Northeast Convective Flash Floods: Helping Forecasters Stay Ahead of Rising Water

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Flash flooding (FF) is a common occurrence in the Northeast during the late spring and summer months. Days when FF associated with deep, moist convection occurs can be difficult to forecast, especially when determining whether the outcome will be widespread or isolated FF. There are many factors that contribute to FF, with both hydrologic and meteorological components. The main goal of this research is to better anticipate the meteorological environments that produce FF, especially during the watch phase of an event (typically 12-24 hours preceding FF). Another objective is to identify factors that may help forecasters distinguish days with widespread FF as opposed to isolated FF.

Thirty-nine FF events within the Albany County Warning Area (CWA) during the warm seasons (May-September) of 2003-2009 were investigated. FF events associated with tropical systems were not included in this study. Events were classified by the dominant synoptic scale feature in place when FF occurred. Also, various sounding-derived parameters were compiled and will be shown for each event. Composites for select synoptic scale features were plotted and stratified by days with widespread FF vs. days with isolated FF.

Results indicated little difference for most parameters comparing days with widespread FF vs. isolated FF. The maximum 0-3 km winds were somewhat stronger for widespread events (average of 19 kts for widespread compared to 15 kts for isolated), but little else yielded concrete results. However, notable signatures were evident in some composite plots of synoptic scale features, including 250 hPa zonal mean wind, 500 hPa geopotential height anomaly, and 850 hPa meridional wind anomaly. These signatures will be shown in the presentation.

Initial results have shown a strong relationship between cut-off lows and widespread FF. Also, based on observed sounding data preceding FF, most events exhibited a veering wind profile in the lowest 3 km and unidirectional flow in the 3-6 km layer. Other findings will be presented as well, including observations from storm-scale analyses of all FF events studied.