Question & Answer Session 1

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)

Question 1: Please, explain me how you consider the scale mapping on the use of several RS sources in this cases?
Answer 1: We use data in GIS (QGIS as we will see) and combine different sources

Question 2: Precipitation data from the Giovani web site are available for all countries or only for US?
Answer 2: For all countries

Question 3: For any particular flood incident, how do we decide on capturing the data i.e. from which tool to select?
Answer 3: We looked at Giovanni and GDACs today, we also looked at the GEOS-5 portal for weather forecasts. Next week we'll look at some other tools. Especially for inundation mapping and looking at streamflow and runoff.

Question 4: How does forest cover affect SMAP data?
Answer 4: SMAP radar can look - because radar can penetrate forest cover, but the radar on SMAP isn't working. The radiometer data, that is affected by forest cover. But next week we'll see Synthetic Aperture Radar can map soil moisture even when there is forest cover. For now, yes, SMAP has - you can get soil moisture data, but it is influenced by forest data. There's also a modeling product available in which SMAP data is assimilated. That provides, perhaps, better representation of soil moisture everywhere.

Question 5: Please, how I can determine the return period from TRMM, GPM or GEOS-5 data?
Answer 5: GPM and TRMM core satellites have a repeat period on hours-days for TRMM and GPM is a few hours. The product we talked about TMPA (TRMM) and IMERG (GPM) that is a combination of multiple satellites, and so it is every half hour. All

the constellation satellites are calibrated with GPM core data and so data are available every half hour at 1/10ths of a degree resolution.

Question 6: I have accessed the servir mekong but data can't be downloaded. is there any problem?
Answer 6: SERVIR mekong data - you can contact SERVIR, but you may have to register to download the data. They can help answer your question.

Question 7: This webinar will cover any kind of 2D hydraulic model analysis (i.e. TUFLOW, RasMapper2D). Or it will be covering identifying flood hazard using only GIS and RS analysis
Answer 7: Not in this webinar. Identifying flood hazards using QGIS, we'll do a little of that - we'll be putting different RS data in GIS to be able to make better decisions. But modeling is not part of this webinar, since it's an introductory webinar. If there's an interest, we'll have a brief survey available after the next session, and you can let us know.

Question 8: By capturing the qualities of data of a particular region, prior to the occurrence of a flood, would we be able to forecast the possibility of a flood in that region?
Answer 8: Yes, if you look at past data over a particular region of your interest. When you already know when floods occurred, you have in situ data and you can try and correlate it with past satellite data. You'll be able to decide once you look at forecast rainfall, you can have forecast possibility

Question 9: can we download IMERG data in tiff format
Answer 9: Yes - IMERG data can be download in .TIFF format - as a .tiff image - the PMM site we just saw that has a training on how to get IMERG data from different locations in different formats. Registration is required. Link: https://pmm.nasa.gov/training

Question 10: Are any of these data sources exposing the data via open APIs?
Answer 10: Again - yes, IMERG data are available through open applications. Since you asked, we'll cover it next week quickly.

Question 11: How accurate are these data when relating them to terrestrial data of meteorological stations? and if it can be taken as a forecast or prediction for official information, or will we have to adjust it with terrestrial information?
Answer 11: I think local validation is highly recommended - as for when you look at meteorological rain gauge data - if you have satellite data that is 10s of km - there's not going to be a direct match. If you see a time series, you can do bias correction between in situ and satellite data. That's been done by many groups. That gives them a better idea of how to track satellite data. When you look at a large area - IMERG looks at 10 km - rain intensity might be way less than station data. Bias correction is important if you want to do any quantitative analysis.

Question 12: On these websites, is there a way to collect antecedent precip in the watershed, upstream from my area of interest?
Answer 12: Yes - you can go to Giovanni and pick any region, upstream of your area - and there's a time series to look at past data. You can start following back and see if there's upstream rain and if you can expect any flooding as a result. That is possible. You use spatial area and temporal range, look at time series analysis

Question 13: Are urban flooding maps based on radar data highly affected by backscatter noise from buildings?
Answer 13: Buildings do pose a problem, yes, backscatter does have an affect. We'll go into more detail on this in the next session.

Question 14: Is GEOS forecast data is available globally or for the US only?
Answer 14: GEOS data is available globally - as we saw on the website, you can zoom into a particular region. You can go on the website in the presentation and download global data. We want to do special selection - there's a way on the NASA EarthData website we mentioned in the presentation.

Question 15: Question about Giovanni date range for daily accumulated rainfall. Since we cannot choose beginning and ending time increments, what time range is used and which time zone?
Answer 15: Time zone is all in UTC - these are all GMT time - you have to adjust your local time that way. But you can pick beginning and end times in Giovanni. You can pick different dates, different hours within dates. For IMERG it's half-hourly.

Question 16: As SMAP has stopped operating , how can this be useful currently?
Answer 16: SMAP radar is not working, but the radiometer is still working. If you are - it is useful just to - if you are looking at a particular area - the resolution is a little low- but if you look at soil moisture maps, it tells you before approaching weather if you're monitoring soil moisture, it'll give you some idea. More soil moisture means less filtration and more likelihood of flooding. If you're using a hydrologic model you can use SMAP data for

Question 17: Would LandSat / Sentinel be able to capture the flooded areas in urban areas considering their spatial resolution (particularly in developing countries' context where the width of roads is less and built up density is higher)?
Answer 17: Both Landsat and Sentinel-2 data will be available. Res will be 10 m in that case. It's likely better than what we have now. You also have to see Landsat and Sentinel revisit time isn't daily, so you might miss some flood data. That's why we use MODIs, although it is lower resolution, because it has daily data. You aren't able to look at roads that aren't wide or surrounded by buildings. One way to get around this, is to look at LIDAR images of urban areas that can help you ID buildings and narrow roads also. That way you actually have slopes and everything identified before you see rain. THEN you can look at Landsat and SEntinel data superimposed to give you a better idea. Lidar data can give you some guidance.

Question 18: Are the GPM, Aqua, Terra, Landsat, GEOS-5, etc products also available through a FTP or similar? For acquisition via scripting/scheduling.
Answer 18: Yes, all this data are available through FTP. If you go to the Hydrologic Modeling webinar from February on VIC has a tutorial on how to FTP data. (Session Two) Link: https://arset.gsfc.nasa.gov/water/webinars/VIC18

Question 19: The IMERG and TMPA combined products will have temporal coverage from 1997 until now? When will this product be available?
Answer 19: Yes - IMERG and TMPA combined will be 1/10th of a degree, half-hourly data starting in January 1998/1999. Should be available later this year.

Question 20: Would you need to include elevation data in addition to slope in the QGIS demo that you showed since there could be higher elevation plateaus?
Answer 20: Yes, you can. It's a good idea to look at terrain data also.

Question 21: Is there any way to project the flood? And you mentioned about Modis and other satellite data but during typhoon, the cloud is really interfering. How to get rid of cloud interfering and map the flood extent?
Answer 21: This is a real challenge. When there's major storm passing through or rain system going through, there's clouds. And MODIS and Landsat are optical, and cannot see through clouds. That is why Synthetic Aperture Radar (SAR) data can be more useful. We'll see next week some of the advantages of SAR data. Another way people have done - there are cloud clearance algorithms used. More composite data are use rather than using daily data. You use 3-10 day composites that eliminates some of the cloud interference, but it is a challenge and a problem.

Homework 1: there's no submission as such, you're downloading and installing QGIS on you computer. The exercise is also available for you to work with SRTM data using GDeX. You don't need to submit anything. But next week when we do the exercise, you'll be using QGIS. So it will help to have QGIS already installed.

If you aren't able to do exercise 1 today, if you have any questions, you can also ask them next week. Today we focused mostly on precip - we didn't look at river or coastal flooding. So next week, when we look at flood monitoring tools, that provides info on whether there is any river flooding going on that might cause urban flooding. You can see coastal inundation in certain cases. We'll see that. Something we aren't addressing here is the snow melt issue. We're mostly focusing on flooding resulting from rainfall and coastal flooding because of nearby storms. We also want to ask a question:

If any of you are involved in urban flood management, your feedback on this training will be very useful for us. We have all these datasets, but actual decision making on the ground:

- What kind of data do you use?
- What kind of latency is required?
- What kind of resolution is required?
- How are you making your decisions?

That information would be very useful for us. If you're willing to talk to us offline, we'd be happy to set up a call with you. Email nasa.arset@gmail.com if you're interested.