

## GOESR3 Periodic Reporting

**Reporting Period:** July 2019 – Dec. 2019 (1st half of FY19 funding cycle)

**Team Lead:** Sanmei Li Donglian Sun

**Team Members:** Sanmei Li Donglian Sun

**Project Title:** Integration of GOES-R/ABI data in Flood Mapping Software for Flood Monitoring and Forecasting

**Project Number:** 402

### Executive Summary

**Overall Status:** Green

	<b>Green<sup>1</sup></b> (Controlled)	<b>Yellow<sup>2</sup></b> (Caution)	<b>Red<sup>3</sup></b> (Critical)	Deviation Summary <sup>4</sup>
<b>Budget</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Schedule</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Scope</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

<sup>1</sup>Project is within budget, scope and on schedule.

<sup>2</sup>Project has deviated slightly from the plan but should recover

<sup>3</sup>Project has fallen significantly behind schedule, is forecast to be significantly over budget, and/or has taken on tasks that are out of scope.

<sup>4</sup>Details of deviations provided in subsequent section of report

Milestone	Approved Schedule	Start Date	Forecasted Completion	Actual Completion	Status
Milestone Title					
Development of the archive and downloading system	July 2017	July 01, 2018	July 31, 2020	Dec. 31, 2019	Completed
Development of a demo website	Sep. 2019	Sep. 01, 2019	Dec. 31, 2019	Dec. 31, 2019	Completed
Output ABI flood data in shapefile format	July 2019	Aug. 01, 2019	Dec. 31, 2019	Dec. 31, 2019	Completed
Development of the downscaled ABI flood maps	July 2019	July 2019	July 2020		In progress
Near real-time flood response	July 2017	July 01, 2018	July 31, 2020		In progress

**Note:** Bold milestones are key external project deliverables

Status Definition: Green (will meet schedule), Yellow (milestone will be delayed), Red (milestone cannot be met on current path)

## 1 Development of the archive and download system

We focused on the development of the archive and downloading system for the ABI flood products, which is also used for the AHI and VIIRS flood products. The archive and downloading system includes a database and a web interface. The database is used to manage the ABI/AHI/VIIRS flood products pushed by the processing system in CIMSS and the web interface is used for users to browse and download the flood products.

The web interface includes two parts: Display and Download. The “Display” interface provides users to browse the ABI/AHI/VIIRS flood maps with different filters such as date, product types, regions, transparency and so on. Users can zoom in/out the flood maps, change background map, add or remove labels, locate the geographic coordinates, change transparency of the flood maps or download the map in the current window. Fig.1 shows a screenshot of the Display interface. The “Download” interface provides users with filters including date, product type, geographic coordinates and data format to schedule a task. When a task is confirmed, the ordered data will be available in the ftp site: <ftp://jpsfflood.gmu.edu> for users to download.

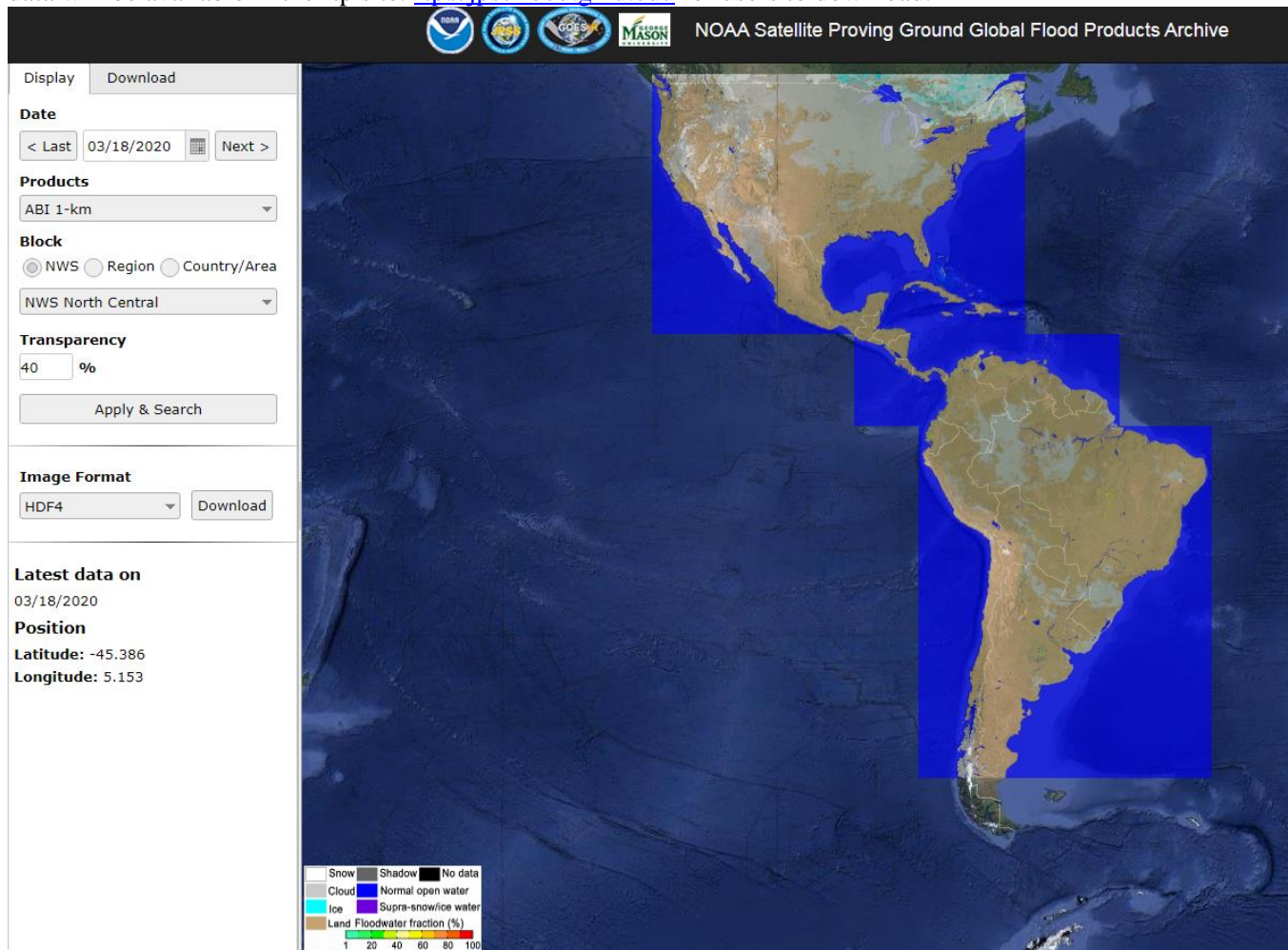


Fig. 1 A screenshot of the web interface of the archive and download system

## 2 Development of the demo website

A demo website has also been developed for users to access the ABI/AHI/VIIRS flood products in a more convenient way (<https://www.ssec.wisc.edu/flood-map-demo/flood-products/>). User guide on the ABI flood product has been provided and updated in the demo website.

### 3 Modification of the image display module with shapefile format

To meet the requirement from GIS users, vector data format (shapefile) is now available for the ABI flood datasets in addition to the existing data formats including hdf4, png and geotiff. The module is based on GDAL libraries with Python scripts. The floodwater fractions are output in 6 layers (each layer is an independent shapefile combination with \*.shp, \*.shx, \*.prj and \*.dbf) from 1% to 100%.

### 4 Development of the downscaled ABI flood maps

We started developing the downscaled flood products from the VIIRS and ABI flood maps. The 30-m SRTM/DEM data in the west hemisphere were collected and re-processed. 30-m SWBD data and other related datasets were also collected. other related datasets were also collected.

### 5 Near real-time response to flood events with the ABI flood maps

The ABI flood maps have been applied in near real-time response to flood events including floods in Texas, Caribbean islands and Mexico. Flood maps were sent to FEMA, RFCs and International Charter for their applications during those flood events. Fig. 2 presents a flood map on Sep. 21, 2019 in the West Gulf region of USA.

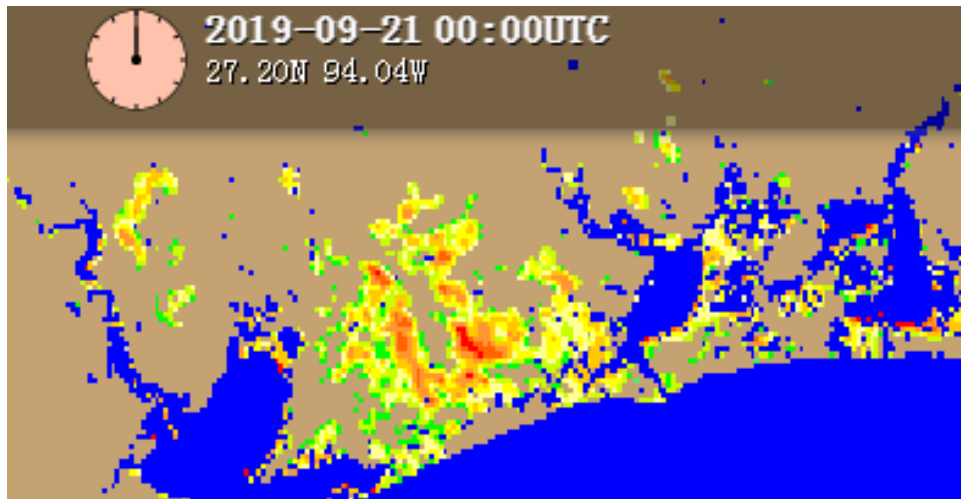


Fig. 2 GOES-16/ABI flood map on Sep. 21, 2019 in the West Gulf region, USA

## *Plans for Next Reporting Period*

### 1 Continue to evaluate the ABI flood product

We will continue to evaluate the ABI flood product using other higher spatial resolution satellite imagery. Communications will be made with RFCs to see whether there are any issues for them to use the product. Improvements will be made to fix the potential issues from the evaluation results.

### 2 Downscale the ABI 1-km flood products

We will continue to develop the downscaling model for the ABI flood products together with the VIIRS results to generate high-resolution flood products.

### 3 Applications of the ABI flood product

We will continue to use the ABI flood products for near real-time flood events response from FEMA, RFCs and International Disaster Charter.

### **1. Interaction with operational partners**

We attend monthly telecons organized by the JPSS Program Office, and communicate with NWS's River Forecast Centers on the progress and the issues we meet during the ABI development. We also communicate with the GOES-R Program on the issues related to the ABI imagery.

### **2. Conference/workshop participation**

We attended three workshops and presented two short courses and one presentation during the workshops:

1. We presented a short course “**Satellite Flood Mapping to Support Flood Forecasting and Mitigation**” in the 2019 Joint Satellite Conference in Boston on 29 September.

2. We contributed to a short course “**From GOES-R and JPSS Satellite Data to Disaster Response**” in January 2020 AMS in Boston.

3. We presented a presentation “**Introduction to the Global GEO-LEO Flood Mapping System**” in CEC (Commission for Environmental Cooperation) remote sensing workshop in Mexico City in Nov. 15, 2019 with our Canadian and Mexican partners.

In addition, we attended three conferences and presented two presentations and one poster during the conferences:

1. We presented a presentation “**Contributions of GEO-LEO Satellite Imagery in Flood Mapping for Flood Forecasting and Monitoring**” in CSPP User Conference in June, 25, 2019 in Chengdu, China

2. We presented a presentation “**Application of GOES-16/ABI Imagery in Automatic Flood Detection**” in Oct. 2019's Pecora&ISRSE conference in Baltimore, MD

3. We presented a poster “**Contributions of GEO-LEO Satellite Imagery in Flood Mapping for Flood Forecasting and Monitoring**” in December 2019's AGU in San Francisco, CA.

### **3. Outside project publicity**

None.

### **4. Journal articles**

None.

Joint VIIRS/ABI Flood Map in Caribbean Islands

Sep.04, 2019

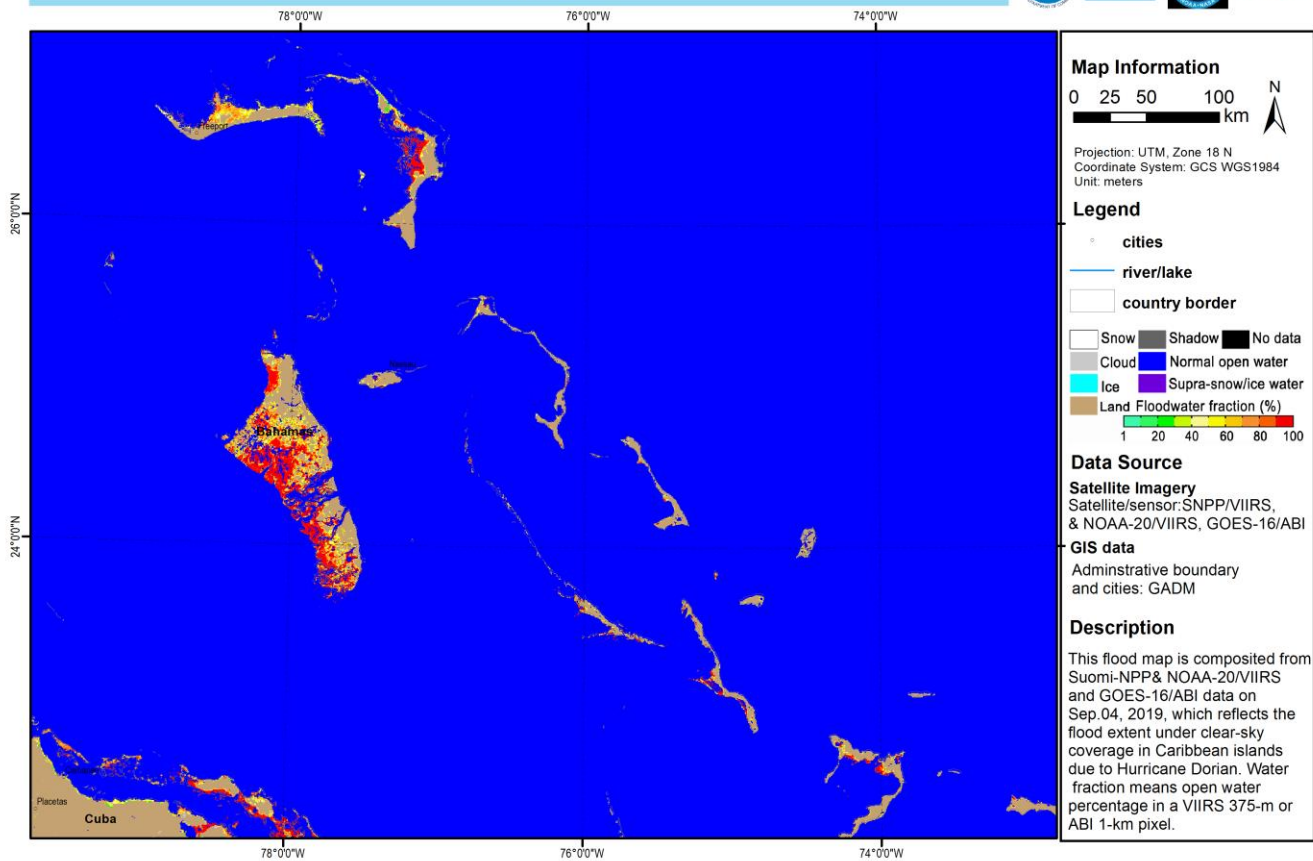


Fig. 3 A joint VIIRS/ABI flood map on Sep. 04, 2019 in the Caribbean Islands