Advanced Flood Management Training
Week-4 Homework

There are two parts to this hands-on exercise:
1. Select and examine a flood case of your interest in the area of your interest
2. Real time flood monitoring

Part 1a: Select a flood case (within last three years) of your interest and note down dates, river, geographical area where the flooding occurred

- Go to http://flood.umd.edu/
- Scroll down to **Rainfall (7 – day accum) [mm]**.
- Using **'Pan the map'** and **'Zoom in'** and **'Zoom out'** arrow zoom in to the flood area you selected.
- Under the map enter appropriate '**Start time':** and '**End time':**
- Click on **Animate** and observe how the rainfall changes.
- Note the maximum amount of 7-day accumulated rain observed during the flood event.
- Note the approximate area (in latitude and longitude) where heavy rainfall is observed.
- From the '**Plot different variables':** on the right side of the map select '**Streamflow 12 km res**' from the drop-down menu and click on **'plot'**.
- Repeat map animation steps for the **'Streamflow 12 km res'** for the same '**Start time:'** and '**End time':** as above, click on **Animate** and observe how the stream flow is changing. Note the range of streamflow values observed in the animation. [Note: 1 km streamflow data are not archived]
- From the '**Plot different variables'** on the right side of the map, select '**Flood Detection (Depth)**' from the drop-down menu and repeat the above steps to see the animation**.**
- Based on the rainfall animation, did the river you expected to flood show high **flood detection depth**?
- Note the date, time, and maximum flood depth observed.
- From the **'Plot different variable'** select **'Flood detection (Depth)'** from the drop-down menu.
- In the **'Plot time series for an individual point (lat, lon):**' section and enter appropriate time
- '**T1:'** and **'T2:'**
    - In the map zoom in enough to individual pixels to pick by clicking on the map or based on the map analysis above, enter lat –lon for a location where you want to examine flood intensity variations.
- Click on '**See time Series'**
- Save the time series on your computer (by dragging or right clicking the image with your mouse).

Part 1b: Examine the same Flood Event from MODIS NRT

- Go to the MODIS Near Real-Time (NRT) Global Flood Mapping Portal: http://oas.gsfc.nasa.gov/floodmap/
- Click on a grid in the region of the flood case you selected in the Part 1a.
- From the top bar select **'14 Day Composite'**.

- Using the calendar in the top upper left, select appropriate dates (based on your selection of T1 and T2 in Part1a Time Series Analysis).
- Do you see any inundation where GFMS shows high rainfall?
- Also use the direction arrows [ ] to explore surrounding grids to see if there is surface inundation present.
- Click on the maps to zoom-in and see the surface inundation.
- Note the area/date where flooding is observed.

Part 2: Real Time Flood Monitoring

- **Note the date when you conduct this exercise**
- Go to the Extreme Rainfall Detection System (ERDS) portal http://erds.ithacaweb.org/
- On the left side under the **'Alerts'** you will see a list of countries where current flood warning is present. Also, you will see the level of alert posted next (left) to each country – yellow (low), orange (medium), and red (severe) – save this list in a text file on your computer **(flood-list-1).**
- From the **'Alerts'** menu, choose **72h** alert and examine how the country list and level of alert change – save this list in a file **(flood-list-2)**.
    - On the 72h alert map, click on the blue flood warning markers on the map for each location where warnings are present and note the name of the location (on top of the line graph), '**maximum precipitation 72h'** value and **'potentially affected population'**
- Go to http://flood.umd.edu/
- Note the latest time and date for which the **Flood Detection/Intensity (depth above threshold)'** map is displayed on this website.
- In the '**Flood Detection/Intensity (depth above threshold)'** map zoom on to each country **(from flood-list-1),** one by one, where ERDS showed flood alert.
- Do you see flooding occurring in these countries from the 'depth above threshold' map? Note the 'depth above threshold' value range for each country.
- Go to http://oas.gsfc.nasa.gov/floodmap/
- Zoom on to each country where ERDS showed current flood alerts and check whether MODIS maps show any flooding.
- **(Optional)** You may want to go back to GFMS after three days and check whether ERDS 72h flood alerts (flood-list-2) are reflected in the 'GFMS Depth above threshold' map.

Week-4 Homework Question

Answer the following questions based upon the flood case exercise for week 4 of the Advanced Flood Management Webinar.

Since the case study is for a flood event of your choice, all answers to the following questions will be unique to you.

Answer the following questions based on the Part-1 exercise:

1. Write the location (country, river) of the flooding event you examined in Part-1.

2. What was the time period of the flooding event examined in Part-1?

3. What was the maximum 7-day accumulated rainfall observed in GFMS for this flooding event? Provide a date, time and approximate latitude-longitude of where the maximum rainfall was.

4. What was the range of the streamflow values observed during the flood event? (Answer this question from the 'streamflow 12 km res' animation)

5. What was the maximum flood intensity/depth above threshold observed during the flood event? Did the flood intensity values change during the event or just the location of flooding?

6. Provide the lat-lon values and time period (T1 and T2) where you examined flood intensity/depth above threshold time series. At this location how many flooding episodes with threshold depth above 0 did you see in the time series?

7. Was this flooding event observable in the MODIS flood map? If yes, note the date and location (approximate lat-lon) of the flooding. If not, please explain why you cannot see the flooding in the MODIS-derived map?

Answer the following questions based on the Part-2 exercise:

8. What was the date when you examined the real-time flood monitoring (Part 2 exercise)?

9. From the ERDS analysis how many countries showed flood alert and what were the alert levels? (i.e. provide the flood-list1 that you saved from the exercise).

10. For the countries in flood-list-1, did the GFMS flood intensity/depth above threshold maps indicate flooding (i.e. were the depth values above 0 mm)?

11. From the 72h forecast alert map, which countries showed potential for flooding? (Enter Flood-list-2 with the name of the countries with likely flooding and level of alerts).

12. Provide the 'maximum precipitation 72h' and 'potentially affected population' values you noted for all the locations from the 72h forecast map

13. Did the MODIS flood map show any flooding indicated by ERDS in the countries noted in flood-list1? If yes, provide the name of the countries.