

WHY SOUNDER DATA CAN HELP YOU

(AND A PEEK INTO THE FUTURE)

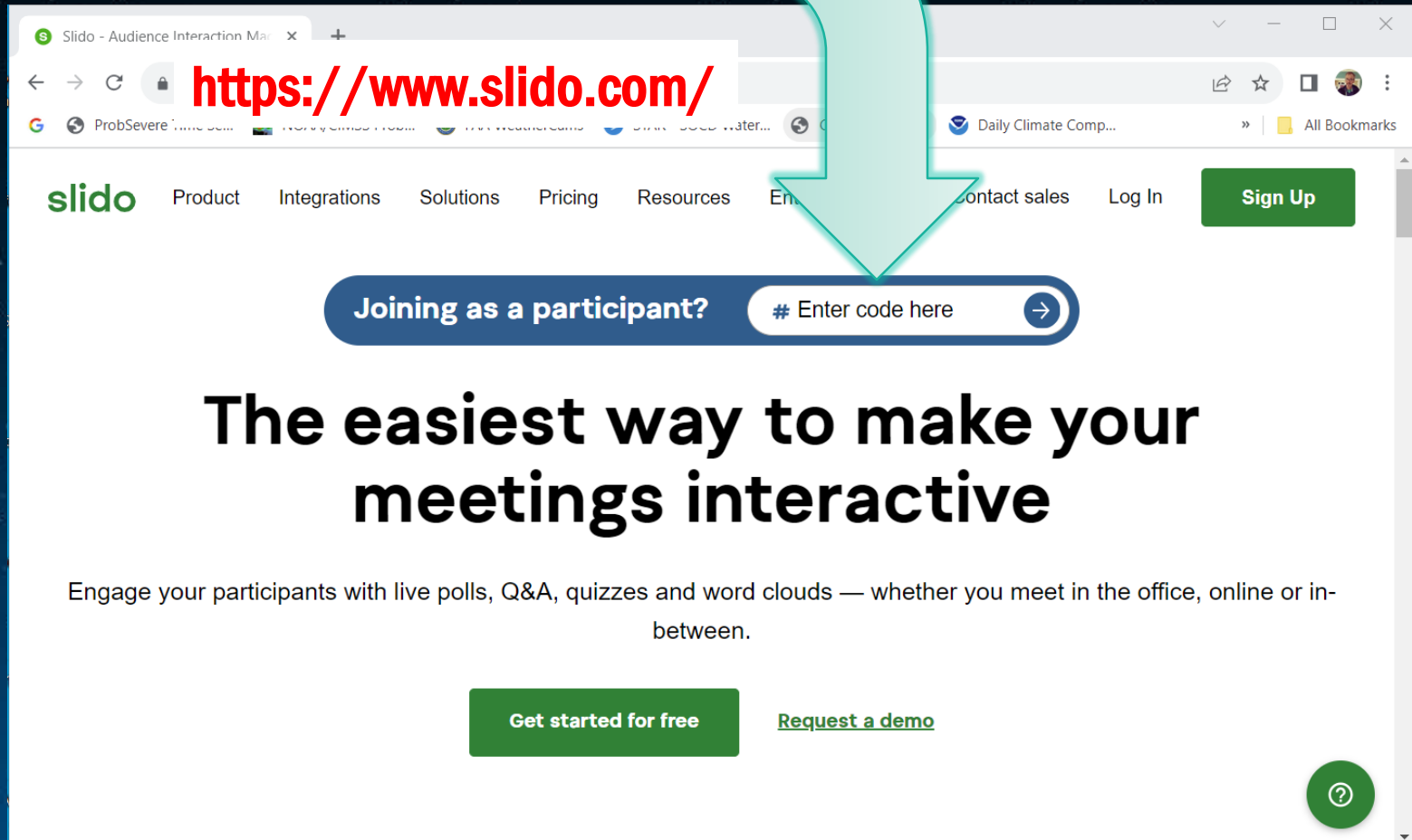
Scott Lindstrom, UW-Madison

Cooperative Institute for Meteorological Satellite
Studies



We are using slido.com!

■ #AOMSUC13



The screenshot shows the Slido website homepage. The browser address bar displays <https://www.slido.com/>. The navigation menu includes links for Product, Integrations, Solutions, Pricing, Resources, and a 'Sign Up' button. A prominent blue banner asks 'Joining as a participant?' with an input field containing '# Enter code here' and a right-pointing arrow. Below this, the main heading reads 'The easiest way to make your meetings interactive'. A sub-headline states: 'Engage your participants with live polls, Q&A, quizzes and word clouds — whether you meet in the office, online or in-between.' At the bottom, there are two buttons: 'Get started for free' and 'Request a demo'. A help icon (question mark in a circle) is visible in the bottom right corner.

You can do different things at slido

The screenshot shows a web browser window with the URL `app.sli.do/event/qWTLfw7agEwy73FZ73iXeU/live/questions?clusterId=eu1`. The browser's address bar and tabs are visible. The Slido interface includes a navigation bar with a 'Q&A' tab highlighted by a grey box, and a 'Polls' tab. Below the navigation bar, there is a text input field with a purple 'C' icon and the placeholder text 'Type your question'. To the right of this field, red text reads: 'If you hear something unclear, or something needs to be repeated, or raises a question in your mind, type that in here'. Below the input field, there are two tabs: 'Popular' (selected) and 'Recent'. A '1 question' indicator is shown to the right. A question card is displayed, featuring a purple 'C' icon, the name 'Chico Escuela', and the text '7 days ago'. The question text is 'Why are we here?'. To the right of the question card, a blue arrow points to a thumbs-up icon with the number '0'. Below the question card, red text reads: 'The Q&A Tab: You are asking US questions, and if you see one you, like, well, click on the thumbs up icon!'. At the bottom center, the word 'slido' is written in green. At the bottom right, there is a green circular button with the word 'Ask' in white.

You can do different things at slido

AOMSUC-13 Training - UW-Madison

app.sli.do/event/qWTLfw7agEwy73FZ73iXeU/live/polls?clusterId=eu1

Q&A Polls

Do you use Microwave Data or Products?

Yes

No

Not Sure

Send

slido

The Polls Tab: We are asking You questions (questions can have different formats; answer them then press 'Send')

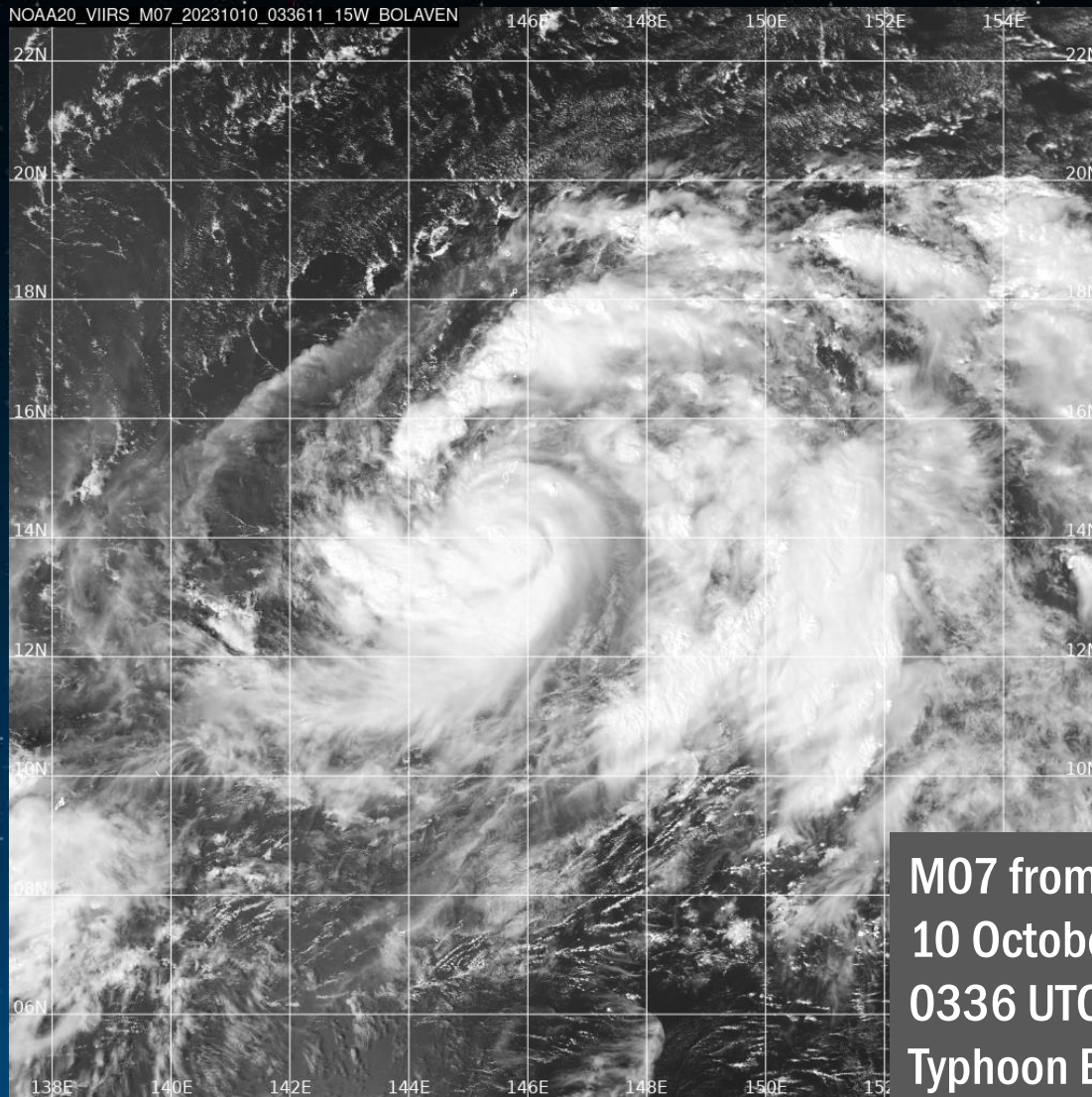
Imagers v. Sounders

- **Maybe you're familiar with Imagers: AHI, AMI, AGRI, ABI, GHI**
 - Advanced Himawari Imager (16 bands)
 - Advanced Meteorological Imager (16 bands)
 - Advanced Geostationary Radiation Imager (16 bands)
 - Advanced Baseline Imager (16 bands)
 - Geostationary High-speed Image (7 bands)
- **Radiometers: AVHRR, VIIRS, VIRR**
 - Advanced Very High Resolution Radiometer (5-6 bands)
 - Visible/Infrared Imager Radiometer Suite (22 bands)
 - Visible and Infrared Radiometer (10 bands)
- **Other LEO Imagers: MERSI-1, MERSI-2, MERSI-LL**
 - Medium Resolution Spectral Imager (up to 25 bands)

Slido Question #1

- **Go to Slido.com and answer the questions, and we'll discuss!**
- **Question 1: What satellite data do you currently use?**
- **Question 2: How do you get that data?**

Imagers give a view of a surface



You can use Imager data to derive products. Sometimes that derivation requires information from Numerical Models

(For example, I might have added a Sea Surface Temperature analysis under the image of Bolaven)

M07 from NOAA-20 VIIRS
10 October 2023
0336 UTC (0.86 μm)
Typhoon Bolaven, east of
Guam

Imagers give information from one level

Sounders give volumetric information

- **CrIS, IASI, HIRAS-2**
 - **Cross-Track Infrared Sounder (1305 bands)**
 - 3.92 – 4.64 μm ; 5.71 – 8.26 μm ; 9.13 – 15.4 μm
 - 2155 – 2550 ; 1210 – 1750 ; 650 – 1095
 - **Infrared Atmospheric Sounding Interferometer (8461 bands)**
 - 3.62 – 15.5 μm ; 645 – 2760
 - **Hyperspectral Infrared Atmospheric Sounding-2 (3000+ bands)**
 - 3.92 – 4.64 μm ; 5.71 – 8.26 μm ; 8.8 – 15.38 μm
 - 2155 – 2550 ; 1210 – 1750 ; 650 – 1136
- **GIIRS, GIIRS-2**
 - **Geostationary Interferometric Infrared Sounder (1188 detectors on FY-4B)**

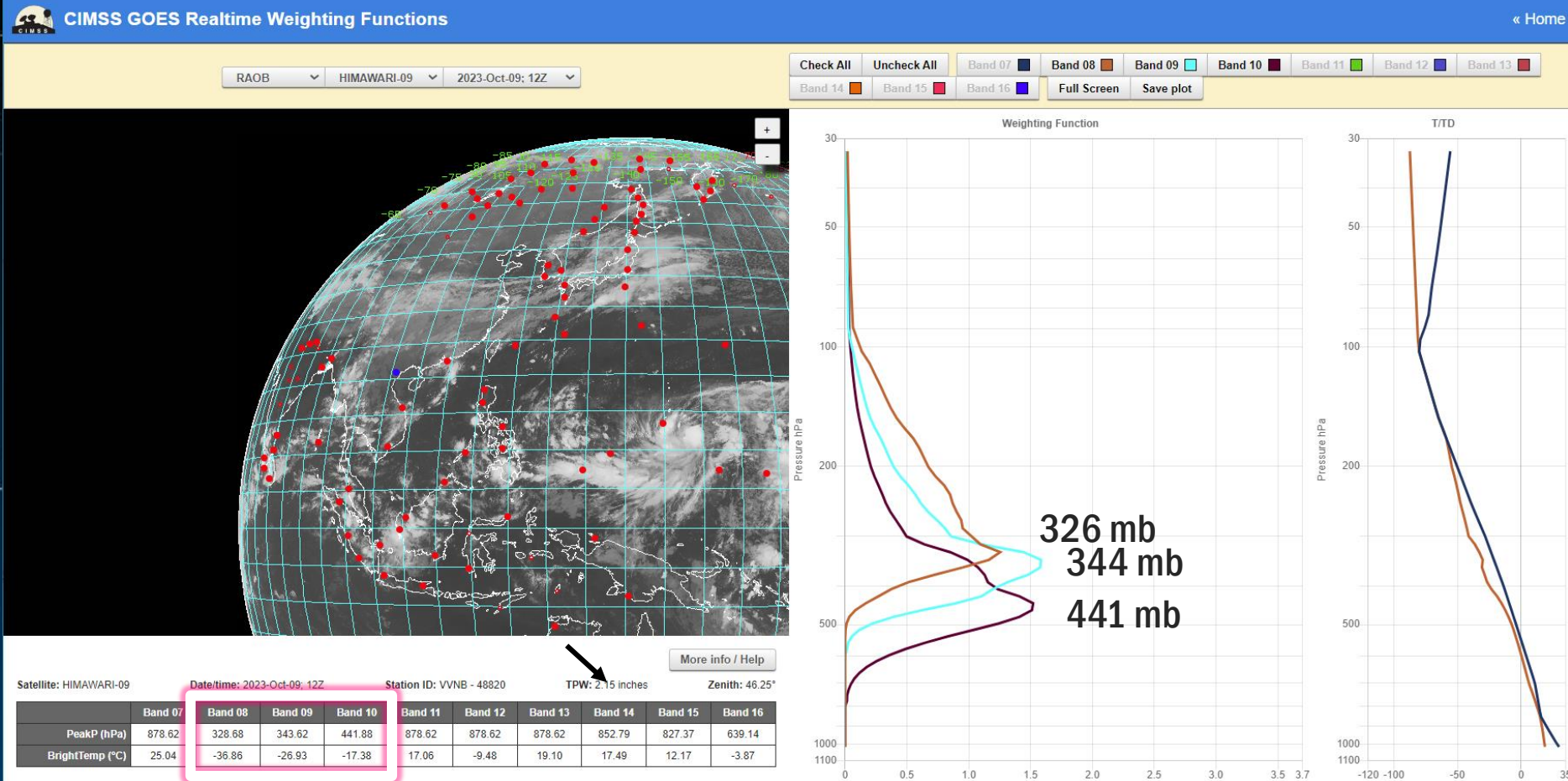
What can sounding data give you: Vertical Profiles of temperature and moisture

- **The >1000 observations of radiances you get from a sounder could represent the emissions from more than one atmosphere**
- **The challenge is to find the most likely combination of temperature and moisture profiles that yield the observations**
 - This is a tricky mathematical problem
 - For 40+ years this has been achieved using Radiative Transfer Models (RTMs) – that are computationally slow
 - How to become famous: Devise a speedy way to transform the observations to the most likely atmosphere

Slido Question #3

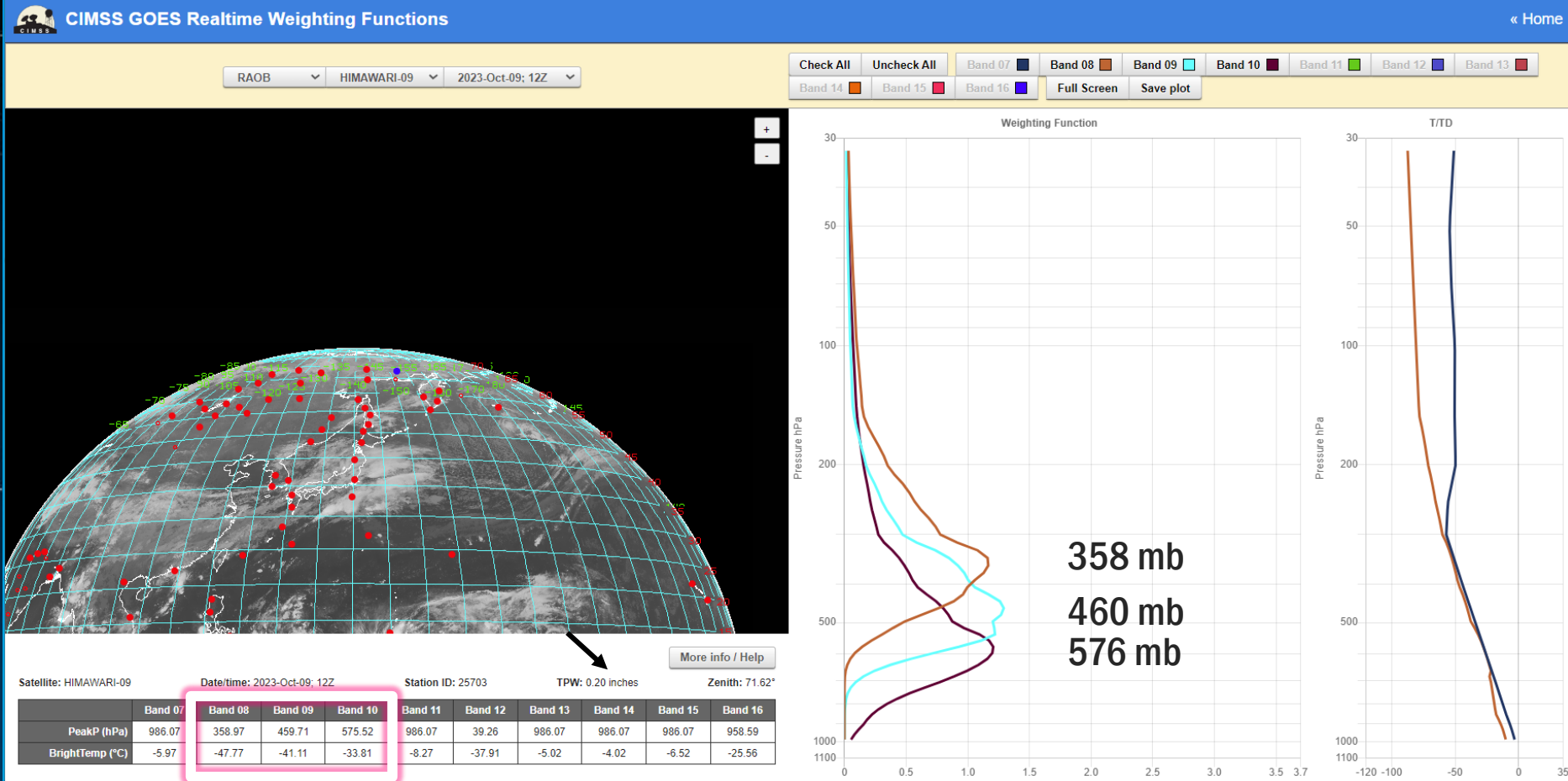
- In clear skies, from where does the information that a ‘water vapor’ infrared channel (for example, Band 8 on AMI at $6.24 \mu\text{m}$) detects originate?
 - A: From the Earth’s Surface
 - B: From around 900 mb
 - C: From around 550 mb
 - D: From around 350 mb
 - E: I need more information!

Weighting Function



AHI has 3 bands in the part of the spectrum that is sensitive to water vapor absorption
 Where does the information sensed by those three channels originate in the vertical?
 This is a function of water vapor in the column

Weighting Function



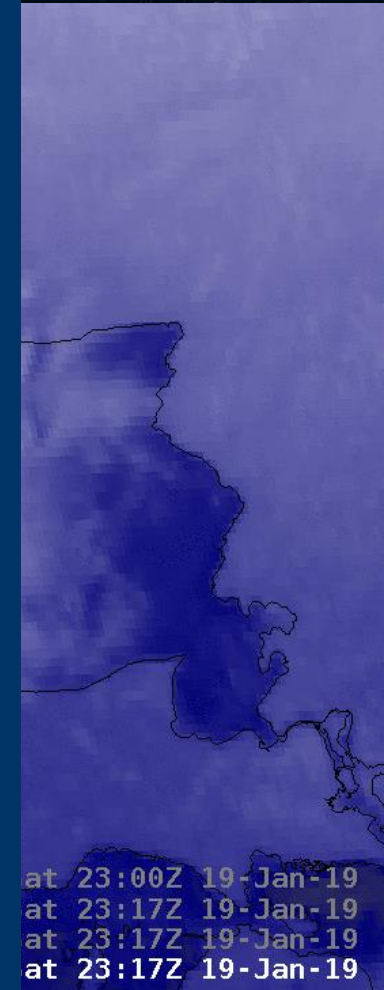
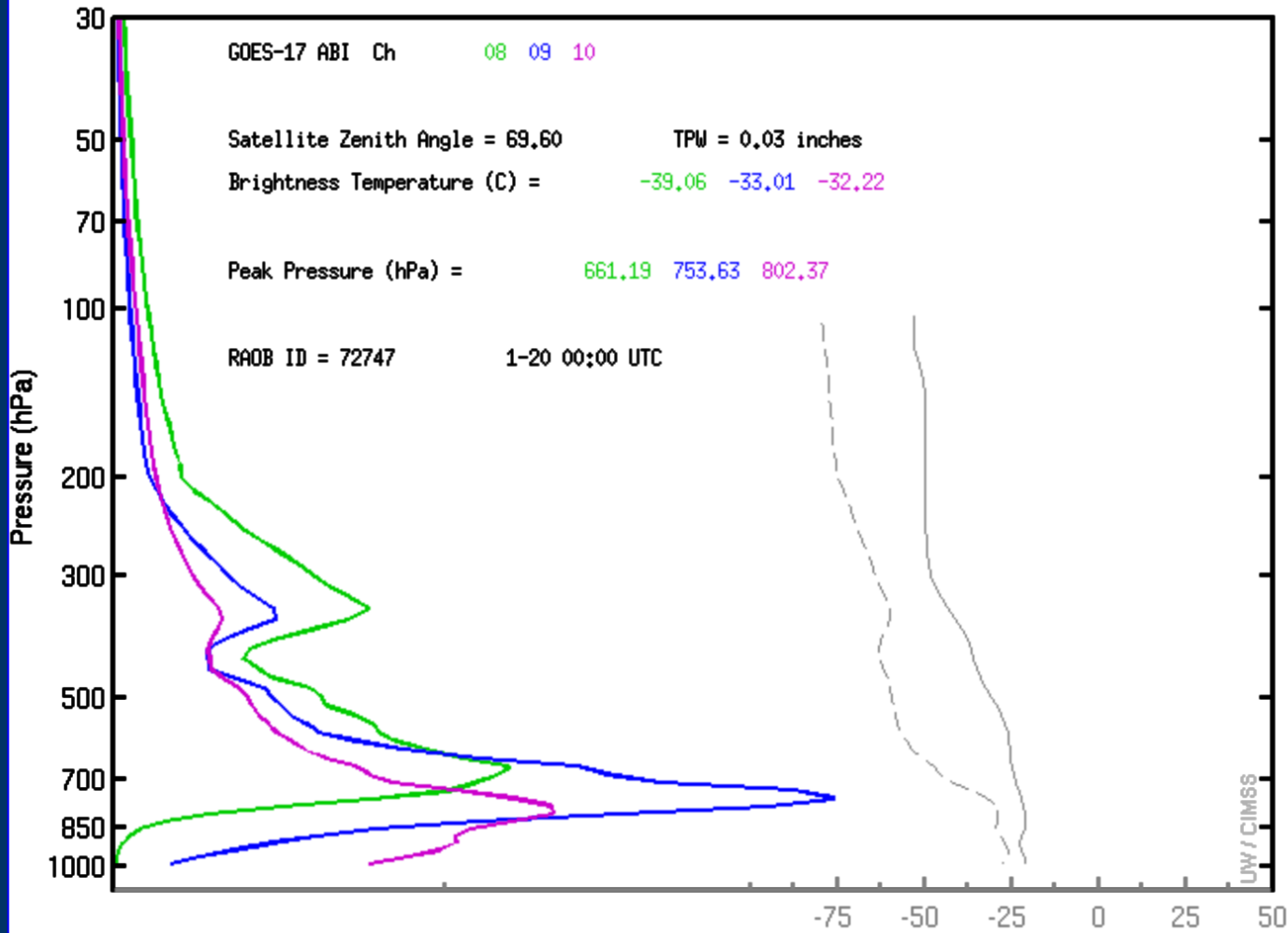
AHI has 3 bands in the part of the spectrum that is sensitive to water vapor absorption
 Where does the information sensed by those three channels originate in the vertical?
 This is a function of water vapor in the column

The complication of water vapor

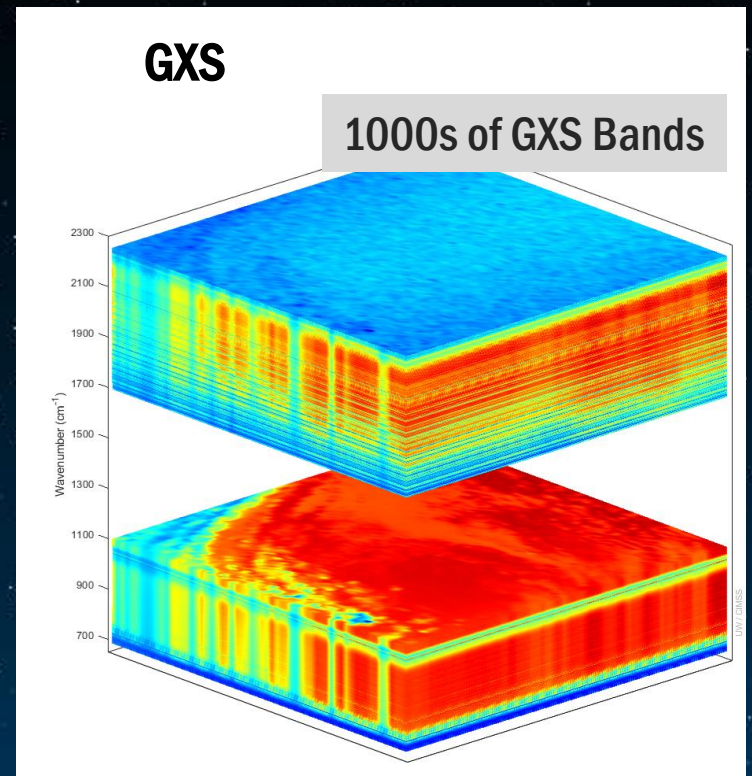
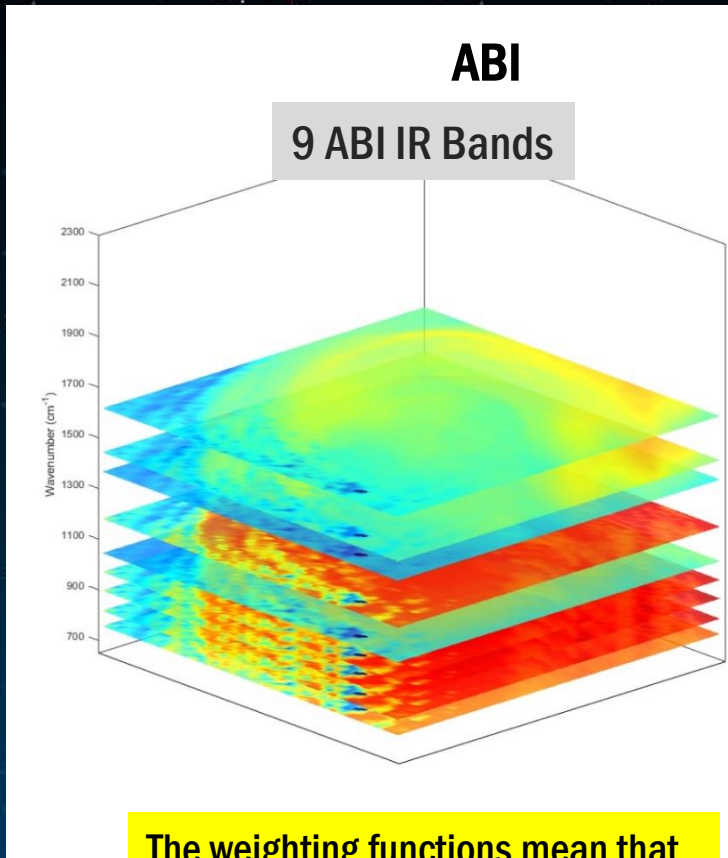
- **“Water Vapor” bands on a satellite are sensing emissions at different wavelengths (6.24, 6.95, 7.35 μm on AHI)**
 - The ability of water molecules to absorb energy at those wavelengths varies as a function of wavelength
 - A thin region of water vapor might absorb most of the energy at 6.24 μm , but a lot of the 7.34 μm energy will move through it.
 - What is the temperature of the water vapor. That also affects the absorption.
 - Are there big gradients in temperature that can be sensed through the water vapor?

- ABI Bands:
- 7 (3.9 μm)
 - 8 (6.2 μm)
 - 9 (6.9 μm)
 - 10 (7.3 μm)
 - 11 (8.4 μm)
 - 12 (9.6 μm)
 - 13 (10.3 μm)
 - 14 (11.2 μm)
 - 15 (12.3 μm)
 - 16 (13.3 μm)

- Profile:
- Temperature (C)
 - Dew Point (C)
 - Mixing Ratio (g/kg)



More spectral bands means more temperature/moisture information in the vertical



The weighting functions mean that 3 (overlapping) moisture layers are resolved (i.e., 3 layers are resolved)

There are more than six times (temperature) and four times (moisture) of number of independent pieces of vertical information in this proposed sounder compared to ABI (i.e., 6 times more for thin clouds.)

Number of Independent Pieces of Vertical Information		
	GXS	ABI
Temperature	13	2
Moisture	11	2.5

Slido Question 4:

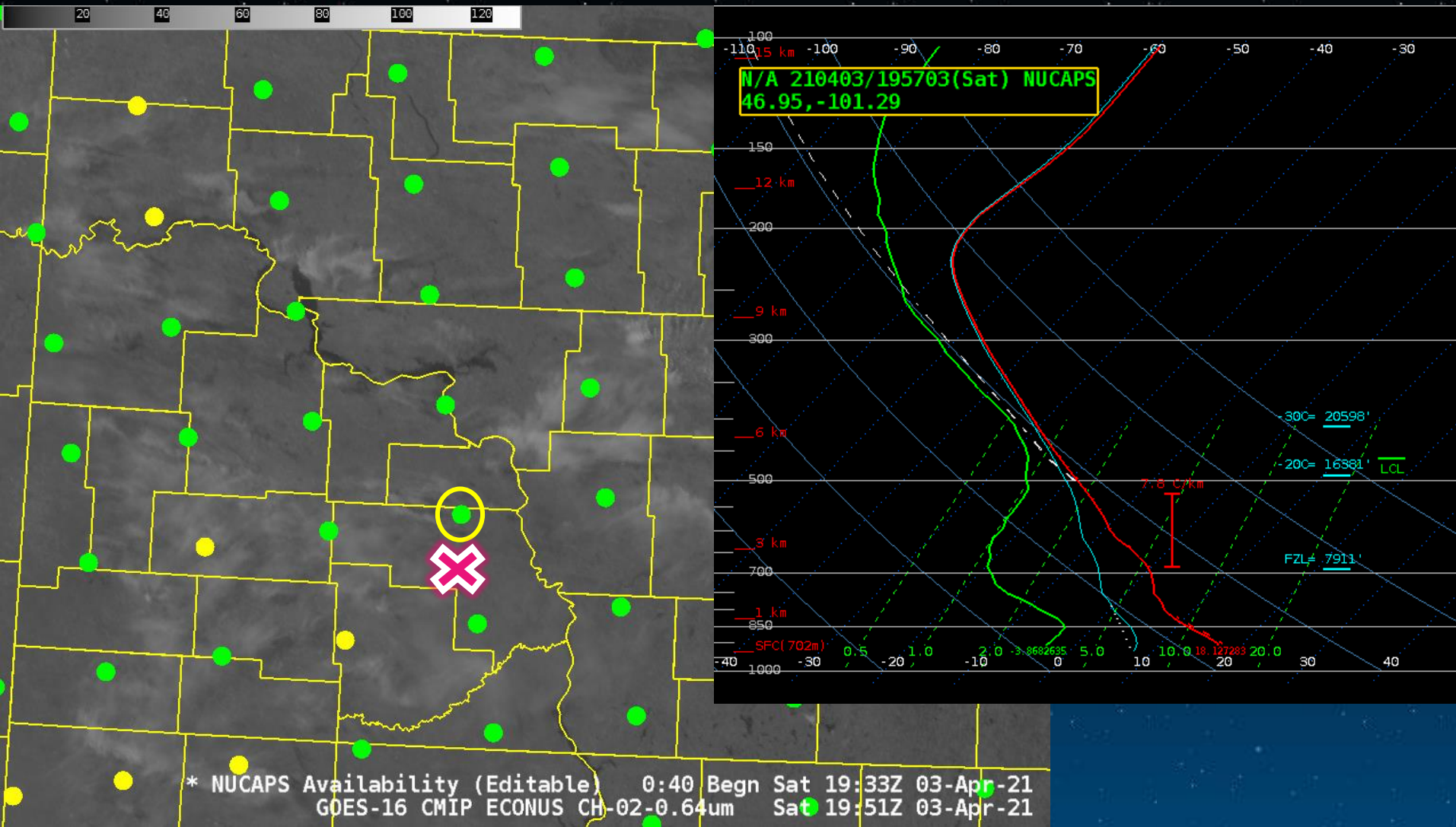
What could you use Sounder information for?



Sounder data is in three dimensions

- You can show vertical profiles of information
- You can show horizontal fields of information

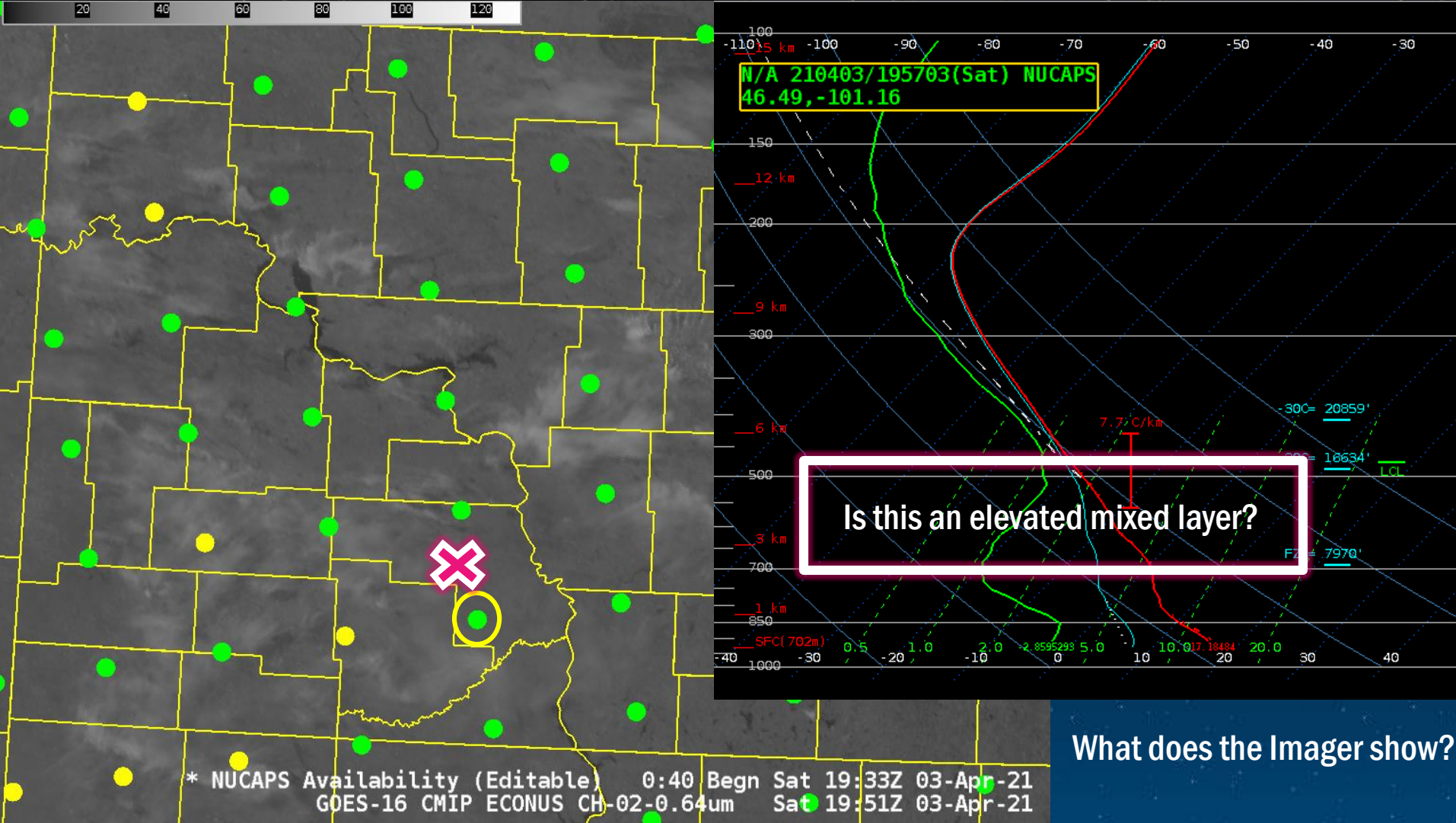
Example of using temperature/moisture data to determine environment



Retrieved Soundings from near a fire location (X)

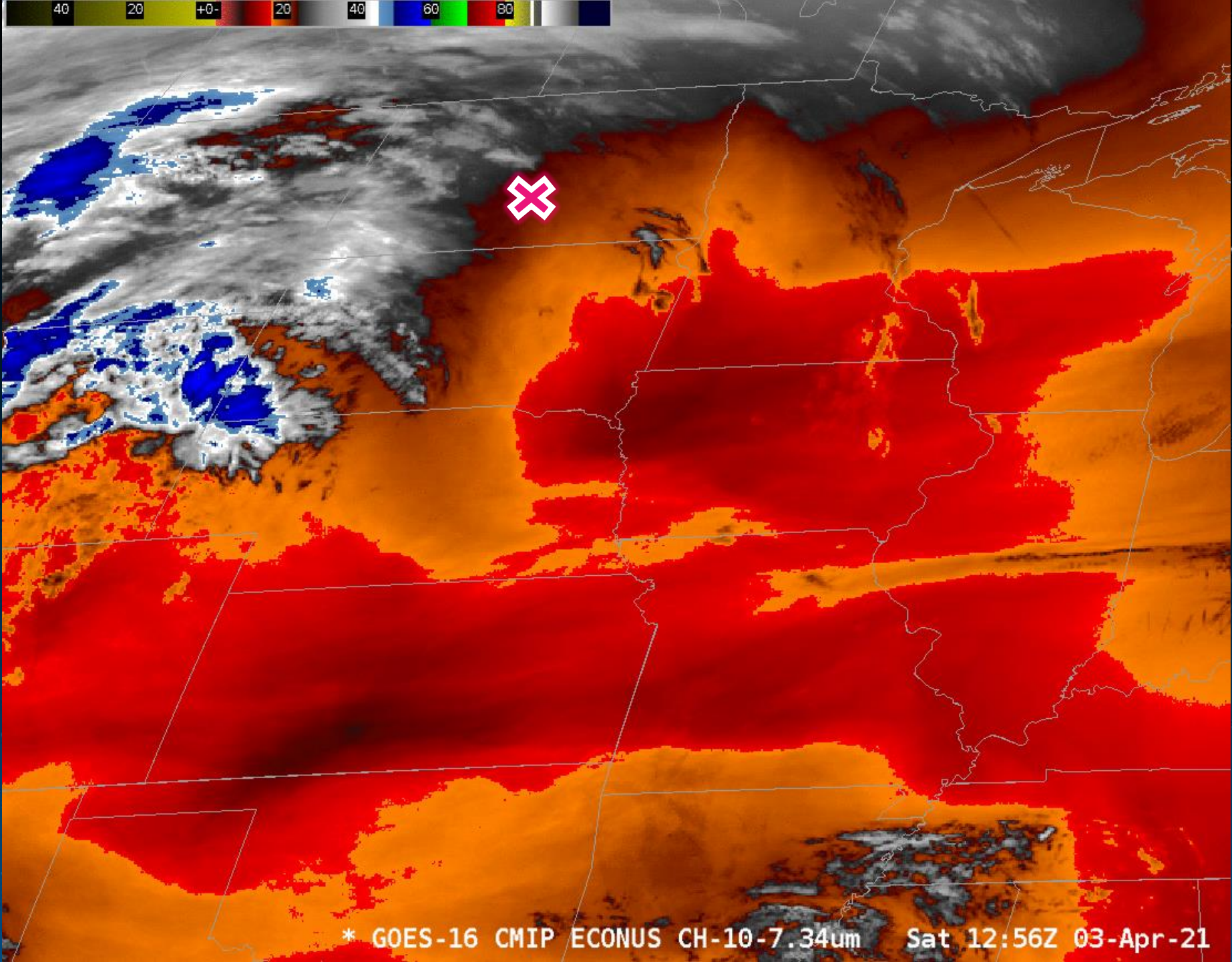


Example of using temperature/moisture data to determine environment



Retrieved Soundings from near a fire location (X)



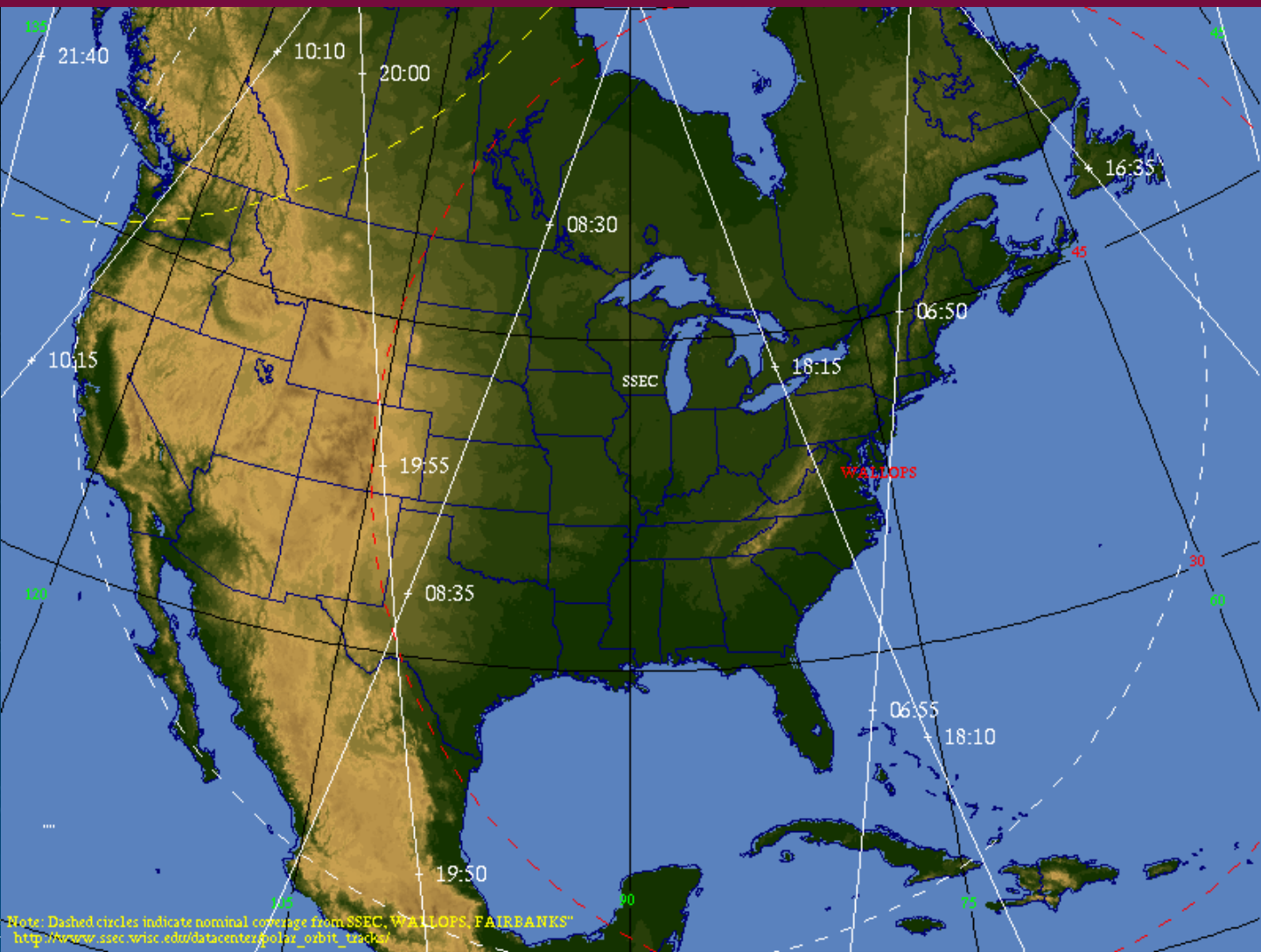


* GOES-16 CMIP ECONUS CH-10-7.34um Sat 12:56Z 03-Apr-21



Where can you find maps like this?

https://www.ssec.wisc.edu/datacenter/polar_orbit_tracks/#satellite:NOAA20;region:North%20America;

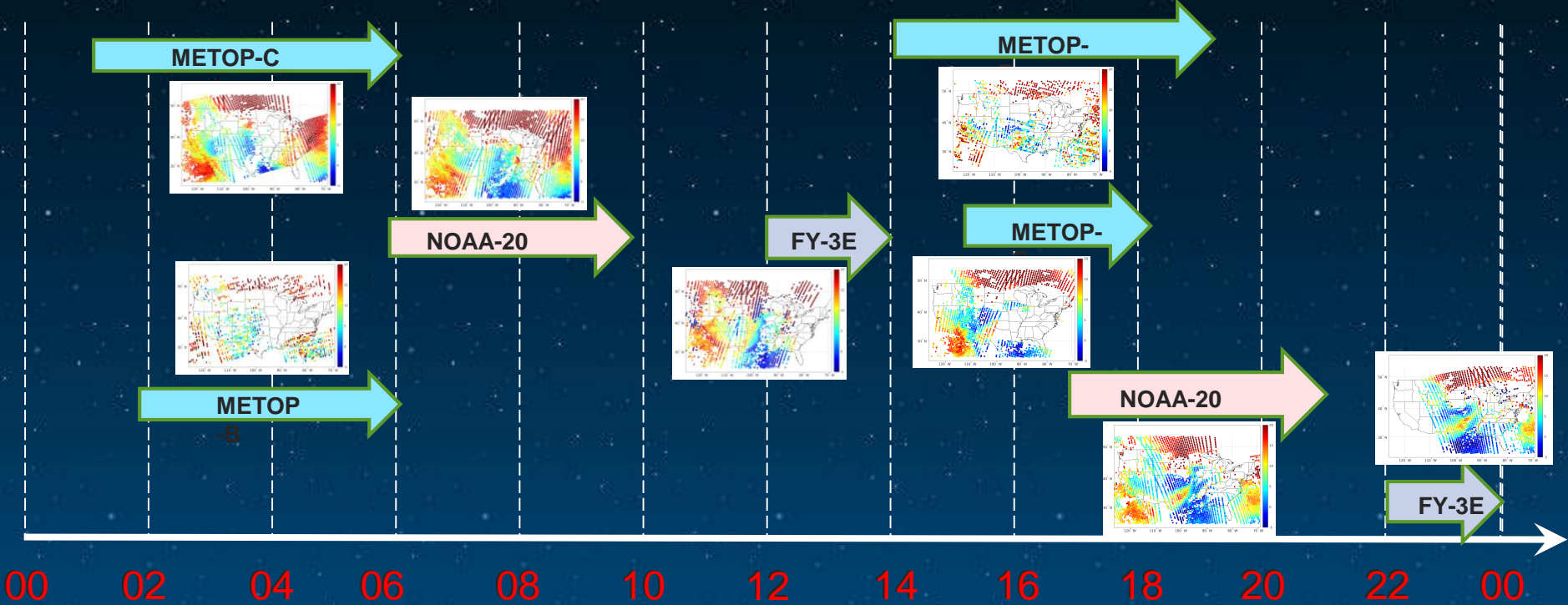
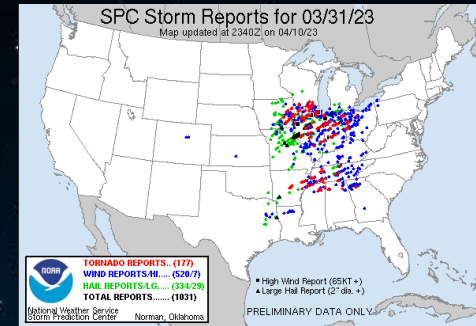


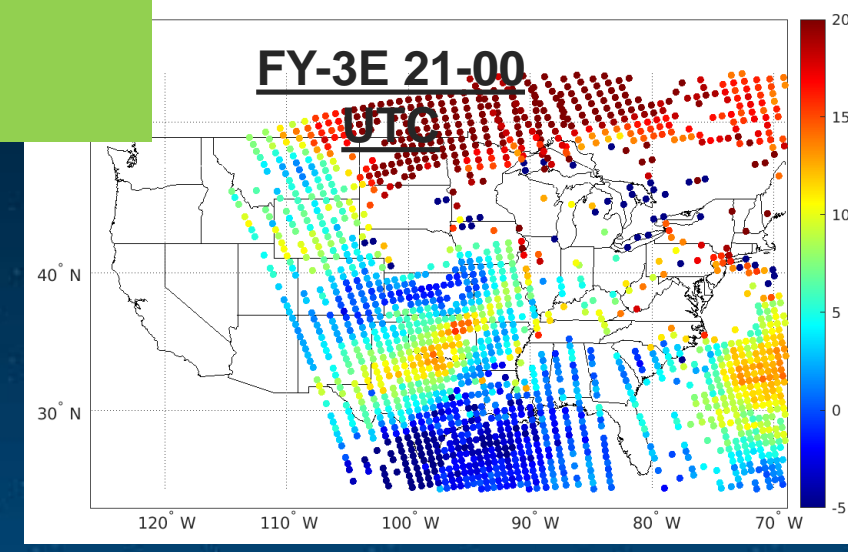
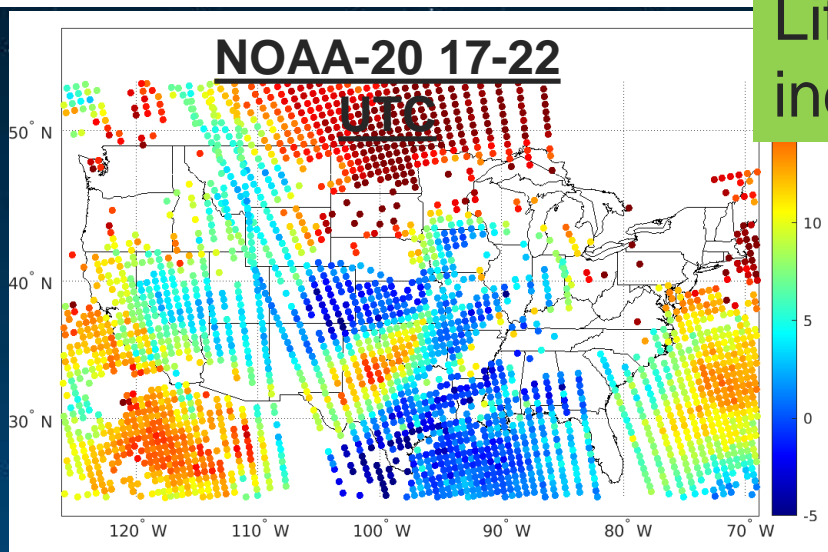
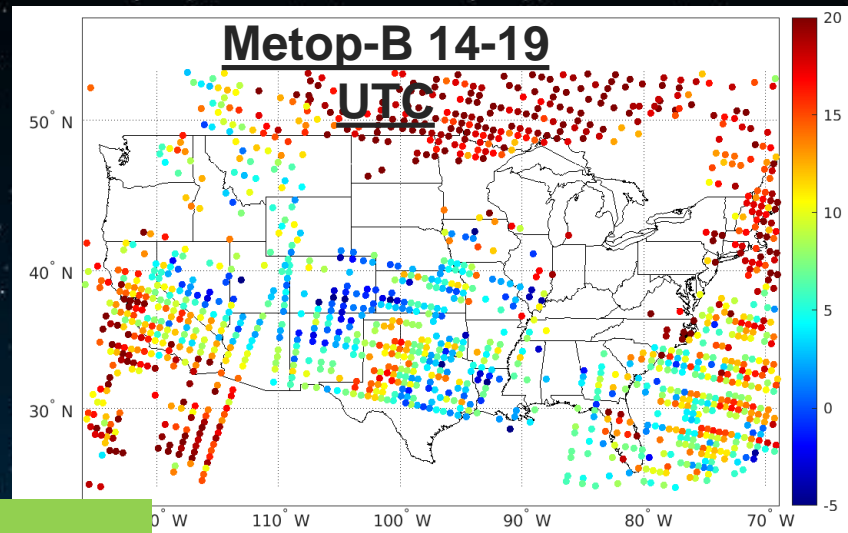
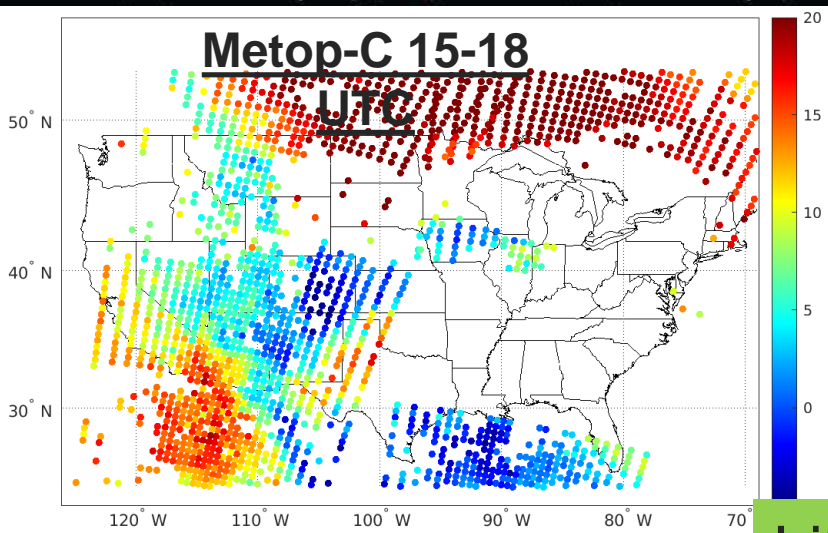
Note: Dashed circles indicate nominal coverage from SSEC, WALLOPS, FAIRBANKS
http://www.ssec.wisc.edu/datacenter/polar_orbit_tracks/



Satellite overpass time over CONUS on 31 March 2023

Early morning FY-3E sounding profiles to fill in the temporal gap!





Lifted index



All that data on the previous page: Observed from satellite

- **No need to worry about model biases or bad initialization**
- **However, infrared sounder data doesn't give great information where clouds are in the way**

NOAA-20 (and Suomi NPP) sounding data are available online

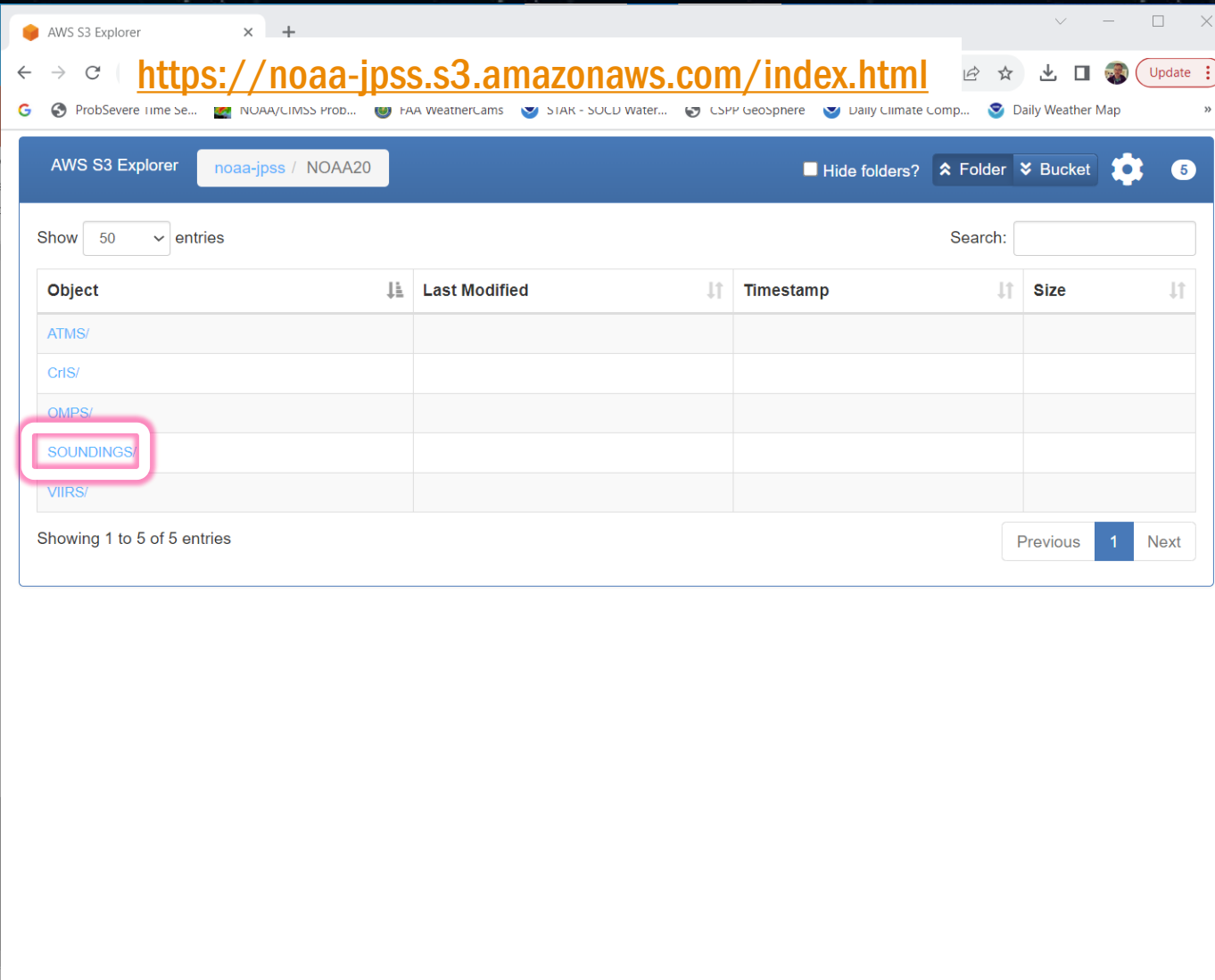
<https://noaa-jpss.s3.amazonaws.com/index.html>

The screenshot shows the AWS S3 Explorer interface for the 'noaa-jpss' bucket. The browser address bar displays the URL <https://noaa-jpss.s3.amazonaws.com/index.html>. The interface includes a search bar and a table of objects. The table has columns for Object, Last Modified, Timestamp, and Size. Three entries are listed: 'JPSS_Blended_Products/', 'NOAA20/' (highlighted with a red box), and 'SNPP/'. The pagination shows 'Showing 1 to 3 of 3 entries' and 'Previous 1 Next'.

Object	Last Modified	Timestamp	Size
JPSS_Blended_Products/			
NOAA20/			
SNPP/			

NOAA-20 (and Suomi NPP) sounding data are available online

<https://noaa-jpss.s3.amazonaws.com/index.html>



The screenshot shows the AWS S3 Explorer interface for the bucket 'noaa-jpss / NOAA20'. The interface includes a search bar, a table of objects, and navigation controls. The 'SOUNDINGS' folder is highlighted with a pink box.

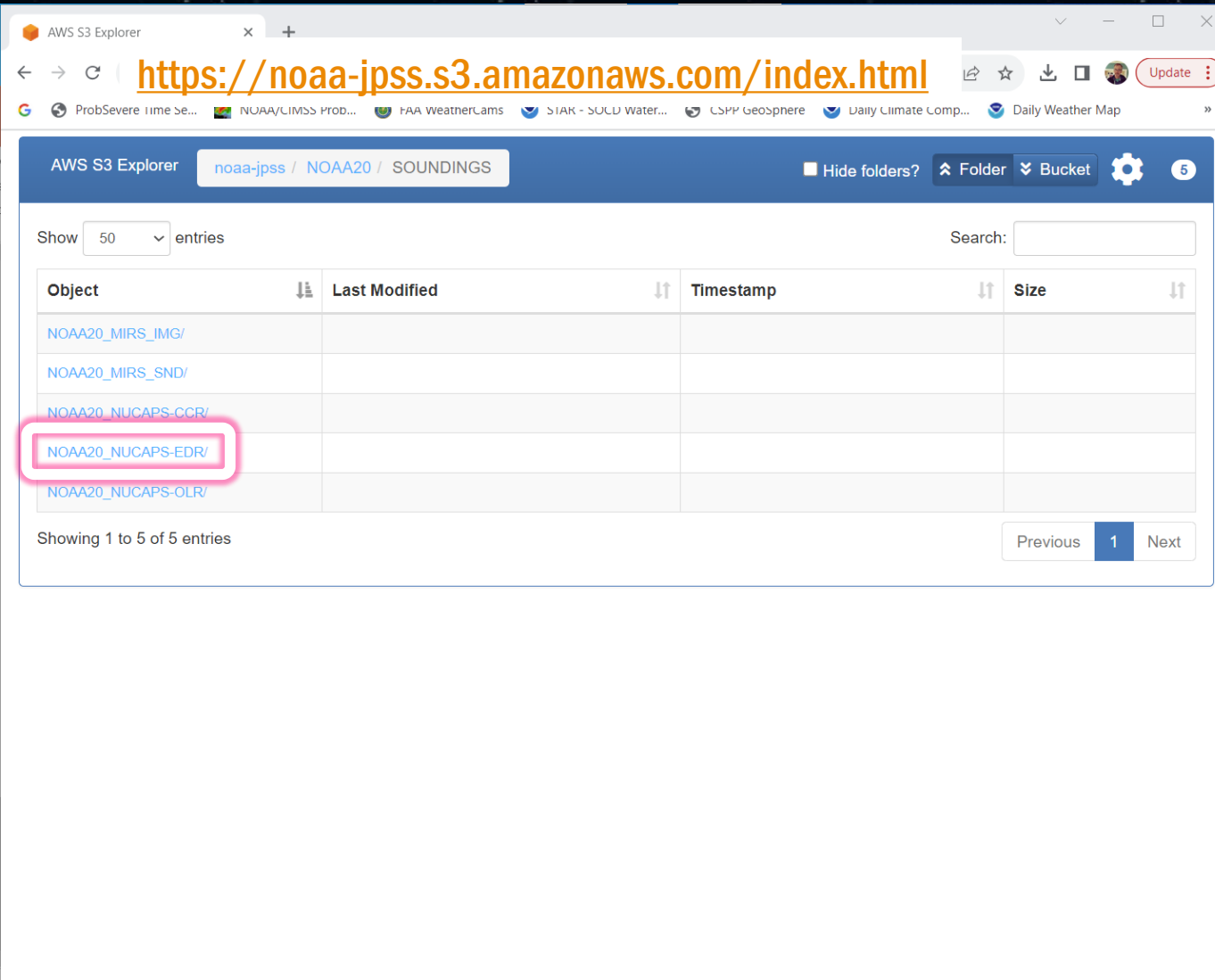
Object	Last Modified	Timestamp	Size
ATMS/			
CrIS/			
OMPS/			
SOUNDINGS/			
VIIRS/			

Showing 1 to 5 of 5 entries

Previous 1 Next

NOAA-20 (and Suomi NPP) sounding data are available online

<https://noaa-jpss.s3.amazonaws.com/index.html>



The screenshot shows the AWS S3 Explorer interface for the bucket 'noaa-jpss' under the path 'NOAA20 / SOUNDINGS'. The interface displays a list of five folders: NOAA20_MIRS_IMG/, NOAA20_MIRS_SND/, NOAA20_NUCAPS-CCR/, NOAA20_NUCAPS-EDR/, and NOAA20_NUCAPS-OLR/. The folder 'NOAA20_NUCAPS-EDR/' is highlighted with a pink rectangular box. The table has columns for Object, Last Modified, Timestamp, and Size. The status bar at the bottom indicates 'Showing 1 to 5 of 5 entries' and includes 'Previous', '1', and 'Next' navigation buttons.

Object	Last Modified	Timestamp	Size
NOAA20_MIRS_IMG/			
NOAA20_MIRS_SND/			
NOAA20_NUCAPS-CCR/			
NOAA20_NUCAPS-EDR/			
NOAA20_NUCAPS-OLR/			

NOAA-20 (and Suomi NPP) sounding data are available online

<https://noaa-jpss.s3.amazonaws.com/index.html>

The screenshot shows the AWS S3 Explorer interface. The breadcrumb path is `noaa-jpss / NOAA20 / SOUNDINGS / NOAA20_NUCAPS-EDR`. The table displays two folders: `2022/` and `2023/`. The `2023/` folder is highlighted with a pink box. The interface includes a search bar, a 'Show 50 entries' dropdown, and pagination controls at the bottom right showing 'Previous 1 Next'.

Object	Last Modified	Timestamp	Size
2022/			
2023/			

NOAA-20 (and Suomi NPP) sounding data are available online

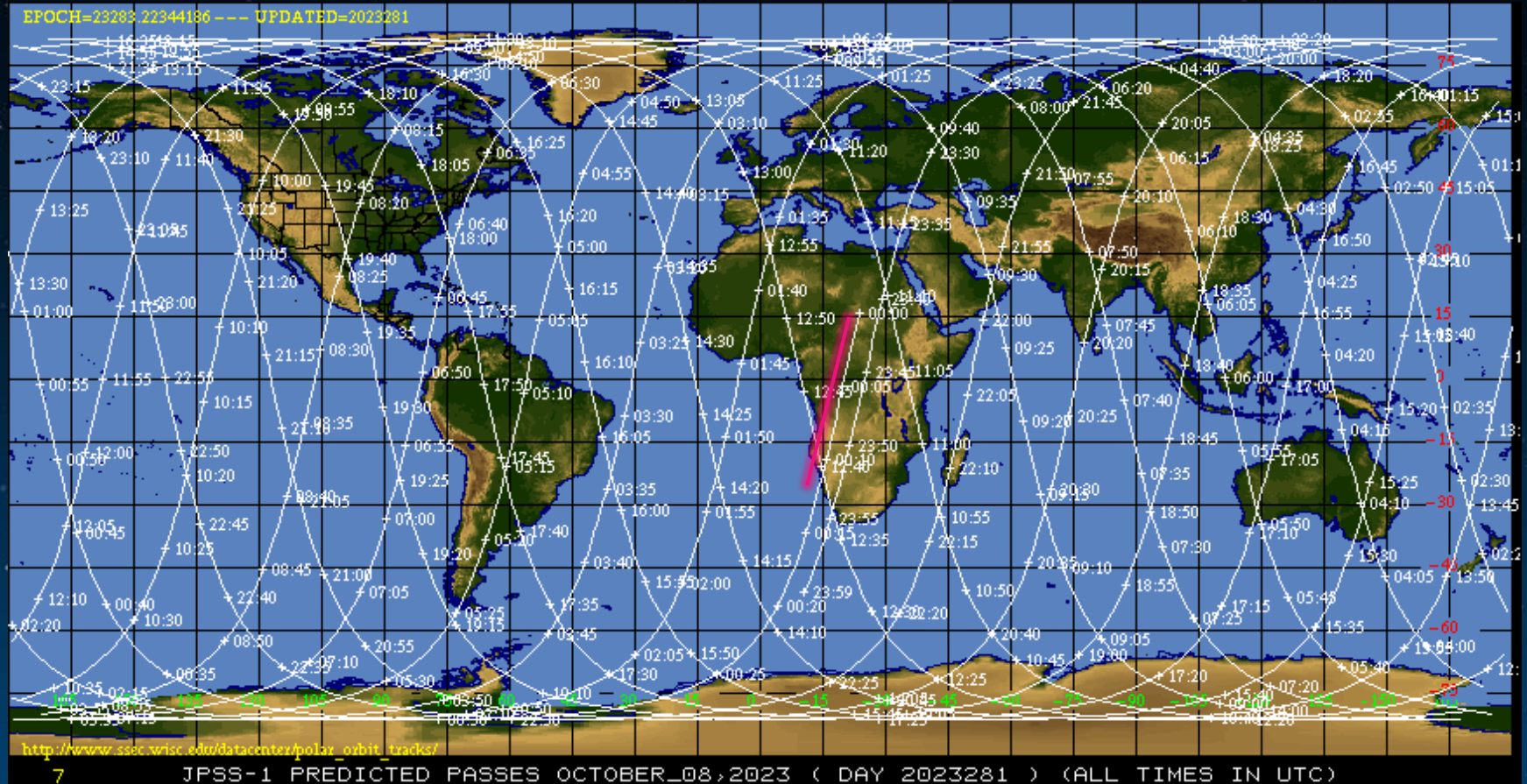
<https://noaa-jpss.s3.amazonaws.com/index.html>

The screenshot shows the AWS S3 Explorer interface for the bucket 'noaa-jpss' under the path 'NOAA20 / SOUNDINGS / NOAA20_NUCAPS-EDR / 2023 / 10 / 08'. The table lists 12 files, each 3 MB in size, with timestamps from 2023-10-08 22:32:46 to 22:32:49. The first three rows are highlighted with a green box.

Object	Last Modified	Timestamp	Size
Where is NOAA-20 at these times?			
NUCAPS-EDR_v3r0_j01_s202310080009439_e202310080010137_c202310080116430.nc	3 days ago	2023-10-08 22:32:46	3 MB
NUCAPS-EDR_v3r0_j01_s202310080010159_e202310080010457_c202310080115380.nc	3 days ago	2023-10-08 22:32:46	3 MB
NUCAPS-EDR_v3r0_j01_s202310080010479_e202310080011177_c202310080118420.nc	3 days ago	2023-10-08 22:32:46	3 MB
NUCAPS-EDR_v3r0_j01_s202310080011199_e202310080011497_c202310080115500.nc	3 days ago	2023-10-08 22:32:47	3 MB
NUCAPS-EDR_v3r0_j01_s202310080011519_e202310080012217_c202310080117370.nc	3 days ago	2023-10-08 22:32:47	3 MB
NUCAPS-EDR_v3r0_j01_s202310080012239_e202310080012537_c202310080119360.nc	3 days ago	2023-10-08 22:32:48	3 MB
NUCAPS-EDR_v3r0_j01_s202310080012559_e202310080013257_c202310080118480.nc	3 days ago	2023-10-08 22:32:48	3 MB
NUCAPS-EDR_v3r0_j01_s202310080013279_e202310080013577_c202310080119150.nc	3 days ago	2023-10-08 22:32:48	3 MB
NUCAPS-EDR_v3r0_j01_s202310080013599_e202310080014297_c202310080119300.nc	3 days ago	2023-10-08 22:32:48	3 MB
NUCAPS-EDR_v3r0_j01_s202310080014319_e202310080015017_c202310080120300.nc	3 days ago	2023-10-08 22:32:48	3 MB
NUCAPS-	3 days ago	2023-10-08 22:32:49	3 MB



Find orbit paths online



https://www.ssec.wisc.edu/datacenter/polar_orbit_tracks/

How timely are the data at that website?

NUCAPS-EDR_v3r0_j01_s202310112122159_e202310112122457_c202310112155280.nc	a few seconds ago	2023-10-12 19:12:01	3 MB
NUCAPS-EDR_v3r0_j01_s202310112122479_e202310112123177_c202310112156480.nc	a few seconds ago	2023-10-12 19:12:02	3 MB
NUCAPS-EDR_v3r0_j01_s202310112122479_e202310112123177_c202310112156480.nc	a few seconds ago	2023-10-12 19:12:02	3 MB

Data from 2122 UTC on 11 October!

Written at 19:12 on 12 October
(or – 0012 UTC on 13 October)

Conclusion: Data aren't useful for real-time, but are useful for post-storm analysis

Geostationary Sounders

- **Constantly view one region (typically not full disk)**

- **GIIRS (FY-4B) views**

- a 5000x5000 km China domain in 45 minutes
- a 1000x1000 km meso domain in 15 minutes

- **Direct link to website to view products:**

<https://satellite.nsmc.org.cn/PortalSite/Data/DataView.aspx?SatelliteCode=FY4B&SatelliteType=1&InstrumentTypeCode=GIIRS¤tculture=en-US>

Where does GIIRS view?

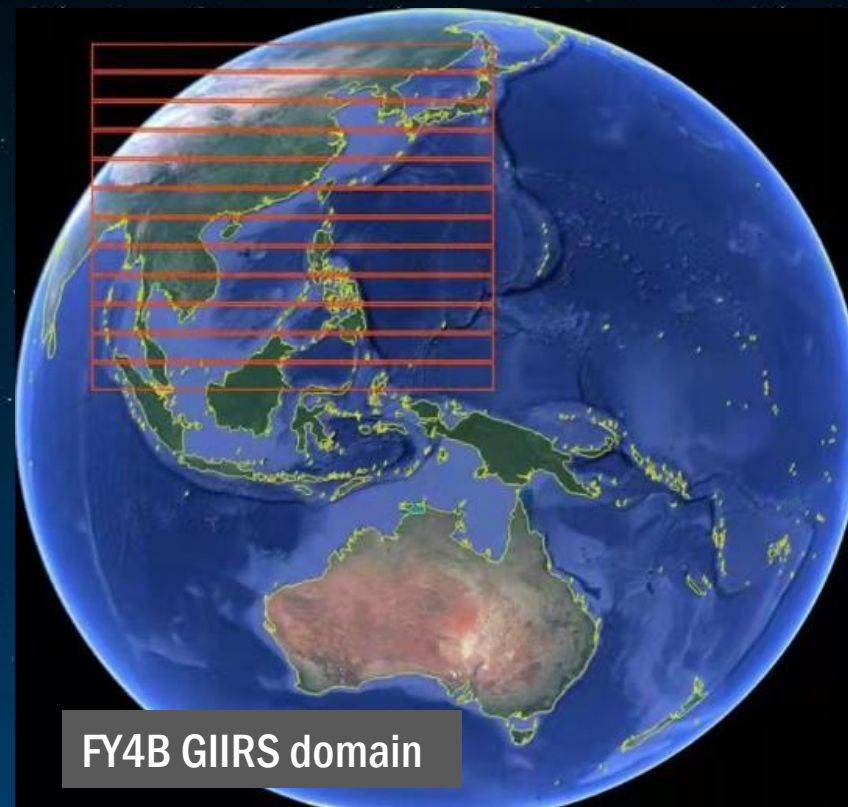


Image Source

How to get GIIRS data

The screenshot shows the FENGYUN Satellite Data Center website. The browser address bar shows the URL `satellite.nsmc.org.cn/portalsite/default.aspx`. The page header includes navigation links for "Sign in", "Register", "NSMC", "Contact us", and "Help". The main navigation menu includes "SATELLITES", "DATA", "IMAGES", "PRODUCTS", "DOCUMENTS", and "TOOLS". A banner for "The first set of images of FY-3G released" is visible. Below the banner, there is an "Archive" table and a search interface for "FY-LEO", "TANSAT", and "FY-GEO". The "FY-GEO" search interface includes fields for "Data Name", "Start Date", "End Date", "Start Time", "End Time", "Time Range", "Spatial Sel", and "Coverage". A "Sign In" form is also present, with fields for "User ID", "Password", and "Verify".

Satellites	File count	Volume(TB)
FY-4B	296915050	4944.4
FY-4A	421171918	9593.4
FY-3E	27237924	2192.0
FY-3D	67746726	6043.8
FY-3C	76748346	1670.6
FY-3B	93146886	6029.8
FY-3A	65240902	3266.6
FY-2H	7412008	108.0
FY-2G	12579446	109.6
FY-2F	12954980	123.4
TANSAT	1915814	178.2

Create a User Presence

(or log in!)

We want to access GEO

How to get GIIRS data

Home > Data > Data View

LEO TANSAT GEO

You have select: FY-4B Atmospheric Vertical Profile(AVP)

Satellite FY-4B FY-4A FY-2H FY-2G
 FY-2F FY-2E FY-2C FY-2C+

Product L1 DATA Image Atmosphere Land
 Ocean Radiation

Catalog FY-4B Image(IMG_FY4B) Surface Shortwave Atmosphere Instability Atmospheric Motion
 Atmospheric Vertical Cloud Phase(CLP)

Period Time

Product	Satellite	Instrument	Period	Format	Resolution	Start Date	Last Date	File count	Volume(GB)	Availability	Operation	Quality Report
<input type="checkbox"/> Regional Atmospheric Temperature and Humidity Profiles	FY4B	GIIRS	HHmm	NC	12KM	2023-02-24	2023-09-27	771860	186.67	View	Go	
<input type="checkbox"/> Regional Atmospheric Temperature and Humidity Profiles(NUL)	FY4B	GIIRS	HHmm	NC	12KM	2023-01-16	2023-09-27	3231	69.76	View	Go	
Total:								775091	256.43			

Time Range

Last 3 days Last Week Last month

Start Date: 2023-09-26 Start Time: 00:00:00

End Date: 2023-09-27 End Time: 23:59:59

Availability Search

Choose what you want

Satellite Data

How to get GIIRS data

The screenshot shows the 'Data Availability' page for the FENGYUN Satellite Data Center. The user is logged in as 'ScottLindstrom'. The page is titled 'Data View' and shows the selection of 'FY-4B' satellite and 'Atmospheric Vertical Profile(AVP)' product. A table lists available data products, with the first row selected. The table columns include Product, Satellite, Instrument, Period, Resolution, Start Date, Last Date, File count, Volume(GB), Availability, Operation, and Quality Report. The selected row is 'Regional Atmospheric Temperature and Humidity Profiles' for FY-4B, GIIRS instrument, HHmm period, NC, 12KM resolution, from 2023-02-24 to 2023-09-27, with 771860 files and 186.67 GB volume. The 'Time Range' section shows filters for 'Last 3 days', 'Last Week', and 'Last month', with specific start and end dates and times.

Product	Satellite	Instrument	Period	Resolution	Start Date	Last Date	File count	Volume(GB)	Availability	Operation	Quality Report	
<input checked="" type="checkbox"/> Regional Atmospheric Temperature and Humidity Profiles	FY4B	GIIRS	HHmm	NC	12KM	2023-02-24	2023-09-27	771860	186.67	View	Go	
<input type="checkbox"/> Regional Atmospheric Temperature and Humidity Profiles(NUL)	FY4B	GIIRS	HHmm	NC	12KM	2023-01-16	2023-09-27	3231	69.76	View	Go	
Total:								775091	256.43			

Time Range

Last 3 days Last Week Last month

Start Date: 2023-09-26 Start Time: 00:00:00

End Date: 2023-09-27 End Time: 23:59:59

Choose what you want

Satellite Data

Start/end Data as shown

How to get GIIRS data

Your Order(A202309270380921291) has been prepared



由于本站临时数据存储空间有限，您的订单将在线保存3天，之后系统将自动删除，请您及时下载数据。

您的订单处理结果如下：

订单号	文件总数	成功文件数	错误文件数
A202309270380921291	8	8	0

再次感谢您使用本站提供的相关数据！

邮件发送时间2023年09月27日 14时37分37秒(世界时)

Dear ScottLindstrom:

Your Order(Order ID is [A202309270380921291](#)) has been prepared on [2023-09-27 14:37:37\(UTC\)](#). Welcome to use " [FY Satellite Data Download Toolkit](#) " that helps you to automatically download the satellite data.

You can also pick up your data set via ftp://A202309270380921291:MOcihS8_@ftp.nsmc.org.cn . Please download these files within 3 Days.

Order ID	Total Files	Available Files	Unavailable Files
A202309270380921291	8	8	0

Thank you.

E-Mail sending time 2023-09-27 14:37:37(UTC)

Email tells you where the data are

Email tells you where the data are

ftp server at <ftp.nsmc.org.cn>

User name: A202309270380921291

Password: MOcihS8_

(this changes with every order!!)



List of netCDF files (downloading takes a while)

```
variables:
  float Geo_Hgt(z, x, y) ;
    Geo_Hgt:long_name = "GIIRS L2 AVP: AVP vectorGeopotential Height" ;
    Geo_Hgt:standard_name = "Geopotential Height" ;
    Geo_Hgt:_Unsigned = "FALSE" ;
    Geo_Hgt:FillValue = -999999.f ;
netcdf FY4B-_GIIRS-_N_REGC_1330E_L2-_AVP-_MULT_NUL_20230917000328_20230917002945_012KM_V0001 {
dimensions:
  z = 101 ;      z Dimension: Levels in RTM ; x: cross-track ; y: along-track
  x = 64 ;
  y = 216 ;
    Geo_Hgt:coordinates = "z,x,y" ;
    Geo_Hgt:ancillary_variables = "NULL" ;
    Geo_Hgt:Description = "" ;
  float AT_Prof(z, x, y) ;
    AT_Prof:long_name = "GIIRS L2 AVP: AVP vectorAtmospheric temperature profile" ;
    AT_Prof:standard_name = "Atmospheric temperature profile of GIIRS" ;
    AT_Prof:_Unsigned = "FALSE" ;
    AT_Prof:FillValue = -999999.f ;
    AT_Prof:valid_range = 150.f, 400.f ;
    AT_Prof:scale_factor = 1.f ;
    AT_Prof:add_offset = 0.f ;
    AT_Prof:units = "K" ;
    AT_Prof:resolution = "12KM" ;
    AT_Prof:coordinates = "z,x,y" ;
    AT_Prof:ancillary_variables = "NULL" ;
    AT_Prof:Description = "" ;
  float AQ_Prof(z, x, y) ;
    AQ_Prof:long_name = "GIIRS L2 AVP: AVP vectorAtmospheric humidity profile" ;
    AQ_Prof:standard_name = "Atmospheric humidity profile of GIIRS" ;
    AQ_Prof:_Unsigned = "FALSE" ;
    AQ_Prof:FillValue = -999999.f ;
    AQ_Prof:valid_range = 0.f, 50.f ;
    AQ_Prof:scale_factor = 1.f ;
    AQ_Prof:add_offset = 0.f ;
    AQ_Prof:units = "g/kg" ;
    AQ_Prof:resolution = "12KM" ;
    AQ_Prof:coordinates = "z,x,y" ;
    AQ_Prof:ancillary_variables = "NULL" ;
    AQ_Prof:Description = "" ;
```

There's also a Quality Flag variable

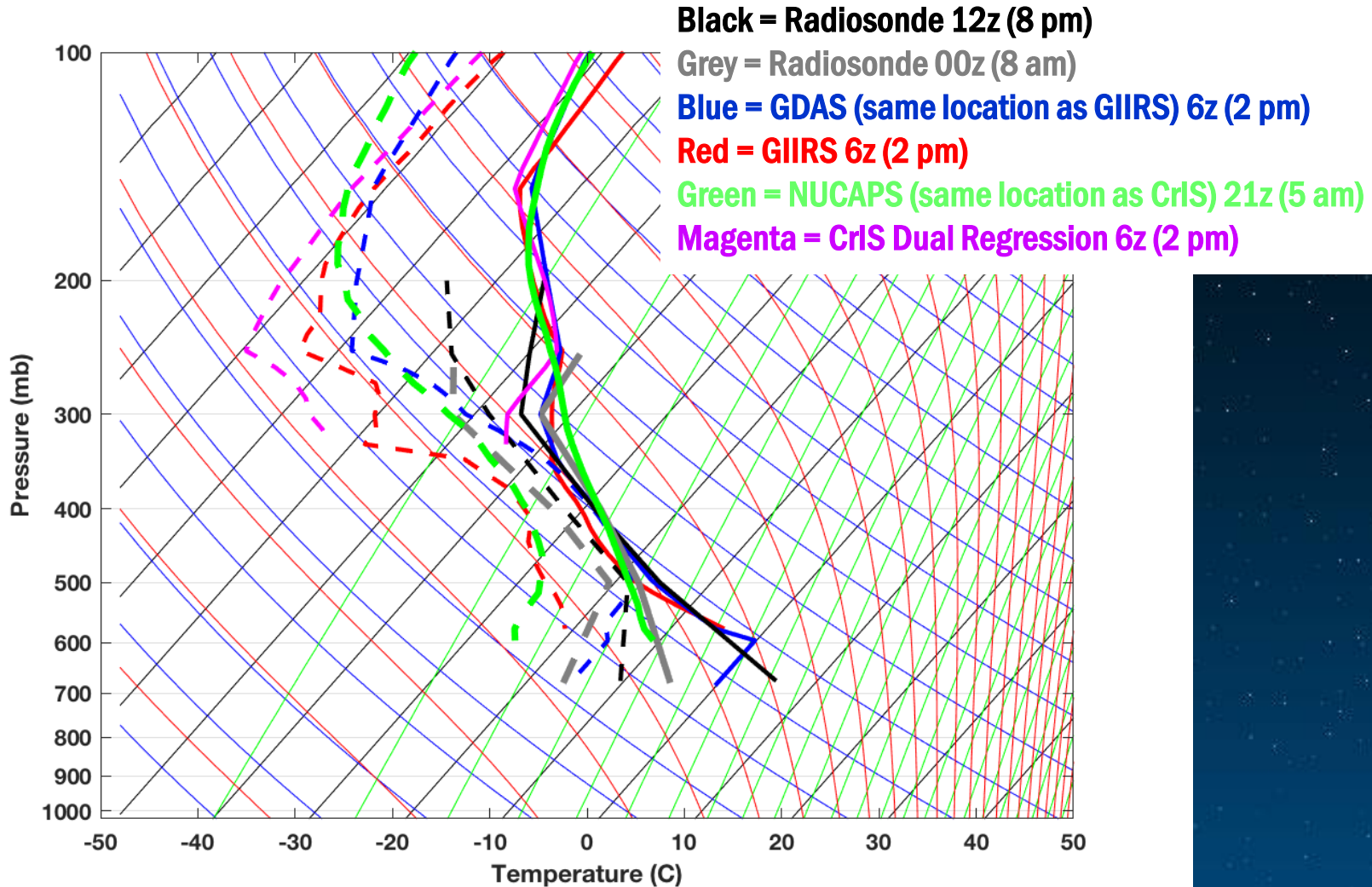
GIIRS and AGRI and GHI possibilities

<input type="checkbox"/>	product,Full Disk Atmosphere Instability Index,REGC (NUL)	FY4B	GIIRS	HHmm	NC	12KM	2023-01-16	2023-10-11	3408	2.75	View	Go
<input type="checkbox"/>	Regional Atmospheric Temperature and Humidity Profiles(NUL)	FY4B	GIIRS	HHmm	NC	12KM	2023-01-16	2023-10-11	3413	73.26	View	Go
<input type="checkbox"/>	Land Surface Temperature product	FY4B	AGRI	HHmm	NC	4000M	2023-07-17	2023-10-11	8110	12.74	View	Go
<input type="checkbox"/>	Cloud Type product, Full Disk	FY4B	AGRI	HHmm	NC	4000M	2022-08-20	2023-10-11	38872	42.69	View	Go
<input type="checkbox"/>	Regional Atmospheric Temperature and Humidity Profiles	FY4B	GIIRS	HHmm	NC	12KM	2023-02-24	2023-10-11	823015	198.41	View	Go
<input type="checkbox"/>	Surface Shortwave Radiation product	FY4B	AGRI	HHmm	NC	4000M	2023-07-17	2023-10-11	8110	465.86	View	Go
<input type="checkbox"/>	Atmosphere Instability Index,REGC	FY4B	GIIRS	HHmm	NC	12KM	2023-02-24	2023-10-11	823151	80.94	View	Go
<input type="checkbox"/>	Ocean Aerosol product	FY4B	AGRI	HHmm	NC	4000M	2023-07-17	2023-10-11	8111	61.4	View	Go
<input type="checkbox"/>	Reflected Shortwave Radiation product	FY4B	AGRI	HHmm	NC	4000M	2023-07-17	2023-10-11	8110	49.1	View	Go
<input type="checkbox"/>	Snow Cover product	FY4B	AGRI	HHmm	NC	4000M	2023-07-17	2023-10-11	8111	15.51	View	Go
<input type="checkbox"/>	Snow Cover Daily product	FY4B	AGRI	HHmm	NC	4000M	2023-07-17	2023-10-10	86	0.02	View	Go
<input type="checkbox"/>	Sea Surface Temperature monthly product	FY4B	AGRI	HHmm	NC	4000M	2023-08-01	2023-09-01	2	0.05	View	Go
<input type="checkbox"/>	Sea Surface Temperature 5-day product	FY4B	AGRI	HHmm	NC	4000M	2023-07-21	2023-10-01	15	0.39	View	Go
<input type="checkbox"/>	Ozone Profile product	FY4B	GIIRS	HHmm	NC	012KM	2023-07-17	2023-10-11	1064	2.75	View	Go
<input type="checkbox"/>	Ozone Profile product,REGC	FY4B	GIIRS	HHmm	NC	012KM	2023-07-17	2023-10-11	301455	31.49	View	Go
<input type="checkbox"/>	Cloud Phase product, Full Disk	FY4B	AGRI	HHmm	NC	4000M	2022-08-20	2023-10-11	38869	40.35	View	Go
<input type="checkbox"/>	GHI L1 Regional, 2KM	FY4B	GHI	HHmm	HDF	2000M	2022-06-01	2023-10-11	448065	2260.79	View	Go

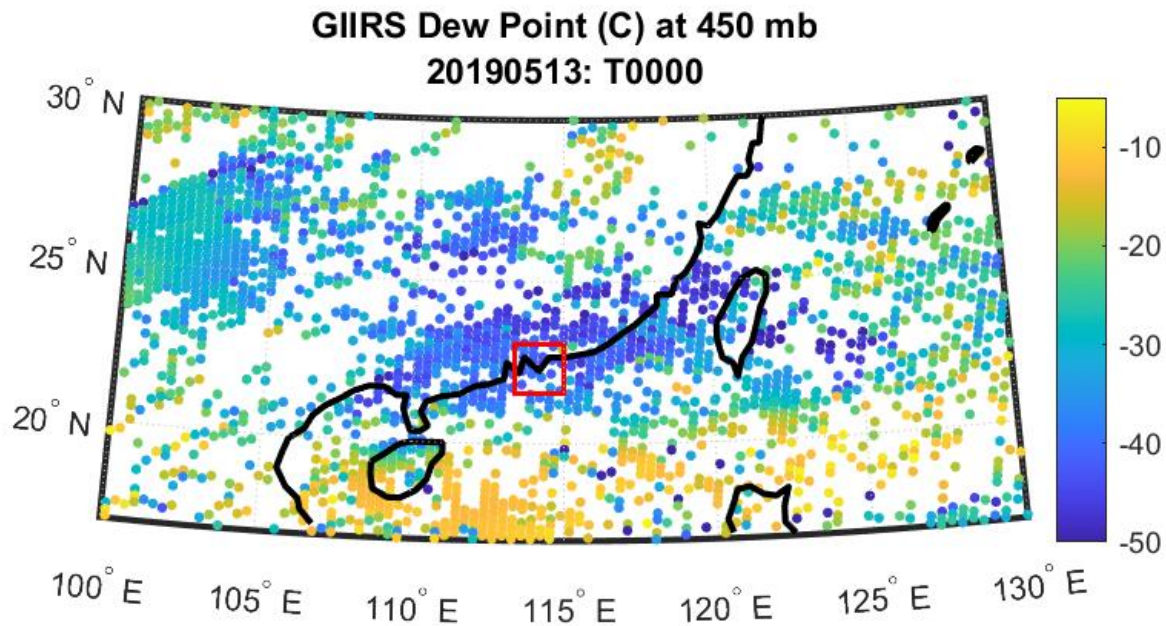
What's the problem with the above?

- **You cannot automate this**
 - Access requires you to go to the website, and order the data, and then go get it!
 - Maybe there are inter-governmental agreements out there that I don't know about that allow a quick transfer of data if it is taken over your region of interest
- **Ask your bosses to streamline data access for Geo Sounder data, or from polar orbiting sounder data**

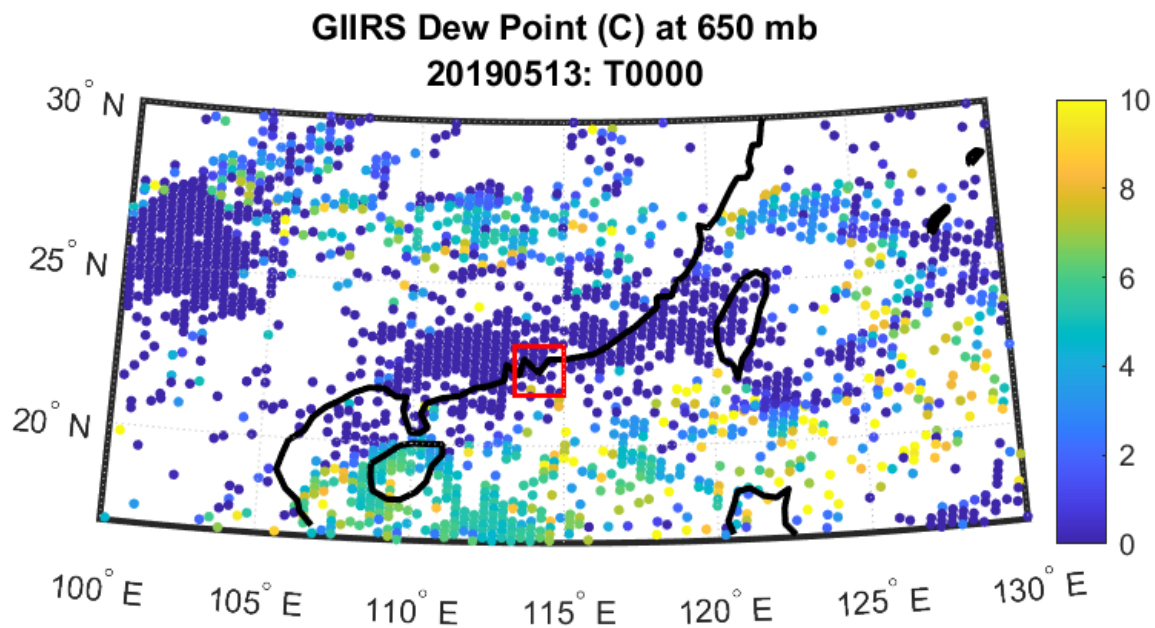
GIIRS Sounding



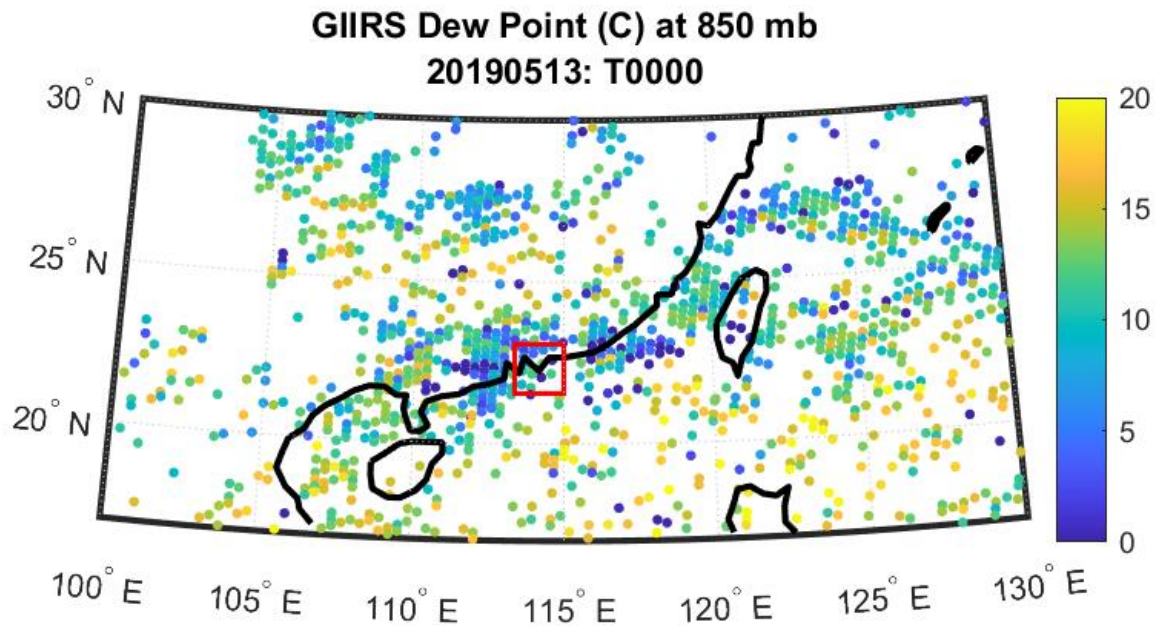
Derived GIIRS dewpoint at 450 mb



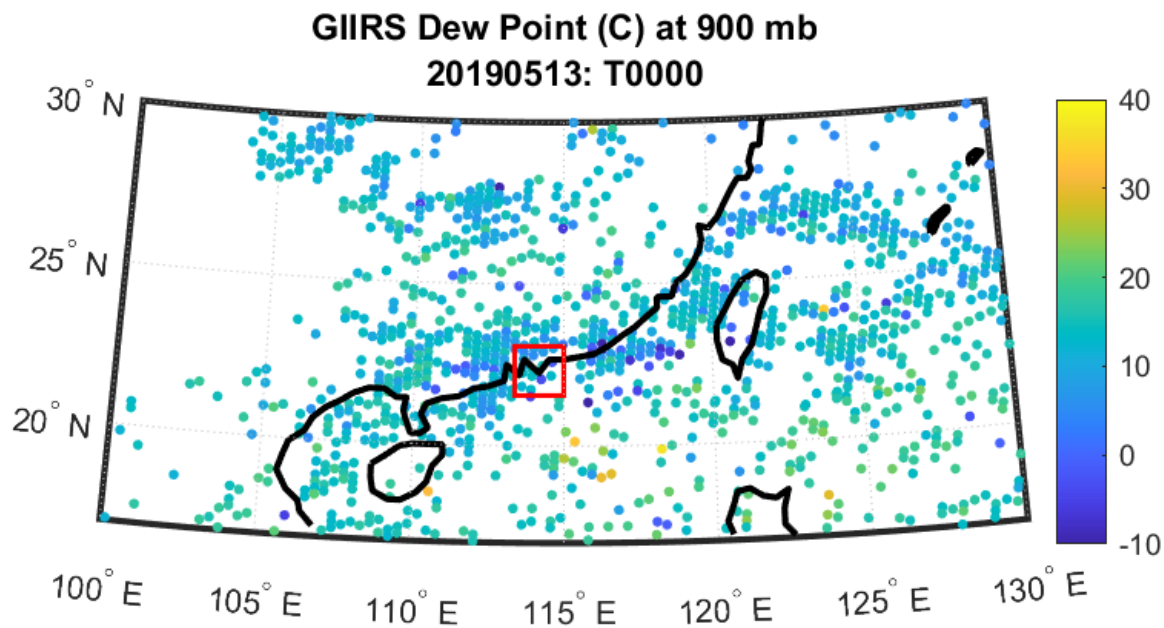
Derived GIIRS dewpoint at 650 mb



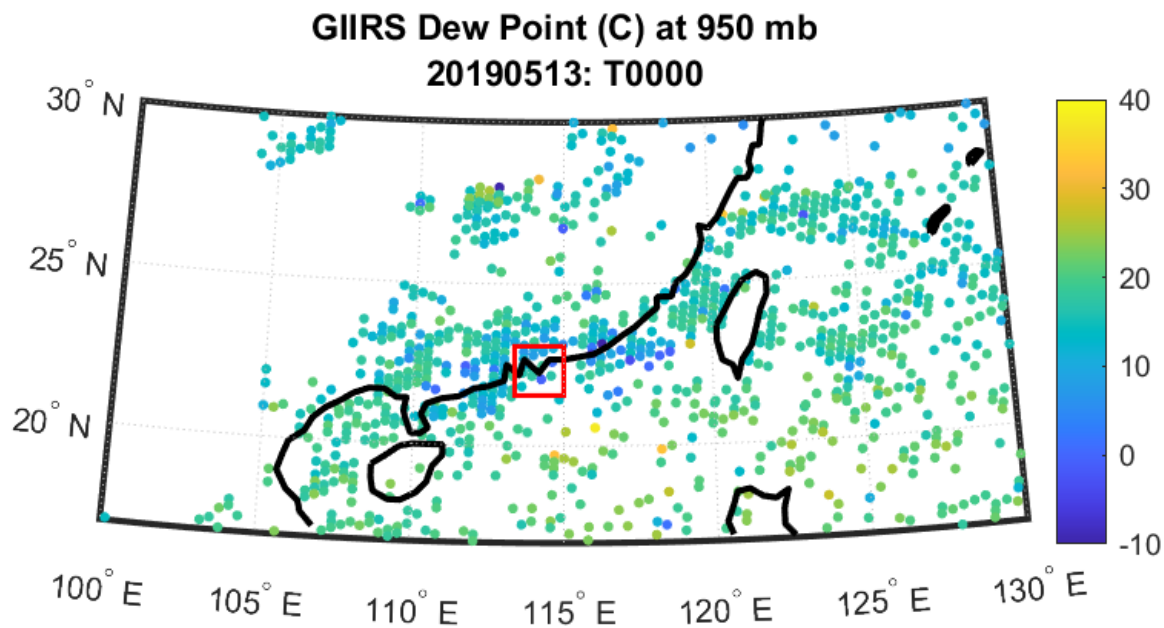
Derived GIIRS dewpoint at 850 mb



Derived GIIRS dewpoint at 900 mb



Derived GIIRS dewpoint at 950 mb



Satellite Observations

- **These are current observations**
- **They give you information that is different from a model simulation/forecast**
- **Can help you fine-tune what you want to investigate**
- **Can help you better define what is happening right now, and what to expect**

Geo Sounders are coming: Get used to using/understanding their data

- **MTG-S1 will be launched in 2024:**
 - IRS: 4.44-6.25 μm ; 8.26 – 14.70 μm
 - Sentinel-4: UV sounder
- **Himawari-10 will have GHMS: Geostationary HiMawari Sounder (launch: 2029)**
- **GeoXO (USA follow-on to GOES-R): mid 2030s**

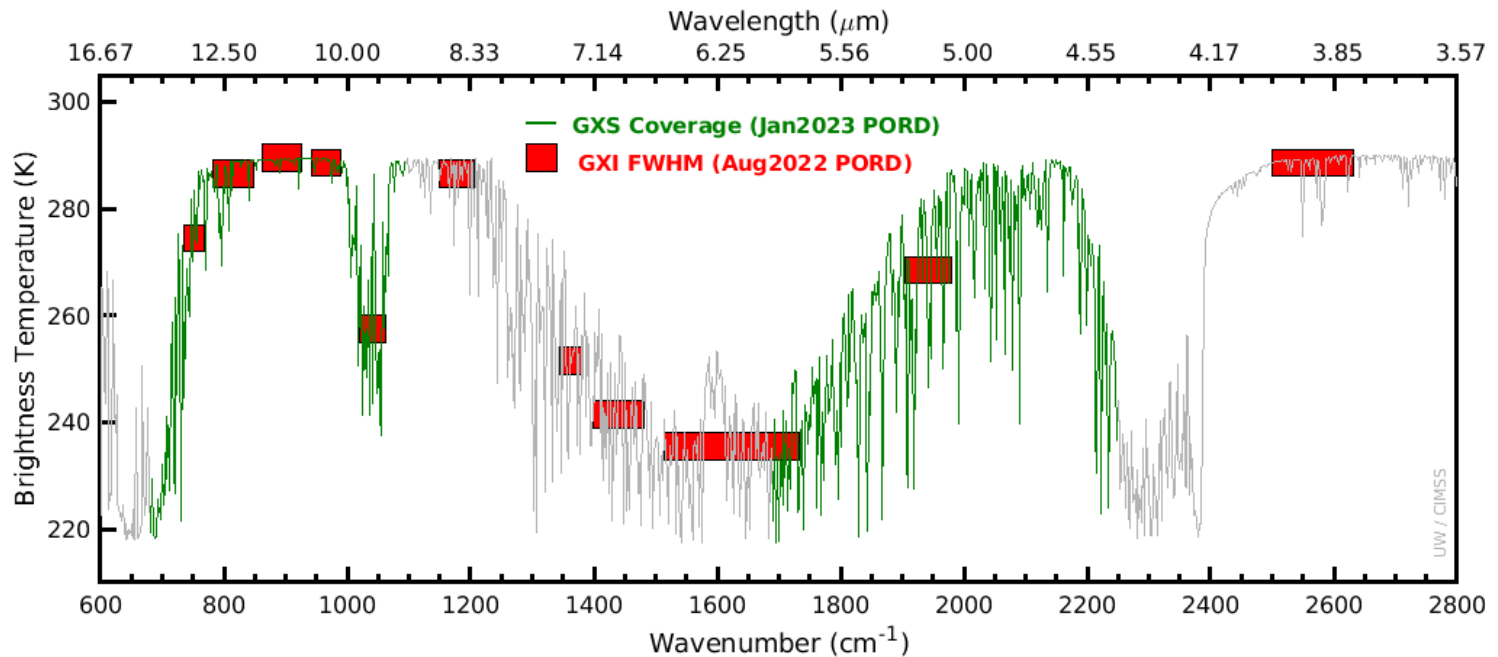
Coming in the 2030s: GXS (Sounder on US Geo Satellite)

Sounding Spectral Range Table

Band	Wavenumber (cm ⁻¹)	Wavelength (μm)
LWIR region (temperature, LWIR window, ozone, NH ₃ , isoprene, HNO ₃ , low level moisture)	680- 1095	14.7 – 9.13
MWIR region (vertical moisture, window and temperature, N ₂ O and CO)	1689 – 2250	5.92 – 4.44μm

Maximum Width for Sounding Channels Table

Spectral Range	Wavenumber (cm ⁻¹) (FTS)	Wavelength (μm) (Grating)
680- 1095 (cm ⁻¹) 14.7 – 9.13 (μm)	0.625	0.0052
1689 – 2250 (cm ⁻¹) 5.92 – 4.44 (μm)	0.625	0.0012



IR Sounder Presentations at AOMSUC-13

- **S2-14, 7 Nov: 13:45-14:00, Estimate of atmospheric vertical information using FY-4B/GIIRS ; Byung-il Lee ; NMSC/KMA**
- **S2-25, 7 Nov: 17:00-17:15, Equivalent cloud property retrievals algorithm based on the FengYun-4 GIIRS ; You Zhao ; Nanjing University**

Thank you!

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