



The Nature and Variability of Ensemble Sensitivity Fields that Diagnose Severe Convection

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INTRODUCTION

Ensemble sensitivity reveals the flow features early in a forecast period that are dynamically relevant to the predictability of chosen high-impact events later in time. Here we attempt to provide an overview of such sensitivity fields over a 6-week period during the Spring of 2016 during the peak of severe weather season in the U.S. The main goal is to provide a more complete understanding of convective-scale sensitivity toward its use in forecasting tools that can improve probabilistic forecasts of high-impact events.

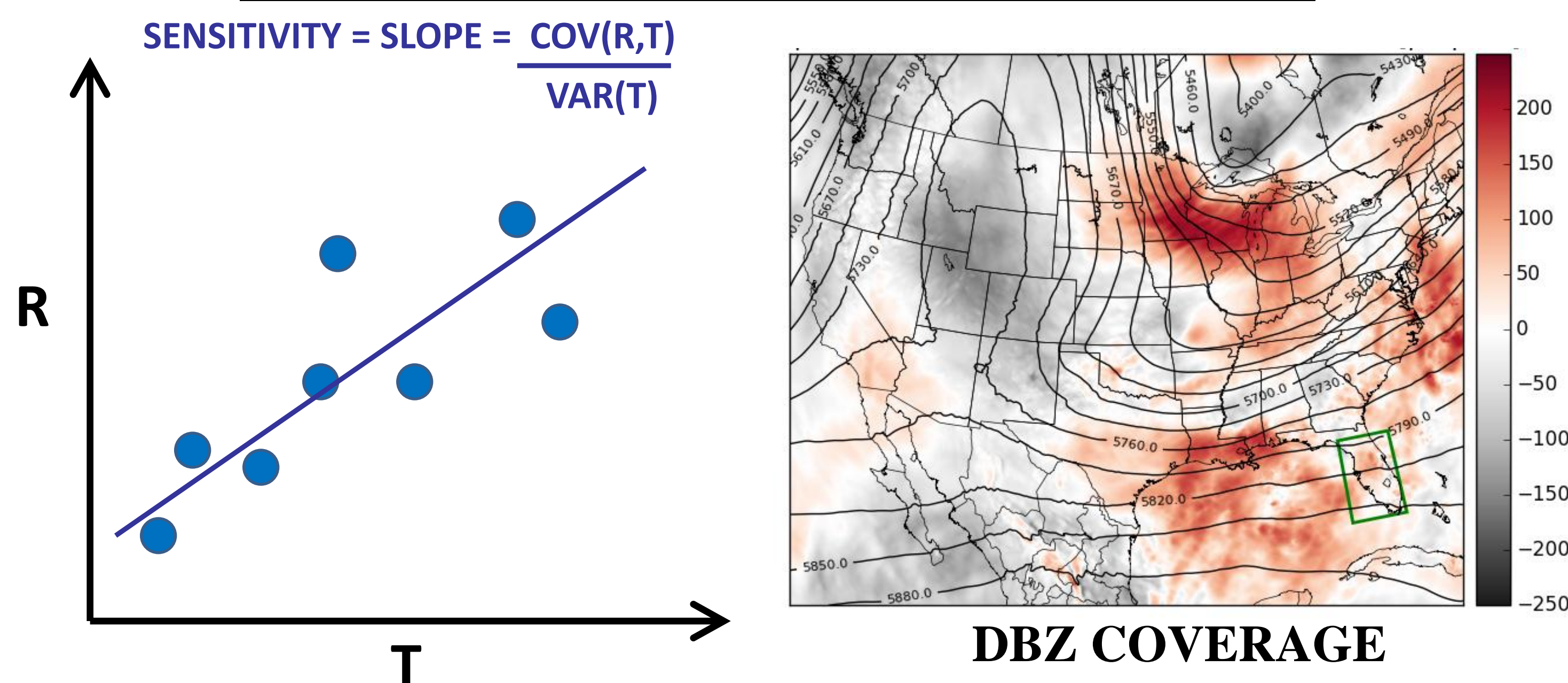
PROJECT BACKGROUND

The 2016 NOAA Hazardous Weather Testbed Spring Forecast Experiment

- 1) Convective response functions (48HR window) chosen in real time from May 2 – June 3:
 - Maximum Magnitude (dBZ, 2-5km UH, 10-m Wind)
 - Coverage (40 dBZ, 50 m²/s², 40 mph)
- 2) Sensitivity calculated with respect to 8 variables:

300 Wind Speed	500 GPH	700 Temp	700 Dewpoint
850 Temp	SLP	2-m Temp	2-m Dewpoint

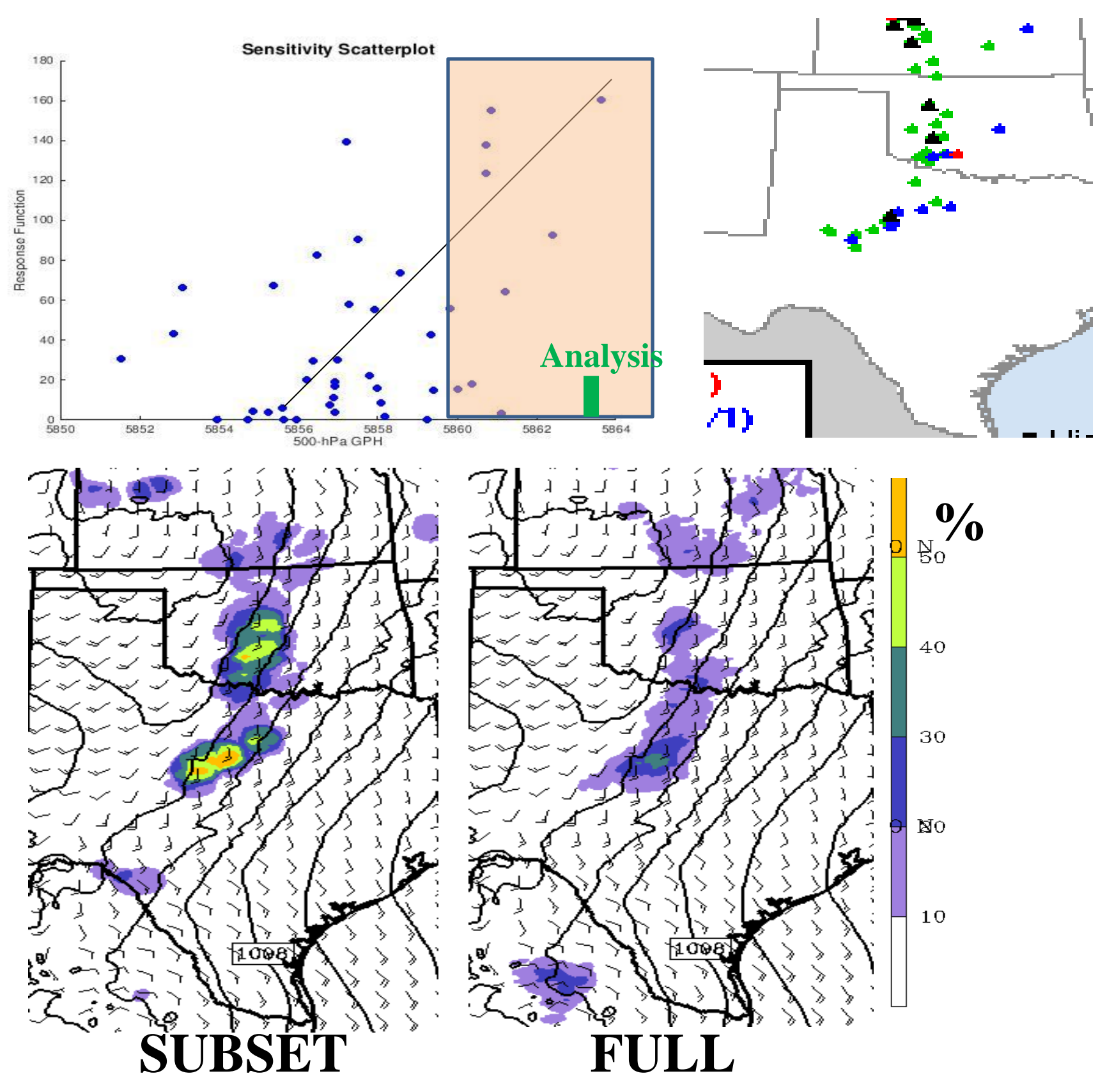
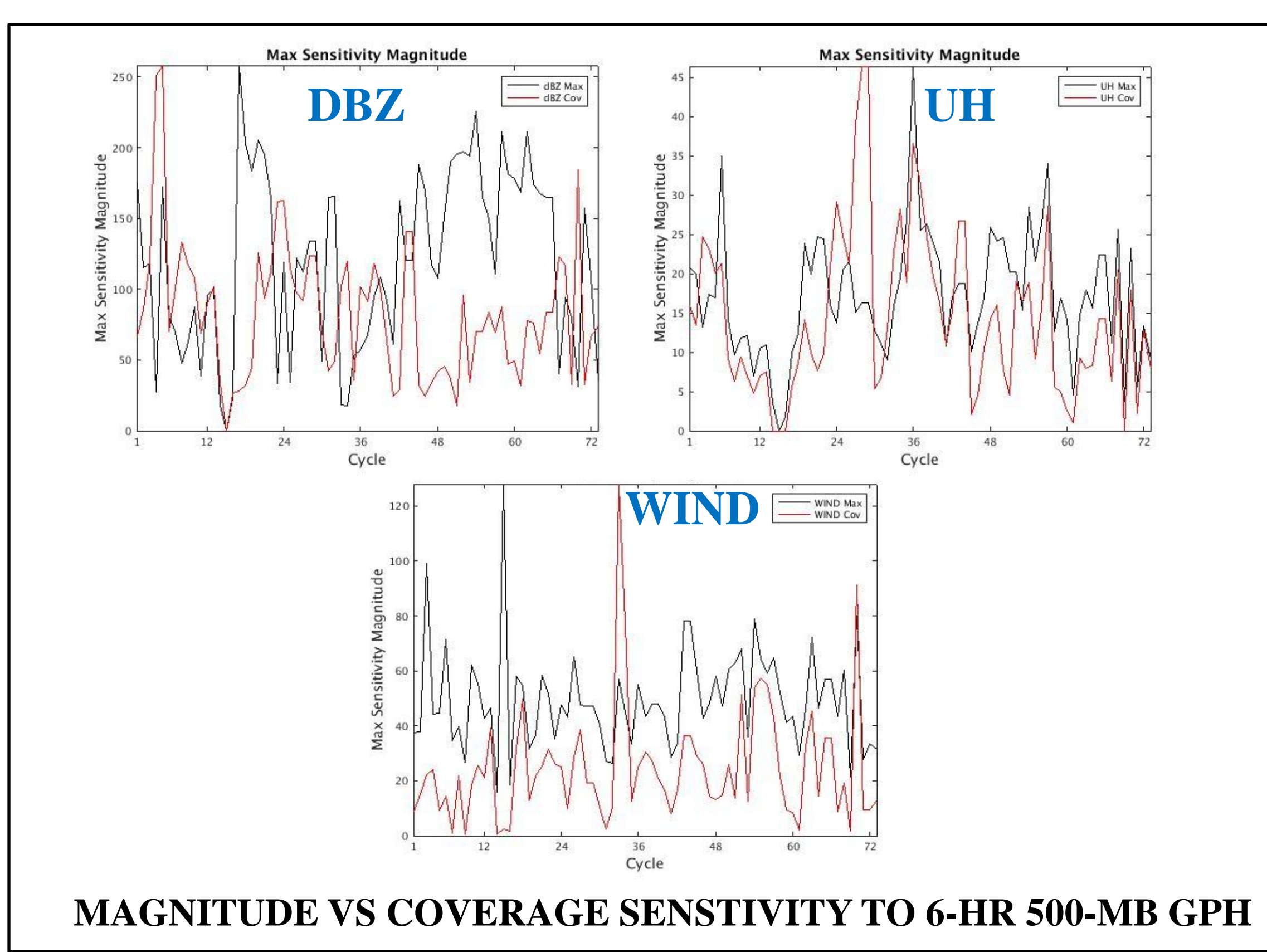
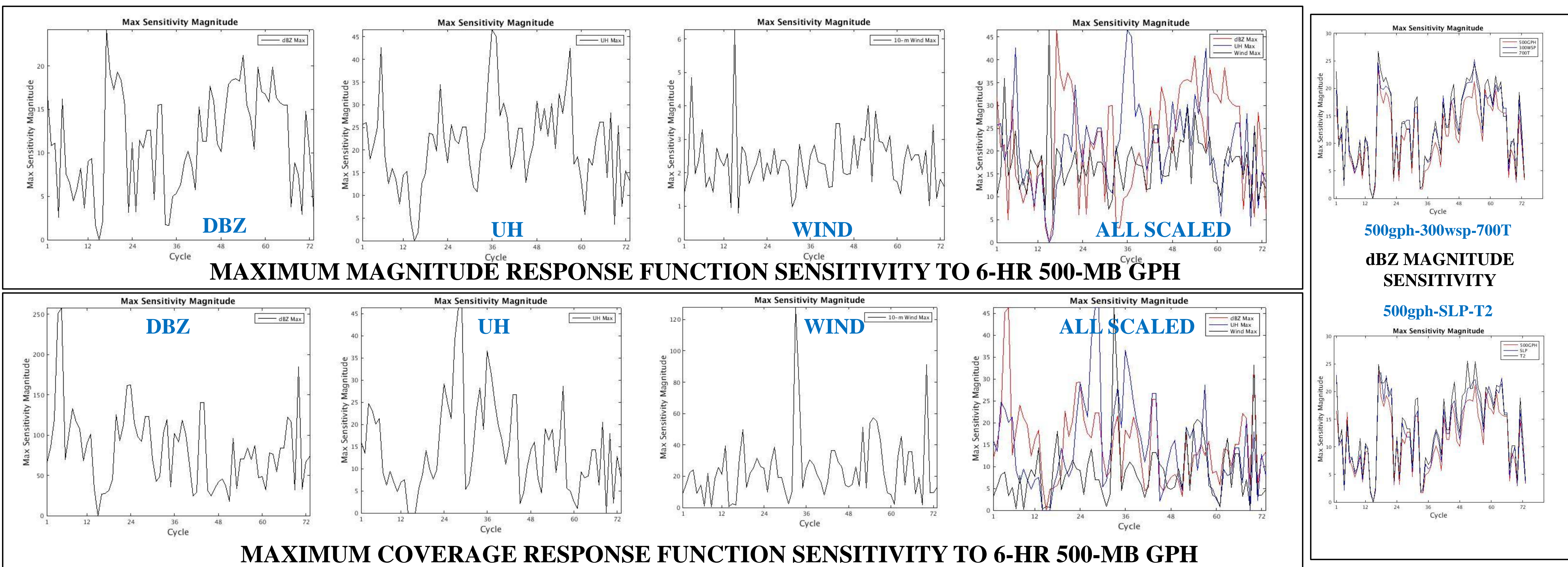
SENSITIVITY BACKGROUND



Specific Research Questions

- How do the magnitude and spatial nature of sensitivity vary from case to case?
- How does the variability of sensitivity change for different response variables?
- How does the variability of sensitivity change for different flow variables and levels?
- Can these results lead to sensitivity-based tools to improve forecast of specific aspects of severe storms (e.g. individual hazards, or mode)?

RESULTS



SUMMARY

- Magnitude and coverage response functions demonstrate large day-to-day variability for severe convection/hazards
 - The sensitivity of different severe hazards can often be different for an event
 - Sensitivity tends to be the same (relatively) at all vertical levels and for different variables for a given event
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