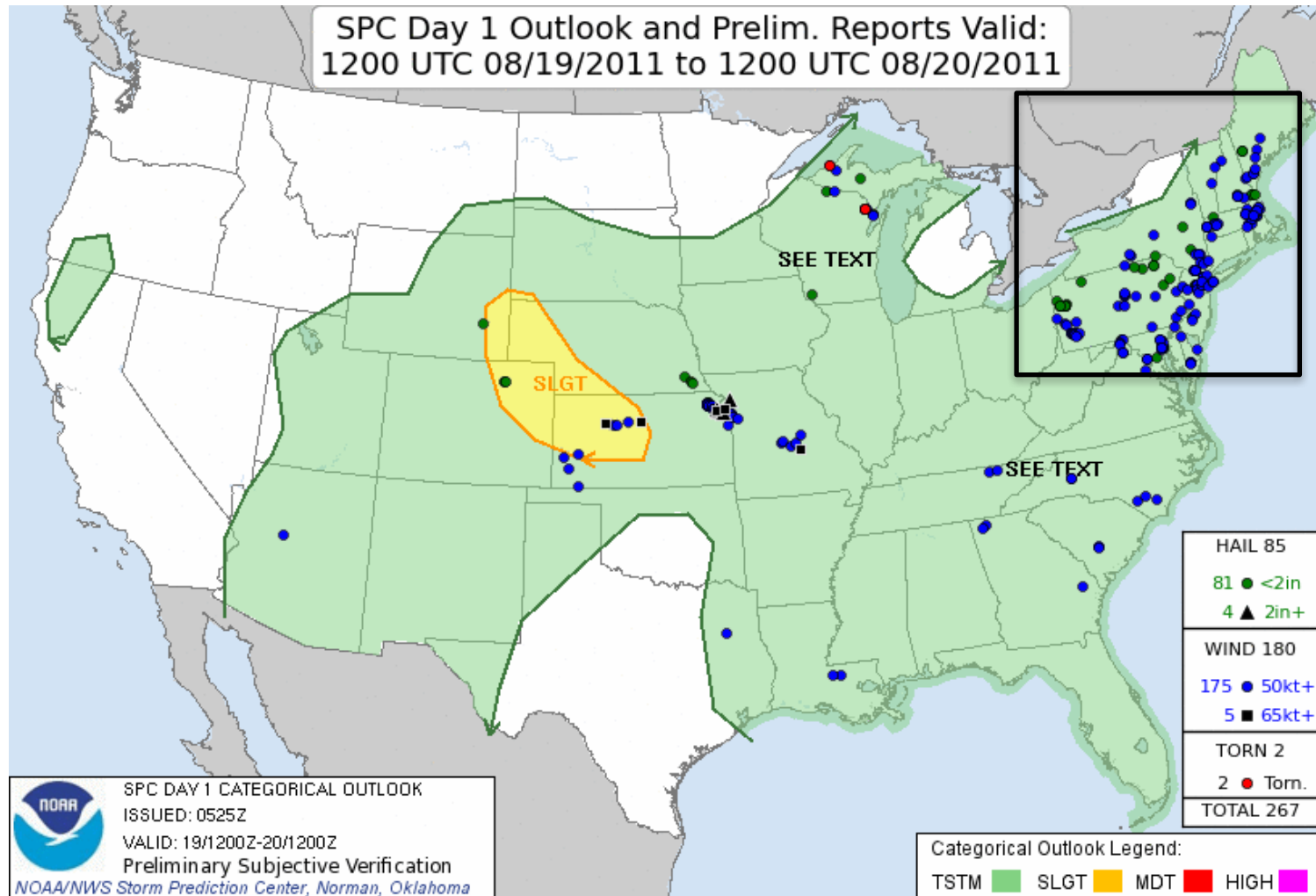


R2O

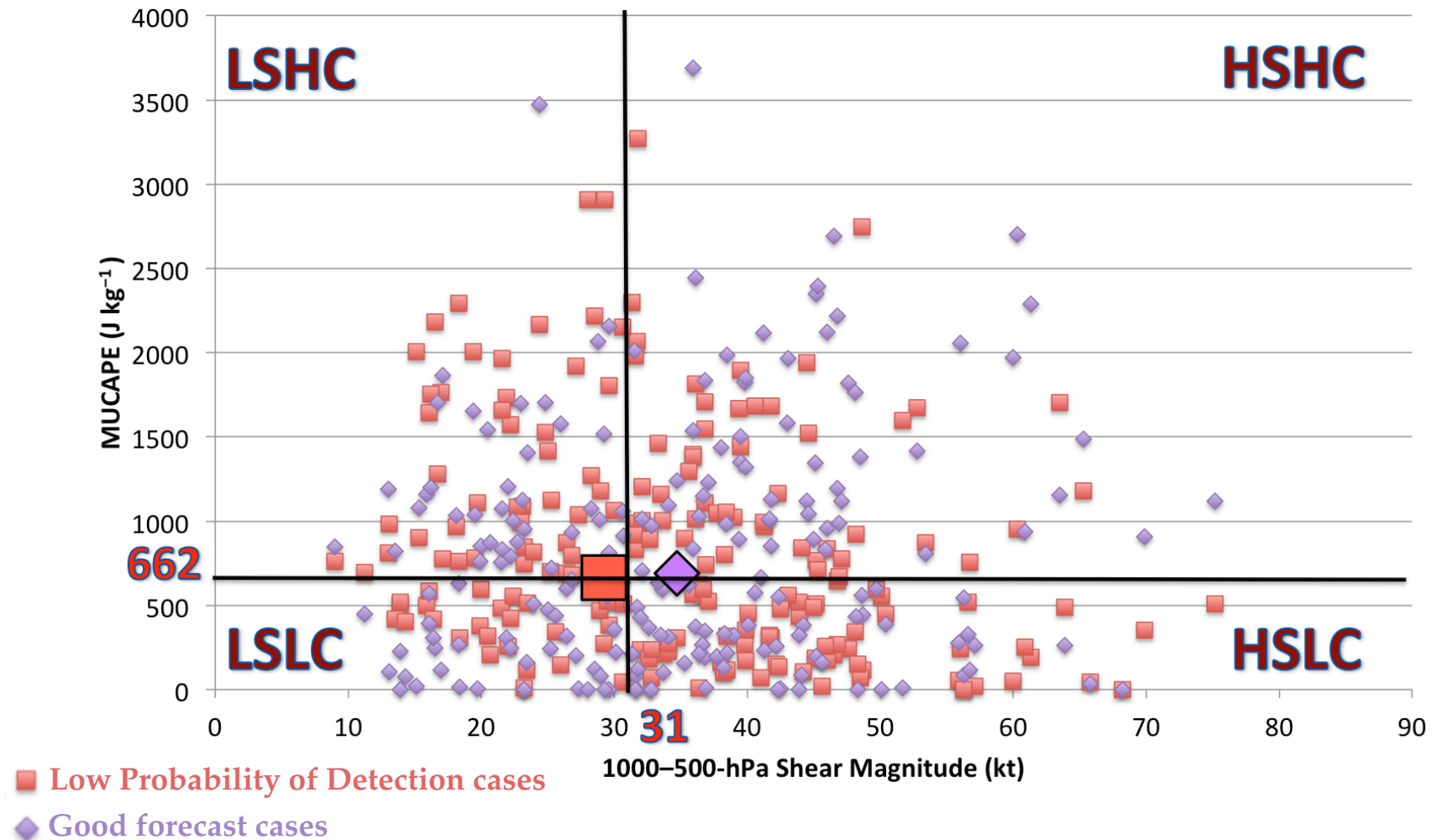
- In addition to theses, oral and powerpoint presentations...
- Short (approx. five page) PDF
 - Only results pertinent to operations
 - (e.g., no methodology, data used, etc.)
 - *Theses and other details available!*
- Annotated web video
 - Talk through operationally relevant results with supporting figures

Low probability of detection (POD) high impact event example

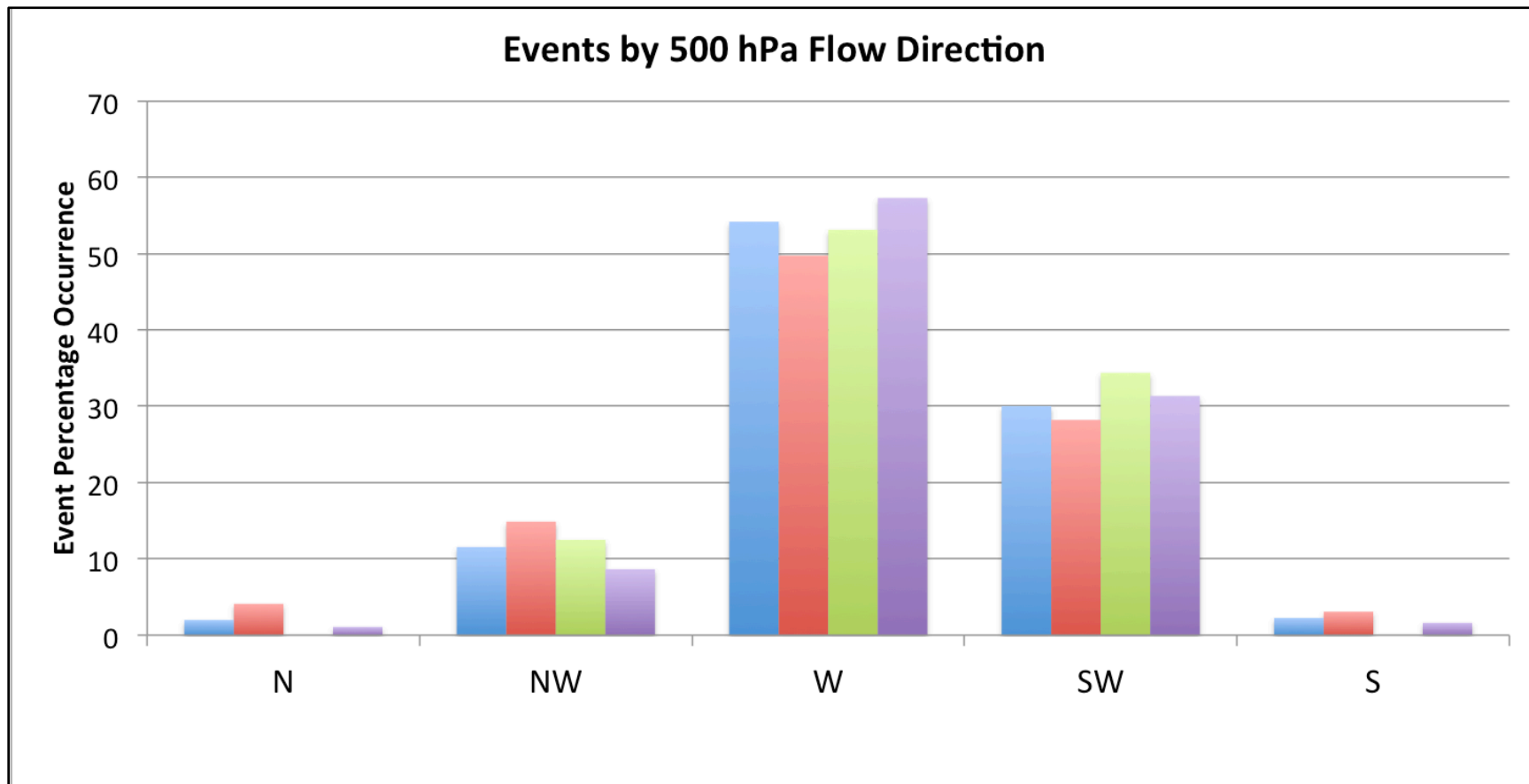


- What characterizes an event with low POD?
- What synoptic-scale patterns might represent such “overperforming” cases?

MUCAPE–Wind Shear Phase Space for case types



- Low POD cases are characterized as having less deep-layer shear than good forecast cases
- Associated with weaker upper-level winds and less synoptic-scale forcing for ascent

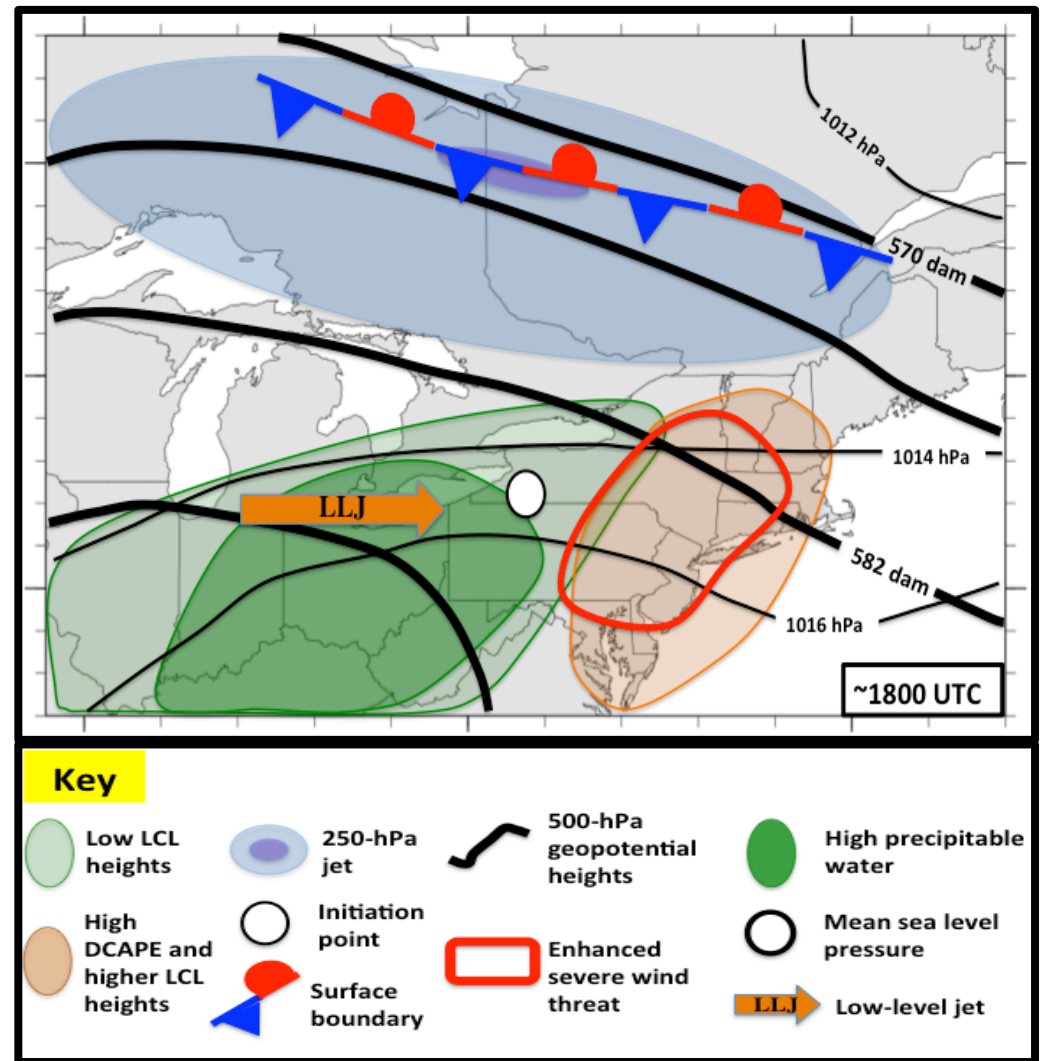


- High impact events
- Low Probability of Detection events (overperforming)
- High False Alarm Rate events (underperforming)
- Good forecast events

- **Low probability of detection** events are the most common type of *northwesterly 500-hPa flow* events

Low Probability of Detection – Northwesterly flow cases

- TS initiation upstream in high precipitable water environment on leading edge of a low-level jet (LLJ)
 - Equatorward of zonal jet and baroclinic zone
- TS moves into environment with high DCAPE and high LCL height (deep PBL)
- Despite weaker shear, **severe wind** threat enhanced





UAlbany CSTAR GEFS Forecast Differences

Ryan D. Torn, Kristen L. Corbosiero



Select GEFS initialization time

GEFS FORECASTS

Choose an initialization time

2016101118

Choose a forecast metric

- ✓ ALB Max. Temp.
- ALB Min. Temp.
- ALB Precip.
- BGM Max. Temp.
- BGM Min. Temp.
- BGM Precip.
- BUF Max. Temp.
- BUF Min. Temp.
- BUF Precip.

Select forecast metric

GEFS forecast initialized 1800 UTC 11 October 2016

48-72 h ALBANY PRECIPITATION

(VALID 1800 UTC 13 OCTOBER - 1800 UTC 14 OCTOBER)

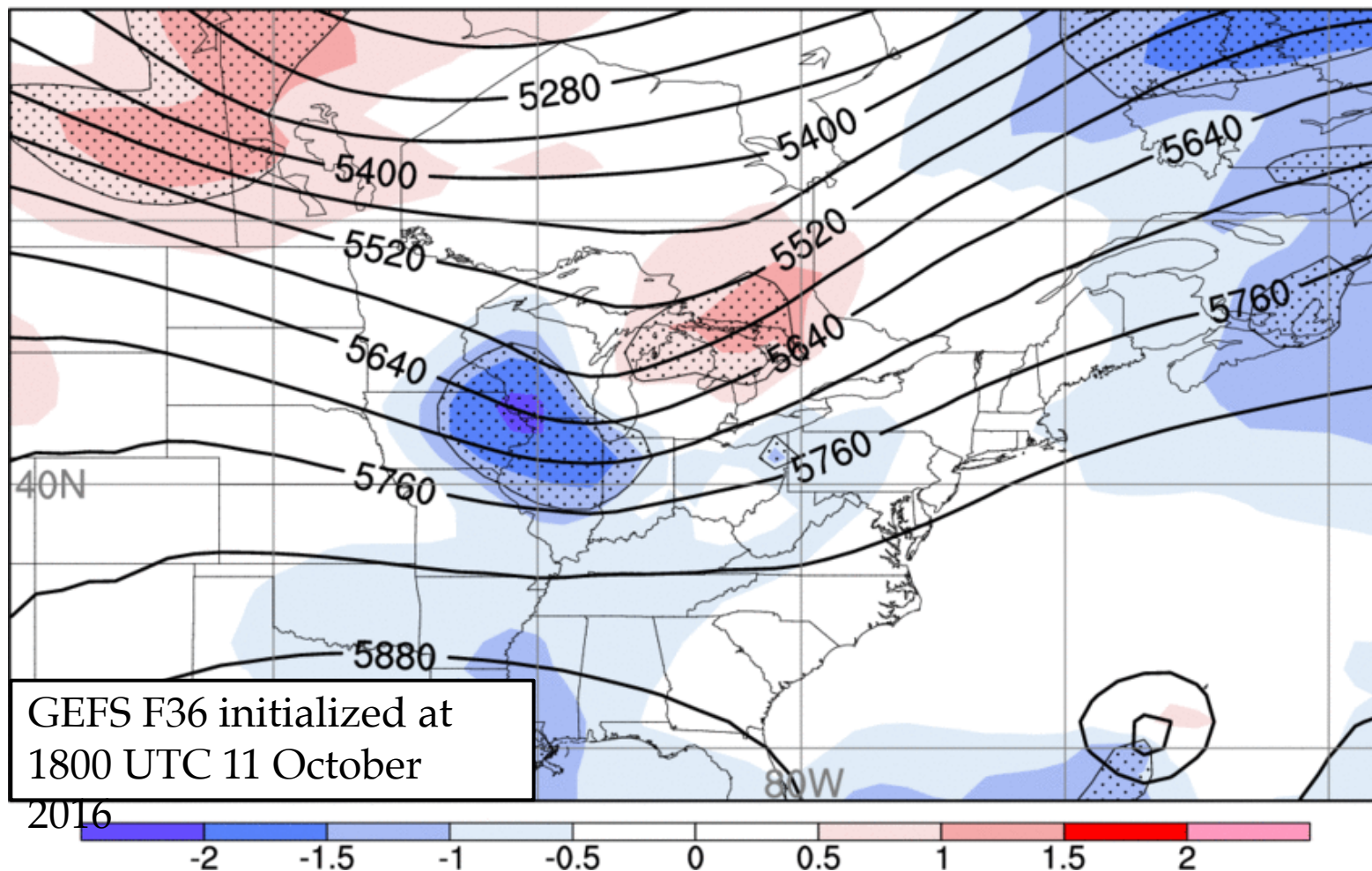
	000 h (11/18)	012 h (12/06)	024 h (12/18)	036 h (13/06)	048 h (13/18)	060 h (14/06)
500 hPa Height <i>500 hPa geopotential height (m).</i>						
Composite Diff.	000	012	024	036	048	060
Precipitable Water <i>Column-integrated precipitable water (mm).</i>						
Composite Diff.	000	012	024	036	048	060
850 hPa Temperature <i>850 hPa Temperature (C).</i>						
Composite Diff.	000	012	024	036	048	060
850 hPa Zonal Wind <i>850 hPa zonal wind (m/s).</i>						
Composite Diff.	000	012	024	036	048	060
850 hPa Meridional Wind <i>850 hPa meridional wind (m/s).</i>						
Composite Diff.	000	012	024	036	048	060

Composite difference variables for selected metric

Arrow keys for navigation | Space = play/pause | Swipe for navigation on touchscreen

500 hPa Height	0	12	24	36	48	60
Precipitable Water	0	12	24	36	48	60
850 hPa Temperature	0	12	24	36	48	60
850 hPa Zonal Wind	0	12	24	36	48	60
850 hPa Meridional Wind	0	12	24	36	48	60

Metric: Total precipitation at KALB between F48-F72



Normalized 500-hPa height difference between the mean of the five members with the largest metric value (ALB precip), and the mean of the five members with the smallest metric value

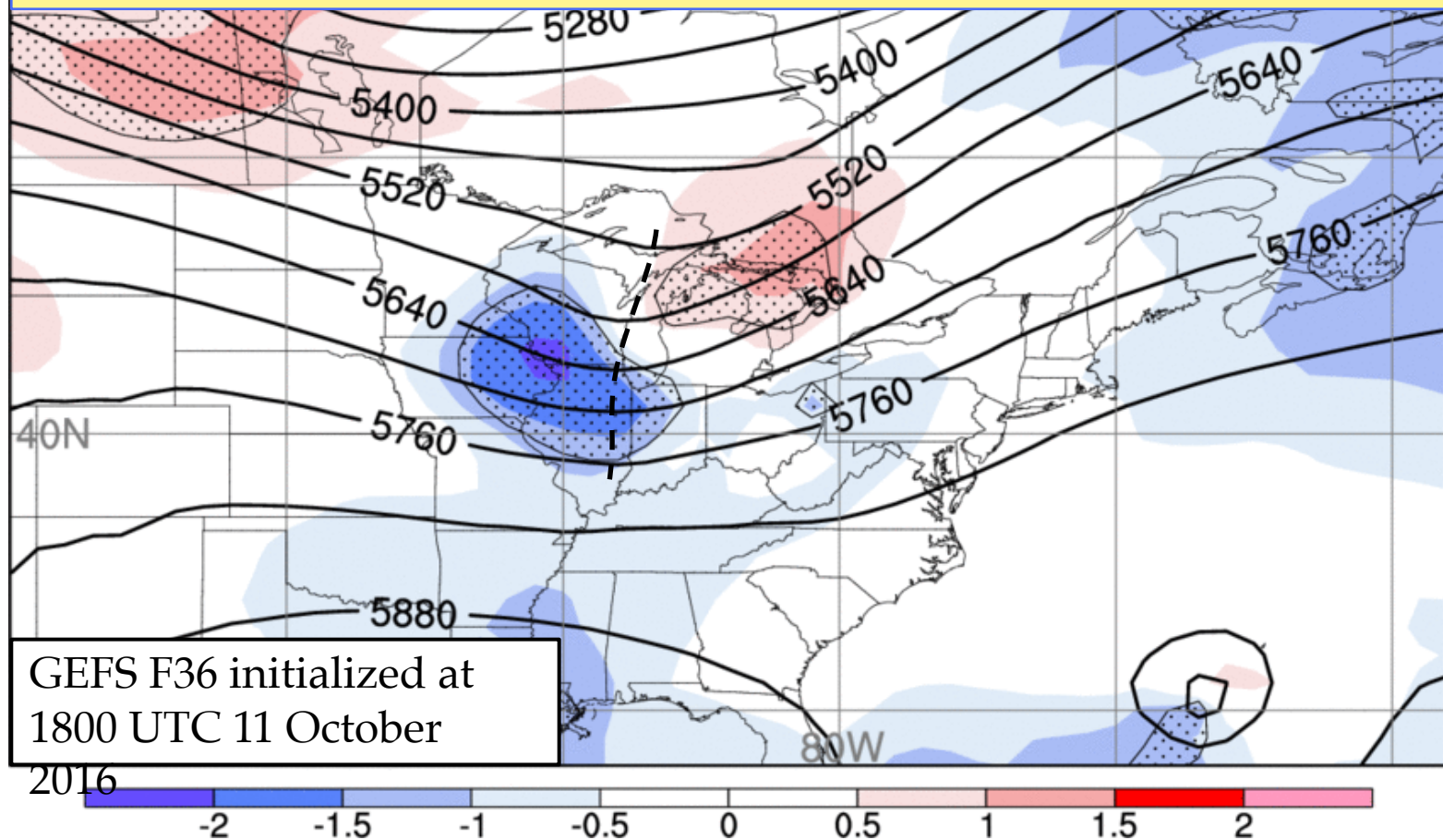
Blue shading – Wetter members have lower 500-hPa heights (stippling = 95% statistical significance)

Red shading – Wetter members have higher 500-hPa heights (stippling = 95% statistical significance)

Black contours – GEFS mean 500-hPa height (m)

Metric: Total precipitation at KALB between F48-F72

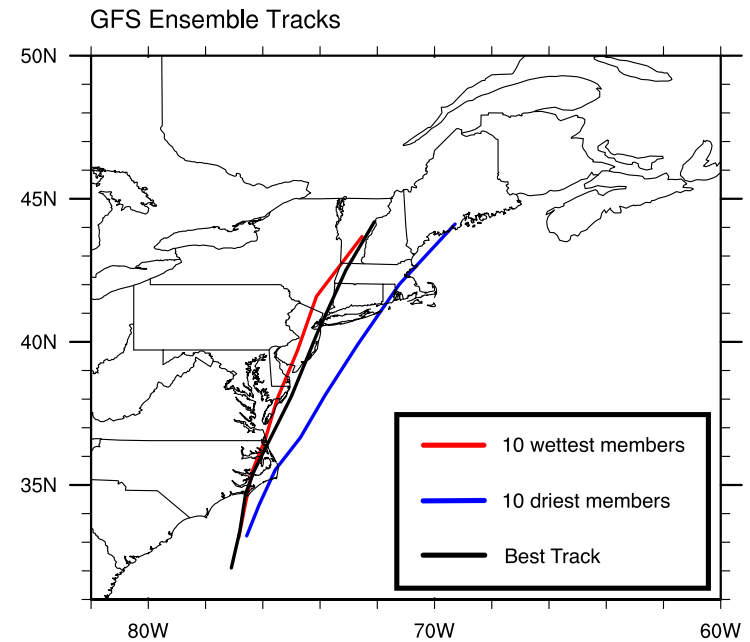
How can a forecaster use this information?



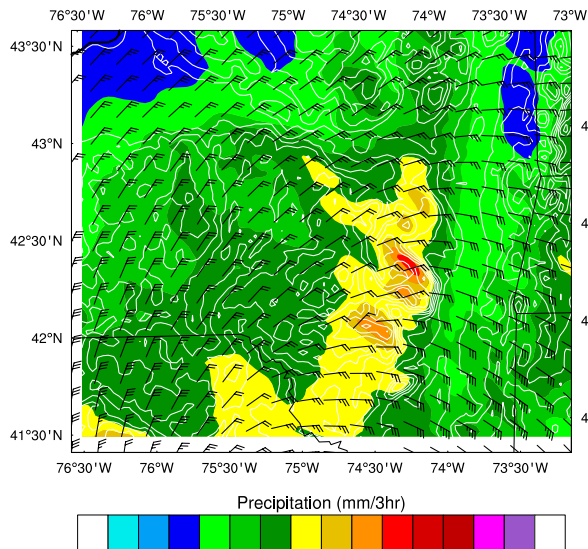
- A **deeper, slower** 500-hPa shortwave trough at F36 results in **more precipitation** at KALB between F48-F72
- Forecasters can easily track the timing of this shortwave in successive model simulations, having a better understanding of its implications on KALB precipitation

Hurricane Irene – 28 August 2011

- 10 wettest GEFS members in Catskill region have a track farther west than 10 driest GEFS members (right)
- Track differences appear to be a result of how upstream potential vorticity within interacting trough
- 3-km WRF ensemble (below) continues to show dramatic differences in Catskill precipitation due to subtle differences in Irene's track

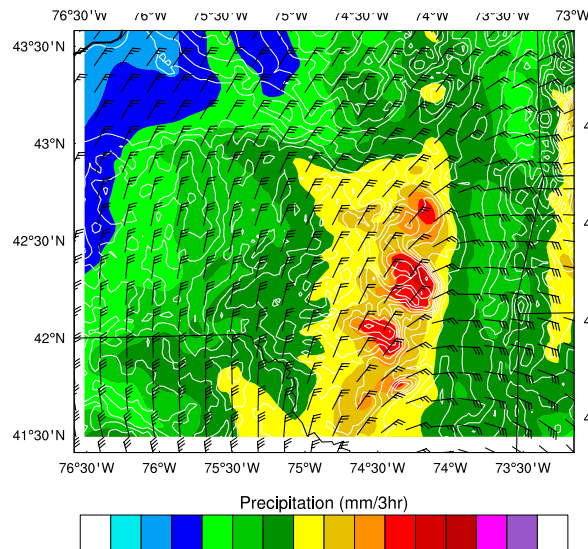


Western members



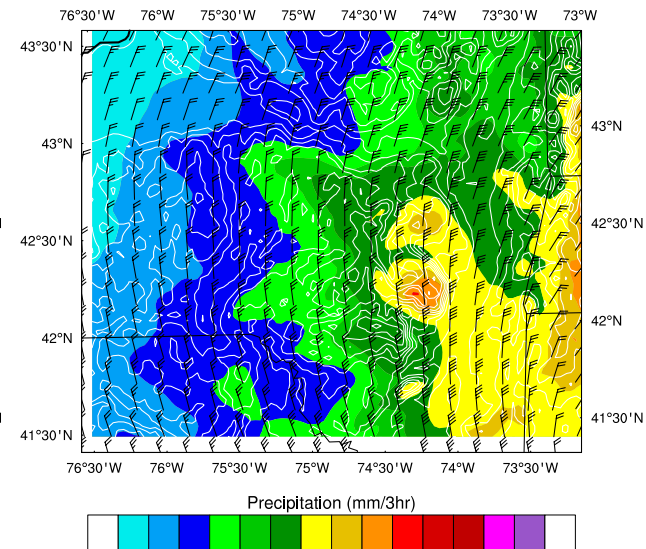
Easterly

Central members



Northeasterly

Eastern members



Northerly

Low-level flow direction during heaviest precipitation