

## How GOES Data Gets to Your Office

The process of getting the data from a gage to users in the water and weather communities is complex, but happens amazingly fast.

[https://hads.ncep.noaa.gov/Complete\\_DCS\\_DataPath.shtml](https://hads.ncep.noaa.gov/Complete_DCS_DataPath.shtml)

Data is collected at the gage site, transmitted to a satellite, and relayed to a ground station for distribution. For most end users, that data is then re-transmitted through a satellite and then back down to them for decoding and processing.

Most of the automated river and precipitation gages (over 16,700 of them) use Data Collection Platforms (**DCPs**) at the gage site to transmit to a GOES satellite.

Most of these gages, but not all, are owned, operated, and maintained by the US Geological Survey. There are over 200 cooperators and a small network of NWS DCPs.

A Ground station (or backup) downloads data for the USGS. You can see their data live on this web page: <https://waterdata.usgs.gov/nwis>

The NWS gets the same GOES data from the NESDIS Master Ground Station at Wallops Island, VA, or its backup. It is transmitted to the NWS MADIS and HADS systems at NCEP Central Operations (NCO).

MADIS is the Meteorological Assimilation Data Ingest System. See this page for MADIS connections to hydrologic data providers...

[https://madis.ncep.noaa.gov/hydro\\_providers.shtml](https://madis.ncep.noaa.gov/hydro_providers.shtml)

HADS is the Hydrometeorological Automated Data System.

See the MADIS page here: <https://madis.ncep.noaa.gov/>

See the HADS page here: <https://hads.ncep.noaa.gov/>

All data that is collected by automated or manual means must be coded into a message for transmission and use by the weather and water communities.

The NWS system that has done this for years for satellite (GOES) observations is HADS. HADS oversight is now provided through the MADIS team.

See **What is HADS** under the **Documentation** section on the HADS page left navigation. <https://hads.ncep.noaa.gov/WhatIsHADS.shtml>

HADS ingests the raw river, precipitation, and other observations from DCPs, and then codes them into SHEF messages. The data is transmitted out several ways.

**HADS Data Path** <https://hads.ncep.noaa.gov/HADSdatapath.shtml>

Data goes back up over DOMSAT for the general User communities for downlink through NOAAPort.

For NWS offices, it goes through the NWS Telecommunications Gateway (**NWSTG**) to get to the AWIPS Network Control Facility (**NCF**), which sends reports to WFOs and RFCs through the AWIPS Satellite Broadcast Network (**SBN**).

There is a built-in backup for failover using the internet using the AWIPS Wide-Area Network (**WAN**).

HADS gets new data every 5-8 seconds.

It produces messages specifically for WFOs (e.g., SXUS39 for WFO Kansas City...ID=EAX) and collectives of data for RFCs (e.g. SRUS27 for MBRFC...IR=KRF) routinely.


You should be getting new HADS messages into your office every minute, perhaps every 2 or 3 minutes at the absolute latest.

With over 16,000 gages, ALL of the data cannot be transmitted at once.

Most of the gages transmit reports of data once per hour, with four 15-minute readings reported.


On the HADS page, you can enter the NWS Location Identifier (**NWSLI**) to see WHEN that gage transmits each hour plus additional information.

Enter **KCDM7** (Missouri River at Kansas City, MO) for an example.



NESDIS ID	CE79291C	NWS Location ID	KCDM7	Owner	CENWK1
Location	MISSOURI RIVER BELOW HANNIBAL BRIDGE AT KANSAS CITY				
Latitude	N 39°06'42"	Longitude	W 94°35'17"	HSA	EAX
State	MO				
Channel	58	Transmission Interval (min)	60	Next Transmit GMT	15:38:40
				Initial Transmit Time (HH:MM:SS)	00:38:40

[AHPS Point](#) - Experimental link function. The link may be dead or non-functional.



NWSLI	Data Interval(min) Self-time	Data Interval(min) Random	SHEF Code	Time Offset (min)	Coefficient Self-time	Coefficient Random	Constant	Base Elevation (ft)	Gage Correction
KCDM7	15	15	PCIRG	8	1	0.01	0	0	0
KCDM7	15	15	HGIRG	8	1	0.01	0	0	0

Data values are **PROVISIONAL**

Today ▼ Decoded Data

If you are looking for the next river report, you see that the transmission interval is 60 minutes and the next time would be after 15:38Z. It transmits hourly, about 39 minutes past the hour. In the next table, it says the data interval is 15 minutes, so you would get four 15-minute readings with each hourly transmission, the latest being probably at 15:30Z but transmitted about 15:39Z.

HADS would typically decode and send this data within 2 minutes and you should see it decoded, posted to the database, and available for viewing in the Hydro perspective by 15:45Z at the latest unless there are data or decode delays.

I just checked the Hydro perspective tool ...

LiveData > Station Reporting Status / Latest Observations...

and this report posted at 15:42Z. Impressive to see this in my workstation, decoded and posted to the hydro database, just over 3 minutes from the time the observation transmitted to GOES from the DCP at the gage.

DCPs transmit on either a **Self-Timed** or **Random** mode.

**Self-Timed** are typically 1 hour but can be 30 min, 2 hours, 3 hours, or 4 hours.

The data intervals are typically 15-minute but can range from 2-min to 60-min.

The **Random** data interval is for a “**random**” report that contains a short message from either 1, 2, or 3 sensors reaching a “critical” threshold. For example, river stage reaching a specified height or rainfall rate reaching a specific value could trigger a random report.

Use AWIPS or this **Iowa State University** website to access text HADS products for any office.

<https://mesonet.agron.iastate.edu>

See the next page to view the GUI with some entries to see HADS data for a WFO.

To get to the example page from the Iowa mesonet home page listed above...

Click the **Current** tab pulldown menu


Choose the **NWS Text** option

Here is the direct link to that page ...

<https://mesonet.agron.iastate.edu/wx/afos/#>

iastate.edu
Index

IOWA STATE UNIVERSITY  
Iowa Environmental Mesonet


Archive
Climate
Current
Info
GIS
Networks
Roads
Svr Wx
Webcams

### 3-6 Character PIL

Specify 4-6 characters for exact match

### 4 Character Center

Can be left blank

### 6 Char WMO Header

Can be left blank

### Date Descending Entries

### Start Date

### End Date

HelpRRSEAX

Refresh
Download Text
Send Text to Printer
Close Tab

Permalink for following product:

```

567
SXUS39 KWOH 060458
RRSEAX
:&&AFWS REPORT FOR USER EAX
.E KS073 200706 Z DH045500 /HGIRR/ DIN5 / 4.58:
.E M0406 200706 Z DH045500 /HGIRR/ DIN5 / 1.18:
.E KS073 200706 Z DH045500 /PPERR/ DIN5 / 0.00:
:END OF REPORT

```

Permalink for following product:

```

066
SXUS39 KWOH 060457
RRSEAX
:&&HADS SOR REPORT FOR USER EAX
.E KRRM7 20200706 DH0400/PCIRG/DIN15/0.00/0.00/0.00/0.00
.E KRRM7 20200706 DH0400/HGIRG/DIN15/4.46/4.46/4.46/4.46
:END OF REPORT

```

I put in **RRSEAX** for the **PIL** for HADS data for WFO Kansas City/Pleasant Hill, MO.

I added **KWOH** to specify the HADS system as the **4 Character Center**.

I added **SXUS39** which is the **WMO Header** for HADS data for EAX.

I added **100** for **Date Descending Entries** (you get to choose Ascending/Descending), and the **100** was to get the up to 100 reports for the date range chosen below. The default is 1, which just gets the latest (current) data.

**NOTICE** the **Start Date & End Date** formats are YYYY-M-D. The calendar option when you click in the Start Date box defaults to the beginning of record for their system, which is 1983. It's easiest to type in the date in the correct format.