

Increasing precipitation extremes across the globe will naturally lead to not only increased flooding but an increase in the occurrences of flash floods, with assessment and prediction of these events becoming more critical every year. This work focuses on assessing the innate differences in the high-resolution Multi-Radar Multi-Sensor (MRMS) system and the Integrated Multi-satellitE Retrievals for GPM (IMERG) suite of satellite products when used as precipitation forcings to simulate hydrologic outputs through the Ensemble Framework for Flash Flood Forecasting (EF5) hydrologic framework. The overestimation of precipitation presented by satellite products has been well studied, but less has been done to assess how significant these errors persist into physical hydrologic processes especially when compared to ground-based radar estimates. Hydrographs are simulated for both products across a study period of 2002-2011 and discrete simulated flood events are determined and matched, assessing the ability of each precipitation product to accurately generate reliable simulated representations of flood characteristics. Relationships between these flood characteristics, such as peak flow and flood duration, and physical basin characteristics are investigated. Increasing knowledge regarding the capabilities or deficiencies of satellite precipitation products with respect to flash flood modeling will have implications on the ability to characterize flood events over areas with little or no coverage by precipitation monitoring networks and subsequently improve flood forecasting operations globally.

#### Plain Language:

Climate change is expected to increase the threat of dangerous flash flooding associated with more powerful storms across the globe. In the Continental United States, flash floods can be reliably predicted or forecasted using powerful, high-quality radar data. There exists the potential, however, to provide flash flood forecasting capabilities to areas of the world without radars through use of satellite data. This work focuses on understanding how reliably satellite data can model and predict flash floods compared to the high-quality data found in the US.