Questions & Answers Part 4

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) or Sean McCartney (sean.mccartney@nasa.gov).

Question 1: How many multi-parameters should we consider for an ideal Disaster Risk Reduction (DRR) mapping and which specific software or integrated software is required for integrated mapping?
Answer 1: (Amita) It depends on the type of hazard you're looking at. For your own region, you can look at past data to see what hazards are most common and decide which parameters you want to look at. As we saw with cyclones: precipitation, winds, sea level pressure can be used. For flooding: precipitation, terrain and slope, and soil moisture can be used. DRR has to be assessed regionally. There is no one answer for how many parameters you need for DRR. If you see in the PDC presentation, they have about 4,000 layers. Regionally, some of these parameters may be useful. Regarding software for DRR - GIS is commonly used with remote sensing, socioeconomic, and in situ data layers. If you look at open source software, people have used R and Python for analysis. Also, Jupyter Notebook is used that combines software development and a GIS interface. I'm not an expert in that, but I've heard that's a useful platform.

Question 2: What exactly is the definition of risk?
Answer 2: According to the UN Office for Disaster Risk Reduction (UNDRR), disaster risk is defined as: The potential loss of life, injury, or destroyed or damaged assets that could occur to a community as a function of a hazard, exposure, or vulnerability. https://www.unisdr.org/we/inform/terminology

Question 3: Is it possible to access Soil Moisture and Ocean Salinity (SMOS) data to estimate ground water content for hydrological models?
Answer 3: Yes. Please see https://smos-diss.eo.esa.int/oads/access/.

Question 4: Is it possible to model the short duration extreme precipitation using remote sensing data?

Answer 4: IMERG precipitation data is half-hourly. That is the shortest duration (latency) you can look at with satellite data. Every half hour you can see how precip is changing and can derive rate or accumulation of rainfall in that region over a period of interest.

Question 5: Are global and regional thresholds different when declaring disasters?
Answer 5: Absolutely, yes. Climatology or long-term mean and variations of parameters differ regionally, so threshold values have to be decided based on this information. That's why it's important to look at past data or a long time series. It gives you a baseline of relevant parameters. Based on that threshold values should be decided regionally.

Question 6: What about geological parameters like topography, geomorphology, soil lithology, etc? Are there any studies on this subject? Especially for landslides?
Answer 6: In research literature, yes, you will find many papers looking at these parameters. And again, that would be regionally dependent. For landslide monitoring, all these parameters have been looked at: topography, soil moisture conditions, etc.

Question 7: What are the operational applications of remote sensing for disaster management?
Answer 7: All the natural disasters we talked about in this webinar series - cyclones, heat stress, and floods - remote sensing is used by emergency management and responders in pre-, during- and post- disaster conditions to plan for warning, response, and recovery operations. Another use of remote sensing is in operational weather nowcast and forecast models, where satellite data are assimilated.

Question 8: What additional in situ data is best for real-time analysis in remote sensing from drone data - LiDAR/ Images (Photogrammetry)?
Answer 8: In addition to LIDAR data, rain gauges, and weather stations can help in collecting in situ data. Also, stream gauges can help in monitoring water flow. Soil moisture conditions and land cover data are also useful. This information can also be used to calibrate and validate satellite data in your region. In situ data may be used for bias correction or downscaling of remote remote sensing data.

Question 9: What other professional skill sets are needed in disaster risk assessment for real-time analysis? (Pre- & Post- disaster as well)?

Answer 9: In addition to the skills of analyzing data, if you want data-driven decisions, you have to have a good understanding of hazards, exposure, vulnerability, and their socioeconomic impacts in your area. Also, ability to use combined data from in situ sources, remote sensing, and modeling to assess disaster magnitude and risk is important. Communications among various societal sectors also is crucial for DRA.

Question 10: Can LiDAR data be used for flood or water levels as well?
Answer 10: LiDAR can be used for looking at terrain and inundated surfaces, yes. I'm not sure about water level.
https://coast.noaa.gov/data/digitalcoast/pdf/lidar-101.pdf

Question 11: How important is disaster management for a region that is indirectly affected by tropical cyclones?
Answer 11: Not sure what that means - what does indirectly affected mean? Is it if a cyclone becomes a mid-latitude storm and it affects your region? Looking at past data helps in deciding what kind of disaster management level is required. Information such as - how frequently are you affected indirectly by a cyclone? Is it based on cyclone intensity and track? What type of hazard is likely (extreme rain, winds, flooding)? What kind of exposure and damage have occurred due to indirect impact of cyclones in your region? - would help. Some of the same remote sensing data we talked about in the webinar may help answer some of these questions.

Question 12: Where does PDC get its socioeconomic data and how often do they update this data?
Answer 12: The socioeconomic data come from a variety of sources. The global assessments come from World Bank, Academia, World Health Organization (WHO), and others. The data are updated once per year. Subnational assessments come from the specific countries. These are obtained through bi- and multilateral engagements with the Countries. These are updated when the specific country update their data.

Question 13: What platform does PDC use for their data processing? Can governments link to their data in a distributed GIS System such as ArcGIS Enterprise?
Answer 13: PDC uses a variety of platforms for processing data, including ArcGIS, proprietary, and open source software. For information on our data services, please contact info@pdc.org

Question 14: Which datasets are used for subcomponents on slide 18? Are they publicly available?
Answer 14: There are numerous subcomponents listed via PDC. All of the indicators should be publically available.

Question 15: How does one create region-specific climate indicators from satellite or reanalysis info for a region, such as the Caribbean islands?
Answer 15: This is something we are looking into leveraging. The publicly available data for the Caribbean is sparse due to data availability. This is a next step we are looking to take. We are looking for any type of anomaly over a certain time period. There are collaborations we are undertaking to research these ideas.

Question 16: How best can a drought resilience framework be developed?
Answer 16: UNCCD has a report on drought resilience. There are several components to drought resilience:
https://www.unccd.int/sites/default/files/relevant-links/2018-08/DRAMP_Policy_Framework.pdf
https://www.drought.gov/drought/resources/national-drought-resilience-partnership

Question 17: How are the MODIS rasters translated to the 12km resolution in the NLDAS resolutions?
Answer 17: From Tabassum's talk, it looks like she used high-resolution MODIS data within 12 km NLDAS temperature grids. You can average the MODIS temperature over each NLDAS grid.

Question 18: How does one work with data having multiple resolutions, in one application to raster analysis?
Answer 18: You can use either interpolation of low-resolution data to high-resolution, or can use upscaling/averaging of high-resolution data to low-resolution. Depends on your application. One can do these operations in a GIS.

Question 19: Nicaragua analysis shows a boundary with "very low" on one side and "very high" on the other. Can the PI's please explain the absence of a gradient?
Answer 19: The indices are on a scale. This is specifically for emergency managers. We can tailor the results for the various stakeholders.

Question 20: Are there any tools to use real-time data from sensors comparing them to satellite "real-time" data? What is the platform for such analyses?
Answer 20: So I'm not sure about the question. There is no platform that covers this currently. DisasterAWARE allows you to overlay NASA IMERG rainfall accumulation data with stream gauge observations (where available) for enhanced situational awareness.

Question 21: Does PDC have a standard for their metadata on their datasets?
Answer 21: Yes, PDC uses ISO191 for our metadata. All of the data layers in DisasterAWARE (emops.pdc.org) include metadata. Select the "i" button to the right of a layer's name to access its description. Then select "View Full Metadata" for additional information.

Question 22: What is the Risk & Vulnerability Assessment (RVA) data?
Answer 22: Socioeconomic, governance and hazard exposure data gathered with the expressed purpose of comparing disaster risk and vulnerability across geography.

Question 23: As a government agency we would like to know if you have any requests to link with your services - any special data agreements needed between parties?
Answer 23: PDC engages with many types of organizations (e.g. government, NGOs, public, academia, etc.) around the world and at multiple levels (e.g. local, state/provincial, national, regional, international, etc). For more information on how to partner with PDC, as well as leverage our services, please contact us at info@pdc.org.