

# **A Synoptic Comparison of Two High-Impact Predecessor Rainfall Events: Tropical Storm Lee/Hurricane Katia of September 2011 and Hurricane Joaquin of October 2015**

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Predecessor Rainfall Events (PRE) are coherent areas of heavy rainfall (generally 4"/100 mm or greater rainfall centroids/24 h or less) which occur at distant ranges from the centers of tropical cyclones, yet are still indirectly related to these systems, usually through a connected plume of deep tropical moisture. This presentation will focus on two PRE events over the eastern U.S., both of which were extremely high-impact in nature, due to record rainfall and catastrophic flooding.

In early September 2011, a plume of deep moisture associated with the remnants of Tropical Storm Lee spread northward across the eastern U.S., while its remnant circulation slowly decayed on its track through the Tennessee and Ohio Valleys. At the same time, distant Hurricane Katia slowly moved northward, well off the Southeast U.S. coast. The combined effects of these two systems on the large-scale and mesoscale environments were instrumental in forcing a nearly stationary band of excessive rainfall over MD, PA, and NY on 7-8 Sep. In early October 2015, a slow moving closed upper low formed near the eastern Gulf Coast. At the same time, a plume of deep moisture emanating from Hurricane Joaquin was directed towards the Carolinas. The result once again was a nearly stationary band of heavy rain, this time centered over South Carolina.

Key synoptic-scale similarities between these events will be discussed, including the effects of the two distant tropical cyclones (Katia and Joaquin). Newer satellite derived datasets will be used to illustrate the moisture contributions of Hurricanes Katia and Joaquin, most notably the CIRA Layered Precipitable Water product. In light of the unique nature of these cases, the possibility of an additional PRE conceptual model will also be examined.