Improving IDSS: Enhancing Forecaster Situational Awareness of Extreme Rainfall Events

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A group of NWS SOOs working with WPC has formed the first national team to explore methods to improve forecasting of challenging weather phenomena. For this project, the goal was to improve IDSS by increasing forecaster situational awareness leading up to the event. The team reviewed relevant literature, met with experts, and designed a tool concept that leverages both current data sources and those anticipated to be operationally available in the next couple years.

A key requirement for effective decision support is knowing what the potential impact of an event will be. Numerical guidance is often quite successful in identifying when it will rain, and how much rain will fall. The impact of rainfall is related to two additional factors: antecedent conditions and climatological significance. High impact and historic rainfall events often occur when these two components work together.

Components of antecedent conditions include dynamic fields such as soil moisture and streamflow, and static fields such as topography and soil types. These conditions directly relate to the potential for both flash and river flooding, and certain combinations can favor a rapid response to heavy rainfall. Flash flood guidance is often used to determine how quickly the run-off may produce flooding given a specific amount of rainfall.

The first iteration of the tool will focus on the climatological significance, while the program architecture allows for inclusion of antecedent conditions to be added in future versions when additional data (i.e., WRF Hydro, etc.) become available. The situational awareness tool concept and design will be discussed, and one or two cases demonstrating the methodology will be shown.