Flood Risk Assessment Using In-Situ and Remote Sensing Products: Development of Flash Flood Forecasting System for Puerto Rico

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BACKGROUND

• In islands of the Caribbean, floods can occur at any moment throughout the year.

• This can be attributed to the topographic features and weather patterns of a tropical climate.

• Even though any rainfall event can lead to a flood, they are more likely to occur during the hurricane season.

• For Puerto Rico, the Flash Flood Guidance divides the territory in multiple regions and provides a single value for each one of them.
OBJECTIVES

• Implement the Weather and Research Forecasting Hydrological modeling system (WRF-Hydro) for watersheds in Puerto Rico.

• Validate the output of WRF-Hydro for the selected watersheds in Puerto Rico.

• Develop the framework for the application of WRF-Hydro for a Flash Flood Guidance system in Puerto Rico.
DATA ACQUISITION

• Atmospheric and Land Surface Forcing Data:

1. National Weather Service- San Juan
2. Caribbean Coastal Ocean Observing System
3. JPSS Soil Moisture Data (AMSR2)

Operational 1km WRF for Puerto Rico

Satellite Data (GOES-R) + NWS NEXRAD + Numerical Weather Forecast → WRF Hydro (hydrologic model) → Real-Time flood prediction

DECISION MAKING LEAD TIME

REAL TIME FLOOD IMPACT
WRF-Hydro Timeline

2018 Progress

January
- Joined NOAA-CREST
- WRF Research

February
- Meeting with NWS-SJ
- WRF research

March-April
- Scope of project defined
- Started compilation process
- Proposal

May
- Proposal submitted and accepted
- Compilation process

June-July
- NCAR WRF-Hydro workshop
- NWC Summer Institute
FALL 2018 SEMESTER GOALS

1. Model Run for each watershed

2. Preliminary validation for one watershed

3. Use different atmospheric forcing data
Other Works: NWC-Summer Institute

• **Title:**
  • Sensitivity of Urban Flooding to Subsurface Storm Drainage Systems in Low-Gradient Watersheds

• **Description:**
  • Quantify the sensitivity of hydrologic models to stormwater drainage systems for different return periods.

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50 year, 24 hour storm