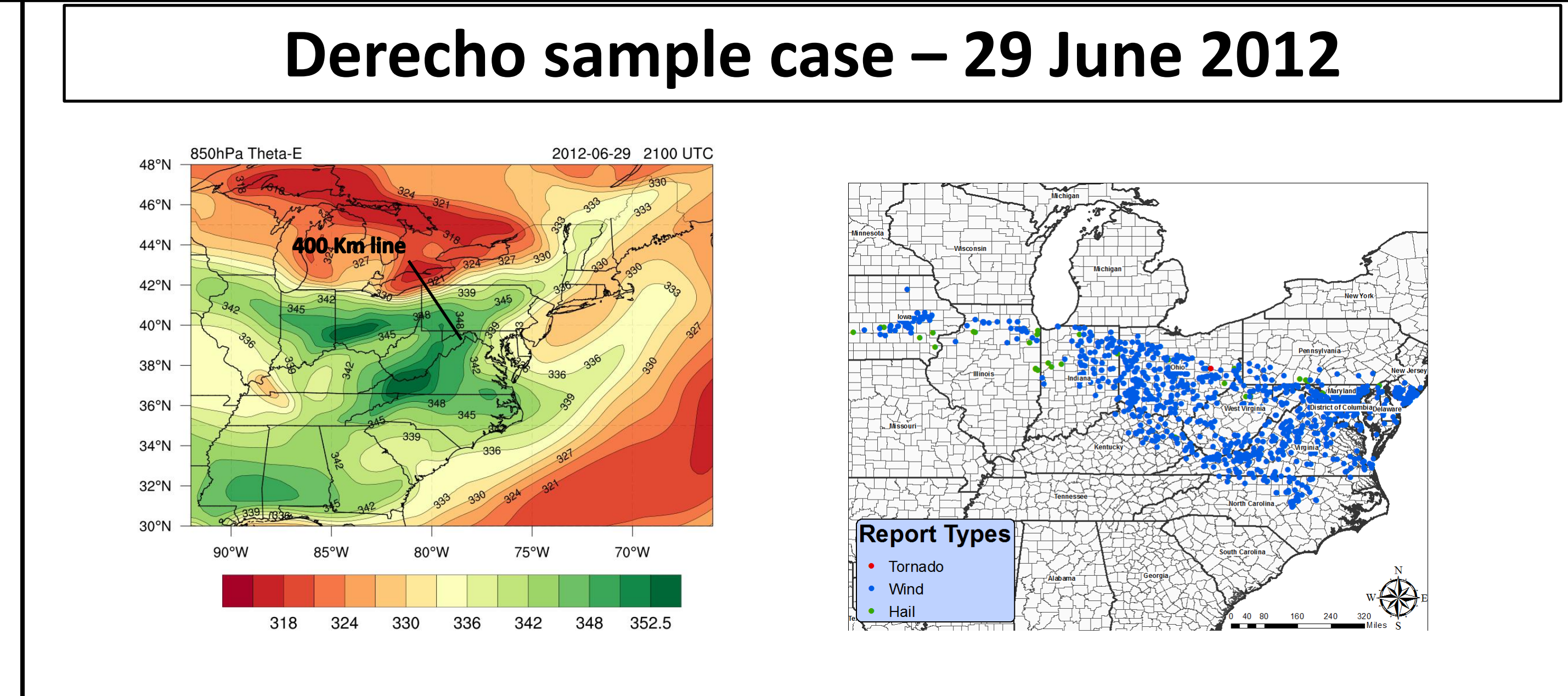
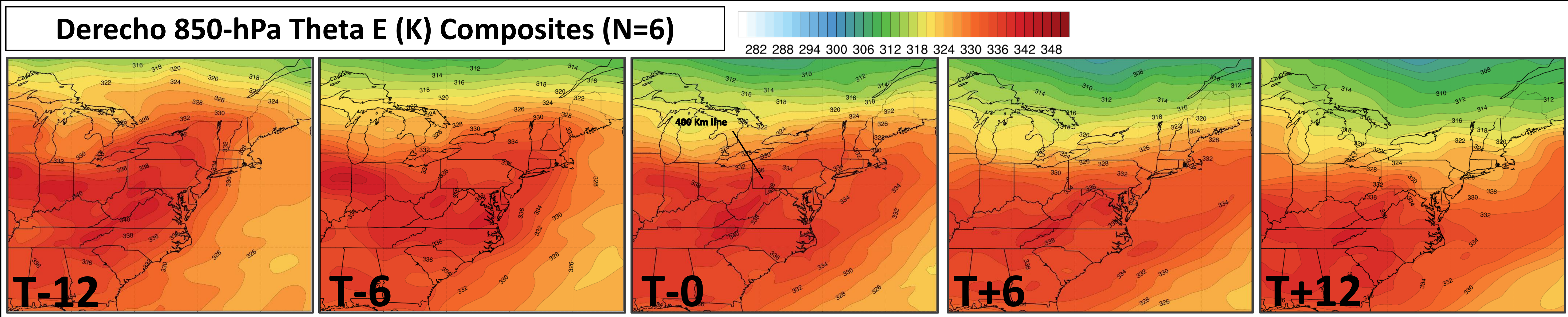
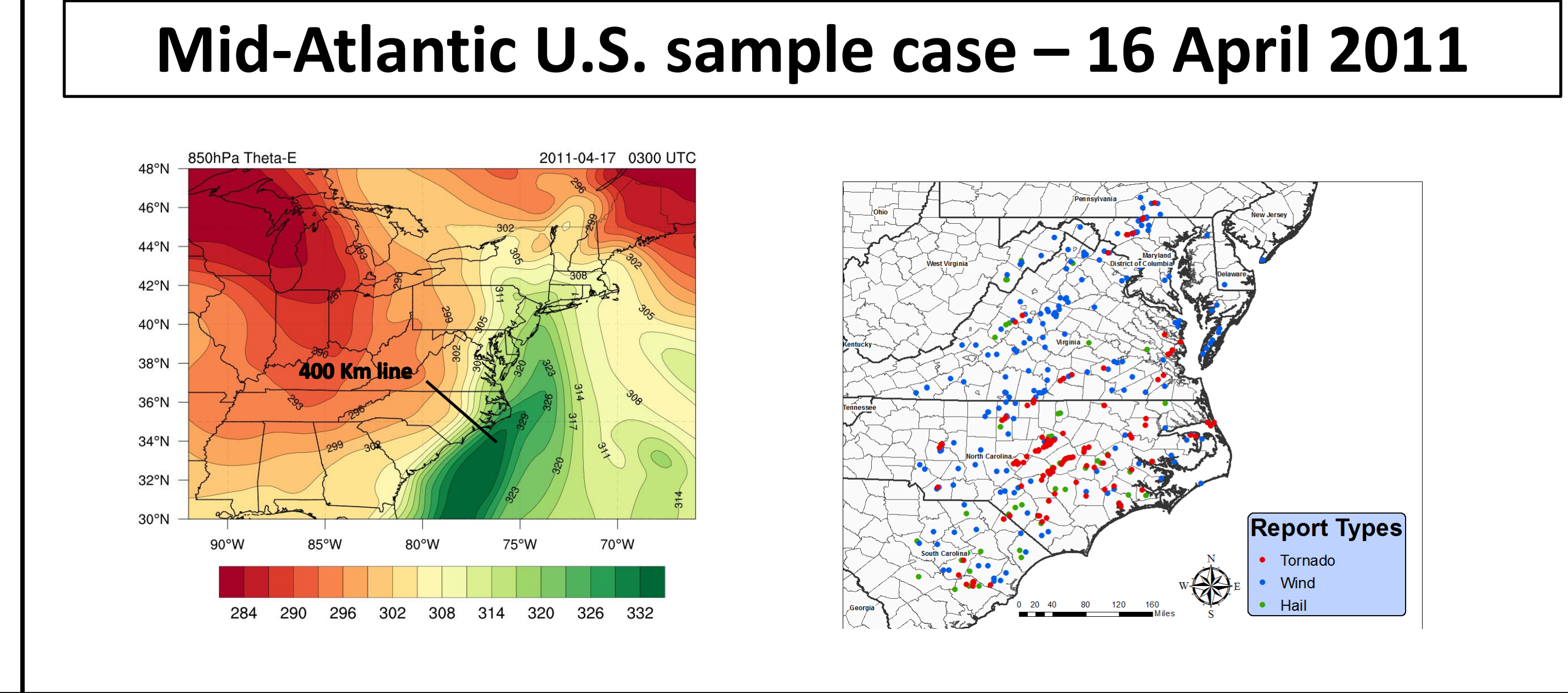
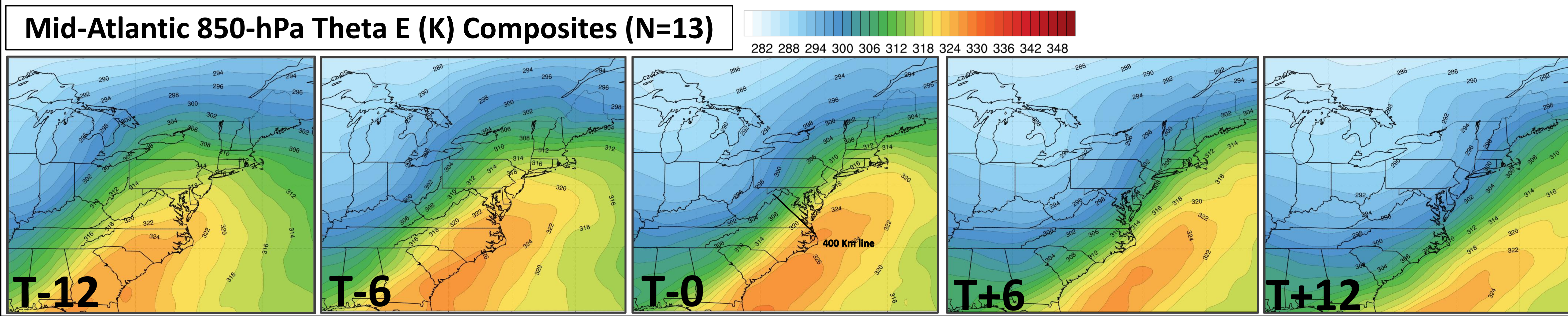
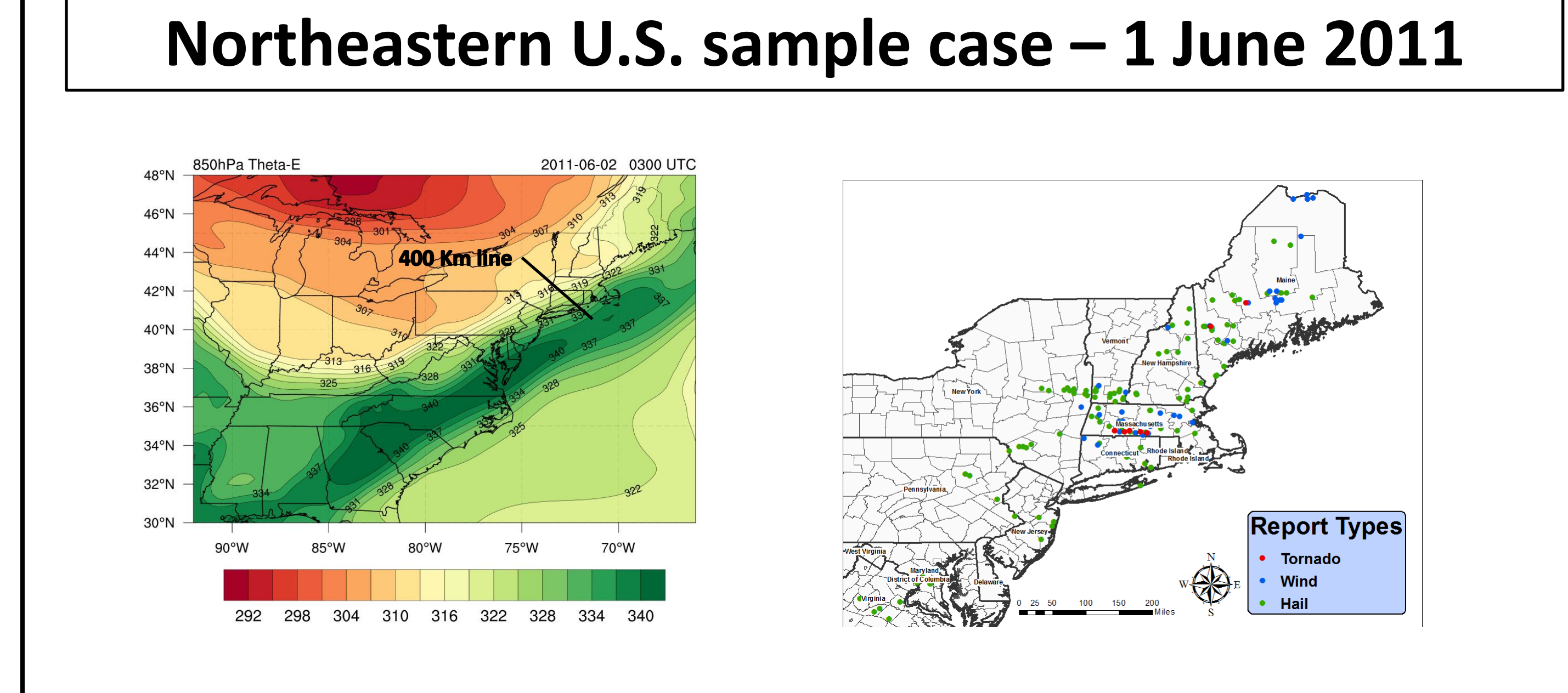
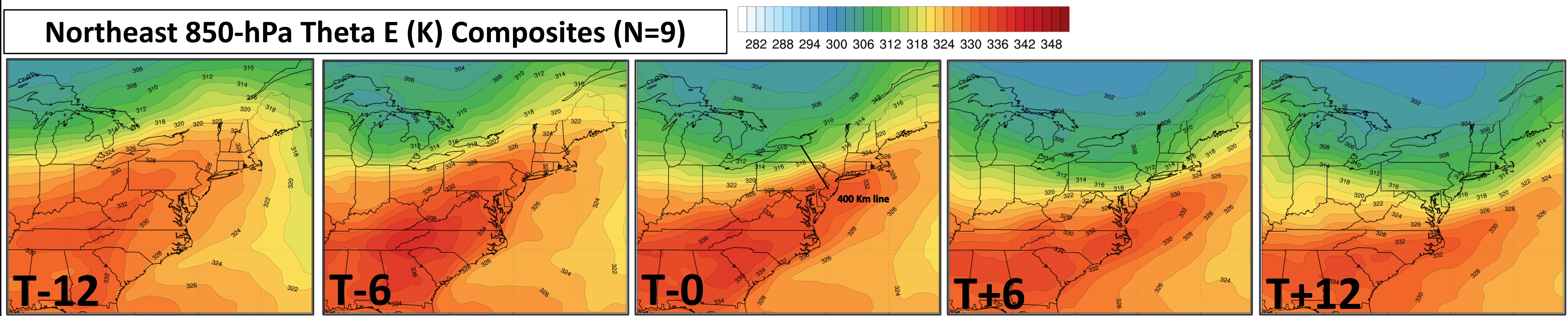


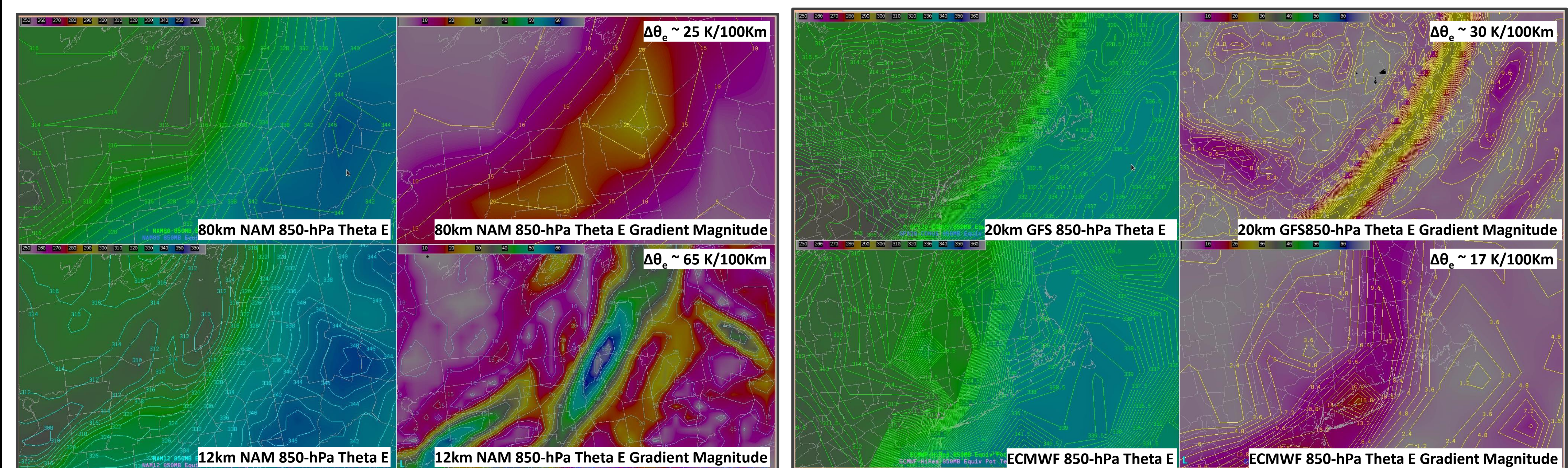
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### $\theta_e$ gradient Vs. $\Delta\theta_e$

Note the differences in magnitudes of gradients based on the resolution



### Previous Work and Summary

- ✓ Previous research identified several factors supporting significant severe weather outbreaks
  - ✓ Elevated mixed layer with surface-based Lifted Indices exceeding -2
  - ✓ Wind core at 850-hPa  $\geq 35$  Kt
  - ✓ Gradient of  $\theta_e \geq 25K$  at 850-hPa
- ✓ Composites for northeast, mid-Atlantic U.S. and progressive derechos were produced
  - ✓ Composites show  $\Delta\theta_e \geq 20K/400$  Km
  - ✓ Individual cases showed  $\Delta\theta_e \geq 25K/400$  Km with localized  $\theta_e$  gradients  $\geq 25K/100$  Km
  - ✓  $\Delta\theta_e$  in units of K/400 Km is more representative of the synoptic scale density discontinuity than localized  $\theta_e$  gradients in units of K/100 Km
  - ✓ Low magnitude  $\Delta\theta_e$  depicted in the derecho composites due to the varying spatial positions of the  $\theta_e$  gradients for each case
- ✓ Future Work
  - ✓ Display magnitudes of  $\Delta\theta_e$  and  $\theta_e$  gradients in units of K/400Km for research and operational applications

Gradient magnitude is  $\Delta\theta_e$  in units of K/100Km, therefore small scale tight gradients exhibit inflated values

Need to display the  $\Delta\theta_e$  in units of K/400Km to resolve the synoptic scale density discontinuity