FLASH: A tool for better flash flood forecasts

Flash floods are the number one weather-related killer in the United States.

The impacts from flash flooding were tremendous in 2016. During the weekend of August 13, as much as 30 inches of rain fell over three days in Louisiana. More than 30,000 people were rescued and over 30 parishes were declared disaster areas. Earlier in the year, historic flood events also affected communities like Ellicott City, Maryland, and Richwood, West Virginia, illustrated by dramatic videos of rescues and a home on fire floating downstream.

New Tool Supports Weather-Ready Nation

To improve forecasts of this deadly threat, National Oceanic and Atmospheric Administration researchers have developed FLASH, a new tool for better flash flood monitoring and prediction that will help produce a Weather-Ready Nation during flash flooding events. FLASH begins with rainfall rates measured by radar, and uses a sophisticated modeling system to track what every raindrop is doing on the ground, whether it infiltrates into the soil or flows across impervious roads, parking lots, and waterways. The system models where water will go, when and where it will become a flood, and does this with updates as frequent as every two minutes – a key attribute for cities that can flood very quickly.

Flooded businesses in Baton Rouge, LA, August, 2016.

Better forecasts save lives

NOAA researchers evaluated forecasts made with the FLASH tool and compared them to the existing tool used by the National Weather Service. Findings showed FLASH improves flash flood forecasts by:

- Doubling the accuracy of the current system and improving spatial resolution by 500 percent.
- Providing up to six hours of forecast lead time.
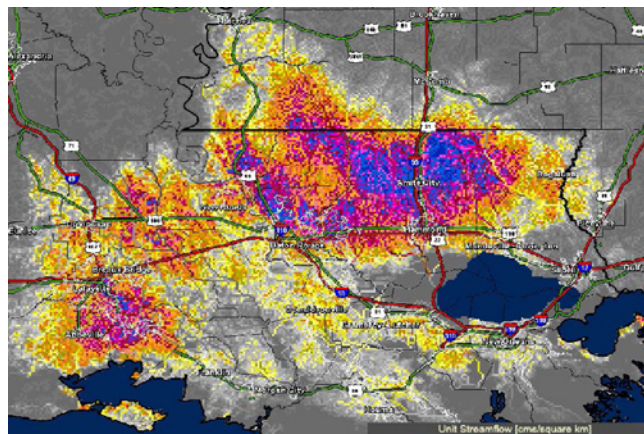- Improving NWS forecasters' ability to identify rare, severe flash floods from minor ones.

Forecasters at NWS Lake Charles, Louisiana, used an experimental feed of FLASH data to support issuance of flash flood emergencies for specific communities and locations in their service area, and to provide partners impact information for bayou and river basins that do not have stream gauges. "We have never had anything before in flash flood opera - tions that collects and routes water downstream. It could be inferred in the past, but FLASH provides a physical representation and visualization," said Jonathan Brazzell, senior service hydrologist.

FLASH pinpointed areas in Louisiana impacted by severe flooding in August 2016. (Blue areas depict severe flash-flooding)

Tool Creators at NSSL and CIMMS

FLASH has been developed by researchers from the NOAA National Severe Storms Laboratory and the University of Oklahoma/NOAA Cooperative Institute for Mesoscale Meteorological Studies in Norman, Oklahoma. This research is described in a paper accepted for publication entitled, "The Flooded Locations and Simulated Hydrographs (FLASH) project: Improving the tools for flash flood monitoring and prediction across the United States."

Aerial image showing flooding in Louisiana. August 14, 2016.