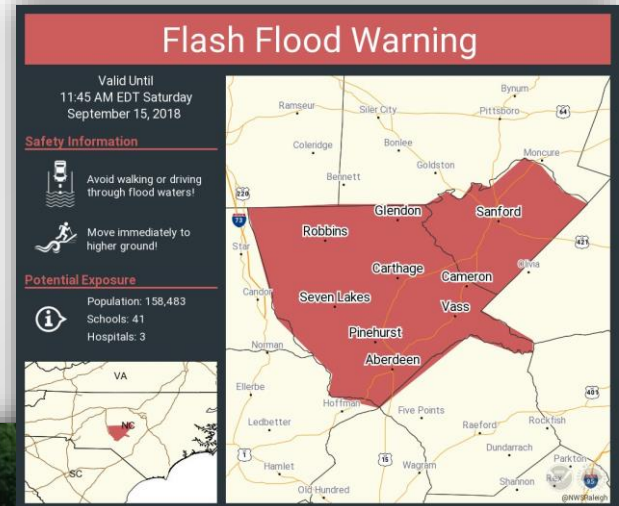


# Developing an Enhanced Flash Flood Climatology for Central North Carolina

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# The need for a climatology

- Synoptic and mesoscale weather patterns for flash flooding are well known - how do they apply to central North Carolina?
- Flash floods impacts can vary in scale and severity - where are the hot spots?
- Reducing the size of Flash Flood Warnings is difficult - can we provide greater detail of flood prone areas in Flash Flood Warnings?

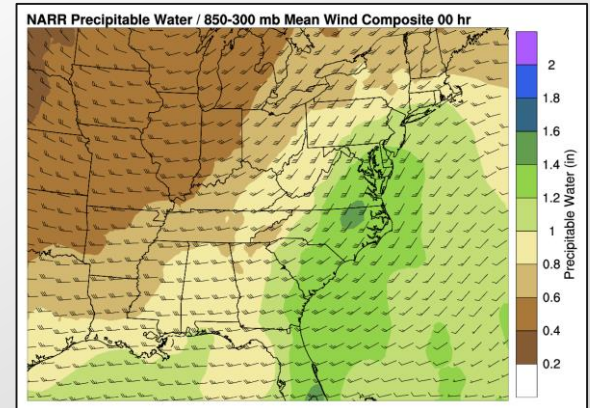
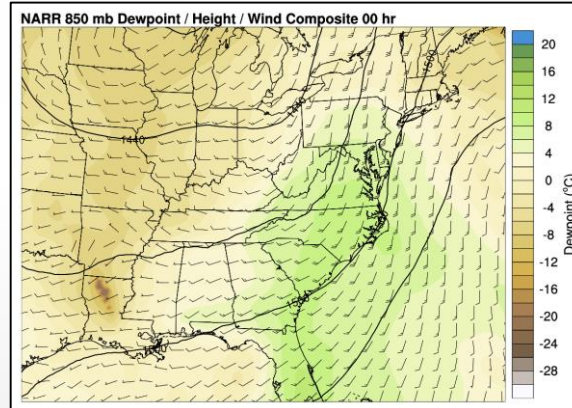
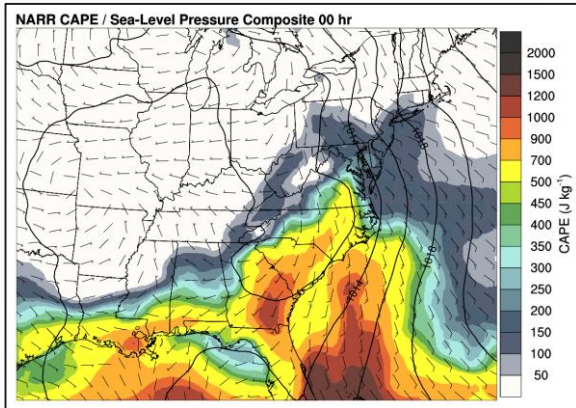
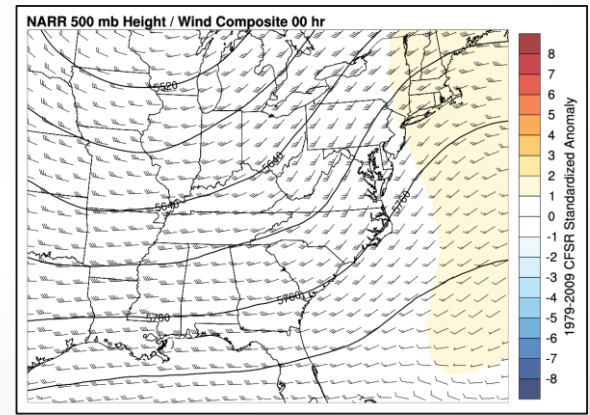
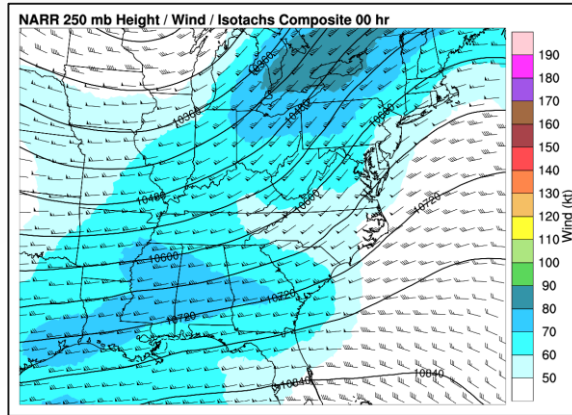


# The Process

- Rigorous review of all flash flood reports from 2008 - 2020 via StormData (~750 in total)<sup>1</sup>
- Reports were initially sorted by month, and then cross-referenced and attributed to individual weather events resulting in flash floods.
- After QC, 570 reports were mapped via ArcMap and uploaded to AWIPS to identify repetitive flooding and hot spots
- The North American Regional Reanalysis (NARR) was used to analyze the individual cases
- Each case analyzed using traditional surface and upper-level parameters from 24 hours prior up to the time flash flooding reports;
- Composites maps for case subsets were created, starting with monthly/seasonal categories

<sup>1</sup> NWS Raleigh Science and Operations Officer, along with two NC State student volunteers

# Pattern Composites (April example)



Note: This study does not yet include antecedent soil moisture conditions

National Weather Service - Raleigh, NC







# Next Steps

- Expand composite maps to each season, including summertime convective regimes, and also further analysis to identify diurnal peaks in flash flooding
- Coordinate with emergency management across central NC to confirm and refine flooding hotspots derived from the catalog of reports
- Integrate into AWIPS (Hazard Services) for use in Flash Flood Warnings