



## Questions & Answer Session 2

Please type your questions in the Question Box. We will try our best to get to all your questions. If we don't, feel free to email Amita Mehta ([amita.v.mehta@nasa.gov](mailto:amita.v.mehta@nasa.gov))

**Question 1:** What is the time unit of rainfall? 3mm means 3mm/per hour or per day?

**Answer 1:** When you see half-hourly data, even then it will be mm/hour. When you go to the metadata, this will be specifically given in there. If you're looking at monthly data, you can look at mm/hr or mm/month. Giovanni provides that option. But original unit is usually in mm/hr for rain rate data. Any image or data you see has units associated, and that's always available in the metadata.

**Question 2:** How do I create a user profile in the [jsimpson.pps.eodis.nasa.gov](http://jsimpson.pps.eodis.nasa.gov) for the purpose of retrieving the near real time IMERG data?

**Answer 2:** Register here:

<https://registration.pps.eosdis.nasa.gov/registration/newContact.html>

To gain access to the "jsimpson" NRT ftp server, be sure to check the box for Near-Realtime Products

You register on jsimpson - when you go back, it'll ask for a username (email address) and a password (also your email address). Also, if you go back and forth, you'll have to login again. Once you register, you can download data.

**Question 3:** Remote sensing products are useful to identify inundated areas. Is it possible to have information about water depth?

**Answer 3:** From inundation data, you cannot get water depth. But there are models (GIS-based) where using terrain data and inundation data you can estimate what the water depth would be. Similarly when you look at streamflow in m<sup>3</sup>/second, it is the volume of water/second - it isn't telling you the depth, but that info comes from terrain data or channel itself. A future NASA mission Surface Water & Ocean Topography (SWOT) will help in deciding water depth



**Question 4:** Do you have any approaches for forecasting future climate, 2030 for example?

**Answer 4:** NASA is not really doing climate forecasting, but there is a NASA climate data service that's available that looks at model inter-comparison projects. These were the models used by IPCC. NASA provides this service - almost 21 models are used - and these data are downscaled. So temperature and precipitation projections are available for 21st century, starting in 1950 and goes all the way to 2099. There's more information on the site: <https://cds.ncss.nasa.gov/nex-gddp/>. NASA GISS also has a climate model (<https://www.giss.nasa.gov/tools/modelE/>) that is used for IPCC projections.

**Question 5:** Can we download these flood prediction data in xlx/txt or other formats?

**Answer 5:** Not sure what you mean by flood prediction - if it's GFMS you're talking about, you can download 3-hourly flood intensity files in binary format. If you go through the GFMS site data availability from 2013. You can download them and read them using any software such as Python, R, or IDL

**Question 6:** GDACS - Would it also be helpful for tornado outbreaks? Is there a NASA product(s) that you would recommend most for tornado events?

**Answer 6:** In the US National Weather Service provides tornado warnings and forecast, but NASA doesn't have tornado information as it occurs - certainly not forecasts. If there's rainfall associated with extreme weather, that can be available from the pmm site. GDACS may report tornadoes after they occur but forecast will not be available. GDACS would see alerts if they're coming from regional or national weather services.

**Question 7:** In the notes and handouts....is there an explanation of which datasets are used with which applications? I gather kmz is for Google Earth....for instance

**Answer 7:** Because there are multiple formats available, you can explore which format is most appropriate for you. KMZ is usually quick to look at by using google Earth and to look at map and features. In general, if you're just looking at images, you can see online or save as png, jpg, GeoTIFF formats. If you're downloading data yo can use NetCDF or HDF format and open them tools like Panoply. You can also use GIS to view and analyze NetCDF and GeoTIFF files. It is for the user to decide which format is most convenient for them to use.

**Question 8:** Is it true that near real time data are not exact geolocation?



**Answer 8:** They are geolocated. That's why there is some latency after the data is received. They're processed and then posted. So when we say near real-time, there could be 4-5 hr latency.

**Question 9:** Socioeconomic data: does this include flood damage?

**Answer 9:** No

**Question 10:** With so many different NASA products/satellites/tools, is there a spreadsheet/table of disaster types, needs, and suggested tools and their use?

**Answer 10:** We do get this question from many users. In ARSET trainings we try to provide a list of satellites, sensors, and tools used for particular applications. One of the goals of ARSET trainings is to provide this information. As mentioned earlier the Worldview or NASA Earthdata can help search for datasets.

**Question 11:** Will a GDACS training session be organized for this year?

**Answer 11:** We have an archived GDACS training available from 2017:

<https://arset.gsfc.nasa.gov/disasters/webinars/GDACS17>

This year, we don't plan to do a GDACS webinar. Also, please note that the GDACS website has changed after we did the webinar. The website interface has changed, but the same information is available. In the future, we may provide an overview of GDACS again, but there's no plan this year.

**Question 12:** Is there any correction needed for IMERG rainfall data?

**Answer 12:** In the summary of the webinar we talked about validating data locally. IMERG data are validated at selected places based on field campaigns and surface data, but not validated everywhere. In your area, it is important to compare IMERG data with surface based rain gauge data. Because IMERG data is produced at 0.1 degree or about 10 km -- not very high resolution. When compared with point measurements from rain gauge they may not match. But by comparing them if you see biases, you may want to correct the data.

**Question 13:** How to convert hdf to geotiff format? any software?

**Answer 13:** HDF to GeoTIFF - I think Python can help. Python can read HDF and you can convert to GeoTIFF. There is an example available from pmm - the GPM applications link. If you go to applications > trainings, there is some information where



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you can see an example of Python script for reading GPM data in HDF and save as GeoTIFF.

**Question 14:** Will these data be handed over to data scientists?

**Answer 14:** The data are available and can be used by data scientists

**Question 15:** Last time during VIC trg. it was mentioned that there will be a special ARSET on VIC installation and running ; when will be that?

**Answer 15:** It's an advanced training, and if there is a need for that, you can write it in the survey (to come soon). We're currently planning, so maybe the next year or so.

**Question 16:** Which is more reliable for wind velocity ASCAT MetopB/ GOES/ Jason 3?

**Answer 16:** That is a good question - all these data come from different sources. Their algorithms are different and their validations are different. For your own region, that's why it's important to look at different datasets and see which provides the best info for your area, and see which is most accurate for your area.

**Question 17:** Can we use the extreme rainfall Detection System forecast as indicator to heavy rainfall warning ?

**Answer 17:** That is the idea here. It is based on NOAA GFS. But basically, if you look at the forecast, it tells you where there's likelihood of precipitation and it gives you how many mm are accumulated over 12-96 hours.

**Question 18:** How much of this data is already being used via NOAA or other sources? In other words, are there sources we should be looking to for the immediate updates that would be more efficient than locating the data ourselves?

**Answer 18:** When you go to NOAA, you will get information that is either based on the weather service model or their own observations. They do also use NASA satellites and geostationary satellite information. But if you're trying to look at more quantitative data, these are the data and tools to look at. In my opinion, the strength of this data that we talked about is that it has long-term coverage - more than a decade for all of them - some are close to 20 years now. It allows you to study, preparedness through studying past cases. Not just NRT - you'll get many info from operational services and this data can be used very effectively. But looking at past records and deriving decision support strategy - that is the strength of all this data.



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**Question 19:** What is meant by reanalysis product? For cyclone wind generation how they performed?

**Answer 19:** We talked about MERRA, which is NASA's reanalysis - it takes past data and reanalyzes in the sense that it takes in situ data and puts it into the model. That provides production of data as if it is model + observation. For cyclone wind, most reanalysis data performs well since data is assimilated in the observed data. That is true for weather service model also - NOAA model also uses assimilation of data, as does MERRA. It is not easy to say one product is more accurate than another - it depends on cases and regions. In each of our sessions, we recommend "here's the data, they're generally validated, but for your region it's important to look at past data" to see if they need any bias correction.

**Question 20:** ODPEM - Is this data (storm surge, flood extent, flood prediction) available at a granular level, for example Jamaica / for other small islands?

**Answer 20:** Flood extent, storm surge - you'll have to go and look at the tools we talk about, which island we're talking about.

**Question 21:** Satellite data have variations from ground station data, as i have noticed during hydro-logical modelling. what are your comments ?

**Answer 21:** There are multiple reasons - one is there are two different sensors - a ground station would have point measurement. A satellite usually has a footprint that is much bigger than small ground station coverage. MODIS is 250 m, but GPM is 10 km. Direct comparison between the two is not possible, since they're looking at different quantities, areas. If you look at time series of these two data, that gives you info about what the difference between what the satellite sees and what the ground station sees. That's why bias correction - you've likely heard about correction - is sometimes done so it matches local data.

**Question 22:** Is there any provision of specifically maritime information, such as sea state or wave height?

**Answer 22:** NOAA has this information - coastal information available.

**Question 23:** Is that possible to measure water depth or water catchment through terrain data?



**Answer 23:** (See Question # above) There are schemes - not an expert in this area, but if you look at any hydrologic journals, you'll find info about how to look at water depth. Also, there's going to be a new NASA mission - SWOT. At that point, that imagery, or water depth, will be available. There's a plan to provide that information.

**Question 24:** How to determine Inundation depth from SAR image?

**Answer 24:** Similar - surface inundation will not provide you info about depth. Just that when you look down from the satellite, here's the surface where there is water. How deep it is depends on terrain, slope - that's a difficult - you can't say that from satellite data as yet.

**Question 25:** Is it possible to know exactly after how many day the flood water subside in an any particular flooded location ?

**Answer 25:** This would depend on many factors. First of all, what kind of soil characteristics are there. If there's infiltration capability before the flood, how much soil moisture there was. This will depend on, again, regional conditions. I don't think I know the exact answer as to when a flood will subside, but if you look at past data, past cases - that can give you some ideas.

**Question 26:** Do you use other higher resolution Terrain aside from SRTM?

**Answer 26:** In the US there National Elevation Data that is at 10m resolution (<https://lta.cr.usgs.gov/NED>). But not sure if any such global product is available. At least not open data. Does anyone online have any other suggestions?

**Question 27:** How can the latest VIIRS data from Suomi NPP satellite be accessed?

**Answer 27:** Worldview provides VIIRS imagery. Digital data can be searched and downloaded from NASA Earthdata (<https://earthdata.nasa.gov/>). Also, VIIRSdata information can be found from LPDAAC ([https://lpdaac.usgs.gov/dataset\\_discovery/viirs/viirs\\_products\\_table](https://lpdaac.usgs.gov/dataset_discovery/viirs/viirs_products_table))

**Question 28:** What advice do you give to small islands states due to the resolution of some of these forecast products.

**Answer 28:** This is a real issue. The highest resolution from open datasets is SAR at 10 meters. Landsat is 30 meters but less frequent. There are trade offs. Models tend to overcome some of these.



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**Question 29:** How SRTM data is useful for inundation analysis and how its resolution for region near mountains such Haridwar, Uttarakhand, India?

**Answer 29:** 30 m SRTM resolution. In GIS you can calculate slope and other hydrological applications.

**Question 30:** Could the applications that you have demonstrated, be used in other industries, such as design of plants, i.e., power, oil and gas, cross country pipelines, etc.?

**Answer 30:** Soil Moisture training; <https://arset.gsfc.nasa.gov/water/webinars/apps-et-smap>

ARSET is planning an urban flooding webinar - focused specifically on urban areas - extreme rain, flash floods, sustained long-term rain, or because of a storm. Urban flooding itself is because of the resolution requirement, it's a challenging problem. It also depends on how stormwater management is done, what kind of drainage is available - there's multiple issues related to urban flooding. If you have experience with urban flooding, or are working with any organization that deals with urban flooding, we'd appreciate it if you would let us know now so that we can talk to you about it. You can indicate that in the chat or QA box.

Also, we would like to learn from you - what procedures and strategies do you use in storm-related emergency situations. If you've dealt with this before - your experience is very important to us. The info we get from you helps us package our information in a more useful way. That can be a great tool for us.

What would help us - if you tell us the time latency required for emergency response. Although NASA isn't an operational agency, data is available in NRT and forecast mode. What information would help when? How many hours before a storm strikes an area, etc? Winds, flooding, rainfall, storm surge - how early do you start looking at these things, if you're in an emergency response organization?