

11th Annual AMS Student Conference

A 2011 Comparison of Models, Soundings, and Radar At Valparaiso University

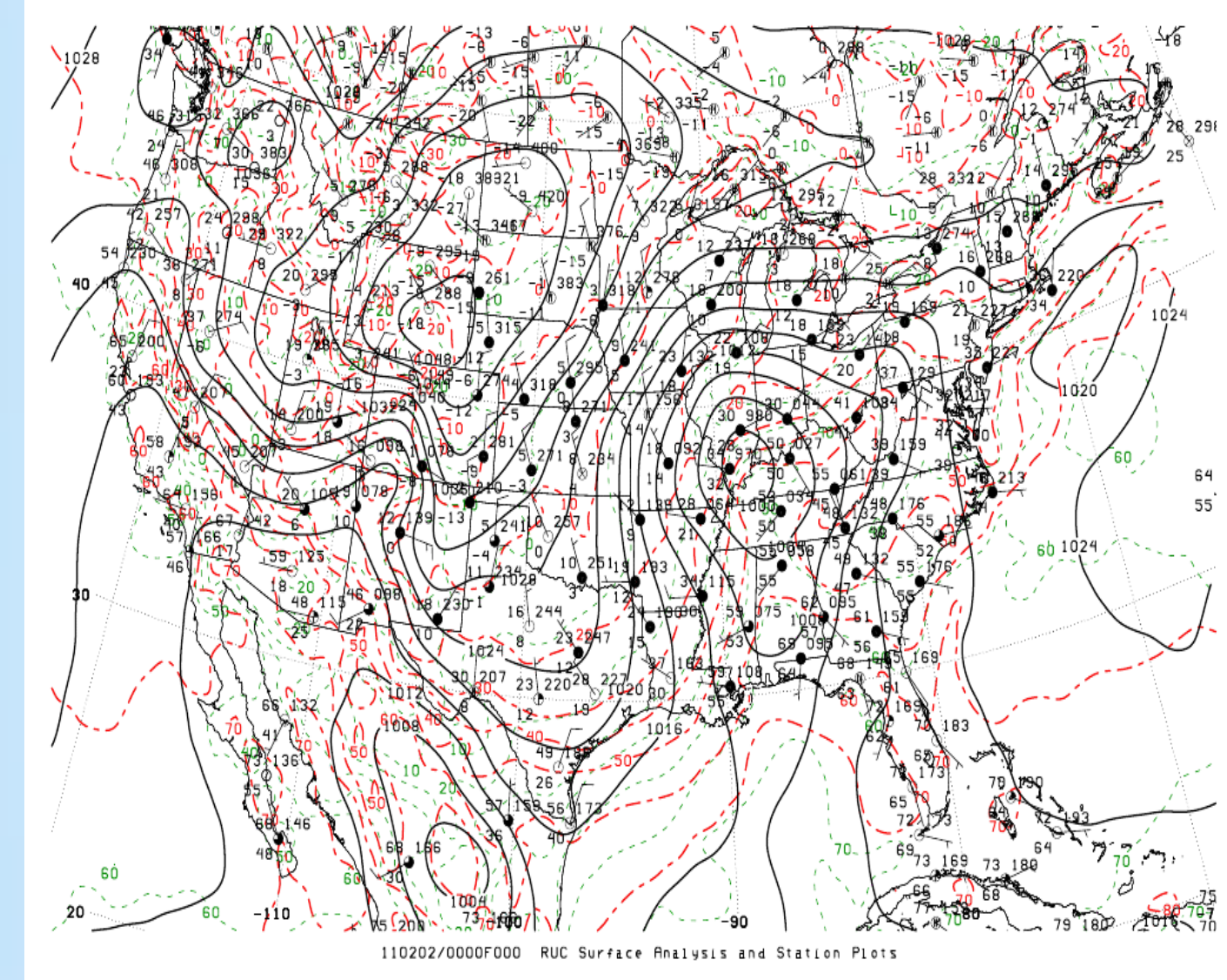
Ian Lee, Sarah Al-Momar, Travis Elless, Kevin Goebbert, Adam Stepanek, Raquel Evaristo, Teresa Bals-Elsholz, Anthony Lyza, Bart Wolf
Valparaiso University, Valparaiso, Indiana

GROUNDHOG DAY BLIZZARD 1-2 FEBRUARY 2011

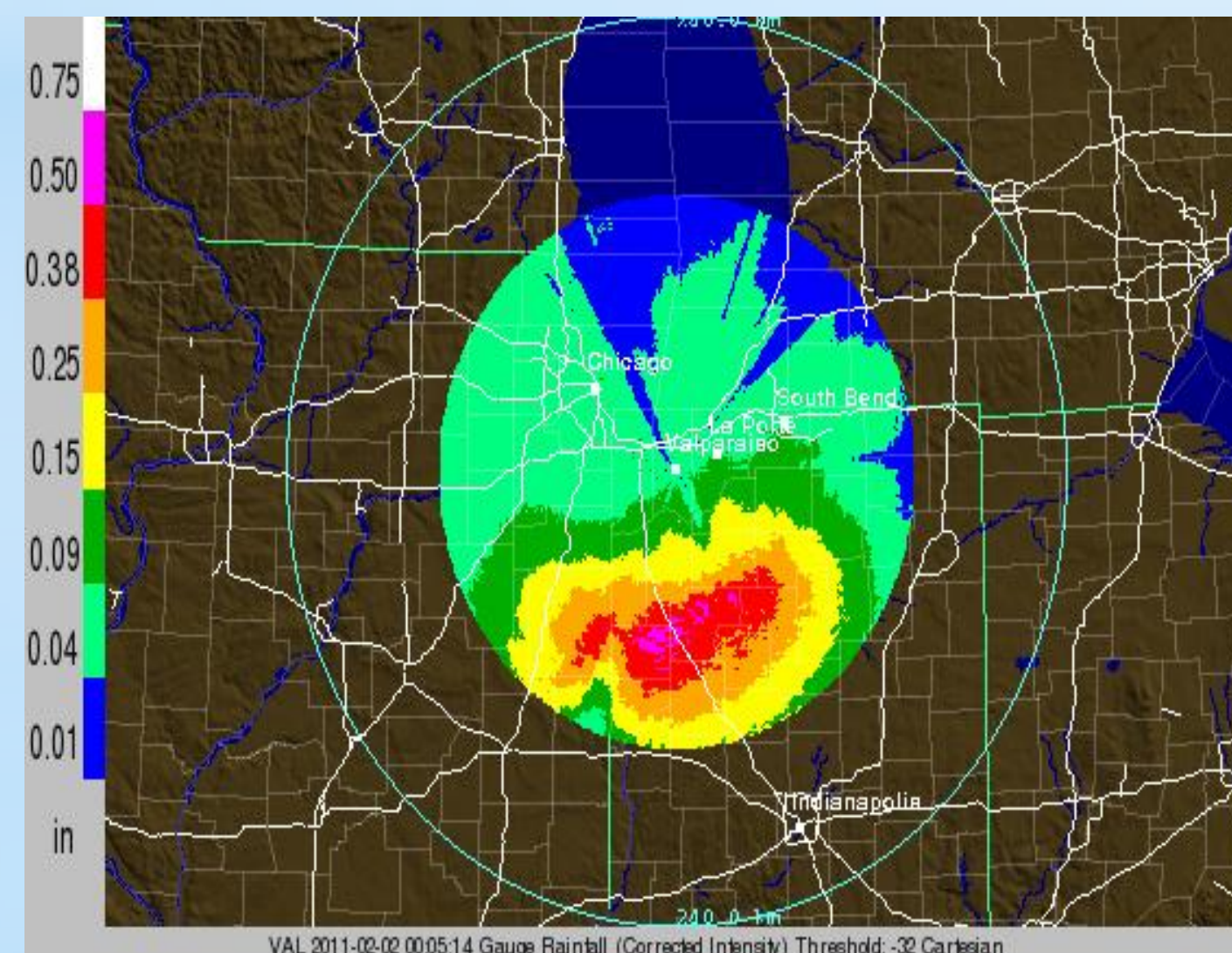
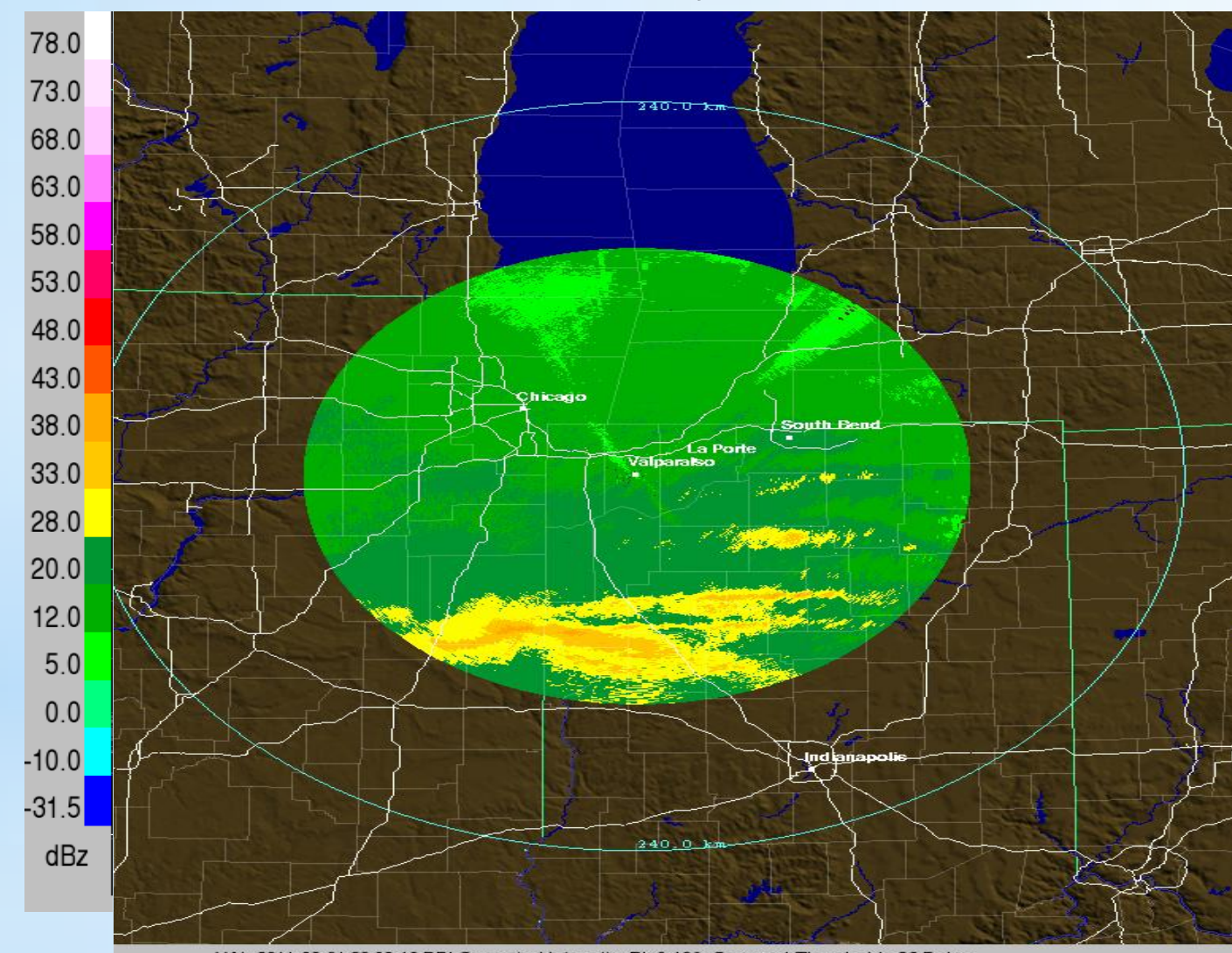
- WAA and differential CVA in left-exit region of jet resulted in synoptic-scale lift
- Broad area of precipitation
- 8-16" of snow (heavier with lake-enhanced)

2 FEB. 2011 OBSERVATIONS

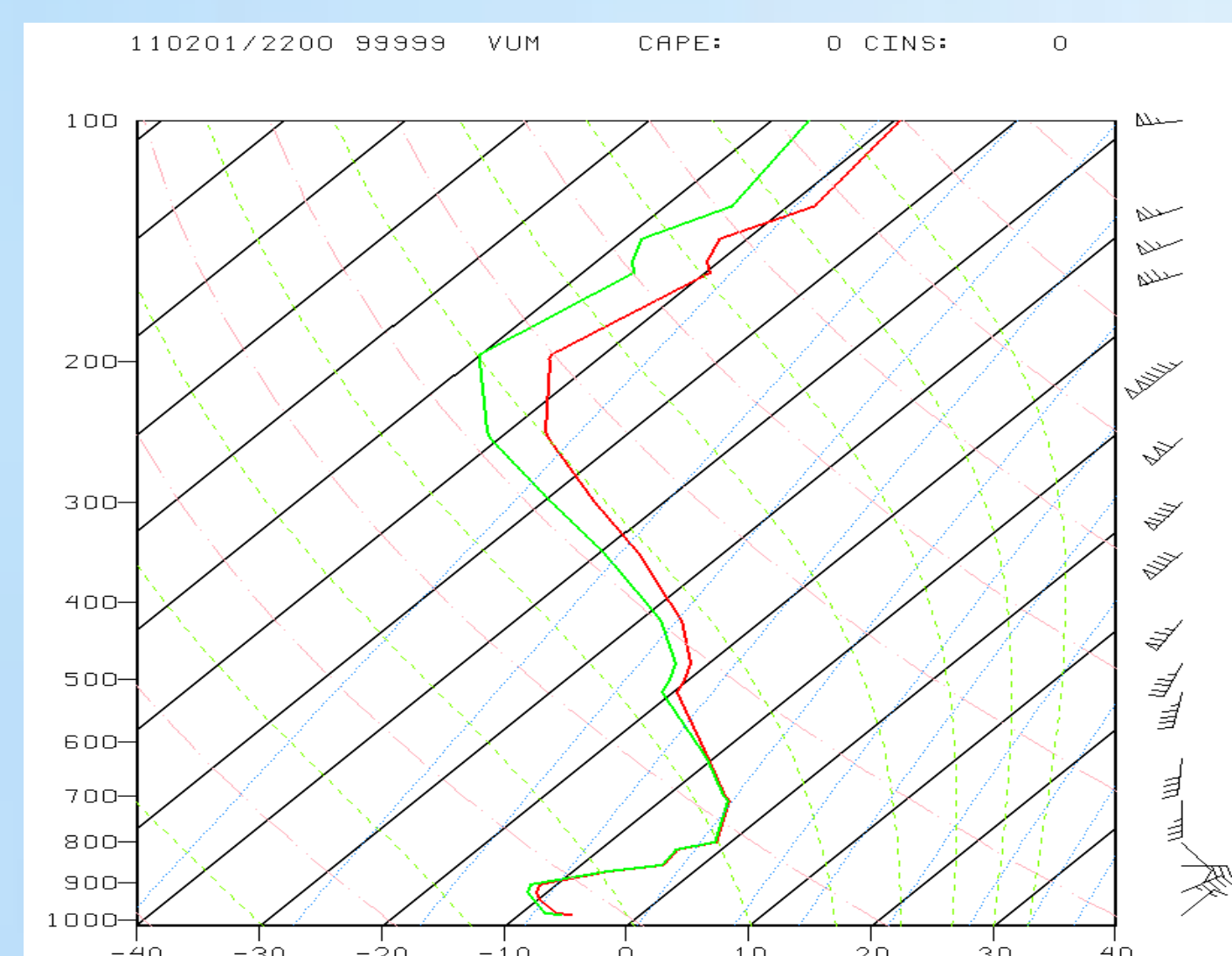
- Regional model reflectivity could not verify with actual radar reflectivity due to bright banding
- Model depicted slightly lower QPF and displaced further south compared to radar 3-hr STP
- Model sounding produced coarser boundary layer with actual sounding revealing superadiabatic layer near surface and stronger low-level inversion



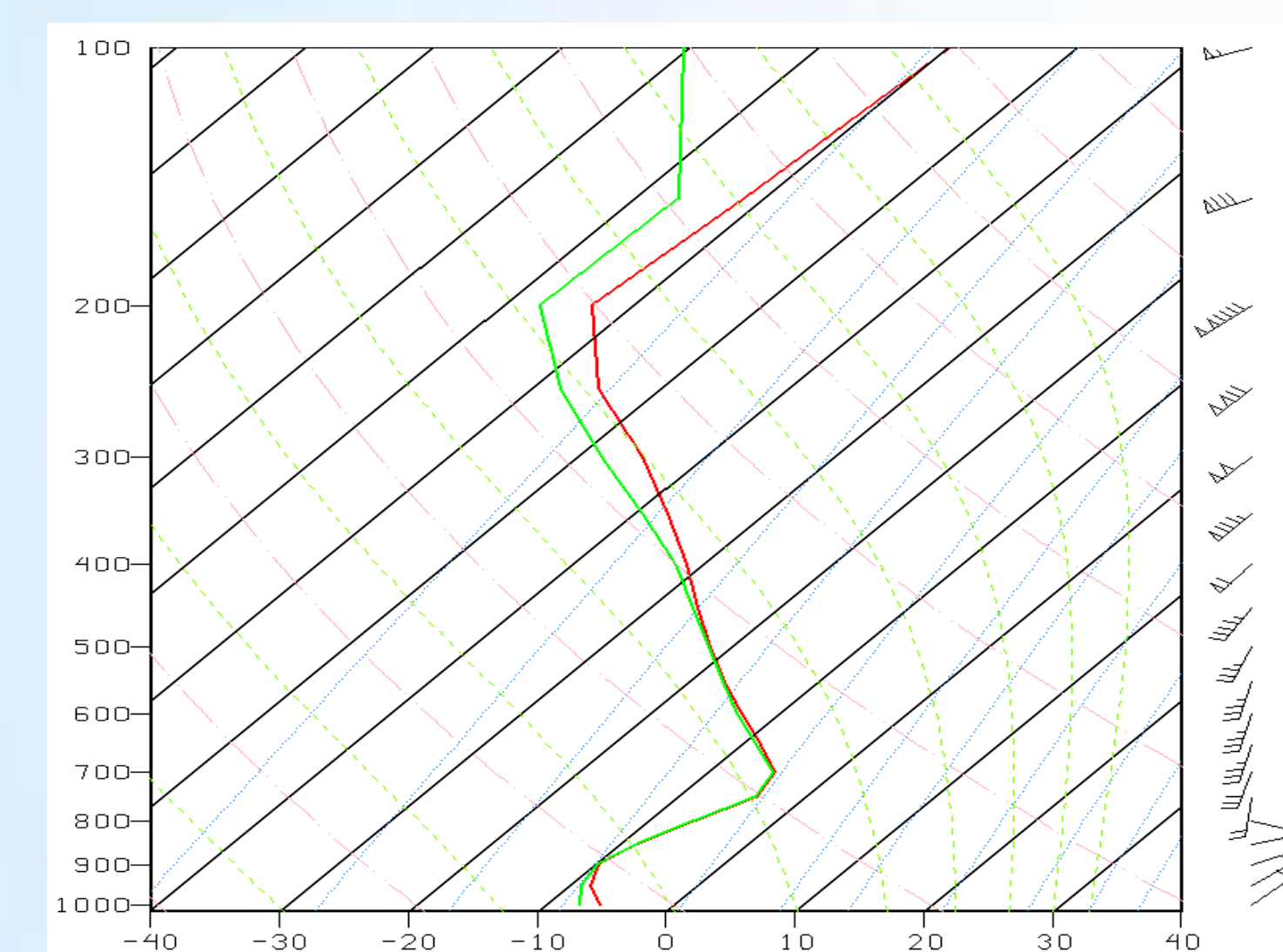
Surface analysis from 0000 UTC
2 February 2011



Clockwise from upper left: Valparaiso University Dual-Pol base reflectivity, simulated WRF reflectivity, Valparaiso University Dual-Pol 3-hr Storm Total Precipitation (STP), RUC 3-hr STP



Valpo sounding 2200 UTC 1 Feb. 2011



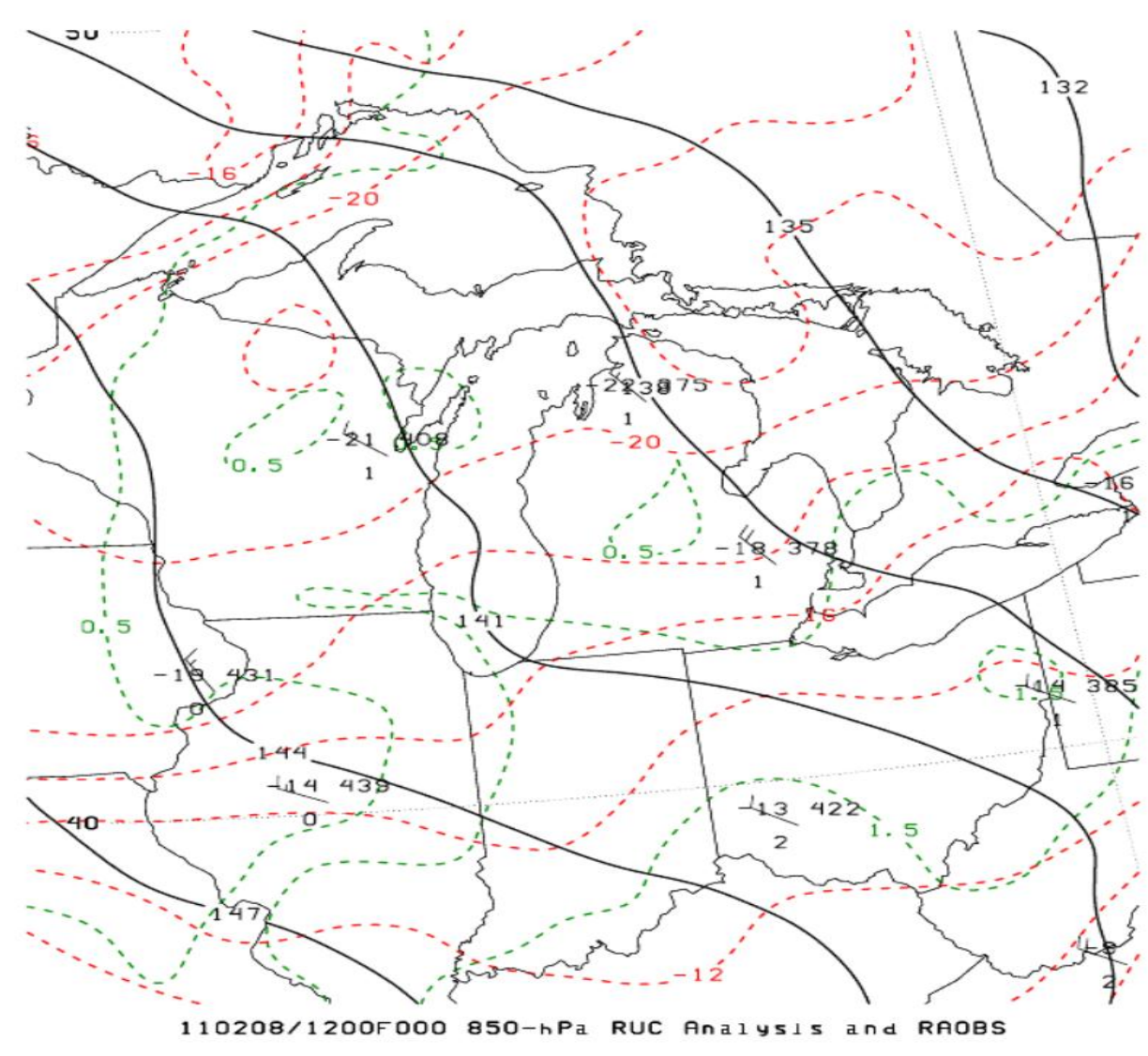
Valpo RUC sounding 2100 UTC 1 Feb. 2011

MULTIPLE MESOLOW LAKE EFFECT EVENT 8 FEBRUARY 2011

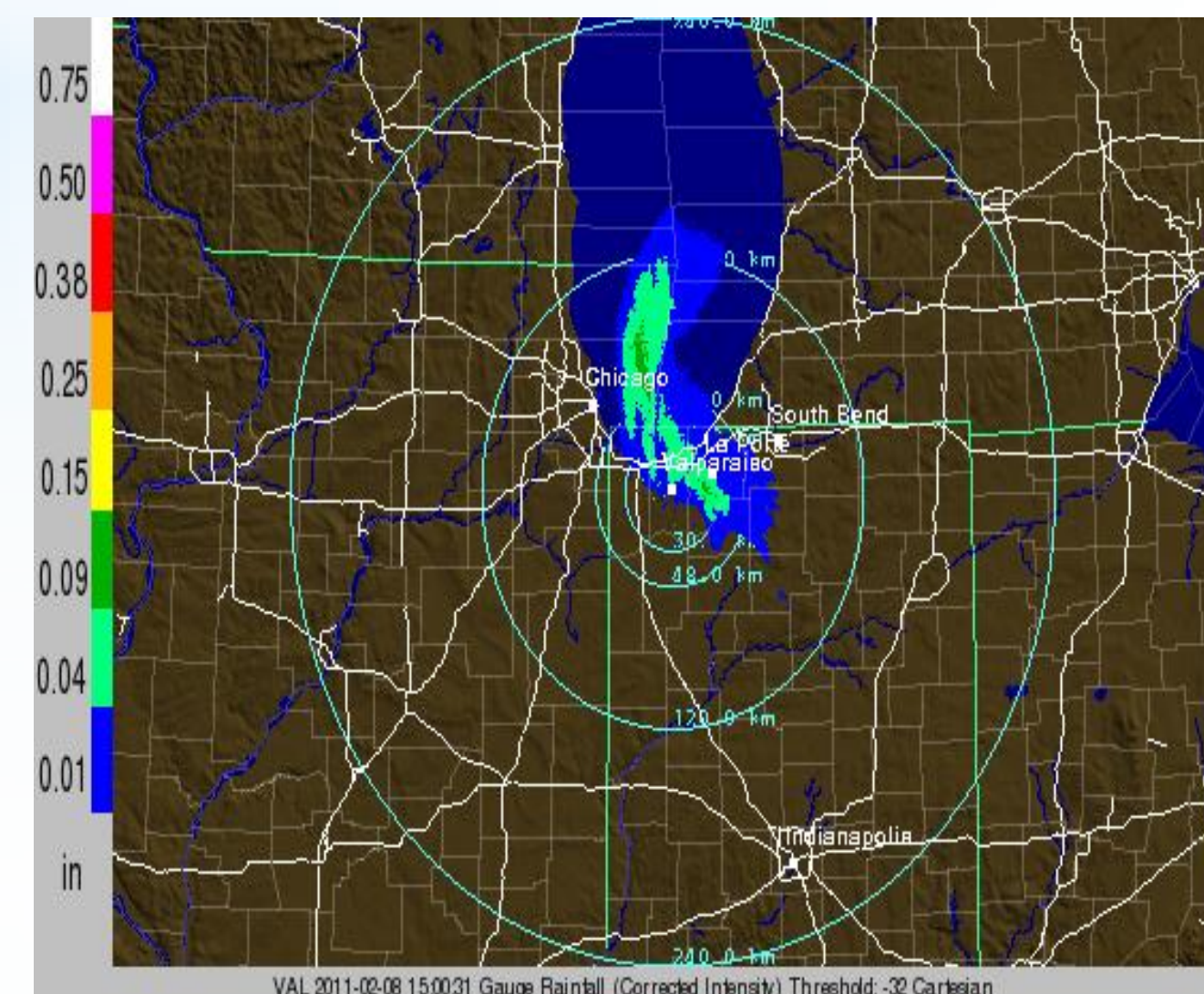
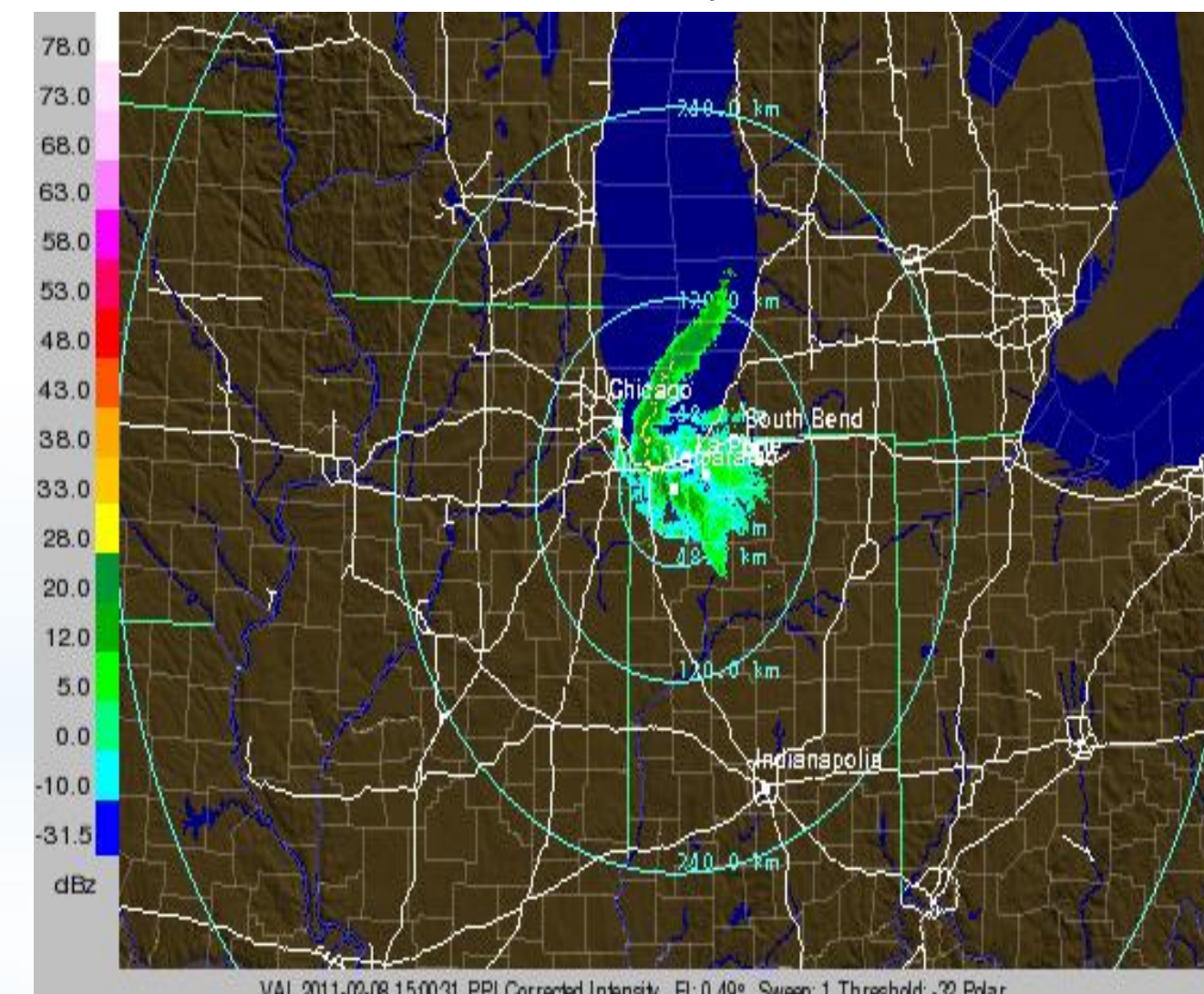
- Short-lived, non-classic lake-effect snow event
- Rising motion associated with differential CVA and mid-level trough
- 850 mb temperature profile favored mesolow development

8 FEB. 2011 OBSERVATIONS

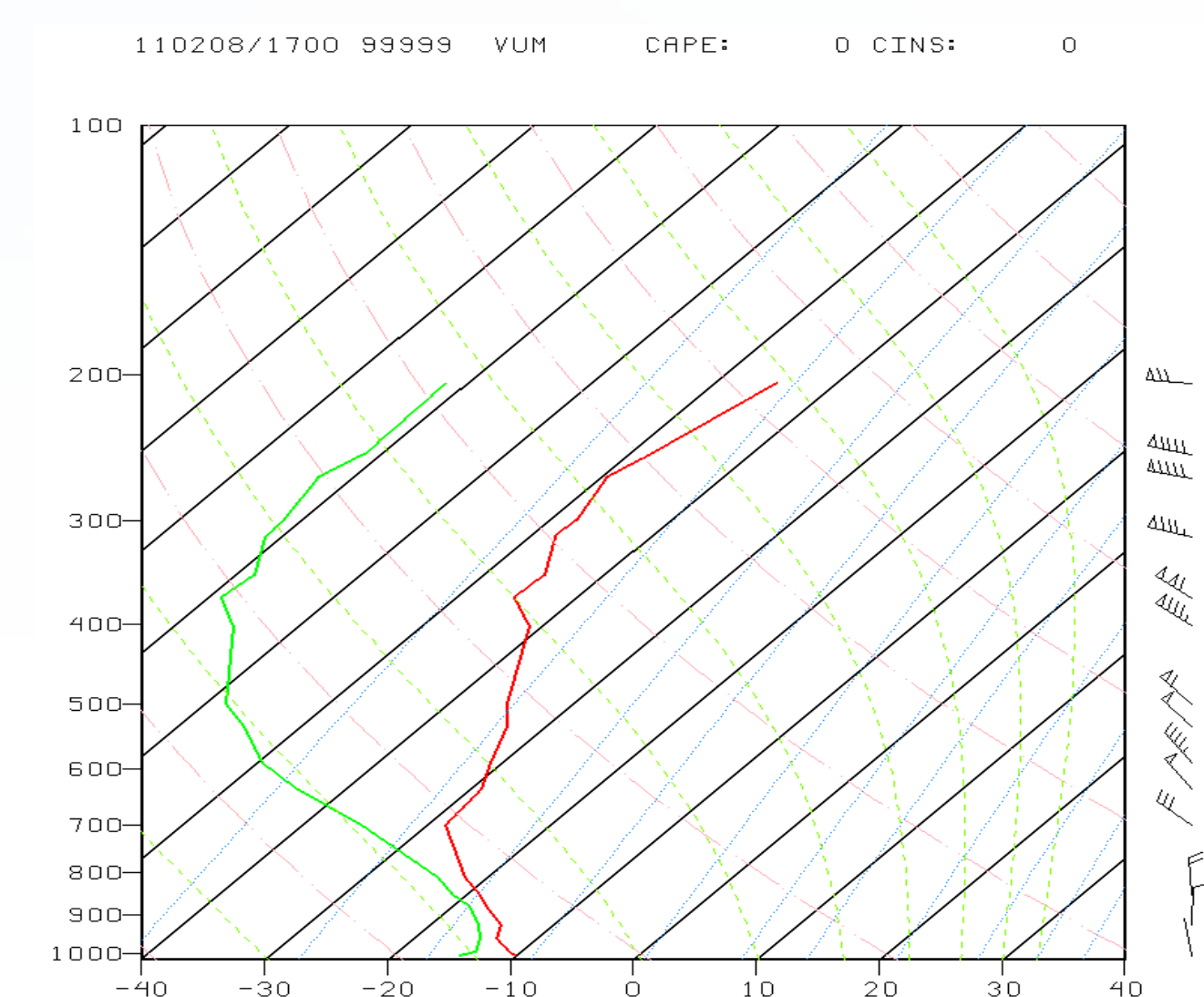
- Model verified mesolow formation and duration with actual radar reflectivity, including mesoscale lake-effect band feature
- Model QPF verified with radar data, despite minor location differences in the mesoscale features
- Model and actual soundings produced nearly identical wind profiles but differed with less low-level moisture and more stable profile in the model



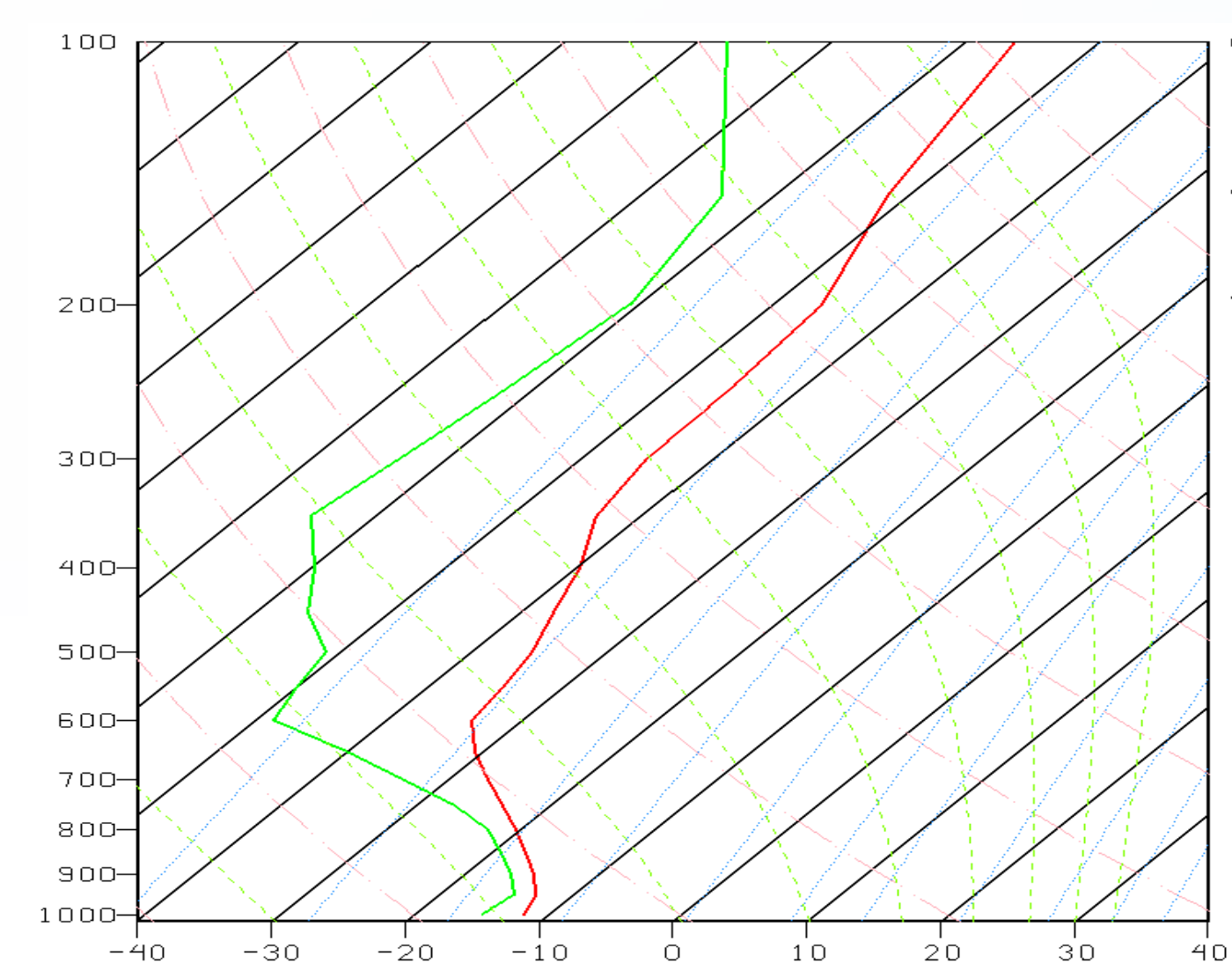
850-hPa analysis from 1200 UTC
8 February 2011



Clockwise from upper left: Valparaiso University Dual-Pol base reflectivity, simulated WRF reflectivity, Valparaiso University Dual-Pol 3-hr STP, RUC 3-hr STP



Valpo sounding 1700 UTC 8 Feb. 2011



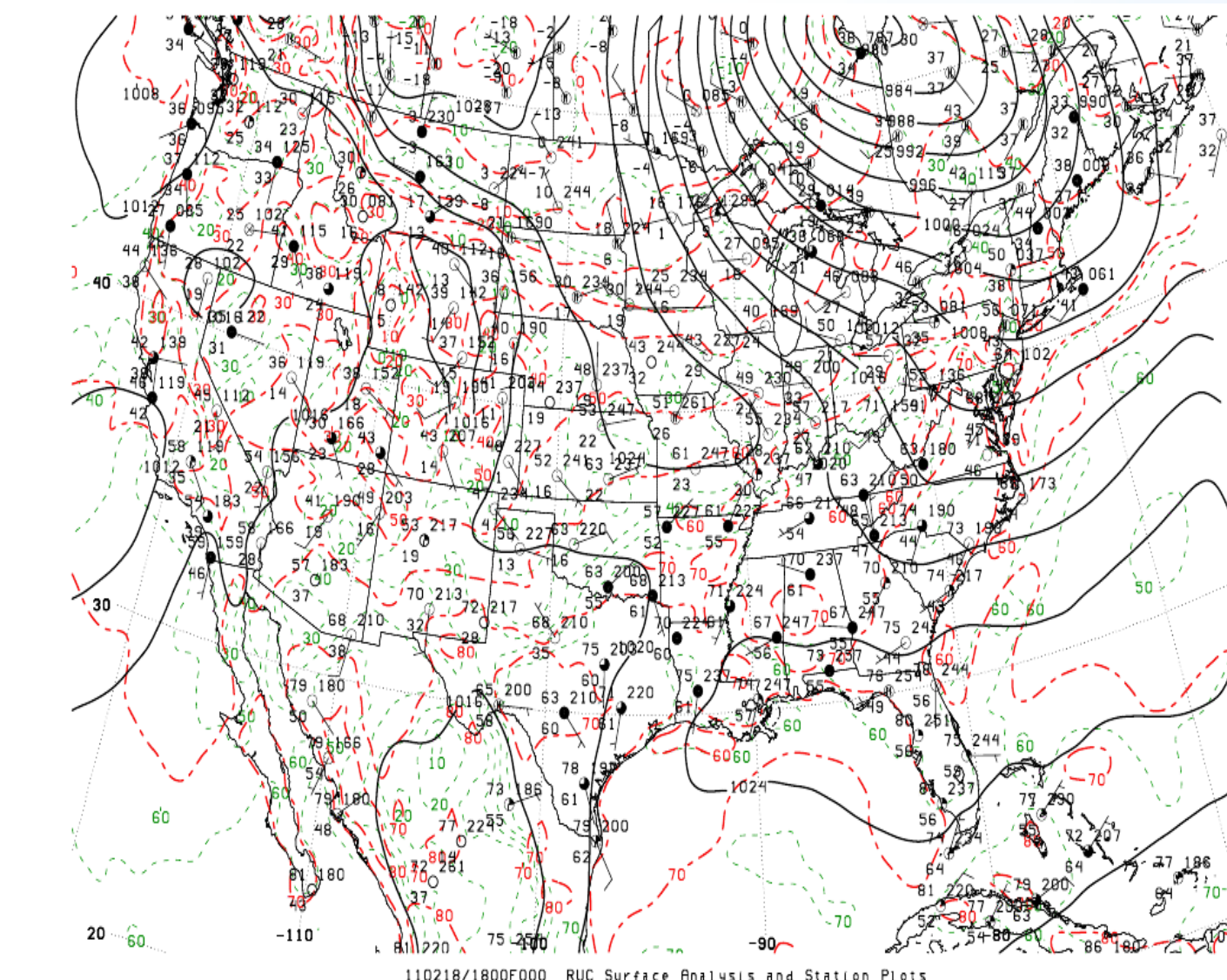
Valpo RUC sounding 1500 UTC 8 Feb. 2011

"CONTROL CASE" 18 FEBRUARY 2011

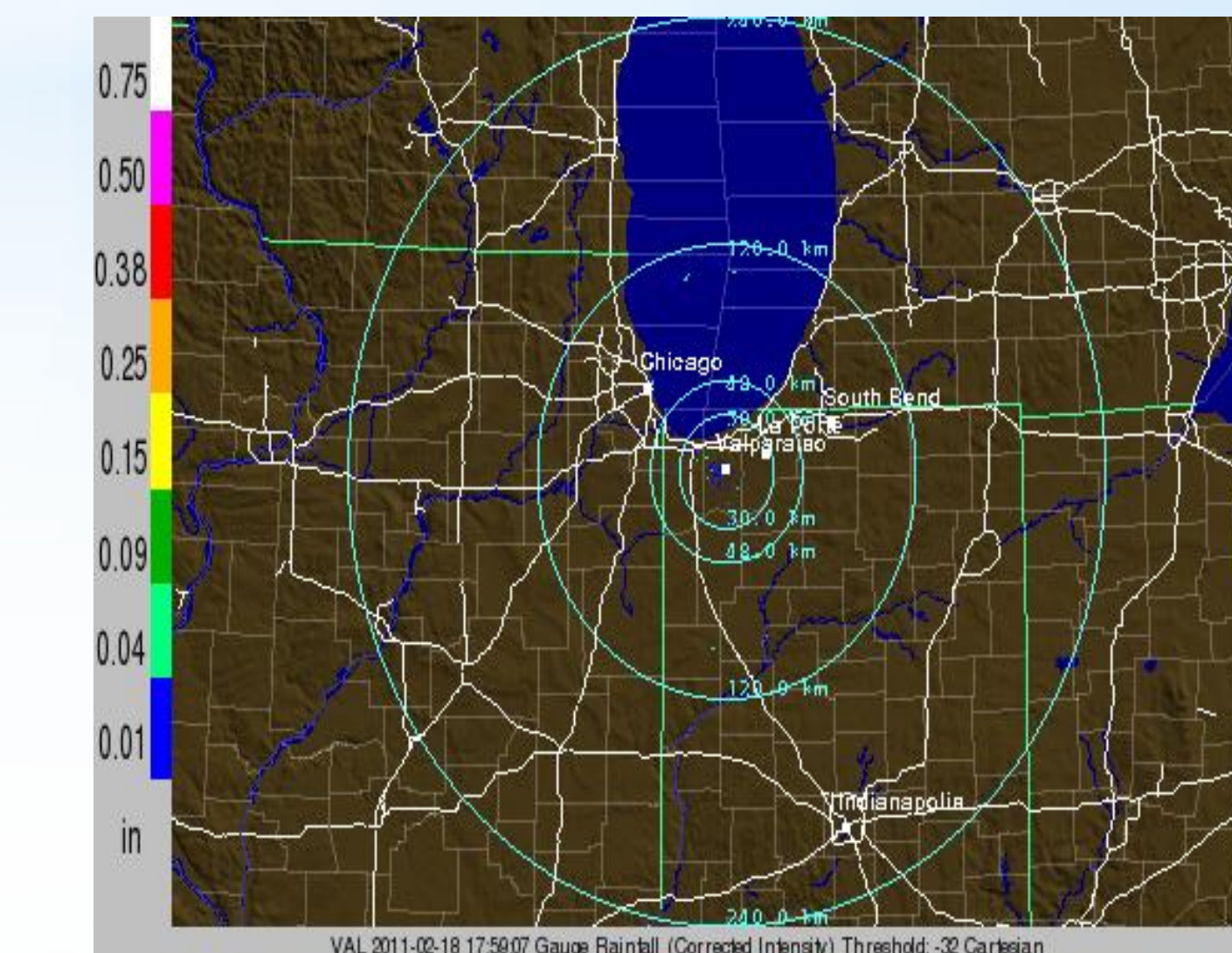
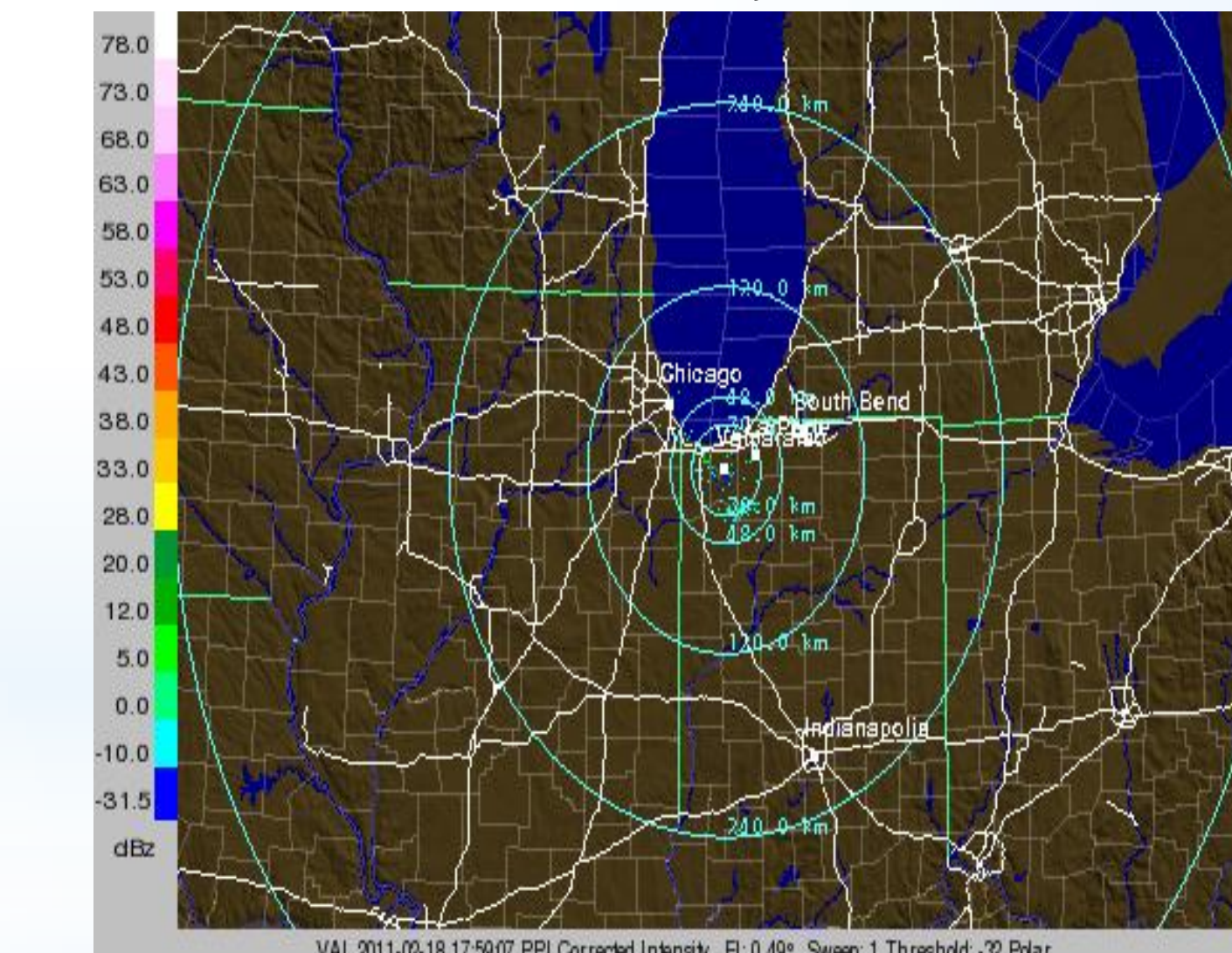
- Clear and dry with upper-level ridging aloft
- Used to compare against "precipitation events"

18 FEB. 2011 OBSERVATIONS

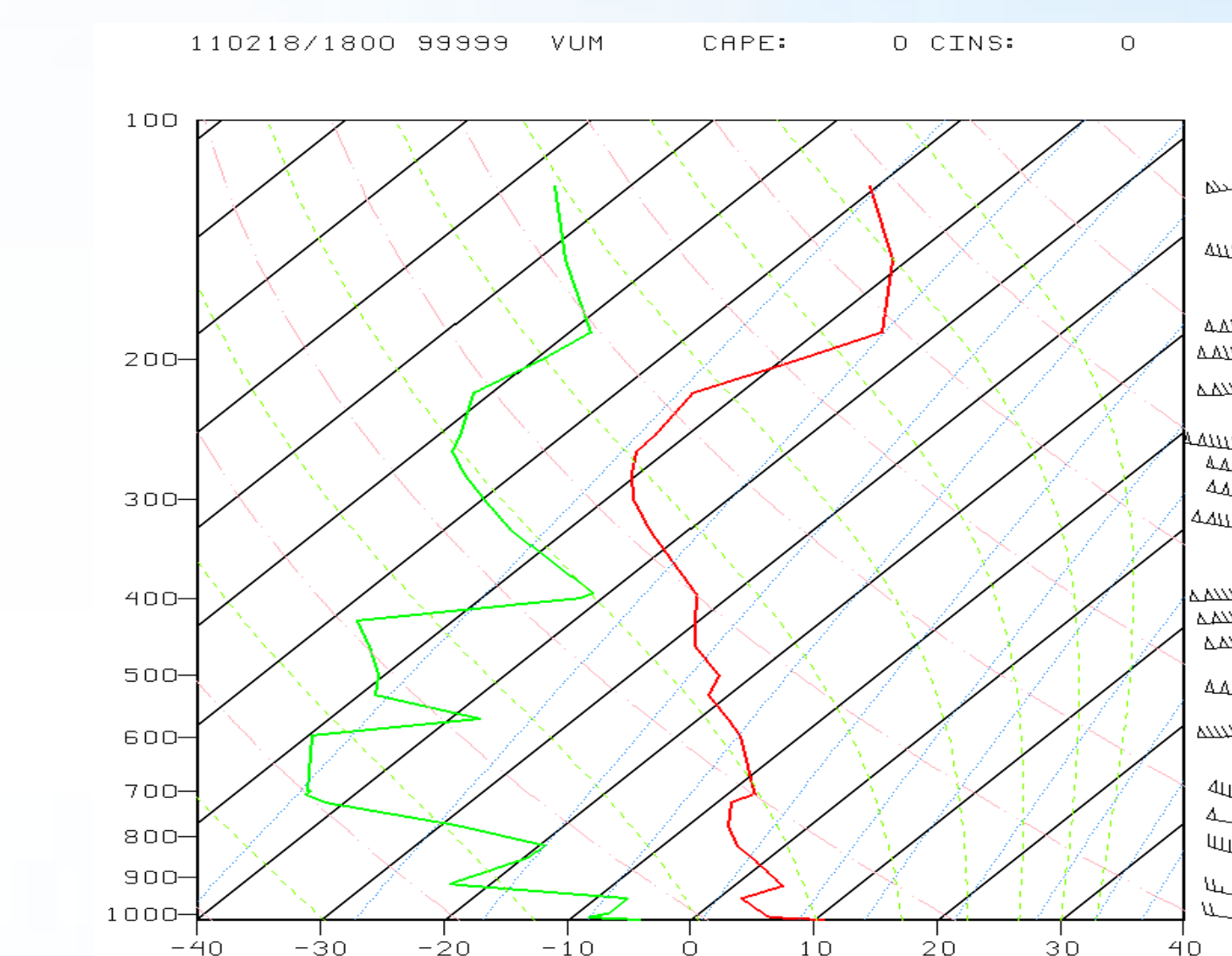
- Actual data verified with model data, excluding ground clutter and other anomalous propagation from radar
- Model soundings verified with actual sounding temperature and moisture profiles, despite coarser model resolution
- Model sounding able to accurately represent boundary layer wind profile



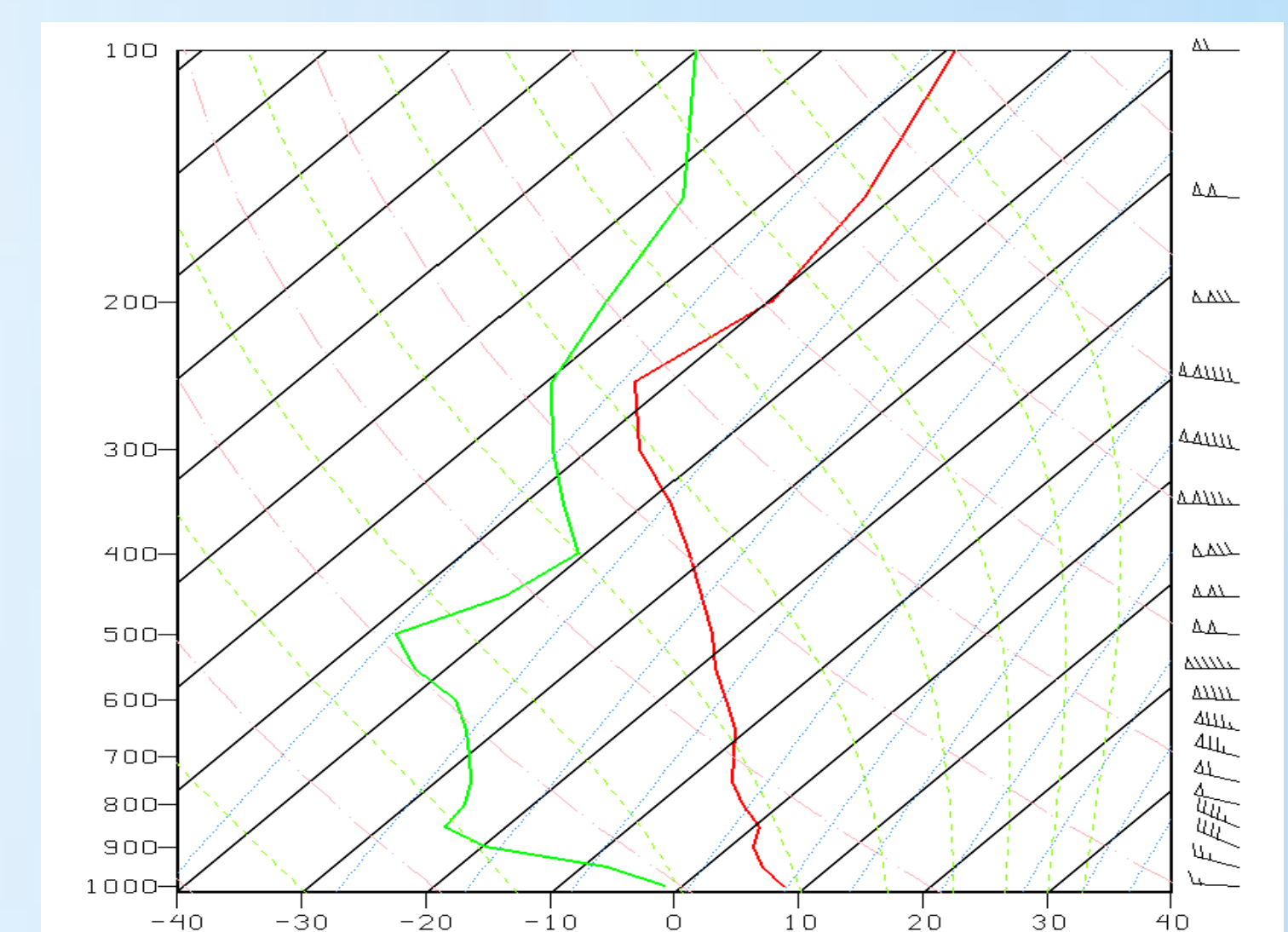
Surface analysis from 1800 UTC
18 February 2011



Clockwise from upper left: Valparaiso University Dual-Pol base reflectivity, simulated WRF reflectivity, Valparaiso University Dual-Pol 3-hr STP, RUC 3-hr STP



Valpo sounding 1800 UTC 18 Feb. 2011



Valpo RUC sounding 1800 UTC 18 Feb. 2011