

An Overview of Gridded Flash Flood Guidance; A Spatially Distributed Runoff and Threshold-Runoff Based Approach

by

Erick M. Boehmler
Hydrologist and Flash Flood Focal Point
NOAA/NWS/Northeast River Forecast Center
Taunton, MA

As part of the last phase of the National Weather Service (NWS) modernization, the NWS envisioned that a distributed grid of threshold runoff values be developed and utilized in Flash Flood Guidance computations as opposed to a generalized grid of threshold runoff mapped to county boundaries. Such a distributed grid would enable River Forecast Centers (RFCs) to generate spatially distributed flash flood guidance values in support of flash flood monitoring software used at the Weather Forecast Office (WFO). In response to this modernization vision, the development of a Gridded Flash Flood Guidance (GFFG) system was undertaken at the Arkansas-Red Basin River Forecast Center (ABRFC). The GFFG system relies on the Distributed Hydrologic Model (DHM) accounting of soil moisture conditions to derive runoff estimates on the Hydrologic Rainfall Analysis Project (HRAP) grid scale of 4 km². Multi-sensor Precipitation Estimates (MPE) and Real-Time Mesoscale Analysis (RTMA) temperatures provide the forcing for the DHM. Variable soil-moisture conditions from the conceptual Sacramento Soil-Moisture Accounting model of upper soil layers are combined with other physically-based data to formulate a dynamic runoff curve number and a variable threshold runoff at the HRAP grid scale. With the development of the GFFG system, Southern Region RFCs acquired and transitioned to this system for use in operations. The Northeast RFC has been running the GFFG system in parallel with the legacy FFG system for nearly a year. Warm season validations have been promising while additional work is in progress to address the GFFG system's performance during rain-on-snow and other winter season conditions.