ATS 641

Mesoscale Meteorology

Lab Exercise 4

March 27, 2023
(Due Friday, April 14, 2023)

Analysis of a severe weather event; and numerical modeling of convective storms

Part 1: On 24-25 March 2023, there was an outbreak of severe weather in the southern US, including the devastating long-track tornado that moved through western Mississippi. (Fig. 1).

For this question, please conduct a brief but thorough case study of this severe weather event. Frame your analysis on the "ingredients-based methodology" for severe and tornadic convection on this day, and why the severe weather occurred in the locations it did, and ideally why the different hazards occurred where they did (i.e., why were tornadoes favored in some locations, and wind in others). Feel free to use any available information. At a minimum, include one or more synoptic maps, thermodynamic soundings, and hodographs, from either observations or model-based analyses. Use supporting evidence for your claims as much as possible, i.e., don't simply say "SPC predicted there would be severe weather...". It may be helpful to consult Dave Schultz's paper "How to Research and Write Effective Case Studies in Meteorology," which is linked in the "Articles" section of the class website, when putting together your case study. A length of ∼3 pages with 3-5 figures is good to aim for; please don't make it excessively long.

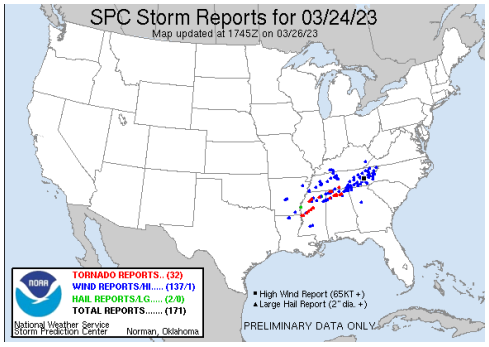

Figure 1: Storm reports from 24-25 March 2023. Obtained from the Storm Prediction Center.

Part 2: Part 2 involves the numerical simulation of convective storms, with instructions found at `https://russ-schumacher.github.io/ats641_spring2023/lab4.html`