# Development of a mobile app for flash flood alerting and data cataloging

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## 1. Motivation

Flash flooding is one of the world's most deadly and costly natural hazards. Mitigating loss of life and property poses great challenges to emergency services in local communities. First, flash floods are difficult to predict. A trained forecaster cannot examine a single radar image and diagnose a heavy rainfall or flash flooding signature, whereas this can be done with high wind events, tornadoes, and hail storms. Moreover, flash floods are not just meteorological phenomena. They are a result of the intersection of meteorological forcing with surface controls by hydrologic conditions that's further complicated by the location of infrastructure and dynamic societal vulnerabilities. Figure 1 shows an example where someone had driven into floodwaters, highlighting the complexities of the societal dimension. Understanding and forecasting flash floods requires an interdisciplinary approach. Lastly, flash floods are not only difficult to predict, they are hard to observe. For these reasons, this poster presents a mobile app solution that can improve the observation and forecasts of flash floods, benefitting local communities and researchers alike.


*Fig. 1. A photograph of vehicle-related flash flooding impact. The photograph was collected as part of the FLOCAST: Flood Observations – Citizens As Scientists using Technology project. Note that the impact is occurring well downstream from the causative rainfall as noted by the partly cloudy skies.*

Ask me for a demo of the app!

## 2. FLASH Project

The Flooded Locations and Simulated Hydrographs (FLASH) project has been producing real-time flash flood forecasts at 10min/1-km resolution across the conterminous US since 2013. Products are displayable at http://flash.ou.edu and the grids are now operationally available for download at the National Weather Service's National Center for Environmental Prediction. The next phase of FLASH improvements is reaching a broader user group (beyond the NWS) and using crowdsourcing approaches to obtain details at the local level about flash flood "hot spots".

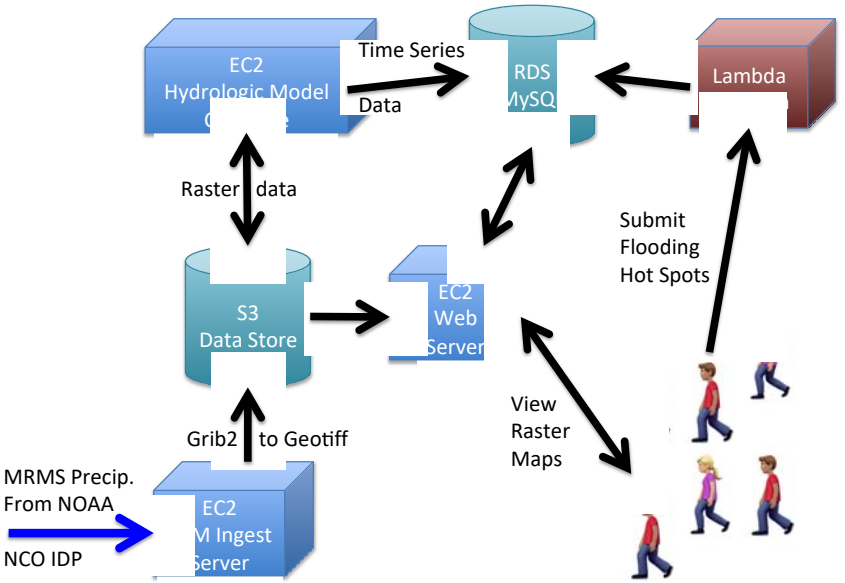


*Fig. 2. Flowchart illustrating the Amazon Web Services tools that are being leveraged to support FLASH product displays on a newly developed mobile app. The same app provides a crowdsourcing capability for users to identify flash flood "hot spots" that are subsequently catalogued in the MySQL database.*

## 3. Mobile App

We built a prototype app that provides flash flood alerts for local communities including emergency services personnel, businesses, and the general public (Fig. 3). The hazard information has been simplified to communicate specific times and locations that are likely to be impacted by flash flooding. The app has been designed to provide 2-way communication. Flash flooding impacts are often controlled by local infrastructure or other factors (e.g., leaves clogging a storm drain) that are not readily observable. For these reasons, users are encouraged to mark and provide information about the specific locations, or "hot spots", of flash flood impacts. These will be catalogued (see Fig. 2) for the local community and ultimately used in future forecasts.

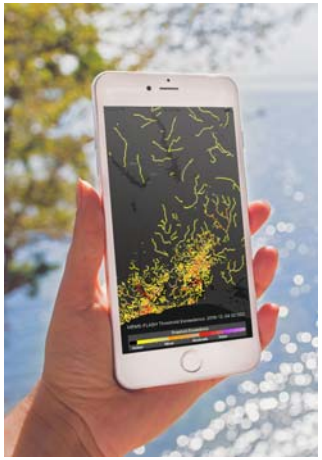

*Fig. 3. Mockup of FLASH mobile app available for demonstration using iOS smartphone.*

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