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The Hydroclimatology of Extreme Flooding in the Lower Mississippi River

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The 1927 flood in the lower Mississippi River was the most destructive flood in American history, inundating more than 68,000 square kilometers of land, resulting in approximately 500 fatalities and leaving more than 700,000 people homeless. Despite the prominence of the 1927 flood, hard details on the flood, and the storms that produced the flood, are sparse. We examine the hydrometeorology, hydroclimatolgy and hydrology of the 1927 flood in the lower Mississippi River through empirical analyses of rainfall and streamflow records and through downscaling simulations of the storms that were responsible for cata-strophic flooding. We use 20th Century Reanalysis fields as boundary conditions and initial conditions for downscaling simulations with the Weather Research and Forecasting (WRF) model. We place the hydrometeorological analyses of the 1927 storms in a hydroclimatolog-ical context through analyses of the 20th Century Reanalysis fields. Analyses are designed to assess the physical processes that control the upper tail of flooding in the lower Missis-sippi River. We compare the 1927 flood in the Lower Mississippi River to floods in 2011, 1937 and 1973 that represent the most extreme flooding in the Lower Mississippi River. Our results show that extreme flooding is tied to anomalous water vapor transport linked to strength and position of the North Atlantic Subtropical High. More generally, the results are designed to provide insights to the hydroclimatology of flooding in large rivers.