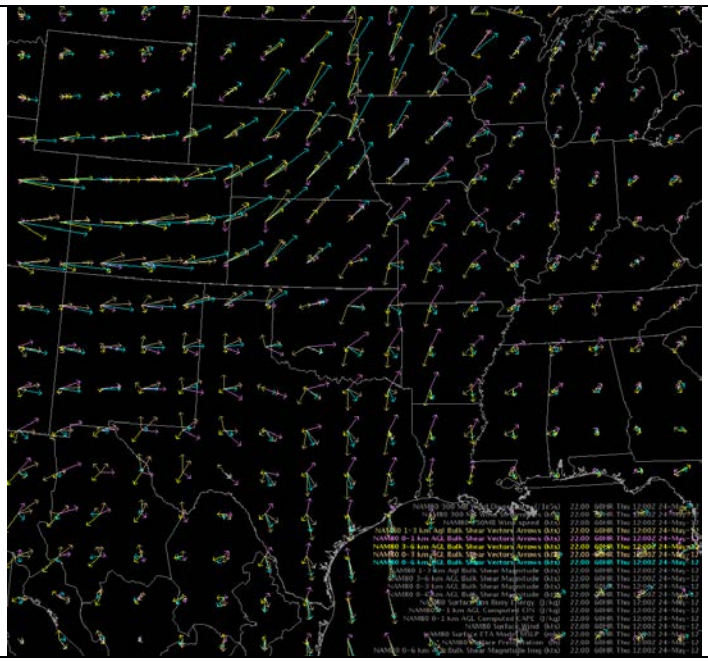
Un-indent the next (500 MB geoVort) resource. Make these changes to the 500 MB geoVort resource:

- Change the displayType from “CONTOUR” to “ARROW”
- Delete the entire colorableCapability line.
- Change the constraintValue for the info.parameter.abbreviation from “geoVort” to “BlkShr”
- Change the constraintValue for the info.level.masterLevel.name from “MB” to “LYRFHAG”
- Change the constraintValue for the info.level.levelonevalue from “500.0” to “3000.0”
- Change the constraintValue for the info.level.leveltwovalue and set the constraintValue to “6000.0”

Delete the last <resourceData> and </resource> tags that were

	remaining from the firstAvailableResourceData.
	Transform the next resource (500-300 MB PTvA) into 0-1 km Bulk Shear Vectors. Make these changes to the 500-300 MB PTvA resource: • Change the displayType from “CONTOUR” to “ARROW” • Change the constraintValue for the info.parameter.abbreviation from “PTvA” to “BlkShr” • Change the constraintValue for the info.level.masterLevel.name from “MB” to “FHAG” • Change the constraintValue for the info.level.levelonevalue from “500.0” to “0.0” • Change the constraintValue for the info.level.leveltwovalue from “300.0” to “1000.0”
	The next pre-existing resource is a firstAvailableResourceData for 300/250 MB wSp. Delete the first four lines (<resource>, <loadProperties>, <properties>, and <resourceData> tags), and un-indent the 300 MB wSp resource. Make these changes to the 300 MB wSp resource: • Change the displayType from “CONTOUR” to “ARROW” • Delete the colorableCapability line. • Change the constraintValue for the info.parameter.abbreviation from “wSp” to “BlkShr” • Change the constraintValue for the info.level.masterLevel.name from “MB” to “LYRFHAG” • Change the constraintValue for the info.level.levelonevalue from “300.0” to “1000.0” • Change the constraintValue for the info.level.leveltwovalue from “-999999” to “3000.0” Delete the last <resourceData> and </resource> tags that are at the end of the 250 mb wSp resource.

41. Test



42. Add the next two layers: Vorticity Generation Parameter (VGP) for 0-2 km and Most Unstable CAPE for 0-4 km.

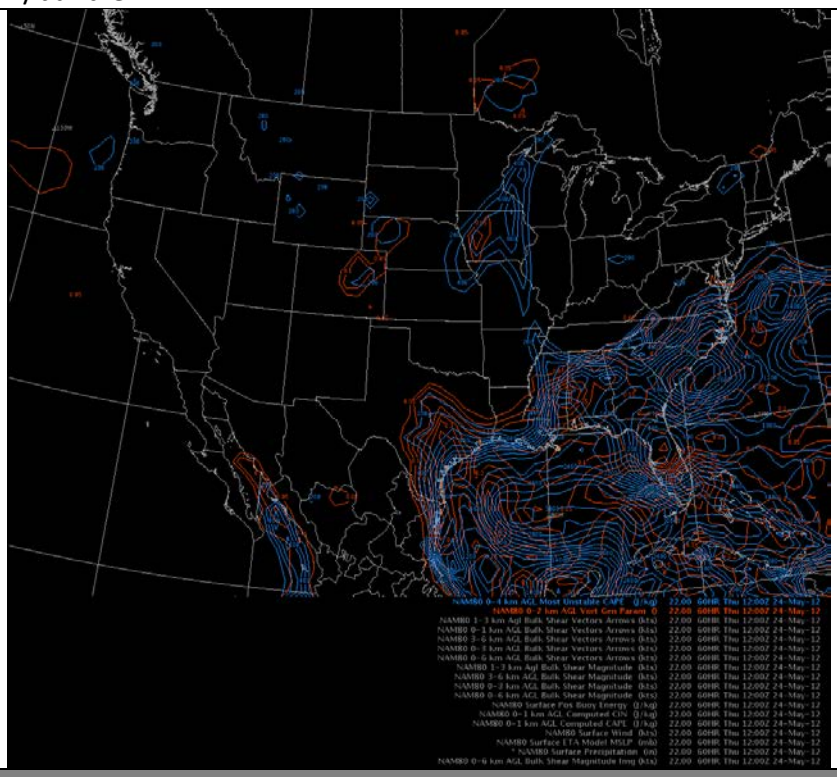
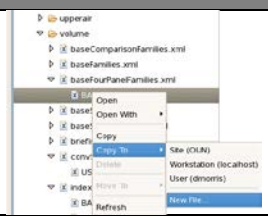
```
|0.|VGP,0-2kmAgl\
|0.|muCape,0-4kmAgl\
```

Transform the 250 MB wSp contour resource into the 0-2 km VGP contour plot. Make these changes to the 250 MB wSp resource:

- Unindent the resource
- Delete the colorableCapability line.
- Change the constraintValue for the info.parameter.abbreviation from “wSp” to “VGP”
- Change the constraintValue for the info.level.masterLevel.name from “MB” to “FHAG”
- Change the constraintValue for the info.level.levelonevalue from “250.0” to “0.0”
- Set the info.level.leveltwovalue and set it to “2000.0”

The next pre-existing resource is a firstAvailableResourceData for 300/250 MB streamlines. Delete the first four lines (<resource>, <loadProperties>, <properties>, and <resourceData> tags), and un-indent the 300 MB streamline resource. Make these changes to the 300 MB streamline resource:

- Unindent the 300 MB streamline resource
- Change the displayType from “STREAMLINE” to “CONTOUR”
- Delete the colorableCapability line.
- Change the constraintValue for the info.parameter.abbreviation from “Wind” to “muCape”
- Change the constraintValue for the info.level.masterLevel.name from “MB” to “FHAG”
- Change the constraintValue for the info.level.levelonevalue from “300.0” to “0.0”

	• Change the constraintValue for the info.level.leveltwovalue from “-999999” to “4000.0” Delete the next resource (250 MB streamlines) including both sets of the <resourceData> and </resource> tags that are at the end of the 250 MB streamline resource. The next resource is a firstAvailableResourceData that is not needed, so it can be deleted in its entirety. Six lines should remain at the bottom of the bundle: <timeMatcher xsi:type=”d2dTimeMaqtcher”..../> <numberofFrames>${frameCount}</numberofFrames> </descriptor> </displays> <displayList> </bundle>
43. Test	
Part 5. Implement the Conv: Derecho Family Menu	
44. The Derecho Family is a four-panel family, so use the baseFourPanelFamilies.xml menu as a	In the Localization Perspective file browser, open **CAVE** » **Menus** » **volume**. Copy baseFourPanelFamilies.xml to convDerechoFamilies.xml, by clicking the **BASE** icon under 

template for the Conv: Derecho Families menu. It's a four-panel family because the numeric descriptors in its Virtual Field Table definition (**Figure 22**) contain three digits.	baseFourPanelFamilies.xml and choosing **Copy To ►New File**. Name the new file **convDerechoFamilies.xml**.
	Edit the new convDerechoFamilies.xml menu file. Change the name of the file for each bundleItem from "DefaultFourPanel" to "ConvDerecho4PFamily.xml". Delete the ECMWF and UKMET entries (see **Figure 20**).

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <contribute xsi:type="bundleItem" file="bundles/volume/ConvDerecho4PFamily.xml"
            menuText="DGEX" id="dgex4panel" useReferenceTime="true">
            <substitute key="modelName" value="DGEX185"/>
            <substitute key="TP" value="TP6hr"/>
            <substitute key="frameCount" value="18"/>
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/volume/ConvDerecho4PFamily.xml"
            menuText="GFS40" id="gfs404panel" useReferenceTime="true">
            <substitute key="modelName" value="GFS212"/>
            <substitute key="TP" value="TP"/>
            <substitute key="frameCount" value="41"/>
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/volume/ConvDerecho4PFamily.xml"
            menuText="GFS" id="gfs904panel" useReferenceTime="true">
            <substitute key="modelName" value="${GFSmodel}"/>
            <substitute key="TP" value="TP6hr"/>
            <substitute key="frameCount" value="41"/>
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/volume/ConvDerecho4PFamily.xml"
            menuText="NAM12" id="nam124panel" useReferenceTime="true">
            <substitute key="modelName" value="${NAM12model}"/>
            <substitute key="TP" value="TP3hr"/>
            <substitute key="frameCount" value="29"/>
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/volume/ConvDerecho4PFamily.xml"
            menuText="NAM40" id="nam404panel" useReferenceTime="true">
            <substitute key="modelName" value="${NAM40model}"/>
            <substitute key="TP" value="TP3hr"/>
            <substitute key="frameCount" value="29"/>
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/volume/ConvDerecho4PFamily.xml"
            menuText="NAM80" id="nam804panel" useReferenceTime="true">
            <substitute key="modelName" value="ETA"/>
            <substitute key="TP" value="TP6hr"/>
            <substitute key="frameCount" value="15"/>
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/volume/ConvDerecho4PFamily.xml"
            menuText="RAP13" id="rap134panel" useReferenceTime="true">
            <substitute key="modelName" value="${RAP13model}"/>
            <substitute key="TP" value="TP3hr"/>
            <substitute key="frameCount" value="19"/>
        </contribute>
        <contribute xsi:type="bundleItem" file="bundles/volume/ConvDerecho4PFamily.xml"
            menuText="RAP" id="rap4panel" useReferenceTime="true">
            <substitute key="modelName" value="${RAPmodel}"/>
            <substitute key="TP" value="TP3hr"/>
            <substitute key="frameCount" value="9"/>
        </contribute>

</menuTemplate>
```

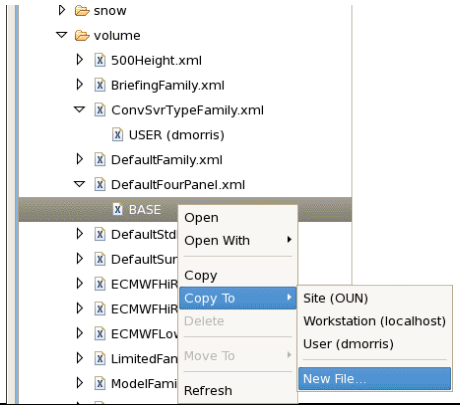
Figure 20. Changes to the ConvDerechoFamilies.xml menu file.

45. Edit the index.xml menu file to create the convective derecho model family	Edit the user version of **index.xml** by double-clicking its **USER** icon. Duplicate the entry for ConvSvrTypeFamilies.xml and change the

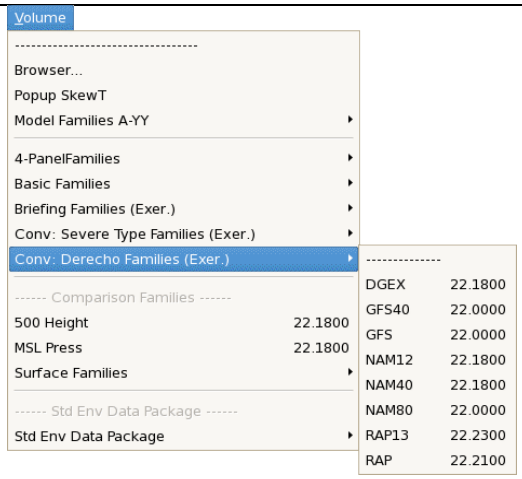
entry above the Convective Severe Types Families entry.	second version to match the red box in **Figure 21.**

```
<menuContributionFile>
    <substitute key="DGEXmodel" value="DGEX185" />
    <substitute key="GFSmodel" value="GFS213" />
    <substitute key="NAM12model" value="ETA218" />
    <substitute key="NAM40model" value="mesoEta212" />
    <substitute key="ARWmodel1" value="HiResW-ARW-East" />
    <substitute key="ARWmodel2" value="HiResW-ARW-West" />
    <substitute key="MMMmodel1" value="HiResW-NMM-East" />
    <substitute key="MMMmodel2" value="HiResW-NMM-West" />
    <substitute key="RAP13model" value="RUC130" />
    <substitute key="RAPmodel" value="RUC236" />
    <include subMenu="Basic Families" installTo="menu:volume?after=VolumeBundles"
             fileName="menus/volume/baseFamilies.xml">
    </include>
    <include installTo="menu:volume?before=VolumeBundles"
             fileName="menus/volume/ModelFamilies.xml">
    </include>
    <include subMenu="4-PanelFamilies" installTo="menu:volume?after=VolumeBundles"
             fileName="menus/volume/baseFourPanelFamilies.xml">
    </include>

    <include subMenu="Briefing Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/briefingFamilies.xml">
    </include>

    <include subMenu="Conv: Severe Type Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/convSvrTypeFamilies.xml">
    </include>

    <include subMenu="Conv: Derecho Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/convDerechoFamilies.xml">
    </include>


    <include installTo="menu:volume?after=ComparisonFamilies"
             fileName="menus/volume/baseComparisonFamilies.xml">
    </include>
    <include subMenu="Surface Families" installTo="menu:volume?after=SurfaceFamilies"
             fileName="menus/volume/baseSurfaceFamilies.xml">
```

Figure 21. Edits to index.xml to create the Convective Derecho Four-Panel family menu entry.

46. Duplicate the DefaultFourPanel.xml *bundle* file as ConvDerecho4PFamily.xml, so that the menu entries created above will work.	In the File Browser, scroll up to the **CAVE** » **Bundles** section. Open **volume** and **DefaultFourPanel.xml**. Right-click the **BASE** icon and choose **Copy To** ►**New File**. Call the new file ConvDerecho4PFamily.xml.	

47. Restart CAVE to see your changes reflected in the Volume menu. The Conv: Derecho Families menu should be located above Severe Type Families and should display the models declared in the convDerechoFamilies.xml menu file.



Part 6. Implement the Conv: Derecho Families Bundle

48. Inspect the ConvDerecho4PFamily.xml.

Open the ConvDerecho4PFamily.xml bundle in the Localization Perspective. By inspection, you should be able to see that the 4-panel product has this structure:

```
<bundle>
        <displayList>
                <displays…..>    [Top Left Panel]
                        <descriptor xsi:type=”mapDescriptor”>
                                <resource>
                                </resource>
                                <resource>
                                </resource>
                                <timeMatcher … />
                                <numberOfFrames>
                                </numberOfFrames>
                        </descriptor>
                </displays>
                <displays…..>  [Top Right Panel]
                        <descriptor xsi:type=”mapDescriptor”>
                                <resource>
                                </resource>
                                <resource>
                                </resource>
                                <timeMatcher … />
                                <numberOfFrames>
                                </numberOfFrames>
                        </descriptor>
                </displays>
                <displays…..>  [Bottom Left Panel]
```

	<descriptor xsi:type="mapDescriptor"> <resource> </resource> <resource> </resource> <timeMatcher … /> <numberOfFrames> </numberOfFrames> </descriptor> </displays> <displays…..> **[Bottom Right Panel]** <descriptor xsi:type="mapDescriptor"> <resource> </resource> <resource> </resource> <timeMatcher … /> <numberOfFrames> </numberOfFrames> </descriptor> </displays> </displayList> </bundle> So for each panel (display), we'll simply modify the resources for each display layer as we've done before.
49. Analyze the Derecho Family in the virtual field table (**Figure 22**).	The first panel is relatively simple, with an image and contours of bulk shear magnitude and a bulk shear vector plot. The second panel requires a firstAvailableResourceData for the 850-300 MB muCape and Surface PBE. The remaining plots for the second panel are simple. However, note that ML doesn't work with OB13.5.1, so we will substitute 0-1km FHAG for the ML references for the cCape and cCin contour plots. In addition to the simple surface precipitation, msl-P, and wind plots, the third panel has a three-way alternative for dew point (boundary layer, surface, or ML). The three-way alternative will utilize firstAvailableResourceData, and will substitute 0-1km FHAG for ML. The fourth panel has wind plots for 6-10 km Agl. This model family has two unusual levels (850MB-300MB, and 6-10 km Agl). The levels and planes are defined in the volume browser's

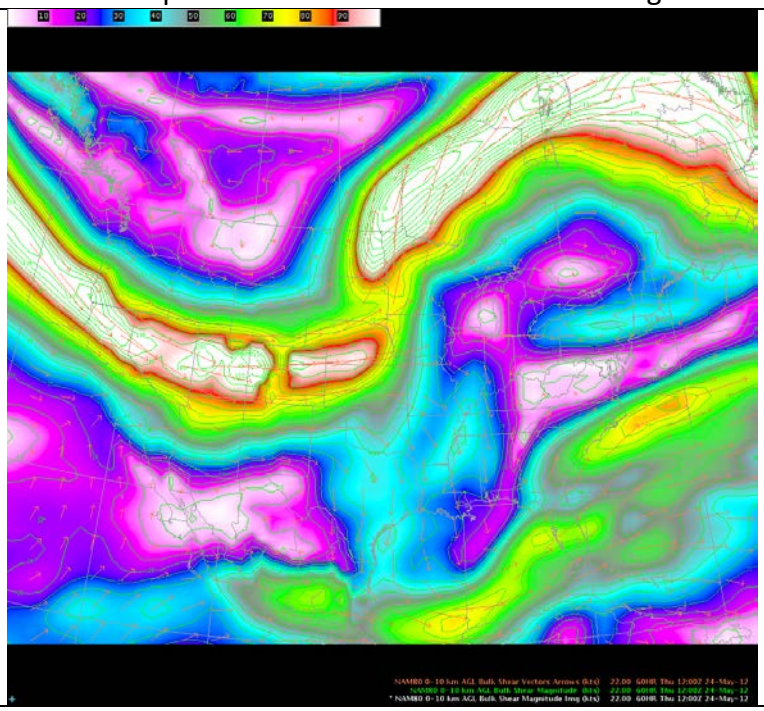
	LevelMappingFile.xml, which can be viewed and overridden in the Localization Perspective (it's under **D2D** » **Volume Browser**). The 850MB-300MB plot is defined in the BASE version of LevelMappingFile.xml but the 6-10 km Agl level is not, so we'll illustrate the process of adding a custom level while constructing the fourth panel. Note: The ordering of the four panels is different between AWIPS-1 and AWIPS-2. AWIPS-1 is consistent in that the four panels are constructed and referenced (for example, by the "Panel Combo Rotate" function by pressing the number keys) in a clockwise order: **1** **2** **4** **3** BlkMag… muCape… TP… wSp… In the AWIPS-2 bundles, the panels are defined in the order shown in the previous step. So if you translate a four panel virtual field table into a bundle without doing any re-ordering, the Derecho Family (**Figure 22**) would appear in this order (as is done in this exercise) where the bottom panels are reversed: BlkMag… muCape… wSp… TP… If you want four-panel families to be *exactly* replicated between AWIPS-1 and AWIPS-2, then you will need to use the third pane defined in the virtual field table as the fourth display in the AWIPS-2 bundle and the fourth virtual field table pane as the third AWIPS-2 bundle display. By the way, the panel combo rotate function in AWIPS-2 references the panels in the same order as AWIPS-1.

```
//
ModFamHH | | N|Conv: Derecho Family| | OTHER| | \
      *MultiLoad,Layer|121.|BlkMag,0-10kmAgl|0.|BlkMag,0-10kmAgl|51.|BlkShr,0-10
kmAgl\
        |101.|muCape,0-6kmAgl\
          |0.|muCape,850MB-300MB|PBE,Surface|0.|cCape,ML|0.|cCin,ML\
          |0.|cCin,Surface|0.|NBE,Surface\
          |101.|TP,Surface|1.|msl-P,Surface|31.|Wind,Surface\
          |0.|DpT,BLyr|DpT,Surface|DpT,ML\
          |21.|DpT,BLyr|DpT,Surface|DpT,ML\
        |121.|wSp,6-10kmAgl|0.|wSp,6-10kmAgl|51.|Wind,6-10kmAgl
//
```

Figure 22. Excerpt of the virtual field table that defines the Conv: Derecho Family. The interpretation of the numeric codes preceding each field and level combination is as follows: *A non-zero value in the ones place means this overlay should be toggled on by default. The tens digit is the display type to use: 0=contour, 1=icons, 2=image, 3=barbs, 4=streamlines, 5=arrows, 6=dualarrows, 7=other. A non-zero value in the hundreds digit means start a new pane. The thousands place is number of frames to load; 0 means the same as the number of forecast times and 99 means whatever the display is currently set for* (verbatim from AWIPS-1 documentation in /awips/fxa/data/localization/documentation/families.html).

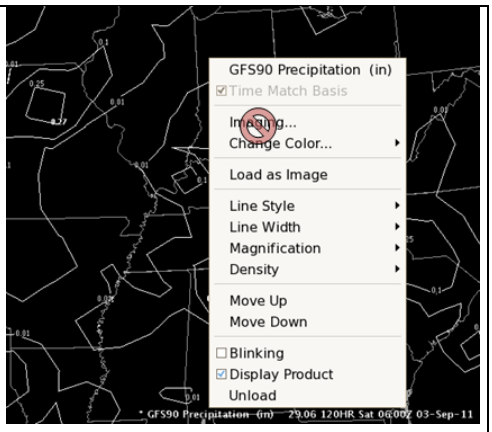
50. Construct the first panel, the 0-10km Agl bulk shear plots.
`|121.|BlkMag,0-10kmAgl`
`|0.|BlkMag,0-10kmAgl`
`|51.|BlkShr,0-10kmAgl\`
	Edit the **USER** version of the ConvDerecho4PFamily.xml bundle in the Localization Perspective. The first pre-existing resource for the first display is a 500 MB AV image. We'll transform the 500 MB AV image into the 0-10km bulk shear magnitude image. Make these changes to the 500 MB AV resource:
	• Verify that the displayType = "IMAGE", renderingOrderId="IMAGE_REGION", and isVisible="true".
	• Change the constraintValue for the info.parameter.abbreviation from "AV" to "BlkMag"
	• Change the constraintValue for the info.level.masterLevel.name from "MB" to "FHAG"
	• Change the constraintValue for the info.level.levelonevalue from "500.0" to "0.0"
	• Change the constraintValue for the info.level.leveltwovalue from "-999999" to "10000.0"

	Use the next pre-existing resource (500 MB GH contours) for the 0-10 km BlkMag contours. Make these changes to the 500 MB GH resource: • Verify that the displayType = "CONTOUR" • Change isVisible to "false" • Change the constraintValue for the info.parameter.abbreviation from "GH" to "BlkMag" • Change the constraintValue for the info.level.masterLevel.name from "MB" to "FHAG" • Change the constraintValue for the info.level.levelonevalue from "500.0" to "0.0" • Change the constraintValue for the info.level.leveltwovalue from "-999999" to "10000.0"

	Using copy/paste, duplicate the new 0-10 km BlkMag contour plot. (Note the closing </resource> tag is just before the <timeMatcher> tag.) Use the second version for the BlkShr vector plot by making these changes: • Change the displayType = "ARROW" • Change isVisible to "true" • Change the constraintValue for the info.parameter.abbreviation from "BlkMag" to "BlkShr"
51. Test. The upper-left pane is shown, using the "panel combo rotate" function by pressing the "1" key.	

52. Construct the second panel, the CAPE and CIN plots.
 	
`|101.|muCape,0-6kmAgl\`
`  |0.|muCape,850MB-300MB|PBE,Surface`
`  |0.|cCape,ML`
`  |0.|cCin,ML\`
`  |0.|cCin,Surface|0.|NBE,Surface\`
	The **first** pre-existing resource for the **second** display is an image for 1000-500 MB thickness (dz). Transform this resource into visible contours of 0-6km muCape by making these changes:
	• Change the displayType to "CONTOUR" and renderingOrderId to "CONTOUR".
	• Verify isVisible="true".
	• Change the constraintValue for the info.parameter.abbreviation from "dZ" to "muCape"
	• Change the constraintValue for the info.level.masterLevel.name from "MB" to "FHAG"
	• Change the constraintValue for the info.level.levelonevalue from "1000.0" to "0.0"
	• Change the constraintValue for the info.level. leveltwovalue from "500.0" to "6000.0"
	Remove the line that begins <capability

xsi:type="imagingCapability". This prevents the **Imaging** contextual menu from being available to allow a user to attempt to change the color palette for a contour plot (which obviously doesn't make sense and would eventually generate a nullPointerException error).



Replace the imagingCapability line with the outlineCapability line (copy/paste from a previous resource):

<capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true" outlineWidth="1" />

The second plot in this display, toggled off by default, has to choose between 850-300 mb muCape (most unstable CAPE) and surface PBE (positive buoyant energy), so it needs a resource with firstAvailableResourceData. Add the lines indicated by the red box in **Figure 23** to begin the firstAvailableResourceData. Note this version of the firstAvailableResourceData includes properties to make the plots not visible.

Indent the next resource (msl-P) using the **Source** menu and the **Shift Right** option, also shown in **Figure 23**.

Make these changes to the msl-P resource:

- Change isVisible to "false".
- Change the constraintValue for the info.parameter.abbreviation from "msl-P" to "muCape"
- Change the constraintValue for the info.level.masterLevel.name from "SFC" to "MB"
- Change the constraintValue for the info.level.levelonevalue from "0.0" to "850.0"
- Add a mapping for info.level.leveltwovalue and set the constraintValue to "300.0"

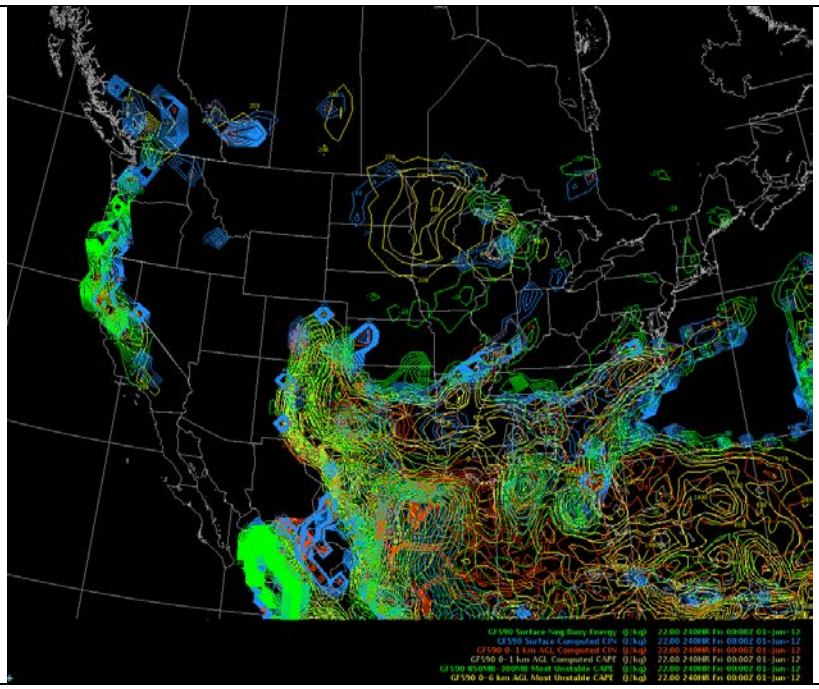
To make the surface PBE plot, duplicate the entire 850-300 MB muCape resource by copying and pasting it. Make these changes to the second version:

- Change the constraintValue for the info.parameter.abbreviation from "muCape" to "PBE"
- Change the constraintValue for the info.level.masterLevel.name from "MB" to "SFC"

	• Change the constraintValue for the info.level.levelonevalue from “850.0” to “0.0” • Change the constraintValue for the info.level.leveltwovalue from “300.0” to “-999999” Add two lines to close the firstAvailableResourceData between the closing </resource> tag of the PBE plot and the <timeMatcher> tag: </resourceData> </resource>
	The next plot, ML cCape (computed CAPE for the mixed layer) needs only a simple resource. Copy the PBE resource (don’t include the last </resourceData> and </resource> tags that close out the firstAvailableResourceData resource). Paste it just before the <timeMatcher> tag (or just beneath the </resourceData> and </resource> tags that close out the firstAvailableResourceData). Use the second copy for the cCape resource by making these changes: • Unindent the resource • Change the constraintValue for the info.parameter.abbreviation from “PBE” to “cCape” • Change the constraintValue for the info.level.masterLevel.name from “SFC” to “FHAG” (we’re using 0-1km AGL rather than ML). • Verify the constraintValue for the info.level.levelonevalue is “0.0” • Change the constraintValue for the info.level.leveltwovalue from “-999999” to “1000.0”
	Duplicate the entire cCape resource to use for the next cCin (computed Convective Inhibition) plot. Make this change to the second version: • Change the constraintValue for the info.parameter.abbreviation from “cCape” to “cCin”.
	Duplicate the cCin plot to use for the surface cCin plot. Make these changes to the last version: • Change the constraintValue for the info.level.masterLevel.name from “FHAG” to “SFC” • Verify the constraintValue for the info.level.levelonevalue is “0.0” • Change the constraintValue for the info.level.leveltwovalue from “1000.0” to “-999999”
	Duplicate the surface cCin plot to use for the NBE plot. Make this change to the second version: • Change the constraintValue for the info.parameter.abbreviation from “cCin” to “NBE”

Figure 23. Additions to the second display to start the firstAvailableResourceData for 850-300MB muCape/surface PBE.

53. Test. The upper-right pane is shown, using the “panel combo rotate” function by pressing the “2” key, and toggling all the invisible contour plots.



54. Construct the third panel, the surface precip, msl-P, and wind plots and the dewpoint plots for either the boundary layer, surface, or mixed layer (substituting 0-1km FHAG for the mixed layer).

```
|101.|TP,Surface
|1.|msl-P,Surface
|31.|Wind,Surface\
|0.|DpT,BLyr|DpT,Surface|DpT,ML\
|21.|DpT,BLyr|DpT,Surface|DpT,ML\
```

Note: This display is in the lower left panel. If an *exact* replication of the AWIPS-1 display is desired, then swap the third and fourth displays in the bundle after you complete editing them following this exercise.

The **first** pre-existing resource in the **third** display is a ${TP} image (i.e., it uses whatever total precipitation field is passed into it from the menu making it model-specific). We need to transform it to a visible contour. Make these changes to this resource:

- Change the displayType to “CONTOUR” and renderingOrderId to “CONTOUR”.
- Change the imagingCapability to the outlineCapability as shown in Step 52.

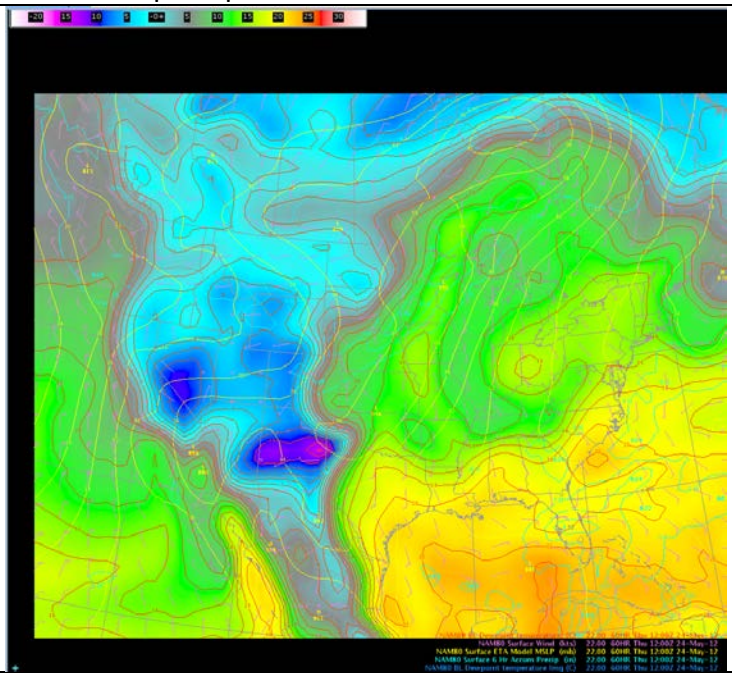
The next resource already in the bundle is a visible contour of 700 MB PVV. We need it to be visible contours of msl-P, so make these changes to it:

- Change the constraintValue for the info.parameter.abbreviation from “PVV” to “msl-P”
- Change the constraintValue for the info.level.masterLevel.name from “MB” to “SFC”
- Change the constraintValue for the info.level.levelonevalue from “700.0” to “0.0”
- Verify the constraintValue for the info.level.leveltwovalue is“-999999”, isVisible is “true”, and displayType is “CONTOUR”.

Copy and paste the msl-P resource we just edited and use the second version as the surface wind barb plot.
Make these changes to the second msl-P resource:

- Change displayType from “CONTOUR” to “BARB”
- Verify isVisible remains “true”

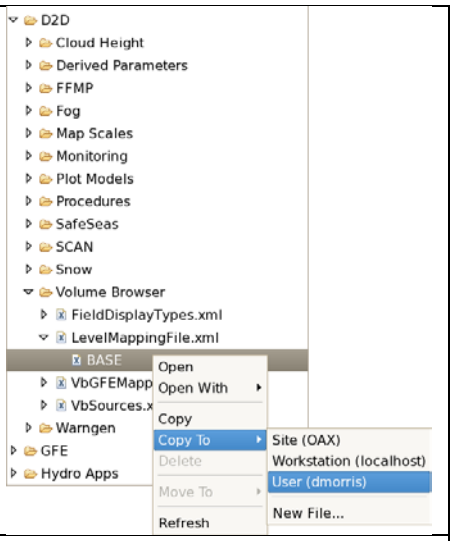
	• Change the constraintValue for the info.parameter.abbreviation from “msl-P” to “Wind” The remainder of the metadata should retain the settings for the surface.
	The next resource needs to be the firstAvailableResource for the dewpoint plot chosen between three alternatives. Copy and paste the entire resource that contains the firstAvailableResourceData that we used in the second display for the muCape/PBE to use a starting point for the modifications we need to make here. In the first embedded resource (muCape), make these changes: • Change the constraintValue for the info.parameter.abbreviation from “muCape” to “DpT” • Change the constraintValue for the info.level.masterLevel.name from “MB” to “BL” • Change the constraintValue for the info.level.levelonevalue from “850.0” to “0.0” • Change the constraintValue for the info.level.leveltwovalue to “30”. In the second embedded resource (PBE), make these changes: • Change the constraintValue for the info.parameter.abbreviation from “PBE” to “DpT” • Verify the constraintValue for the info.level.masterLevel.name is “SFC”. • Verify the constraintValue for the info.level.levelonevalue is “0.0” • Verify the constraintValue for the info.level.leveltwovalue is “-999999”. Copy and paste the second resource to make a third dewpoint resource. Be sure the last </resourceData> and </resource> tags that close out the firstAvailableResourceData are after the </resource> tag for the third dewpoint resource. Make these changes to the third resource: • Change the constraintValue for the info.level.masterLevel.name from “SFC” to “FHAG” • The constraintValue for the info.level.levelonevalue should remain “0.0” • Change the constraintValue for the info.level.leveltwovalue from “-999999” to “1000.0”.

	Add a colorableCapability to each of the three embedded dewpoint plots. Set the colorAsString to “OrangeRed”.
	The last plot in this display is an image version of the dewpoint plot. Copy and paste the entire firstAvailableResourceData for the dewpoint plot. In the second version, change all four instances of isVisible to “true”, all three instances of displayType from “CONTOUR” to “IMAGE”. Remove the renderingOrderId tag from the container resource, but change the remaining three instances of renderingOrderId from “CONTOUR” to “IMAGE_REGION”. Change the colorAsString in the three colorableCapability lines to “dodgerblue”. Replace the outlineCapability lines with imagingCapability lines. Note: the four instances of some of these tags come from the three embedded plots plus the firstAvailableResourceData itself.
55. Test. The lower-left pane is shown, using the “panel combo rotate” function by pressing the “4” key, and toggling all the invisible contour plots.	

56. Construct the fourth panel, which consists of three wind plots. The first two plots are wind speed contours and image but for a custom layer (6-10 km Agl). This new layer has to be specified in a user override of the volume browser customization file called LevelMappingFile.xml.

```
|121.|wSp,6-10kmAgl
|0.|wSp,6-10kmAgl
|51.|Wind,6-10kmAgl
```

In the Localization Perspective File Browser, scroll down to the **D2D** section. Open **Volume Browser** » **LevelMappingFile.xml**. Right-click the **BASE** icon and choose **Copy To ▶ User**.



Edit the LevelMappingFile.xml by double-clicking its **USER** icon. Find the LYRFHAG section by searching the file for LYRFHAG (use **CTRL-F**).

Add the lines indicated by the red box in **Figure 24**, and save your changes.

Continue editing the **USER** version of the ConvDerecho4PFamily.xml bundle. The first resource in the last display is a 1000-500 MB RH image. Make these changes to this resource:

- Verify the displayType is “IMAGE”
- Verify the renderingOrderId is “IMAGE_REGION”
- Change the constraintValue for the info.parameter.abbreviation from “RH” to “wSp”
- Change the constraintValue for the info.level.masterLevel.name from “MB” to “LYRFHAG”
- Change the constraintValue for the info.level.levelonevalue from “1000.0” to “6000.0”
- Change the constraintValue for the info.level.leveltwovalue from “500.0” to “10000.0”.

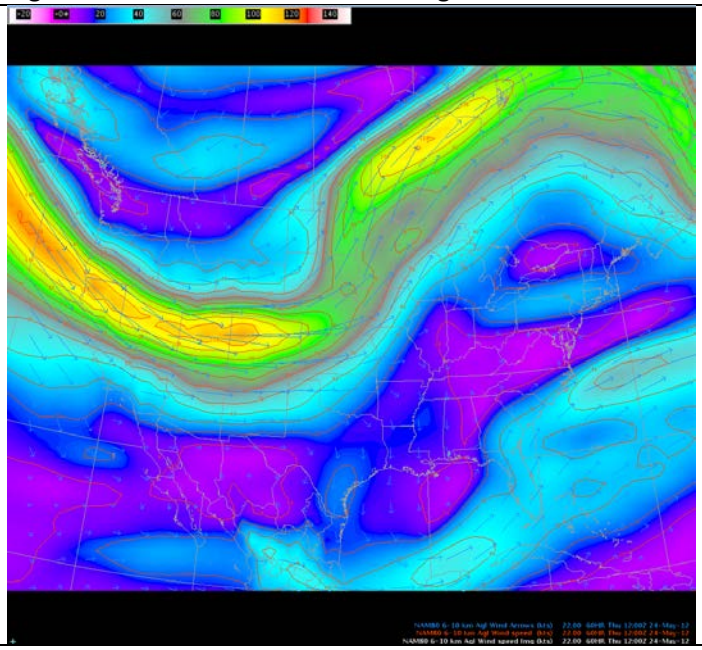
The second resource in the last display is 700 MB GH. Transform this resource into 6-10km AGL wind speed contours with these edits:

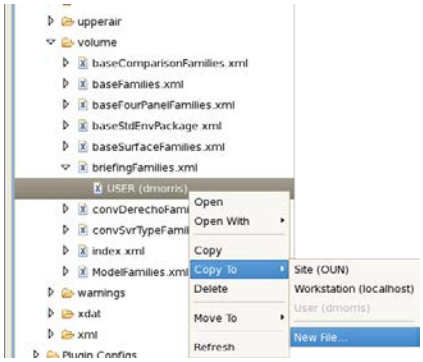
- Change the constraintValue for the info.parameter.abbreviation from “GH” to “wSp”
- Change the constraintValue for the info.level.masterLevel.name from “MB” to “LYRFHAG”
- Change the constraintValue for the info.level.levelonevalue from “700.0” to “6000.0”
- Change the constraintValue for the info.level.leveltwovalue from “-999999” to “10000.0”.
- Set isVisible to “false”.

	Duplicate the last resource (the 6-10 km wind speed contours we just edited) to use for the wind vector plot. Make these changes to the last resource: • Change the displayType to “ARROW” • Change the constraintValue for the info.parameter.abbreviation from “wSp” to “Wind” • Set isVisible to “true” Save your changes.

```
    </Level>
    <Level displayName="2-7 km Agl" key="2-7kmAgl" group="C">
        <DatabaseLevel levelName="LYRFHAG" levelOneValue="2000"
            levelTwoValue="7000.0" unit="m" />
    </Level>
    <Level displayName="2-8 km Agl" key="2-8kmAgl" group="C">
        <DatabaseLevel levelName="LYRFHAG" levelOneValue="2000"
            levelTwoValue="8000.0" unit="m" />
    </Level>
    <Level displayName="3-6 km AGL" key="3-6kmAgl" group="C">
        <DatabaseLevel levelName="LYRFHAG" levelOneValue="3000"
            levelTwoValue="6000.0" unit="m" />
    </Level>
    <Level displayName="3-8 km Agl" key="3-8kmAgl" group="C">
        <DatabaseLevel levelName="LYRFHAG" levelOneValue="3000"
            levelTwoValue="8000.0" unit="m" />
    </Level>
    <Level displayName="3-12 km Agl" key="3-12kmAgl" group="C">
        <DatabaseLevel levelName="LYRFHAG" levelOneValue="3000"
            levelTwoValue="12000.0" unit="m" />
    </Level>
    <Level displayName="6-10 km Agl" key="6-10kmAgl" group="C">
        <DatabaseLevel levelName="LYRFHAG" levelOneValue="6000"
            levelTwoValue="10000.0" unit="m" />
    </Level>
    <Level displayName="0.5 km MSL" key="0.5km" group="S">
        <DatabaseLevel levelName="FH" levelOneValue="500" unit="m" />
    </Level>
    <Level displayName="1 km MSL" key="1km" group="S">
        <DatabaseLevel levelName="FH" levelOneValue="1000.0"
            unit="m" />
    </Level>
    <Level displayName="1.5 km MSL" key="1.5km" group="S">
        <DatabaseLevel levelName="FH" levelOneValue="1500.0"
            unit="m" />
    </Level>
    <Level displayName="2 km MSL" key="2km" group="S">
```

Figure 24. Edit to LevelMappingFile.xml to add 6-10 km Fixed Height Above Ground level.

57. Restart CAVE to test. A restart is necessary because we modified the level mapping file. The lower-right pane is shown, using the “panel combo rotate” function by pressing the “3” key, and toggling the invisible contour plot.	

Part 7: Add the menu for the Demo: Layers Family	
58. Use the briefingFamilies.xml menu as a template for the Demo: Layer Families menu and call the new version demoLayerFamilies.xml. Change the bundle references in this new demoLayerFamilies.xml to be appropriate for the Demo Layer Families Menu.	In the Localization Perspective file browser, open **CAVE** » **Menus** » **volume**. Copy briefingFamilies.xml to demoLayerFamilies.xml, by clicking the **USER** icon under briefingFamilies.xml and choosing **Copy To ►New File**. Name the new file **demoLayerFamilies.xml**.  We'll change the bundle references next.
	Edit demoLayerFamilies.xml and change the name of the file for each bundleItem from BriefingFamily.xml to DemoLayerFamily.xml (see **Figure 25**). Save your changes.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Families ------"
        id="FamiliesLine" />
    <contribute xsi:type="bundleItem" file="bundles/volume/DemoLayerFamily.xml"
        menuText="DGEX" id="dgex" useReferenceTime="true">
        <substitute key="modelName" value="${DGEXmodel}"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="18"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DemoLayerFamily.xml"
        menuText="GFS40" id="gfs40" useReferenceTime="true">
        <substitute key="modelName" value="GFS212"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="41"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DemoLayerFamily.xml"
        menuText="GFS" id="gfs90" useReferenceTime="true">
        <substitute key="modelName" value="${GFSmodel}"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="41"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DemoLayerFamily.xml"
        menuText="NAM12" id="nam12" useReferenceTime="true">
        <substitute key="modelName" value="${NAM12model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="29"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DemoLayerFamily.xml"
        menuText="NAM40" id="nam40" useReferenceTime="true">
        <substitute key="modelName" value="${NAM40model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="29"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DemoLayerFamily.xml"
        menuText="NAM80" id="nam80" useReferenceTime="true">
        <substitute key="modelName" value="ETA"/>
        <substitute key="TP" value="TP6hr"/>
        <substitute key="frameCount" value="15"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DemoLayerFamily.xml"
        menuText="RAP13" id="rap13" useReferenceTime="true">
        <substitute key="modelName" value="${RAP13model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="19"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DemoLayerFamily.xml"
        menuText="RAP40" id="rap" useReferenceTime="true">
        <substitute key="modelName" value="${RAPmodel}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="9"/>
    </contribute>
</menuTemplate>
```

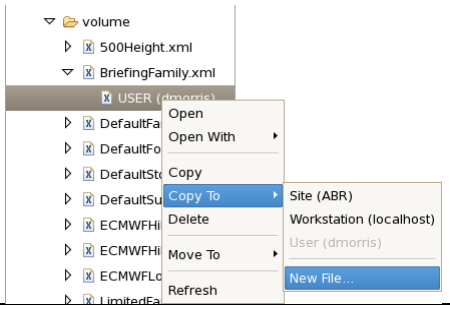
Figure 25. Changes to the DemoLayerFamilies.xml menu file.

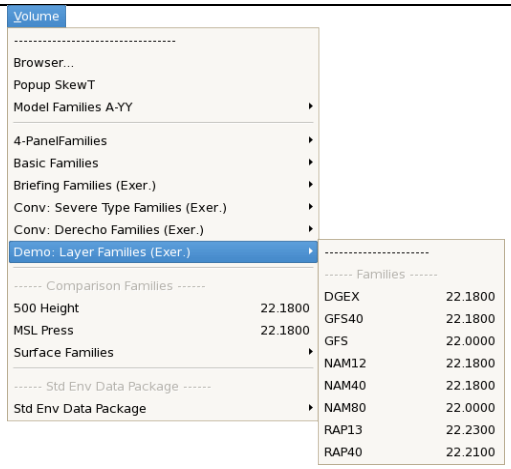
59. Edit the index.xml menu file to create the demo layer model family entry above the Surface Families entry.	Edit the user version of **index.xml** by double-clicking its **USER** icon. Add the lines indicated by the red box in **Figure 26**.

```
<menuContributionFile>
    <substitute key="DGEXmodel" value="DGEX185" />
    <substitute key="GFSmodel" value="GFS213" />
    <substitute key="NAM12model" value="ETA218" />
    <substitute key="NAM40model" value="mesoEta212" />
    <substitute key="ARWmodel1" value="HiResW-ARW-East" />
    <substitute key="ARWmodel2" value="HiResW-ARW-West" />
    <substitute key="MMMmodel1" value="HiResW-NMM-East" />
    <substitute key="MMMmodel2" value="HiResW-NMM-West" />
    <substitute key="RAP13model" value="RUC130" />
    <substitute key="RAPmodel" value="RUC236" />
    <include subMenu="Basic Families" installTo="menu:volume?after=VolumeBundles"
             fileName="menus/volume/baseFamilies.xml">
    </include>
    <include installTo="menu:volume?before=VolumeBundles"
             fileName="menus/volume/ModelFamilies.xml">
    </include>
    <include subMenu="4-PanelFamilies" installTo="menu:volume?after=VolumeBundles"
             fileName="menus/volume/baseFourPanelFamilies.xml">
    </include>

    <include subMenu="Briefing Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/briefingFamilies.xml">
    </include>

    <include subMenu="Conv: Severe Type Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/convSvrTypeFamilies.xml">
    </include>

    <include subMenu="Conv: Derecho Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/convDerechoFamilies.xml">
    </include>

    <include subMenu="Demo: Layer Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/demoLayerFamilies.xml">
    </include>


    <include installTo="menu:volume?after=ComparisonFamilies"
             fileName="menus/volume/baseComparisonFamilies.xml">
    </include>
    <include subMenu="Surface Families" installTo="menu:volume?after=SurfaceFamilies"
             fileName="menus/volume/baseSurfaceFamilies.xml">
    </include>
    <include installTo="menu:volume?after=StdEnvDataPackageFamilies"
             fileName="menus/volume/baseStdEnvPackage.xml">
    </include>
</menuContributionFile>
```

Figure 26. Additions to index.xml menu file to add an entry for Demo: Layer Families entry.

60. Duplicate the BriefingFamily.xml *bundle* file as DemoLayerFamily.xml, so that the menu entries created above will work.	In the File Browser, scroll to the **CAVE** » **Bundles** section. Open **volume** » **BriefingFamily.xml**. Right-click the **USER** icon and choose **Copy To** ►**New File**. Name the new file DemoLayerFamily.xml



61. Restart CAVE to see your changes reflected in the Volume menu. The Demo: Layer Families menu should be located above Surface Families and should display the bundles referenced by the DemoLayerFamilies.xml menu file.	
Part 8. Implement the Demo: Layer Families Bundle.	
62. Analyze the ModFamDM entry in the virtual field table (**Figure 27**). Unlike other model families in this exercise, this bundle was not implemented in AWIPS-1 at a particular WFO, but was developed to illustrate several concepts in constructing bundles.	This family includes an image combination and a variety of different model layers. The image combination can be identified because two layers begin with the numeric code “21.”, meaning a combined visible image for both layers the height of the freezing level and surface precip accumulation (zAGL,FrzLvl and TP,Surface). The image combination in AWIPS-2 is implemented using blendedResourceData. Note: AWIPS-1 required two images in the same model family (or procedure bundle) to be combined. AWIPS-2 has no such requirement, so there can be any number of independent images with appropriate alpha channel (transparency) settings in a bundle.

```
//
ModFamDM | | N|Demo: Layers Family| | OTHER| | \
      *MultiLoad,Layer\
       |0.|HI,Layer\
      |21.|zAGL,FrzLvl\
       |1.|zAGL,FrzLvl\
       |0.|zAGL,CloudBase|zAGL,LiftCondLvl\
      |30.|Wind,BLyr|Wind,Surface\
       |0.|P,PV15\
      |41.|Wind,PV15\
       |0.|PAdv,PV15\
      |21.|TP,Surface \
       |0.|cCape,0-6kmAgl\
      |50.|BlkShr,1-3kmAgl\
       |0.|DpT,305Ke\
       |0.|DpT,330K\

//
```

Figure 27. Virtual Field Table entry that defines the Demo: Layers family. The interpretation of the numeric codes preceding each field and level combination is as follows: *A non-zero value in the ones place means this overlay should be toggled on by default. The tens digit is the display type to use: 0=contour, 1=icons, 2=image, 3=barbs, 4=streamlines, 5=arrows, 6=dualarrows, 7=other. A non-zero value in the hundreds digit means start a new pane. The thousands place is number of frames to load; 0 means the same as the number of forecast times and 99 means whatever the display is currently set for* (verbatim from AWIPS-1 documentation in /awips/fxa/data/localization/documentation/families.html).

63. Add the Haines Index as the first parameter. `|0.|HI,Layer\`	Edit the **USER** version of the DemoLayerFamily.xml bundle. In the first resource, make these changes: • Change the constraintValue for the info.parameter.abbreviation from “TP” to “HI” • Change the constraintValue for the info.level.masterLevel.name from “SFC” to “EA” (EA means “Entire Atmosphere”). Verify the following settings in the first resource • isVisible is “false” • displayType is “CONTOUR” • info.level.levelonevalue is “0” • info.level.leveltwovalue is “-999999”. The info.level.masterLevel.name for a “layer” product is “EA”. The names for the various layer or level types can be determined by inspecting the LevelMappingFile.xml.

64. Add the combined image pair for the height of the freezing level and total precipitation.
`|21.|zAGL,FrzLvl\`
`|1.|zAGL,FrzLvl\`
`|0.|zAGL,CloudBase|zAGL,LiftCondLvl\`
`|30.|Wind,BLyr|Wind,Surface\`
`|0.|P,PV15\`
`|41.|Wind,PV15\`
`|0.|PAdv,PV15\`
`|21.|TP,Surface \`
	The image combination requires the use of a blendedResourceData. It is similar in structure to a firstAvailableResourceData (which happens to be the next pre-existing resource in the DemoLayerFamily.xml bundle). The structure is:
	<resource>
	<loadProperties>
	<capabilities>
	<capability … />
	</capabilities>

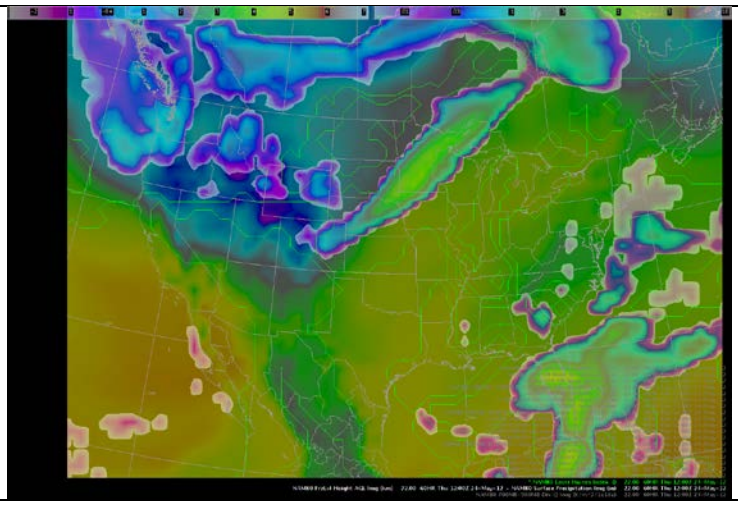
	</loadProperties> <properties …> </properties> <resourceData xsi:type="blendedResourceData"> <resource> *(first image)* </resource> <resource> *(second image)* </resource> </resourceData> </resource> To start the transformation of our firstAvailableResourceData to a blendedResourceData, replace the three loadProperties, properties, and resourceData lines with the lines indicated in **Figure 28.** In the first pre-existing resource (msl-P) of the blendedResourceData, replace the two existing capabilities (the outlineCapability and the colorableCapability) with the three capabilities shown in the red box in **Figure 29.** Remove the xsi:type and displayType from the loadProperties (Box A in **Figure 29**). Add the renderingOrderId="IMAGE_REGION" (Box B in **Figure 29**). Set the info.parameter.abbreviation constraintValue to "zAGL" (Box C in **Figure 29**). Set the info.level.masterLevel.name constraintValue to "FRZ" (Box D in **Figure 29**) for the freezing level. Make sure the levelonevalue is 0. Use Copy/Paste to duplicate the entire zAGL resource (we're re-using the first resource to avoid retyping the edits to the capability lines in the second resource; otherwise we would have used the next pre-existing resource) . In the second version, change the parameter.abbreviation from zAGL to TP, and the info.level.masterLevel.name from "FRZ" to "SFC". Close the blendedResourceData by adding the two lines after the second (TP) resource: </resourceData> </resource> Delete the next resource and the </resourceData> and </resource> tags that previously closed out the firstAvailableResourceData.

```
                    <resourceType>PLAN_VIEW</resourceType>
                </loadProperties>
                <properties isSystemResource="false" isBlinking="false" isMapLayer="false" isHoverOn="false" isVisible="false">
                    <pdProps maxDisplayWidth="100000000" minDisplayWidth="0"/>
                </properties>
                <resourceData xsi:type="gridResourceData" retrieveData="true" isUpdatingOnMetadataOnly="false" isRequeryNecessaryOnTimeMatch="true">
                    <metadataMap>
                        <mapping key="info.parameter.abbreviation">
                            <constraint constraintValue="HI" constraintType="EQUALS"/>
                        </mapping>
                        <mapping key="info.datasetId">
                            <constraint constraintValue="${modelName}" constraintType="EQUALS"/>
                        </mapping>
                        <mapping key="info.level.leveltwovalue">
                            <constraint constraintValue="-999999" constraintType="EQUALS" />
                        </mapping>
                        <mapping key="pluginName">
                            <constraint constraintValue="grid" constraintType="EQUALS"/>
                        </mapping>
                        <mapping key="info.level.masterLevel.name">
                            <constraint constraintValue="EA" constraintType="EQUALS"/>
                        </mapping>
                        <mapping key="info.level.levelonevalue">
                            <constraint constraintValue="0" constraintType="EQUALS"/>
                        </mapping>
                    </metadataMap>
                    <alertParser xsi:type="dataCubeAlertMessageParser"/>
                </resourceData>
            </resource>

            <!-- AWIPS1 Description: |21.|zAGL,FrzLvl\ and |21.|TP,Surface\ -->

            <resource xsi_type="gridLoadProperties" displayType="IMAGE" loadWithoutData="false">
                <loadProperties xsi_type="gridLoadProperties" displayType="IMAGE" loadWithoutData="false">
                    <capabilities>
                        <capability xsi:type="imagingCapability" alpha="1.0" interpolationState="true" brightness="1.0" contrast="1.0"/>
                        <capability xsi:type="blendableCapability" alphaStep="7" resourceIndex="0"/>
                    </capabilities>
                </loadProperties>
                <properties renderingOrderId="IMAGE_REGION" isSystemResource="false" isBlinking="false" isMapLayer="false "
                    isHoverOn="false" isVisible="true">
                    <pdProps maxDisplayWidth="1000000000" minDisplayWidth="0"/>
                </properties>
                <resourceData xsi:type="blendedResourceData">

                    <resource>
                        <loadProperties xsi:type="gridLoadProperties" displayType="CONTOUR" loadWithoutData="false">
                            <capabilities>
                                <capability xsi:type="outlineCapability" lineStyle="SOLID" outlineOn="true" outlineWidth="1"/>
                                <capability xsi:type="colorableCapability" colorAsString="coral"/>
                            </capabilities>
                            <resourceType>PLAN_VIEW</resourceType>
                        </loadProperties>
```

Figure 28. Edits to start a blendedResourceData.

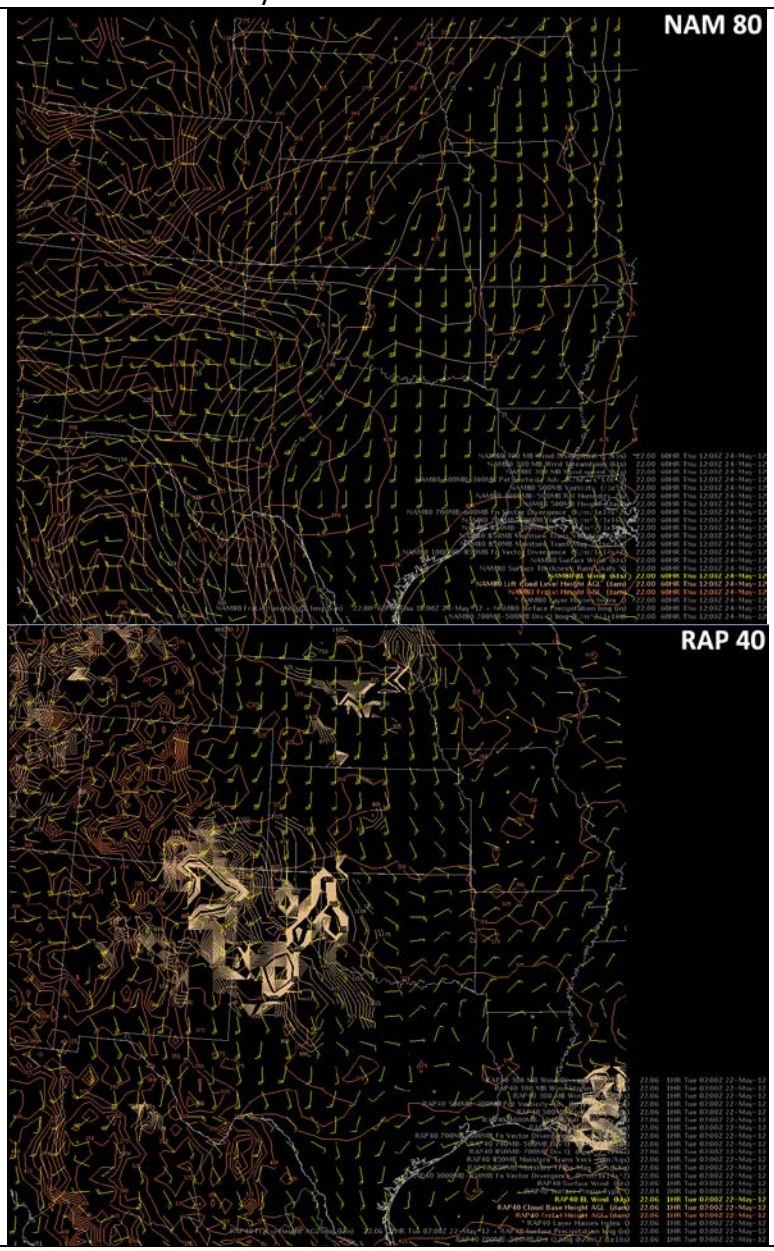
```
                    <alertParser xsi:type="dataCubeAlertMessageParser"/>
                </resourceData>
            </resource>

            <!-- AWIPS1 Description: |21.|zAGL,FrzLvl\ and |21.|TP,Surface\ -->

            <resource xsi_type="gridLoadProperties" displayType="IMAGE" loadWithoutData="false">
                <loadProperties xsi_type="gridLoadProperties" displayType="IMAGE" loadWithoutData="false">
                    <capabilities>
                        <capability xsi:type="imagingCapability" alpha="1.0" interpolationState="true" brightness="1.0" contrast="1.0"/>
                        <capability xsi:type="blendableCapability" alphaStep="7" resourceIndex="0"/>
                    </capabilities>
                </loadProperties>
                <properties renderingOrderId="IMAGE_REGION" isSystemResource="false" isBlinking="false" isMapLayer="false "
                        isHoverOn="false" isVisible="true">
                    <pdProps maxDisplayWidth="1000000000" minDisplayWidth="0"/>
                </properties>
                <resourceData xsi:type="blendedResourceData">

                    <resource>
                        <loadProperties loadWithoutData="false">
                            <capabilities>
                                <capability xsi:type="blendedCapability"/>
                                <capability xsi:type="imagingCapability" alpha="0.5" interpolationState="false" brightness="1.0"
                                contrast="1.0"/>
                                <capability xsi:type="displayTypeCapability" displayType="IMAGE"/>
                            </capabilities>
                            <resourceType>PLAN_VIEW</resourceType>
                        </loadProperties>
                        <properties renderingOrderId="IMAGE_REGION" isSystemResource="false" isBlinking="false" isMapLayer="false" isHoverOn="false" isVisil
                            <pdProps maxDisplayWidth="100000000" minDisplayWidth="0"/>
                        </properties>
                        <resourceData xsi:type="gridResourceData" retrieveData="true" isUpdatingOnMetadataOnly="false" isRequeryNecessaryOnTimeMatch="true":
                            <metadataMap>
                                <mapping key="info.parameter.abbreviation">
                                    <constraint constraintValue="zAGL" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="info.datasetId">
                                    <constraint constraintValue="${modelName}" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="info.level.leveltwovalue">
                                    <constraint constraintValue="-999999" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="pluginName">
                                    <constraint constraintValue="grid" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="info.level.masterLevel.name">
                                    <constraint constraintValue="FRZ" constraintType="EQUALS"/>
                                </mapping>
                                <mapping key="info.level.levelonevalue">
                                    <constraint constraintValue="0.0" constraintType="EQUALS"/>
                                </mapping>
                            </metadataMap>
                            <alertParser xsi:type="dataCubeAlertMessageParser"/>
                        </resourceData>
                    </resource>
```

Figure 29. Edits to the first image resource within the blendedResourceData.

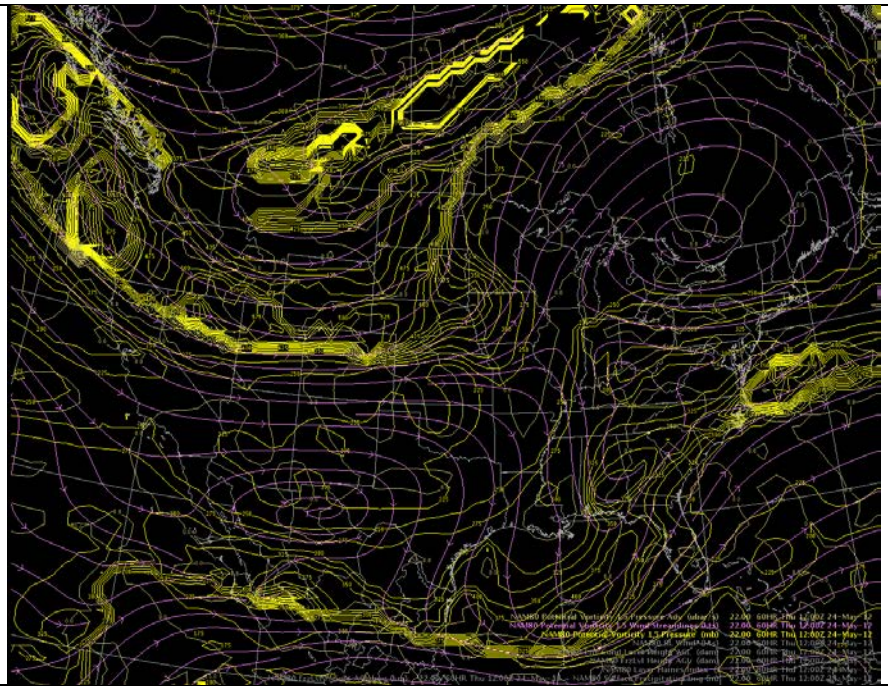
65. Test	
66. Make the next resource be the visible contour plot for the height of the	The next resource already in the DemoLayerFamily.xml bundle contains a firstAvailableResourceData for an icon plot for PTyp and Snow3. Delete the four lines that started the firstAvailableResourceData (<resource>, <loadProperties/>, <properties isVisible="false">, and <resourceData xsi:type="firstAvailableResourceData>" Unindent the next (PTyp)

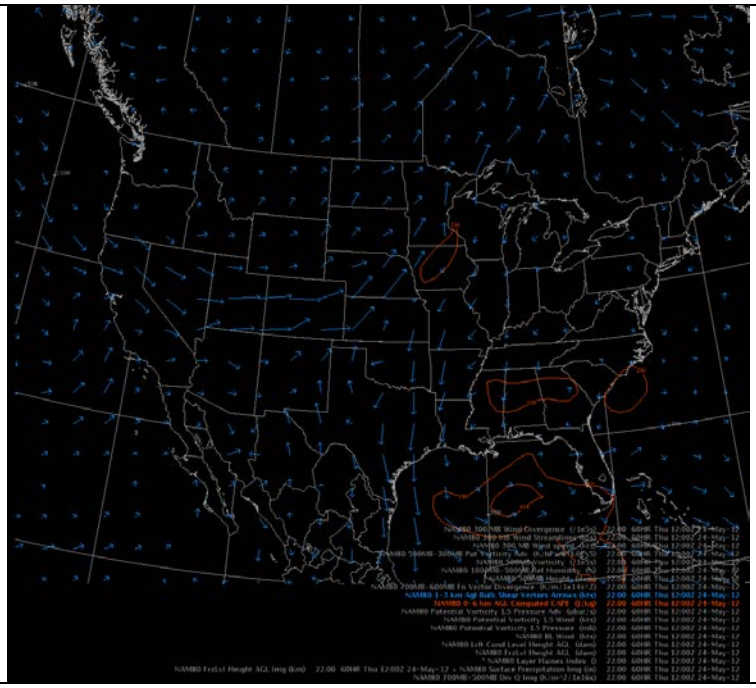
freezing level zAGL. `|1.|zAGL,FrzLvl\`	resoure and make these changes: • displayType from “ICON” to “CONTOUR” • isVisible to “true” • info.parameter.abbreviation from “PTyp” to “zAGL” • info.level.masterLevel.name from “SFC” to “FRZ”. Also, delete the colorableCapability line. Delete the next (indented) resource that was previously for the second half of the firstAvailableResourceData (the Snow3 parameter). Delete the closing </resourceData> and </resource> tags that were associated with the firstAvailableResourceData.
67. The next resource needed should contain a firstAvailableResourceData for either the height of the cloud base or the lifted condensation level. `|0.|zAGL,CloudBase|zAGL,LiftCondLvl\`	The next resource already in the bundle had a firstAvailableResourceData for PTyp and Fzra2. We’ll hijack it for this plot. In the first (PTyp) resource, change the displayType from “ICON” to “CONTOUR. Leave the colorAsString in the colorableCapability as “burlywood”. In the first resource of the firstAvailableResourceData , use these settings for the metadata: • info.parameter.abbreviation: zAGL • info.level.leveltwovalue: -999999 • info.level.masterLevel.name: CBL • info.level.levelonevalue: 0 In the second resource of the firstAvailableResourceData, set the displayType to “CONTOUR” and use these settings for the metadata: • info.parameter.abbreviation: zAGL • info.level.leveltwovalue: -999999 • info.level.masterLevel.name: LCL • info.level.levelonevalue: 0

68. The next resource needs to be a firstAvailableResourceData for two wind barb plots, either for boundary layer winds or the surface.
 	
`|30.|Wind,BLyr|Wind,Surface\`
	The next pre-existing resource is the icon plot for PTyp and Mix2 at the surface. We’ll reuse it for this wind barb plot.
	
	• In the first embedded resource:
	  o change the displayType to “BARB”
	  o change info.parameter.abbreviation to Wind
	  o change info.level.masterLevel.name to “BL”
	  o verify info.level.levelonevalue is 0.0
	  o change info.level.leveltwovalue to 30.0
	• In the second resource:

	o change the displayType to “BARB” o change info.parameter.abbreviation to Wind o change info.level.masterLevel.name to “SFC” o verify info.level.levelonevalue is 0.0
69. Test (Note that the cloud base level is available from the RAP model)	
70. Add the next three layers, which are all on Potential Vorticity surfaces (the 1.5 surface). The three plots are two visible contours of Pressure and Pressure	The next three layers are all simple resources, but are all on a potential vorticity surface. The particular coordinate we need to use is “PV15”. The next pre-existing resource in the file has a firstAvailableResourceData to choose between PTyp or Rain3. Delete that entire resource. The next resource after that is a simple resource for wind barbs, and we’ll use it for the pressure contour plot. Make these changes to that resource: • displayType: “CONTOUR”

Advection separated by a visible plot of streamlines.
`|0.|P,PV15\`
`|41.|Wind,PV15\`
`|0.|PAdv,PV15\`
	• info.parameter.abbreviation: “P”
	• info.level.masterLevel.name: “PV”
	• info.level.levelonevalue: “1.5”
	• info.level.leveltwovalue: “-999999”
	
	Delete the entirety of the next firstAvailableResourceData which should have been for either DivFn or qDiv. The next resource after that was for a contour plot of 850 mb Moisture Transport Magnitude (Mmag). We’ll use that for the streamline plot. Make these changes:
	• displayType: “STREAMLINE”
	• isVisible: “true”
	• info.parameter.abbreviation: “Wind”
	• info.level.masterLevel.name: “PV”
	• info.level.levelonevalue: “1.5”
	• info.level.leveltwovalue: “-999999”
	Transform the next resource (850 MB Moisture Transport Vectors, or MTV) into the pressure advection contours with these changes:
	• displayType: “CONTOUR”
	• isVisible: “false”
	• info.parameter.abbreviation: “PAdv”
	• info.level.masterLevel.name: “PV”
	• info.level.levelonevalue: “1.5”
	• info.level.leveltwovalue: “-999999”

71. Test	

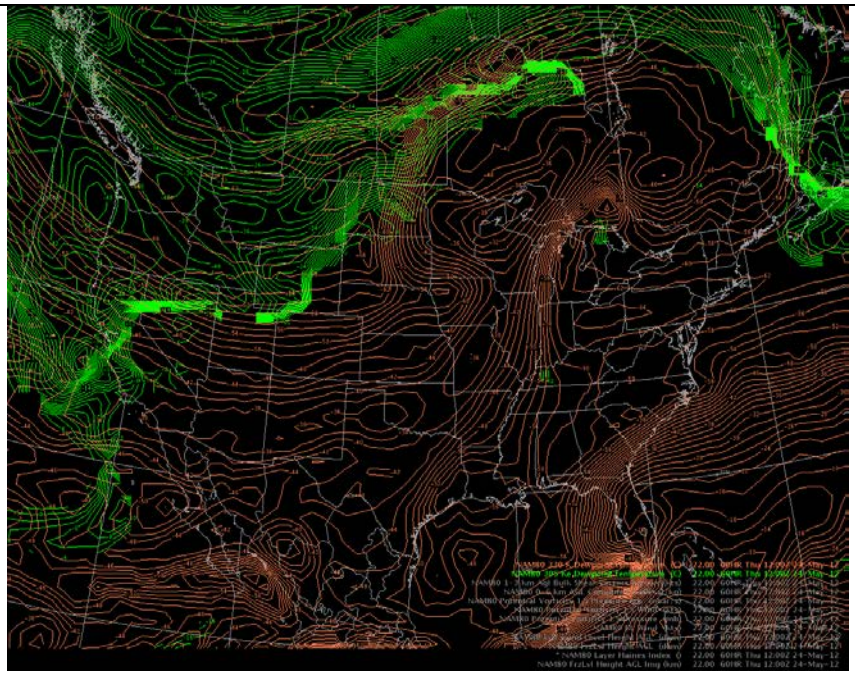
72. Add cCape for 0-6km Agl. `|0.|cCape,0-6kmAgl\`	In the next resource, use these settings: • displayType: CONTOUR • isVisible: false • info.parameter.abbreviation: cCape • info.level.masterLevel.name: FHAG • info.level.levelonevalue: 0 • info.level.leveltwovalue: 6000
73. Add BlkShr arrows for 1-3km AGL `|50.|BlkShr,1-3kmAgl\`	In the next resource, use these settings: • displayType: ARROW • isVisible: false • info.parameter.abbreviation: BlkShr • info.level.masterLevel.name: LYRFHAG • info.level.levelonevalue: 1000 • info.level.leveltwovalue: 3000
74. Test	
75. Add the dew point for the 305Ke surface. `|0.|DpT,305Ke\`	In the next resource, use these settings: • displayType: CONTOUR • isVisible: false • info.parameter.abbreviation: DpT • info.level.masterLevel.name: Ke • info.level.levelonevalue: 305 • info.level.leveltwovalue: -999999 Note: The 305Ke surface is not a default/baseline Ke (equivalent

	potential temperature) level. This level needs to be added to the level mapping file (described later). Delete the next pre-existing resource with the firstAvailableResourceData.
76. Add the DpT for the 330 K (potential temperature) surface `|0.|DpT,330K\`	In the next simple resource, use these settings: • displayType: CONTOUR • isVisible: false • info.parameter.abbreviation: DpT • info.level.masterLevel.name: K • info.level.levelonevalue: 330 • info.level.leveltwovalue: -999999
77. Edit the level mapping file to add the 305Ke level.	Edit the **USER** version of the LevelMappingFile.xml (it's under **D2D** » **VolumeBrowser** in the File Browser). If you completed Part 6 of this exercise to add the Conv: Derecho Family, you already completed a similar edit and created a USER version of this file. If you haven't already created a USER version of this file, refer to that part of the exercise.
	Add the lines indicated in **Figure 30.** Delete the remaining resources in the bundle (1000-500 mb RH, 500 MB AV/geoVort, 500-300 mb PTvA, 300/250 mb wSp, 300/250 mb streamlines, 300/250 mb wDiv) Save your changes.

```
    <Level displayName="335 K" key="335K" group="S">
        <DatabaseLevel levelName="K" levelOneValue="335" unit="K" />
    </Level>
    <Level displayName="340 K" key="340K" group="S">
        <DatabaseLevel levelName="K" levelOneValue="340" unit="K" />
    </Level>
    <Level displayName="345 K" key="345K" group="S">
        <DatabaseLevel levelName="K" levelOneValue="345" unit="K" />
    </Level>
    <Level displayName="350 K" key="350K" group="S">
        <DatabaseLevel levelName="K" levelOneValue="350" unit="K" />
    </Level>
    <Level displayName="350 K - 250 K" key="350K-250K" group="C">
        <DatabaseLevel levelName="K" levelOneValue="350"
            levelTwoValue="250" unit="K" />
    </Level>
    <Level displayName="305 Ke" key="305Ke" group="S">                <!-- added for Demo Layer Family -->
        <DatabaseLevel levelName="Ke" levelOneValue="305" unit="K" />
    </Level>

    <Level displayName="310 Ke" key="310Ke" group="S">
        <DatabaseLevel levelName="Ke" levelOneValue="310" unit="K" />
    </Level>
    <Level displayName="315 Ke" key="315Ke" group="S">
        <DatabaseLevel levelName="Ke" levelOneValue="315" unit="K" />
    </Level>
    <Level displayName="320 Ke" key="320Ke" group="S">
        <DatabaseLevel levelName="Ke" levelOneValue="320" unit="K" />
    </Level>
    <Level displayName="325 Ke" key="325Ke" group="S">
        <DatabaseLevel levelName="Ke" levelOneValue="325" unit="K" />
    </Level>
    <Level displayName="330 Ke" key="330Ke" group="S">
        <DatabaseLevel levelName="Ke" levelOneValue="330" unit="K" />
    </Level>
    <Level displayName="335 Ke" key="335Ke" group="S">
        <DatabaseLevel levelName="Ke" levelOneValue="335" unit="K" />
    </Level>
    <Level displayName="340 Ke" key="340Ke" group="S">
        <DatabaseLevel levelName="Ke" levelOneValue="340" unit="K" />
    </Level>
    <Level displayName="0 m AGL" key="0FHAG" group="S">
        <DatabaseLevel levelName="FHAG" levelOneValue="0" unit="m" />
    </Level>
    <Level displayName="100 m AGL" key="100mAgl" group="S">
```

Figure 30. Edit to LevelMappingFile.xml to add the 305Ke level.

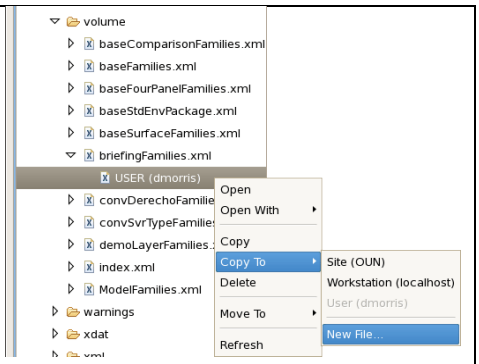
78. Restart CAVE (because we modified the level mapping file) and Test. Depending on the time of year, the dew point plot for the 305Ke surface may appear only at very northern latitudes.



Part 9. For Further Practice: Implement the Aviation Fog Family Menu and Bundle	
79. Edit the index.xml menu file to create the Aviation Fog model family entry just before the Surface Families entry.	In the Localization Perspective file browser, open **CAVE** » **Menus** » **volume**. Edit the user version of **index.xml** by double-clicking its **USER** icon. Make the bottom of the file look like **Figure 31.**

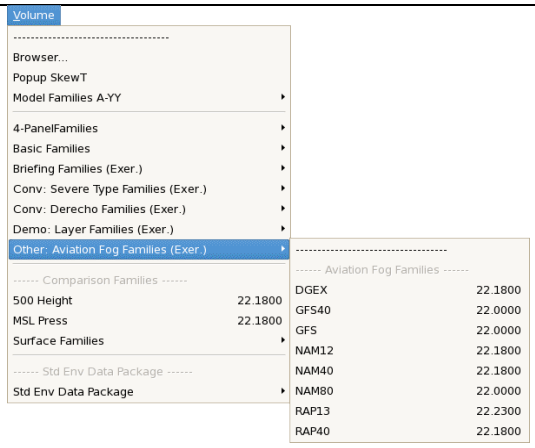
```
<menuContributionFile>
    <substitute key="DGEXmodel" value="DGEX185" />
    <substitute key="GFSmodel" value="GFS213" />
    <substitute key="NAM12model" value="ETA218" />
    <substitute key="NAM40model" value="mesoEta212" />
    <substitute key="ARWmodel1" value="HiResW-ARW-East" />
    <substitute key="ARWmodel2" value="HiResW-ARW-West" />
    <substitute key="MMMmodel1" value="HiResW-NMM-East" />
    <substitute key="MMMmodel2" value="HiResW-NMM-West" />
    <substitute key="RAP13model" value="RUC130" />
    <substitute key="RAPmodel" value="RUC236" />
    <include subMenu="Basic Families" installTo="menu:volume?after=VolumeBundles"
             fileName="menus/volume/baseFamilies.xml">
    </include>
    <include installTo="menu:volume?before=VolumeBundles"
             fileName="menus/volume/ModelFamilies.xml">
    </include>
    <include subMenu="4-PanelFamilies" installTo="menu:volume?after=VolumeBundles"
             fileName="menus/volume/baseFourPanelFamilies.xml">
    </include>

    <include subMenu="Briefing Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/briefingFamilies.xml">
    </include>

    <include subMenu="Conv: Severe Type Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/convSvrTypeFamilies.xml">
    </include>

    <include subMenu="Conv: Derecho Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/convDerechoFamilies.xml">
    </include>

    <include subMenu="Demo: Layer Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/demoLayerFamilies.xml">
    </include>

    <include subMenu="Other: Aviation Fog Families (Exer.)" installTo="menu:volume?before=ComparisonFamilies"
             fileName="menus/volume/aviationFogFamilies.xml">
    </include>

    <include installTo="menu:volume?after=ComparisonFamilies"
             fileName="menus/volume/baseComparisonFamilies.xml">
    </include>
    <include subMenu="Surface Families" installTo="menu:volume?after=SurfaceFamilies"
             fileName="menus/volume/baseSurfaceFamilies.xml">
    </include>
```

Figure 31. Menu contribution to add the Aviation Fog Family.

80. Use the briefingFamilies.xml as a template for the Other: Aviation Fog Families menu. Change the bundle references in the new aviationFogFamilies.xml to be appropriate for the Aviation Fog Families Menu.	Copy briefingFamilies.xml to aviationFogFamilies.xml, by clicking the **USER** icon under briefingFamilies.xml and choosing **Copy To ►New File**. Name the new file **aviationFogFamilies.xml**. We'll change the bundle references next.	
	Edit aviationFogFamilies.xml and change the name of the file for each bundleItem from BriefingFamily.xml to AviationFogFamily.xml (see **Figure 32**). Save your changes.	

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Aviation Fog Families ------"
        id="FamiliesLine" />
    <contribute xsi:type="bundleItem" file="bundles/volume/AviationFogFamily.xml"
        menuText="DGEX" id="dgex" useReferenceTime="true">
        <substitute key="modelName" value="${DGEXmodel}"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="18"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/AviationFogFamily.xml"
        menuText="GFS40" id="gfs40" useReferenceTime="true">
        <substitute key="modelName" value="GFS212"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="41"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/AviationFogFamily.xml"
        menuText="GFS" id="gfs90" useReferenceTime="true">
        <substitute key="modelName" value="${GFSmodel}"/>
        <substitute key="TP" value="TP"/>
        <substitute key="frameCount" value="41"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/AviationFogFamily.xml"
        menuText="NAM12" id="nam12" useReferenceTime="true">
        <substitute key="modelName" value="${NAM12model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="29"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/AviationFogFamily.xml"
        menuText="NAM40" id="nam40" useReferenceTime="true">
        <substitute key="modelName" value="${NAM40model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="29"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/AviationFogFamily.xml"
        menuText="NAM80" id="nam80" useReferenceTime="true">
        <substitute key="modelName" value="ETA"/>
        <substitute key="TP" value="TP6hr"/>
        <substitute key="frameCount" value="15"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/AviationFogFamily.xml"
        menuText="RAP13" id="rap13" useReferenceTime="true">
        <substitute key="modelName" value="${RAP13model}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="19"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/AviationFogFamily.xml"
        menuText="RAP40" id="rap" useReferenceTime="true">
        <substitute key="modelName" value="${RAPmodel}"/>
        <substitute key="TP" value="TP3hr"/>
        <substitute key="frameCount" value="9"/>
    </contribute>
</menuTemplate>
```

Figure 32. Menu entries for the Aviation Fog family.

81. Restart CAVE to see your changes reflected in the Volume menu. The Other: Aviation Fog Families menu should be located above Surface Families and should display the models declared in the aviationFogFamilies.xml file.	
82. Create the AviationFogFamily.xml bundle.	As an exercise on your own, implement the model family shown in **Figure 33**. So you can check your work, the resulting bundle is attached to this exercise. The excerpt of the virtual field table in **Figure 33** indicates this is a four-panel family (because the numeric codes have three digits). The first panel has visible contours of geopotential height at 400 and 700 mb plus two visible images of relative humidity at 400 and 700 mb. Because two images are visible, an image combination is also required. The first panel also has contours of RH at 400 and 700 mb that are not initially visible. The second panel has contours and an image of vertical velocity at 700 mb. The third panel has visible contours of sea-level pressure and wind barbs at the surface. The fourth panel has visible wind barbs representing boundary layer winds plus a visible image of boundary layer RH and contours of boundary layer RH that are not initially visible.

```
//
//
ModFamFK| |N|Other: Aviation Fog Family| |OTHER | | \
  *MultiLoad,Layer|101.|GH,400MB|21.|RH,400MB|0.|RH,400MB|1.|GH,700MB|21.|RH,700MB|0.|RH,700MB\
                  |100.|PVV,700MB|21.|PVV,700MB\
                  |101.|msl-P,Surface|31.|Wind,Surface\
                  |131.|Wind,BLyr|21.|RH,BLyr|0.|RH,BLyr
```

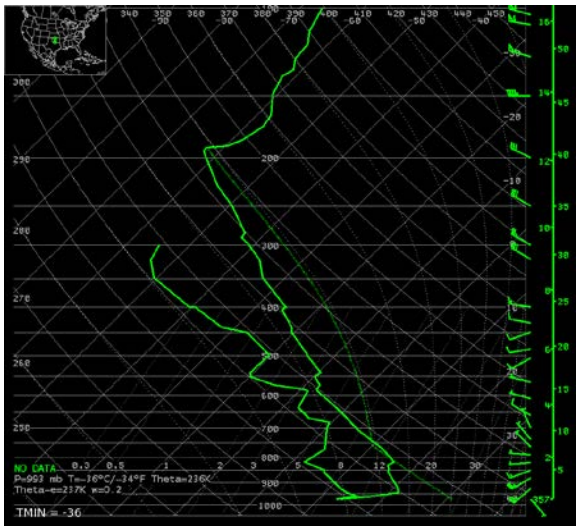
Figure 33. AWIPS-1 virtual field table entry for the Aviation Fog 4-panel Family.

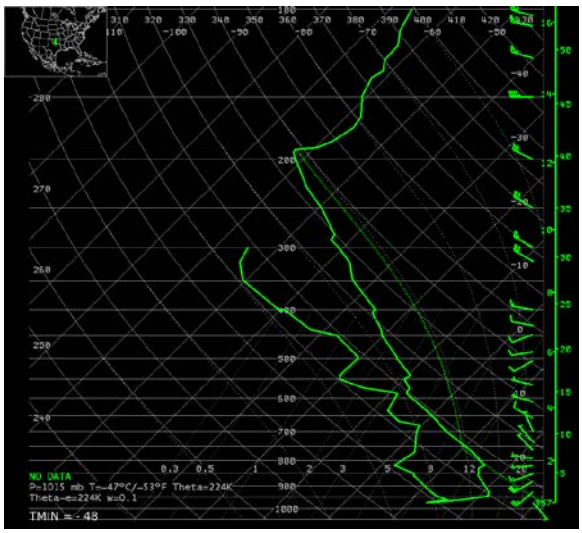
Exercise 10: AWIPS-1 SKEWT_TMIN Directive — Altering Temperature Axis of SKEW-T plots

Objectives: In this exercise, you will perform this procedure:

- Customize the NSHARP sounding display to shift the temperature axis on a skew-t plot.

Background. AWIPS-1 had a directive called "SKEWT_TMIN" that was set in a site's LLL-mainConfig.txt file. This directive allowed the site to set the temperature of the lower-left corner of the skew-t plot. The default temperature for the lower-left corner of the skew-t diagram in AWIPS-1 was -36.6°C, but sites could alter it for their climatic regimes, effectively shifting the sounding left or right on the diagram. For example, very warm sites set this value to -28°C, while several sites in Alaska set this value to -48°C.





In earlier versions of AWIPS-2, the ability to set this value (as an offset, rather than an absolute value) was moved to a soundingPrefs.xml file. Subsequently, the NSHARP GUI allows the user to configure the offset value and to save it. The GUI saves the offset value as a "tempOffset" value in a <graphProperty/> tag near the top of a nsharpConfig.xml file (**Figure 1**). This file is located in the Localization Perspective under **NCEP » Nsharp » nsharpConfig.xml**. If you wish to set a **SITE** default, then set a value for your user and promote your **USER** version of nsharpConfig.xml to SITE using the Localization Perspective (right-click on the **USER** icon and select **Move To ►Site**).

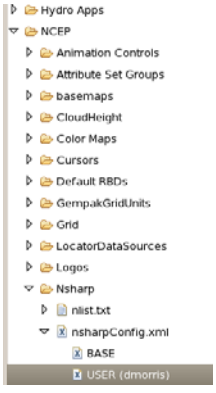


Figure 1. Excerpt from nsharpConfig.xml with the tempOffset value highlighted. This value shifts the temperature axis of the NSHARP skew-t plot left and right.

The exact steps to perform this configuration are covered in a job sheet in the NSHARP overview that is packaged alongside the AWIPS-2 Variance Training. Hence, these steps are not reproduced here. Refer to Job Sheet 4 ("Configuring a Sounding Display") and Task 2 ("Configure the Wind Barb Density and Temperature Range Offset") for specific and simple instructions.

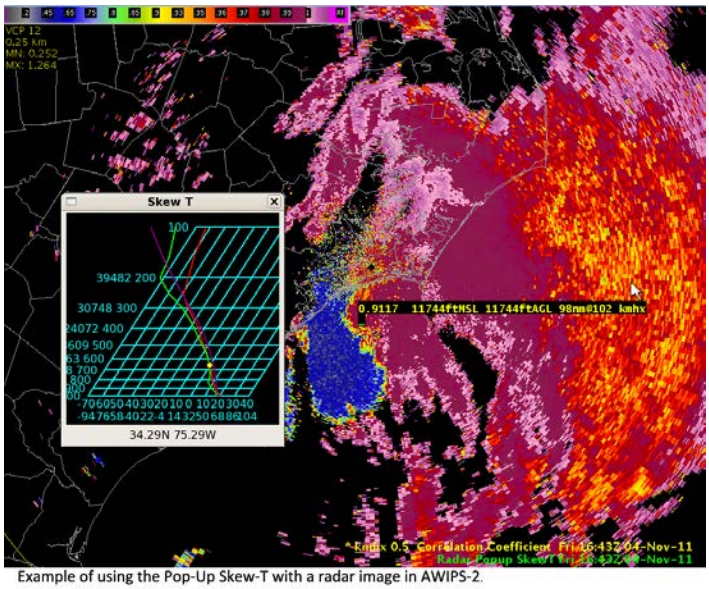
Exercise 11: Customizing the Pop-up Skew-T and the Standard Environmental Data Package and Volume Browser to Include a Local Model

Objectives: In this exercise, you will perform these procedures:

- Add a local model as a choice to sample with the Pop-up Skew-T
- Add a local model to the Standard Environmental Data Package
- Add a custom parameter to sample using the Standard Environmental Data Package
- Add the custom model to the Volume Browser

Background. Once AWIPS-2 has been configured to recognize and ingest a local model, this model can be viewed and sampled using the Pop-up Skew-T and the Standard Environmental Data Package. The Pop-Up Skew-T allows model profiles to be sampled alongside a model grid as well as radar and satellite imagery. The Standard Environmental Data Package allows model parameters to be sampled along the tilt or slant range of a radar. The baseline AWIPS configurations for the Pop-Up Skew-T and the Standard Environmental Data Package include these models:

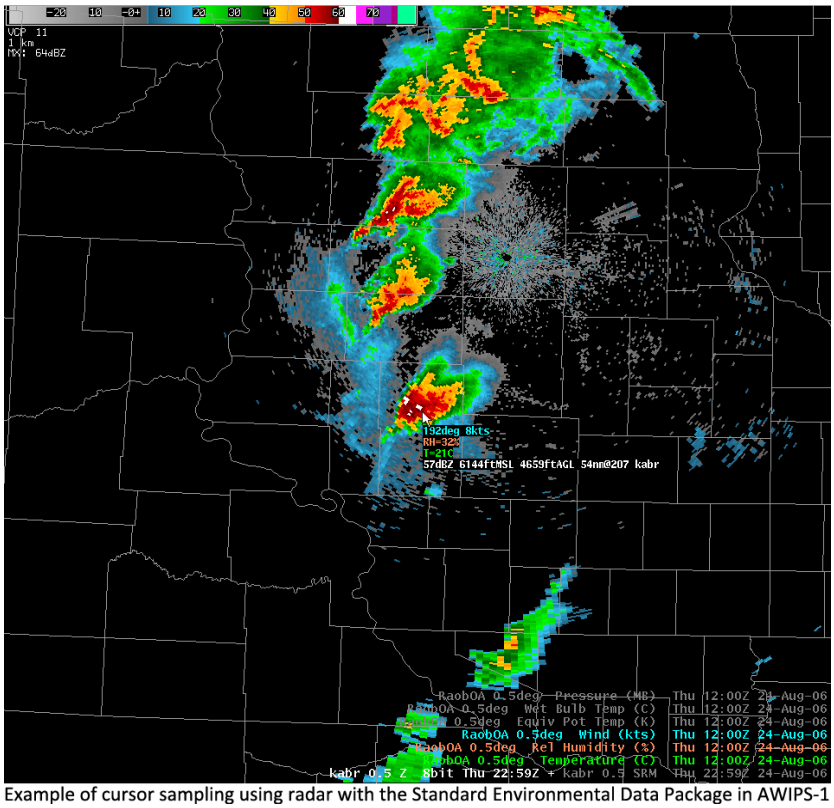
Pop-Up Skew-T	Standard Environmental Data Package
NAM	LAPS
GFS 212	NAM40
RUC	RAP40
LAPS	NAM12
Raobs	GFS40
	RAP13
	RaobOA



Example of using the Pop-Up Skew-T with a radar image in AWIPS-2.

This exercise assumes you've already configured AWIPS-2 to accept a local model according to the "Site Migration Guide" available on the AWIPS One Stop Shop web site. Additional details for adding local models are given in the "AddLocalGrib.pdf" file that's included under "Additional Resources" alongside the Site Migration Guide on the One Stop Shop (as of September 2013). One of the consequences of following these instructions is the production of a model identification .XML file in edex_static/site/**{SITE}**/grib/models (a sample is shown at the right). The examples given in this exercise are for a version of the WRF model (given the model name ID "OUNWRF"), so where "OUNWRF" appears in the examples, you would substitute the ID of your own local model.

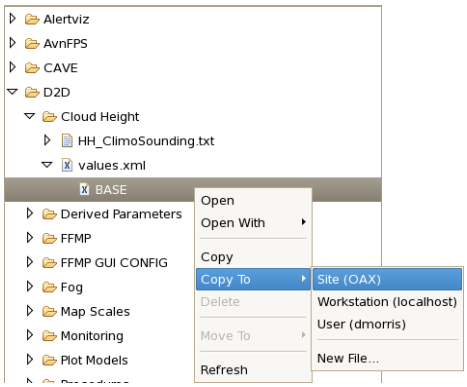
```
<?xml version="1.0" encoding="UTF-8"?>
<gribModelSet>
    <model>
        <name>OUNWRF</name>
        <center>7</center>
        <subcenter>0</subcenter>
        <grid>9500</grid>
        <process>
            <id>98</id>
        </process>
    </model>
</gribModelSet>
```



Example of cursor sampling using radar with the Standard Environmental Data Package in AWIPS-1

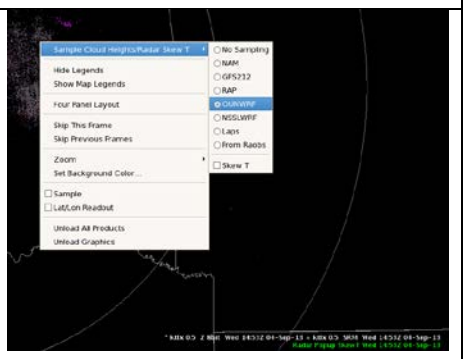
Adding the new model to the Pop-Up Skew-T requires customizing the values.xml file under D2D » Cloud Height in the Localization Perspective. The menu and display bundles for the Standard Environmental Data Package are modified to include a new model and custom parameter, respectively. Finally, adding the model to the volume browser involves an override to the vbSources.xml file. The changes to each of these files are relatively simple.

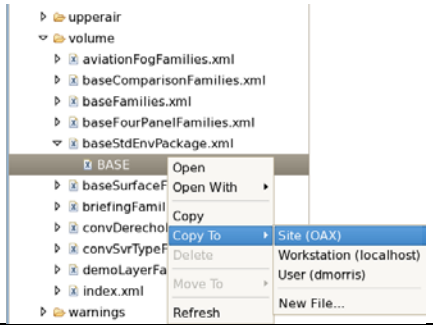
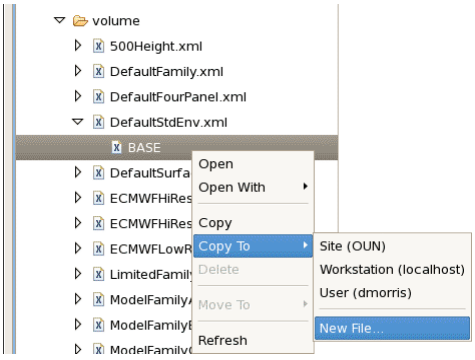
This exercise should take about 15-30 minutes to complete.

Concept	Actions
Part 1: Add the local model to the Pop-Up Skew-T	
1. Make a site override for the values.xml file that's part of the Cloud Height plugin. **Note: Your user must have site override permissions enabled in the userRoles.xml file. See Exercise 1 for more information.**	In the Localization Perspective file browser, open **D2D** » **Cloud Height** » **values.xml.** Make a site version by right-clicking the **BASE** icon and choosing **Copy To ► Site.** 
2. Add the local model to the SITE version of values.xml.	Edit the SITE version of values.xml. Add a line like the one indicated in **Figure 1.** Remember to substitute the ID for your model in place of "OUNWRF". The display name can contain spaces. This is the text that appears in the Pop-Up Skew-T contextual menu, which allows the user to choose the model to be sampled. Save your changes.

```
<cloudHeightData nx="25" ny="25" maxTimeoutSecGrid=".25"
    maxTimeoutSecRaob=".1" maxMouseDistanceDeg="5.0" displayOption="PEAK">
    <sources>
        <source name="NONE" type="NONE" displayName="No Sampling"/>
        <source name="ETA" type="MODEL" displayName="NAM"/>
        <source name="GFS212" type="MODEL" displayName="GFS212"/>
        <source name="RUC130" type="MODEL" displayName="RAP"/>
        <source name="OUNWRF" type="MODEL" displayName="OUNWRF"/>
        <source name="NSSLWRF" type="MODEL" displayName="NSSLWRF"/>
        <source name="LAPS" type="MODEL" displayName="Laps"/>
        <source name="bufrua" type="RAOB" displayName="From Raobs"/>
    </sources>
</cloudHeightData>
```

Figure 1. Addition of a local model (OUNWRF) to the values.xml file to enable sampling with the Pop-Up Skew-T.

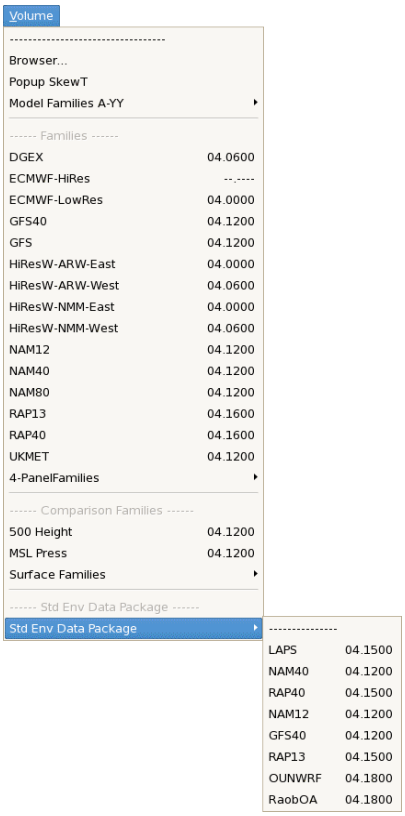
3. Test the Pop-Up Skew-T to verify the change.	In the D2D perspective, load a radar or satellite image. Load the Pop-Up Skew-T by clicking on CAVE's **Volume** menu then **PopUp SkewT.** Right-click somewhere in the radar or satellite image away 

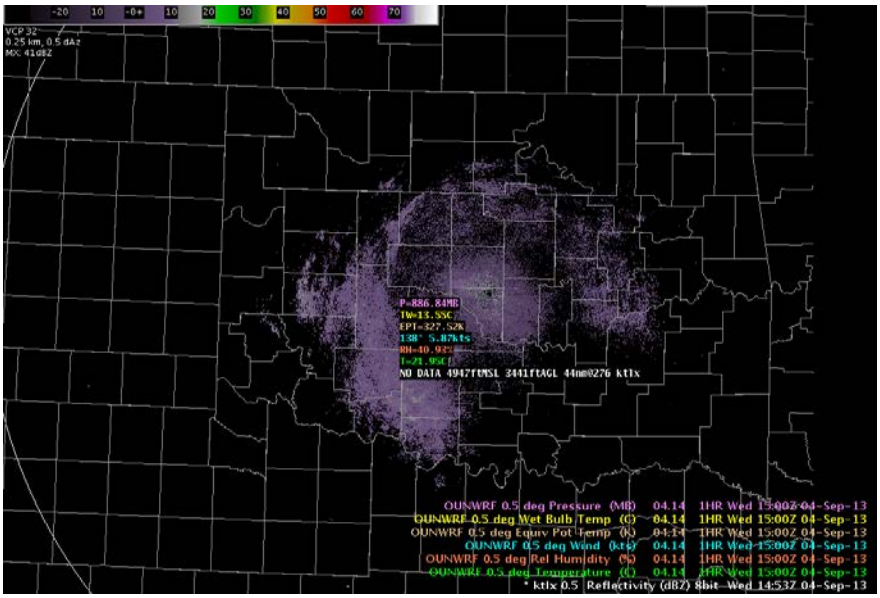
	from the legend. In the context menu that appears, click the **Sample Cloud Heights/Radar Skew T** pull-out menu and choose the new source. Right-click to get the contextual menu again and choose the **Sample** check box. Roam around the image and examine the corresponding data in the Pop-Up Skew-T.
Part 2: Add the local model to the Standard Environmental Data Package	
4. Make a site override of the baseStdEnvPackage.xml menu for the Standard Environmental Data Package.	In the Localization Perspective file browser, open **CAVE** » **Menus** » **volume** » **baseStdEnvPackage.xml**. Make a site version by right-clicking the **BASE** icon and choosing **Copy To ► Site.** 
5. Edit the menu and add a menu entry for the new model.	Edit the new SITE version of baseStdEnvPackage.xml. Add a new menu entry similar to the change highlighted in **Figure 2**. The most critical piece of information is the model ID used as the value tag for the model name. Note we also changed the name of the bundle file the menu item references from DefaultStdEnv.xml to ounwrfStdEnv.xml. This change can accommodate parameters your local model may have that standard models do not have. Save your changes.
6. Copy the DefaultStdEnv.xml bundle to ounwrfStdEnv.xml.	In the Localization Perspective file browser, open **CAVE** » **Bundles** » **volume** » **DefaultStdEnv.xml**. Right-click the **BASE** icon and choose **Copy To ► New File.** Name the new file to whatever filename was used in Step 5. In our case, it is ounwrfStdEnv.xml. 

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <contribute xsi:type="titleItem" titleText="------ Std Env Data Package ------"
        id="StdEnvPackageLine" />
    <contribute xsi:type="subMenu" menuText="Std Env Data Package">
    <contribute xsi:type="bundleItem" file="bundles/volume/DefaultStdEnv.xml"
        menuText="LAPS" id="lapsstdenv" useReferenceTime="true">
        <substitute key="modelName" value="LAPS"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DefaultStdEnv.xml"
        menuText="NAM40" id="nam40stdenv" useReferenceTime="true">
        <substitute key="modelName" value="${NAM40model}"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DefaultStdEnv.xml"
        menuText="RAP40" id="rap40stdenv" useReferenceTime="true">
        <substitute key="modelName" value="${RAPmodel}"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DefaultStdEnv.xml"
        menuText="NAM12" id="nam12stdenv" useReferenceTime="true">
        <substitute key="modelName" value="${NAM12model}"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DefaultStdEnv.xml"
        menuText="GFS40" id="gfs40stdenv" useReferenceTime="true">
        <substitute key="modelName" value="GFS212"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/DefaultStdEnv.xml"
        menuText="RAP13" id="rap13stdenv" useReferenceTime="true">
        <substitute key="modelName" value="${RAP13model}"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/ounwrfStdEnv.xml"
        menuText="OUNWRF" id="ounwrfstdenv" useReferenceTime="true">
        <substitute key="modelName" value="OUNWRF"/>
    </contribute>
    <contribute xsi:type="bundleItem" file="bundles/volume/RaobStdEnv.xml"
        menuText="RaobOA" id="raoboastdenv" useReferenceTime="true">
    </contribute>
    </contribute>
```

Figure 2. Adding the local model to the Standard Environmental Data Package menu.

7. Test.	Restart CAVE then load a radar image. Then load the new model from the Standard Environmental Data Package (**Volume** » **Std Env Data Package** » **New Model**). Finally, enable sampling.

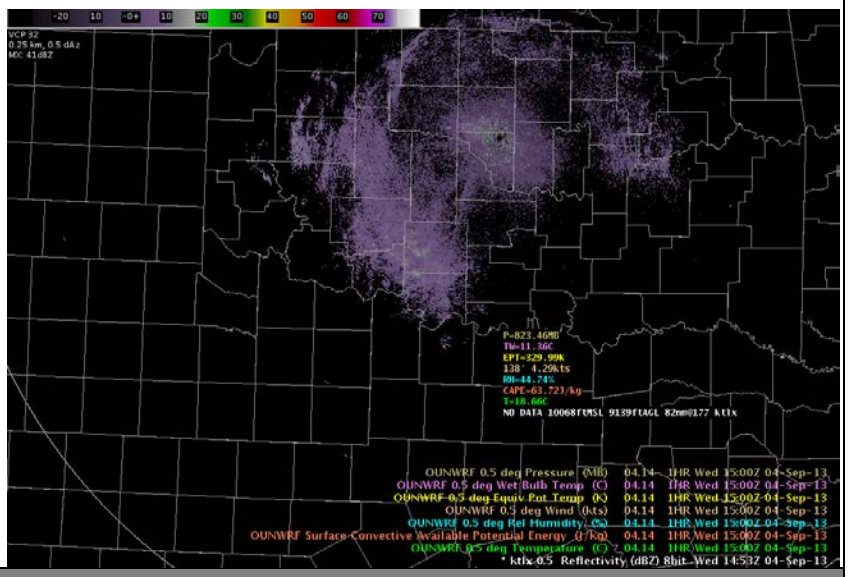
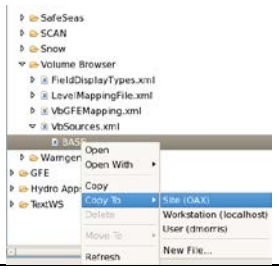




Part 3: Add a custom parameter from the new model to the Standard Environmental Data Package

8. Edit the ounwrfStdEnv.xml bundle that we just created. It contains the default parameters in the Standard Environmental Data Package. Add a bundle resource for the custom parameter. In this case, we'll add surface CAPE. The edits here are similar to those made in Exercise 9 for model families.	In the Localization Perspective file browser, open **CAVE** » **Bundles** » **volume** » **ounwrfStdEnv.xml**. Copy and paste the lines highlighted by the red box in **Figure 3**. In the second version, make these changes: • Change the constraintValue for the parameter.abbreviation from P to CAPE (Box "A" in Figure 3). • Change the constraintValue for the info.level.masterLevel.name from "TILT" to "SFC" (Box "B" in Figure 3).

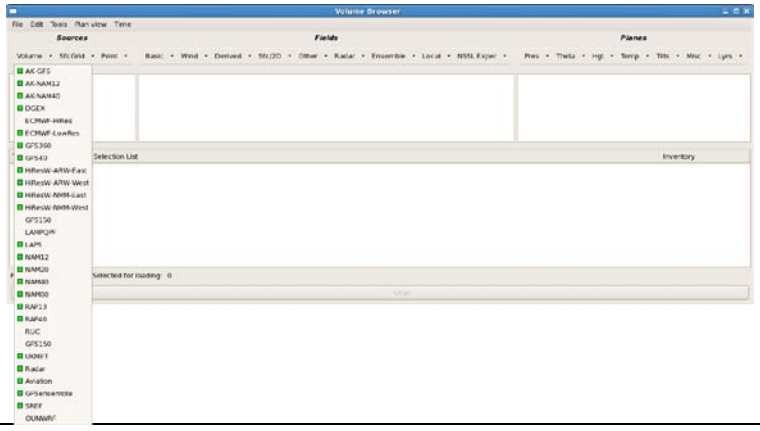
Figure 3. Edits to the ounwrfStdEnv.xml bundle to add a custom model parameter to the Standard Environmental Data Package readout. The name of the bundle you edit is whatever you called it in Step 5.

9. Test.	Load a radar image and the Standard Environmental Data Package as in Step 6. Note the CAPE parameter displays in the cursor readout. 
Part 4: Add the new model as a source for the Volume Browser	
10. The sources for the volume browser are configured using the VbSources.xml file. Make a site override of this file.	In the Localization Perspective file browser, open **D2D** » **Volume Browser** » **VbSources.xml**. Make a site version by right-clicking the **BASE** icon and choosing **Copy To ► Site.** 
11. Add a entry for the new model into VbSources.xml.	Edit the SITE version of the VbSources.xml file. Add an entry similar to the one highlighted in **Figure 4.** It is critical that the key be the model ID for your local model.

```
<vbSourceList>
  <vbSource category="Volume" key="GFS160" />
  <vbSource category="Volume" key="ETA242" />
  <vbSource category="Volume" key="mesoEta216" />
  <vbSource category="Volume" key="DGEX185" />
  <vbSource category="Volume" key="ECMWF-HiRes" />
  <vbSource category="Volume" key="ECMF-NorthernHemisphere" />
  <vbSource category="Volume" key="GFS201" />
  <vbSource category="Volume" key="GFS212" />
  <vbSource category="Volume" key="HiResW-ARW-East" />
  <vbSource category="Volume" key="HiResW-ARW-West" />
  <vbSource category="Volume" key="HiResW-NMM-East" />
  <vbSource category="Volume" key="HiResW-NMM-West" />
  <vbSource category="Volume" key="MRF204" />
  <vbSource category="Volume" key="LAMPQPF" />
  <vbSource category="Volume" key="LAPS" />
  <vbSource category="Volume" key="ETA218" />
  <vbSource category="Volume" key="mesoEta215" />
  <vbSource category="Volume" key="mesoEta212" />
  <vbSource category="Volume" key="ETA" />
  <vbSource category="Volume" key="RUC130" />
  <vbSource category="Volume" key="RUC236" />
  <vbSource category="Volume" key="RUC" />
  <vbSource category="Volume" key="MRF205" />
  <vbSource category="Volume" key="UKMET-NorthernHemisphere" />
  <vbSource category="Volume" key="radar" name="Radar" />
  <vbSource category="Volume" key="Aviation" views="PLANVIEW TIMESERIES" />
  <vbSource category="Volume" key="ENSEMBLE" views="PLANVIEW TIMESERIES" />
  <vbSource category="SfcGrid" key="BHPE" views="PLANVIEW TIMESERIES" />
  <vbSource category="SfcGrid" key="GFE" views="PLANVIEW TIMESERIES" />
  <vbSource category="SfcGrid" key="GFSGuide" views="PLANVIEW TIMESERIES" />
  <vbSource category="SfcGrid" key="LAMPTstorm" name="GFSLAMP-Grid" views="PLANVIEW TIMESERIES" />
  <vbSource category="SfcGrid" key="MOSGuide" views="PLANVIEW TIMESERIES" />
  <vbSource category="SfcGrid" key="HPE" views="PLANVIEW TIMESERIES" />
  <vbSource category="SfcGrid" key="MPE" views="PLANVIEW TIMESERIES" />
  <vbSource category="SfcGrid" key="MSAS" views="PLANVIEW TIMESERIES" />
  <vbSource category="SfcGrid" key="NamDNG" views="PLANVIEW TIMESERIES" />
  <vbSource category="SfcGrid" key="ETA212" views="PLANVIEW TIMESERIES" />
  <vbSource category="SfcGrid" key="NICICE" views="PLANVIEW TIMESERIES" />
  <vbSource category="Volume" key="SREF212" views="PLANVIEW TIMESERIES" />
  <vbSource category="Point" key="bufrmosLAMP" name="GFSLAMP-Stn" views="TIMESERIES" />
  <vbSource category="Point" key="obs" name="Metar" views="TIMESERIES TIMEHEIGHT" />
  <vbSource category="Point" key="obsOA" name="MetarOA" views="PLANVIEW TIMESERIES" />
  <vbSource category="Point" key="radar149" name="DMD" subCategory="Column" views="CROSSSECTION TIMEHEIGHT VARVSHGT TIMESERIES" />
  <vbSource category="Point" key="modelsoundingGFS" name="GFSBufr" subCategory="Column" views="CROSSSECTION TIMEHEIGHT VARVSHGT SOUNDING TIMESERIES" />
  <vbSource category="Point" key="goessounding" name="GoesBufr" subCategory="Column" views="CROSSSECTION TIMEHEIGHT VARVSHGT SOUNDING TIMESERIES" />
  <vbSource category="Point" key="acarssounding" name="ACARS" subCategory="Column" views="CROSSSECTION TIMEHEIGHT VARVSHGT SOUNDING TIMESERIES" />
  <vbSource category="Point" key="modelsoundingETA" name="NAMBufr" subCategory="Column" views="CROSSSECTION TIMEHEIGHT VARVSHGT SOUNDING TIMESERIES" />
  <vbSource category="Point" key="poessounding" name="PoesBufr" subCategory="Column" views="CROSSSECTION TIMEHEIGHT VARVSHGT SOUNDING TIMESERIES" />
  <vbSource category="Point" key="profiler" name="Profiler" subCategory="Column" views="CROSSSECTION TIMEHEIGHT VARVSHGT SOUNDING TIMESERIES" />
  <vbSource category="Point" key="bufrua" name="Raob" subCategory="Column" views="CROSSSECTION TIMEHEIGHT VARVSHGT SOUNDING TIMESERIES" />
  <vbSource category="Point" key="bufruaOA" name="RaobOA" subCategory="Column" />
  <vbSource category="Volume" key="OUNWRF" />

</vbSourceList>
```

Figure 4. Additional entry in the VbSources.xml file to add a local model to the sources menu of the Volume Browser.

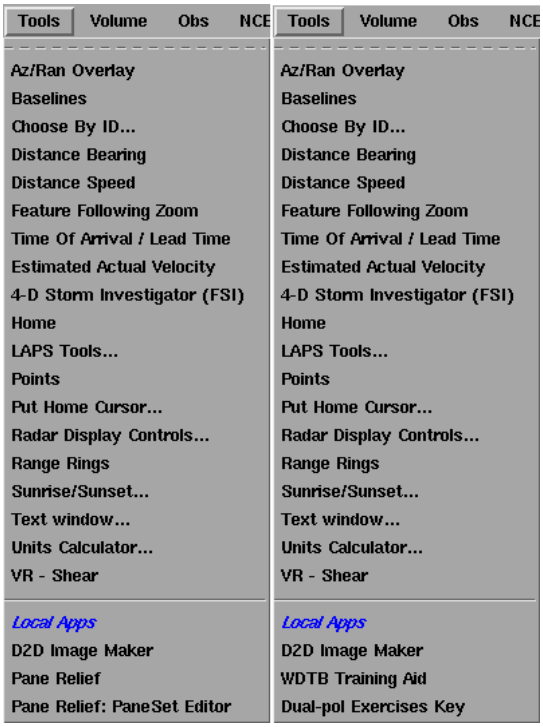
Note: Some WFOs have their local model under a Local menu in the Volume Browser. In this case, the category should be “Local”.

12. Restart CAVE and Test.	Open the Volume Browser and ensure the new model is available from the Volume menu in the sources area and that you can load a product from the model using the volume browser. 

Exercise 12: Adding Custom Menu Entries to the Tools and Help Menus

Objectives: In this exercise, you will perform these procedures:

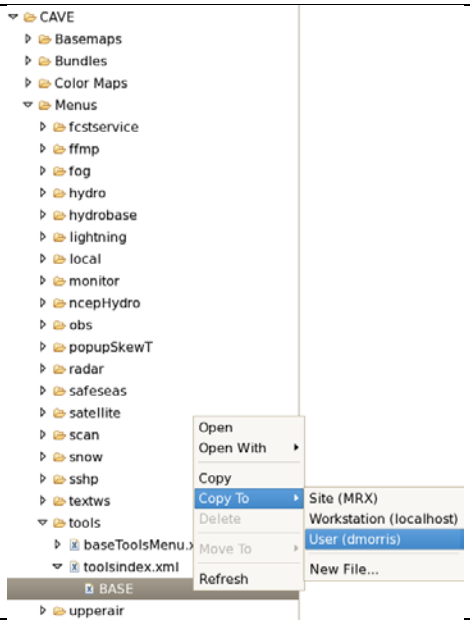
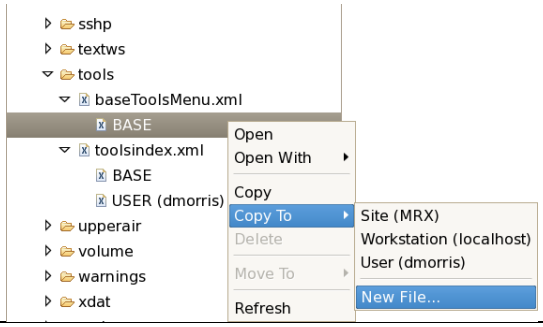
- Add a custom menu entry to the Tools menu to execute an arbitrary command that is external to AWIPS-2
- Add a custom menu entry to the Help menu to execute an arbitrary command that is external to AWIPS-2.



Background. AWIPS-1 had the ability to add custom menu entries to the Tools menu of D2D by editing a localAppsInfo.txt file located in $FXA_CUSTOMFILES. In AWIPS-2, custom menu entries are added by editing menu XML files in the localization perspective.

This exercise demonstrates the procedure of adding additional menu entries to execute commands that are external to AWIPS-2 (that is, any command that could be executed using a command prompt). The specific example given here is to access the AWIPS-2 Variance Training web page using the Firefox web browser. For demonstration purposes, the same command is added to both the Tools menu and the Help menu. A similar procedure would be followed allow CAVE to launch other external locally-developed applications. In this exercise, two similar methods are used, one for the tools menu and the other for the help menu. The difference between the two is that one method could prevent later baseline menu changes from being seen while the other allows both local changes and future baseline changes to be activated.

This exercise should take about 5-10 minutes to complete.

Concept	Actions
1. Make a user override for the toolsindex.xml menu file.	In the Localization Perspective file browser, open **CAVE** » **Menus** » **tools** » **toolsindex.xml.** Make a user version by right-clicking the **BASE** icon and choosing **Copy To ► User.** 
2. Make a new user-level menu file called trainMenu.xml using the baseToolsMenu.xml file as a template.	Open **baseToolsMenu.xml** and right-click the **BASE** icon and choose **Copy To ►New File.** Name the new file **trainMenu.xml**. 
3. Edit the new trainMenu.xml to delete the pre-existing entries and to add a new entry for the AWIPS-2 Variance Training web page.	Edit the trainMenu.xml file by double-clicking its icon. Delete the existing menu contributions beginning with the one for the Az/Ran Overlay and ending with the one for the Vr – Shear tool. If you are performing this action on an ADAM platform, make the edit shown in **Figure 1**. If this is on a live AWIPS-2 system, make the change shown in **Figure 2**. Save your changes. Note that the baseline menu file includes a comment near the bottom of the file that documents the available options involved in adding an arbitrary command to a CAVE menu. Additional menu contributions could be added as well as more structure, including submenus, if desired. For examples of submenus, see Exercise 8.

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

   <contribute xsi:type="separator" id="trainingLinks" />
   <contribute xsi:type="titleItem" titleText="----- Reference Info -----"/>

   <contribute xsi:type="command"
         commandId="com.raytheon.viz.awipstools.arbitrary"
         menuText="AWIPS 2 Variance Training ">
         <parameter key="commandAction" value="firefox https://collaborate.nws.noaa.gov/training/AWIPS2VariancesFinal/start.html" />
         <parameter key="captureOutput" value="false" />
         <parameter key="showStdOut" value="false" />
    </contribute>

   <!-- example arbitrary command below, commandAction parameter is required,
   the others default to false if undefined.  If captureOutput is true then after
   the launched command closes a dialog box will show the contents printed to
   standard output.  If showStdOut is true then standard output will be echoed on
   standard out of cave ( not very useful ) -->
   <!--
   <contribute xsi:type="command"
       commandId="com.raytheon.viz.awipstools.arbitrary"
       menuText="ps -A" >
       <parameter key="commandAction" value="/bin/ps -A" />
       <parameter key="captureOutput" value="true" />
       <parameter key="showStdOut" value="false" />
   </contribute>
   -->

</menuTemplate>
```

Figure 1. Edits to trainMenu.xml to add a command to launch the firefox web browser with the Variance Training web page (ADAM version)

```
<menuTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

   <contribute xsi:type="separator" id="trainingLinks" />
   <contribute xsi:type="titleItem" titleText="----- Reference Info -----"/>

   <contribute xsi:type="command"
         commandId="com.raytheon.viz.awipstools.arbitrary"
         menuText="AWIPS-2 Variance Training ">
         <parameter key="commandAction" value="firefox http://165.92.25.138:85/Training/AWIPS2VariancesFinal/start.html" />
         <parameter key="captureOutput" value="false" />
         <parameter key="showStdOut" value="false" />
    </contribute>

   <!-- example arbitrary command below, commandAction parameter is required,
   the others default to false if undefined.  If captureOutput is true then after
   the launched command closes a dialog box will show the contents printed to
   standard output.  If showStdOut is true then standard output will be echoed on
   standard out of cave ( not very useful ) -->
   <!--
   <contribute xsi:type="command"
       commandId="com.raytheon.viz.awipstools.arbitrary"
       menuText="ps -A" >
       <parameter key="commandAction" value="/bin/ps -A" />
       <parameter key="captureOutput" value="true" />
       <parameter key="showStdOut" value="false" />
   </contribute>
   -->

</menuTemplate>
```

Figure 2. Edits to trainMenu.xml to add a command to launch the firefox web browser with the Variance Training web page (live AWIPS-2 workstation version)

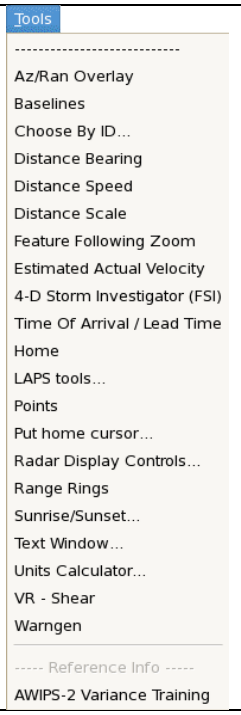
4. Edit the toolsindex.xml menu to include the new trainMenu.xml.	Edit your **USER** version of toolsindex.xml. Add the new menu entry that is highlighted in **Figure 3**. Save your changes.

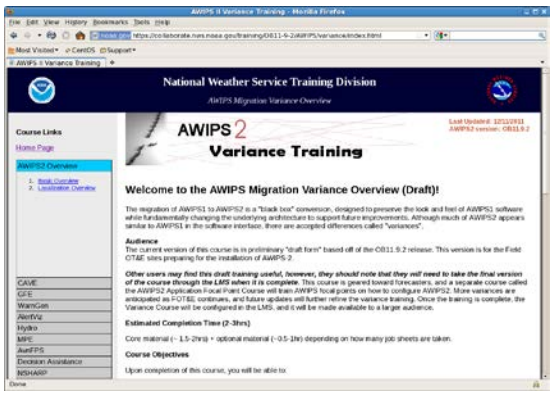
```
<menuContributionFile>
    <include installTo="menu:tools?after=tools.start"
        fileName="menus/tools/baseToolsMenu.xml">
    </include>

    <include installTo="menu:tools"
        fileName="menus/tools/trainMenu.xml">
    </include>

</menuContributionFile>
```

Figure 3. Including the trainMenu.xml menu to the bottom of the D2D Tools Menu.

5. Restart CAVE and open the Tools menu to see the new menu entry and verify that it works.

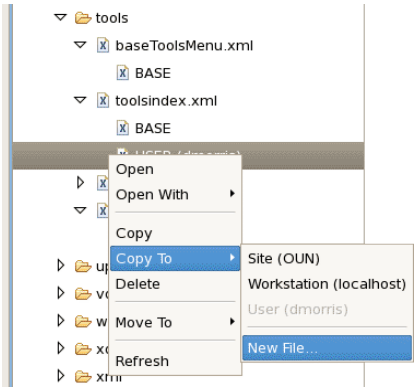
   (Note: if Firefox is already open on your workstation, then the web page may open in a new tab in the existing Firefox instance).





6. Make a new trainindex.xml file. Any menu file named according to *index.xml gets included into the menu structure so long as it references part of the existing structure. With the previous method, if a future baseline change to toolsindex.xml occurred, we would never see it because our USER or SITE override would prevent those changes from being reflected on our system. This method does not consist of an override; rather, it just adds a new menu contribution.

Right-click the USER version of the toolsindex.xml file (**CAVE** » **Menus** » **tools** » **toolsindex.xml**) and choose **Copy To ►New File.** Name the new file trainindex.xml. Edit trainindex.xml so it reads like **Figure 4.**

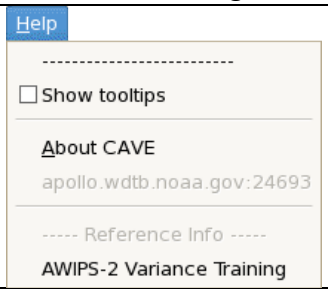


Note: the help menu is not explicitly shown as a separate category in the Localization Perspective; it is defined elsewhere. Additionally, there is no recommended place to store a local menu contribution file. One WFO made a localmenus directory to store such files. This directory has to be manually created outside the Localization Perspective in cave_static/site/{Site}/menus/localmenus.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
    <!--
        This_software_was_developed_and_/_or_modified_by_Raytheon_Company,
        pursuant_to_Contract_DG133W-05-CQ-1067_with_the_US_Government.

        U.S._EXPORT_CONTROLLED_TECHNICAL_DATA
        This_software_product_contains_export-restricted_data_whose
        export/transfer/disclosure_is_restricted_by_U.S._law._Dissemination
        to_non-U.S._persons_whether_in_the_United_States_or_abroad_requires
        an_export_license_or_other_authorization.

        Contractor_Name:_____Raytheon_Company
        Contractor_Address:_____6825_Pine_Street,_Suite_340
        ____________________Mail_Stop_B8
        ____________________Omaha,_NE_68106
        ____________________402.291.0100

        See_the_AWIPS_II_Master_Rights_File_("Master_Rights_File.pdf")_for
        further_licensing_information.
    -->
<menuContributionFile>
    <include installTo="menu:help"
        fileName="menus/tools/trainMenu.xml">
    </include>
</menuContributionFile>
```

Figure 4. Adding the trainMenu.xml to the bottom of the D2D Help Menu using a new trainindex.xml menu file rather than overriding an existing menu file.

7. Restart CAVE and open the Help menu to see the new menu entry and verify that it works.

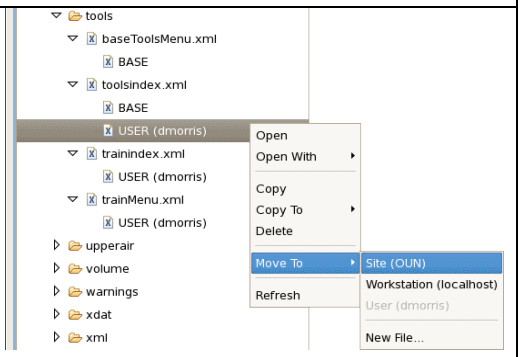


8. If desired, promote your **USER** versions of toolsindex.xml and trainMenu.xml to **SITE**.

   Note: Your user must have site override permissions enabled in the userRoles.xml file. See Exercise 1 for more information.

Right-click the USER version of toolsindex.xml and choose **Move To ►Site**.

Right-click the USER version of trainMenu.xml and choose **Move To► Site.**



Right-click the USER version of trainindex.xml and choose **Move To► Site.**

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