

Clarus Multi-State Regional
Demonstrations, Evaluation of Use
Case #1: Enhanced Road Weather
Forecasting Enabled by *Clarus*

September 8, 2011

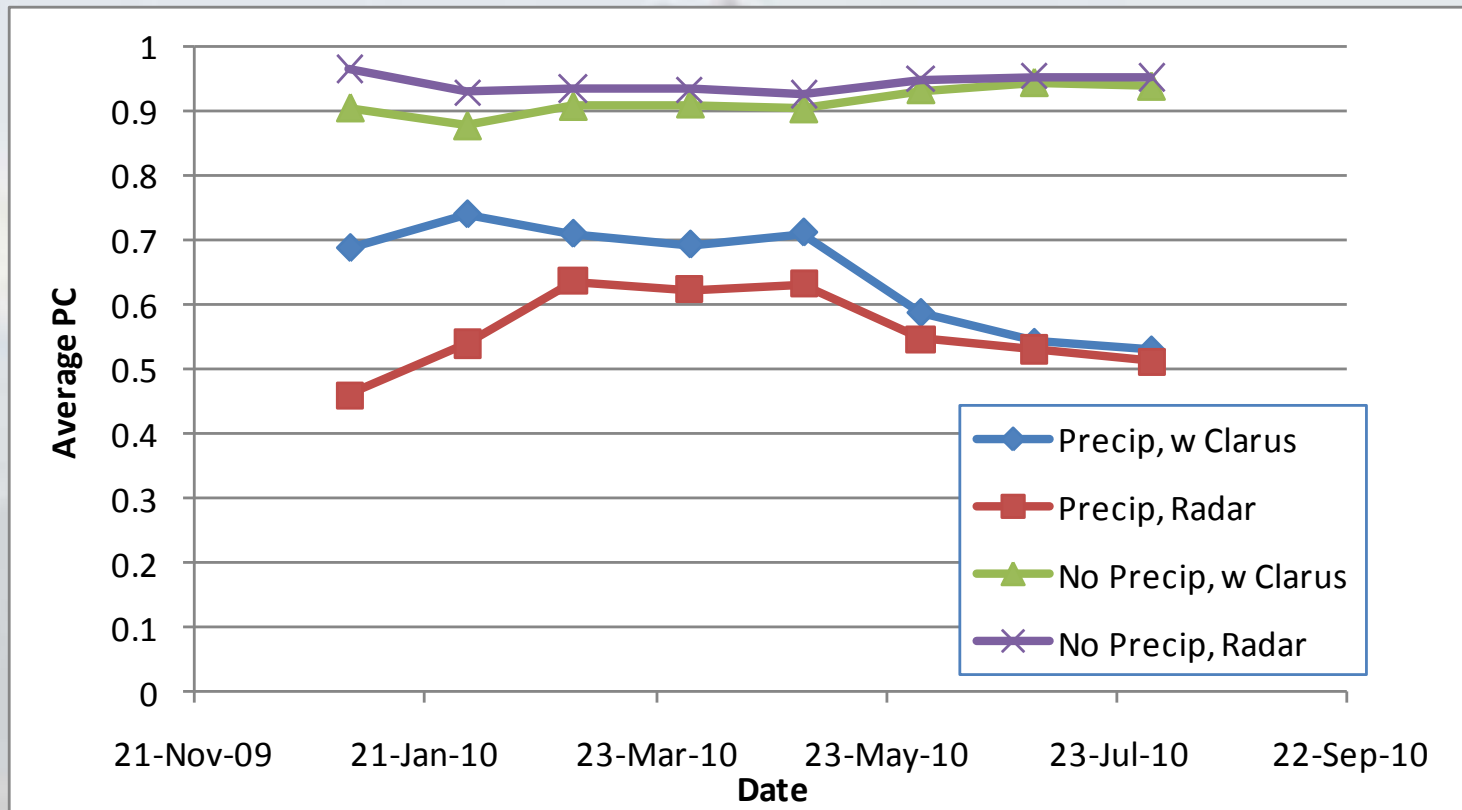
A tall, thin meteorological instrument tower stands on a grassy hill. In the background, there is a large body of water, likely a lake, and a range of mountains with some snow-capped peaks under a clear blue sky. The tower is the central focus of the image, extending from the bottom towards the top.

IMPACT OF *CLARUS* DATA ON PRECIPITATION ESTIMATES

Potential *Clarus* Impacts

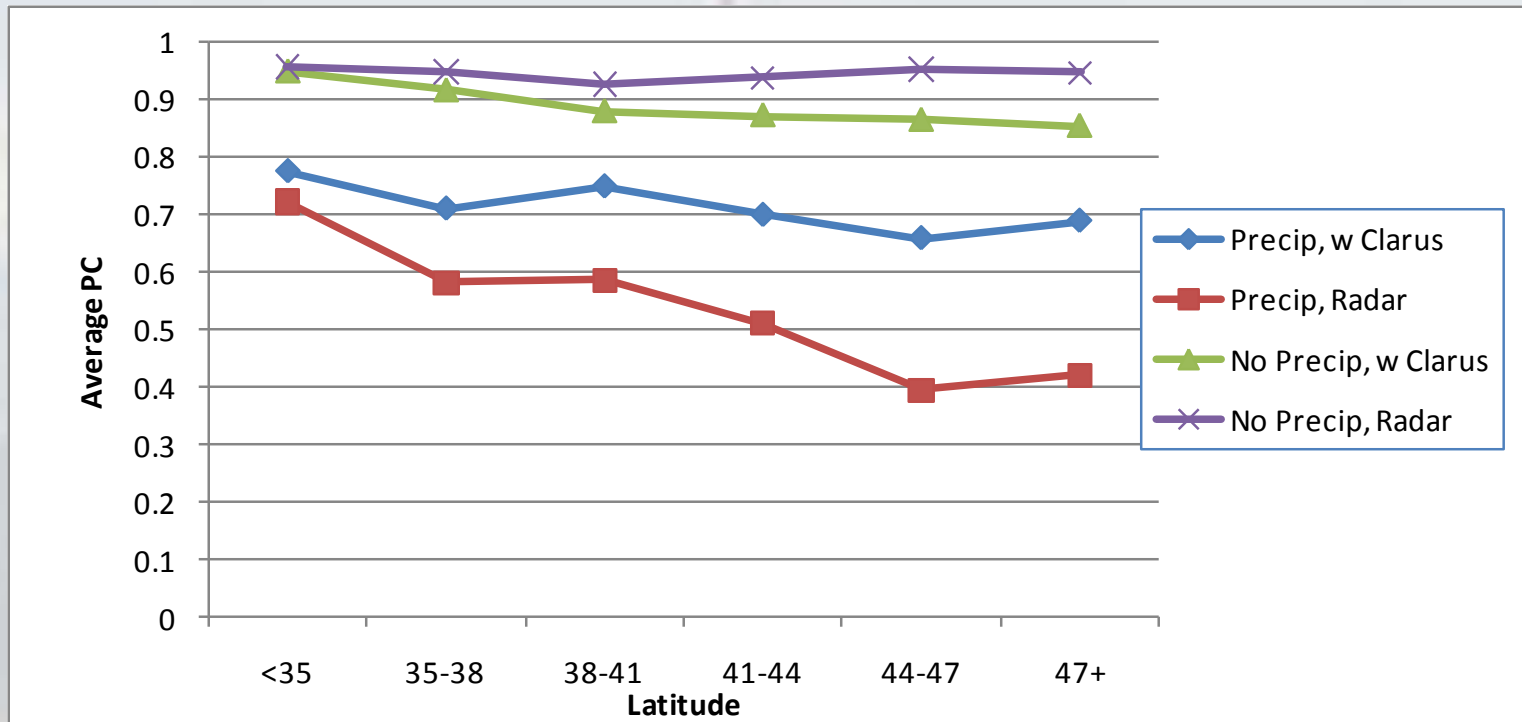
- Radar observations can overshoot precipitation originating in the lower atmosphere
- The problem of overshoot is worse at locations further from a radar station and in the winter
- *Clarus* observations can be combined with radar and satellite to provide enhance precipitation estimates

Impact of *Clarus* on Precipitation Estimates



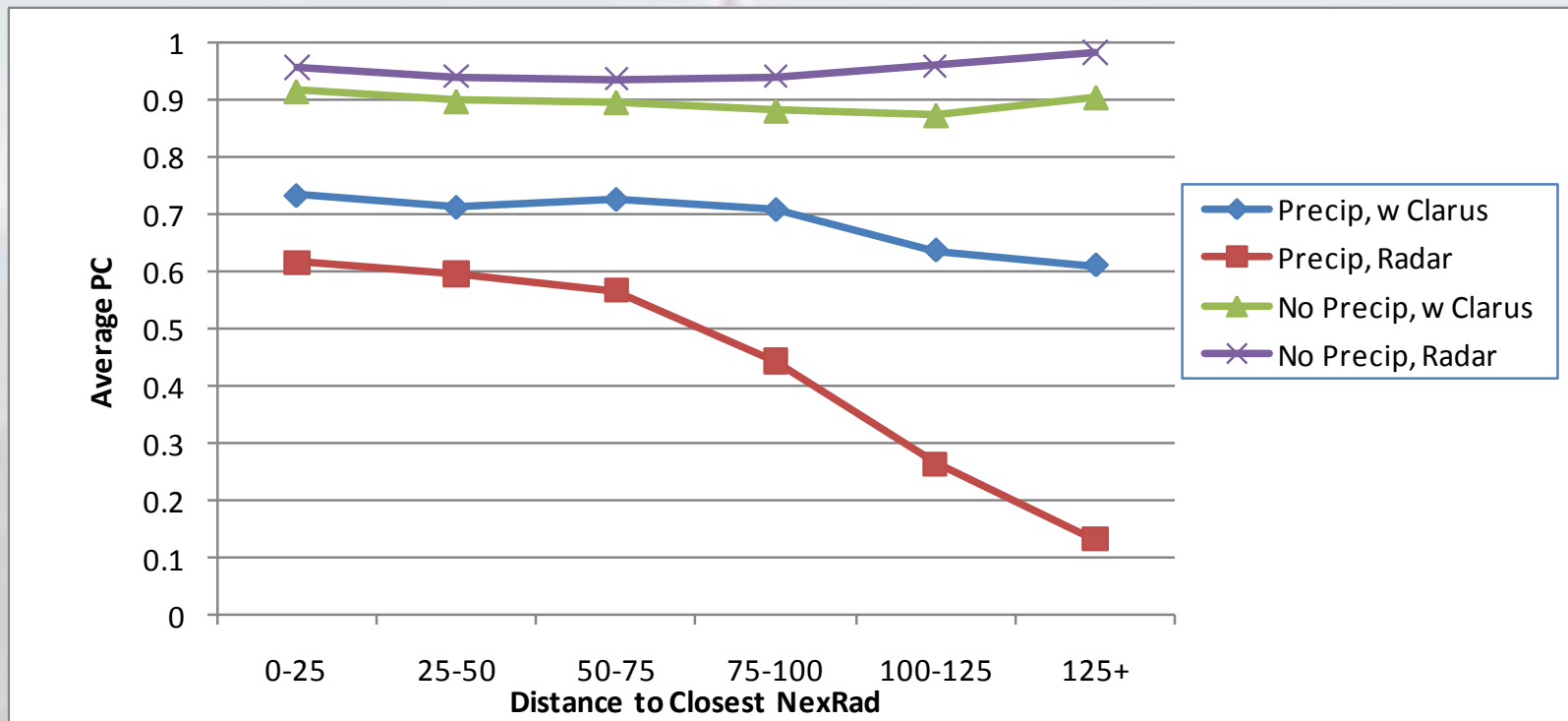
Clarus Impact Precipitation Estimates

Impact of *Clarus* on Precipitation Estimates



***Clarus* Impact Precipitation Estimates by Latitude in Winter Months**

Impact of *Clarus* on Precipitation Estimates



Clarus Impact Precipitation Estimates by Distance from NexRad in Winter Months

Summary and Conclusion

- The *Clarus* data and the PPAES model improved the ability to identify precipitation
- The improvements are larger at locations distant from the NexRad station
- The improvements are larger in the winter months and at higher latitude

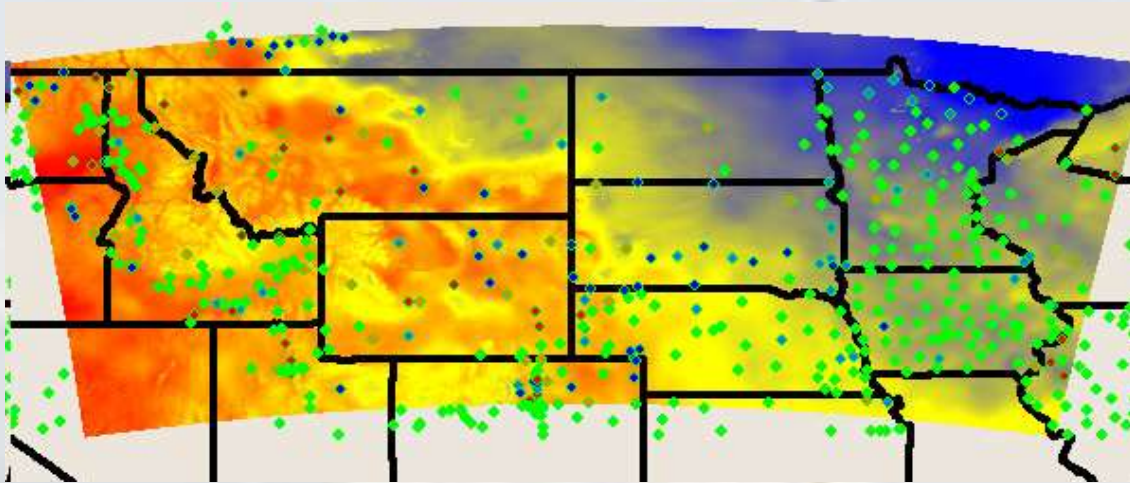
A tall, thin tower stands on a grassy hill. In the background, there is a valley with a river or lake, and mountains with patches of snow under a clear blue sky. The tower has several horizontal rungs or sensors along its length.

IMPACT OF CLARUS DATA ON REGIONAL FORECASTS

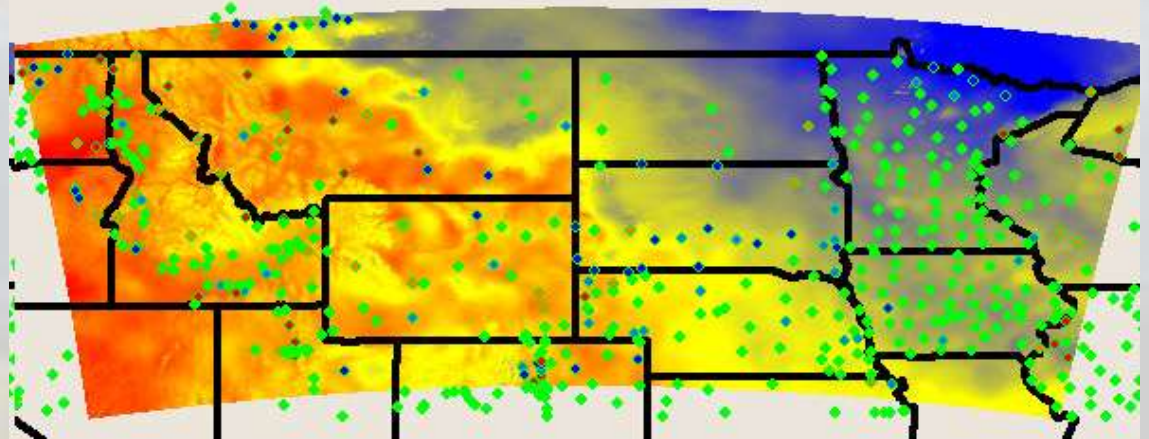
Potential *Clarus* Impacts

- Model Initialization (LAPS)
 - Combines data from multiple sources to produce initial estimate for starting conditions
 - This is where *Clarus* data enters the models
- WRS-ARW Model
 - Estimates how starting conditions will evolve over time based on weather physics and background models
 - *Clarus* impacts on initialization data flow into model forecasts

Impact of *Clarus* on LAPS

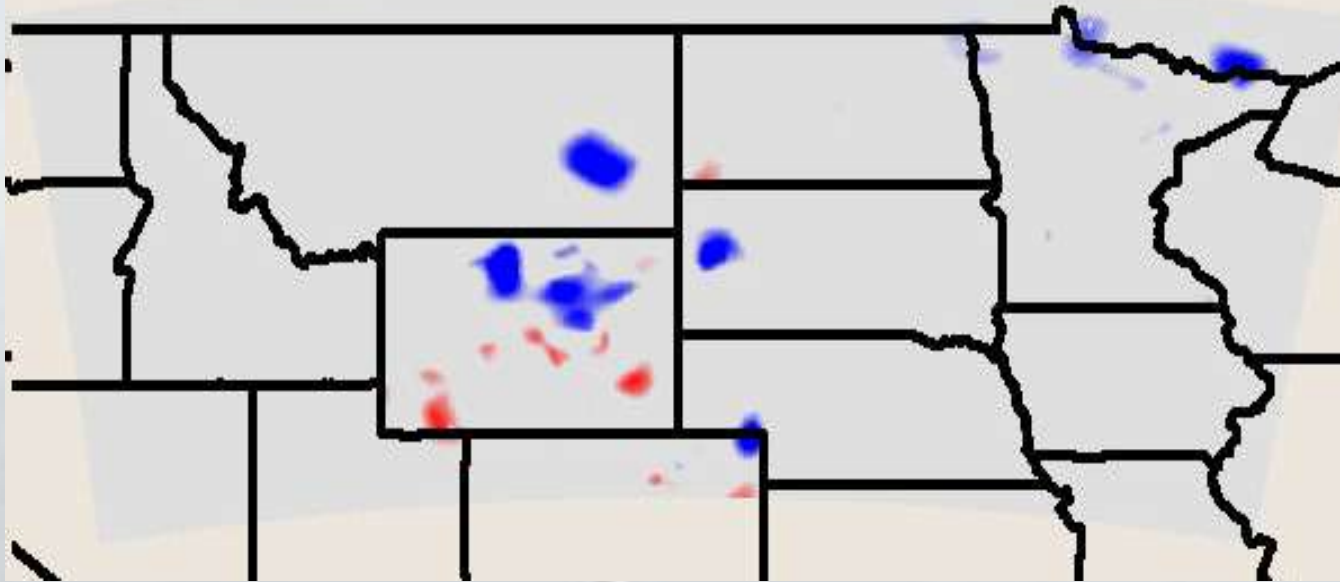


LAPS Temperatures w/o *Clarus* (1/16/2011)



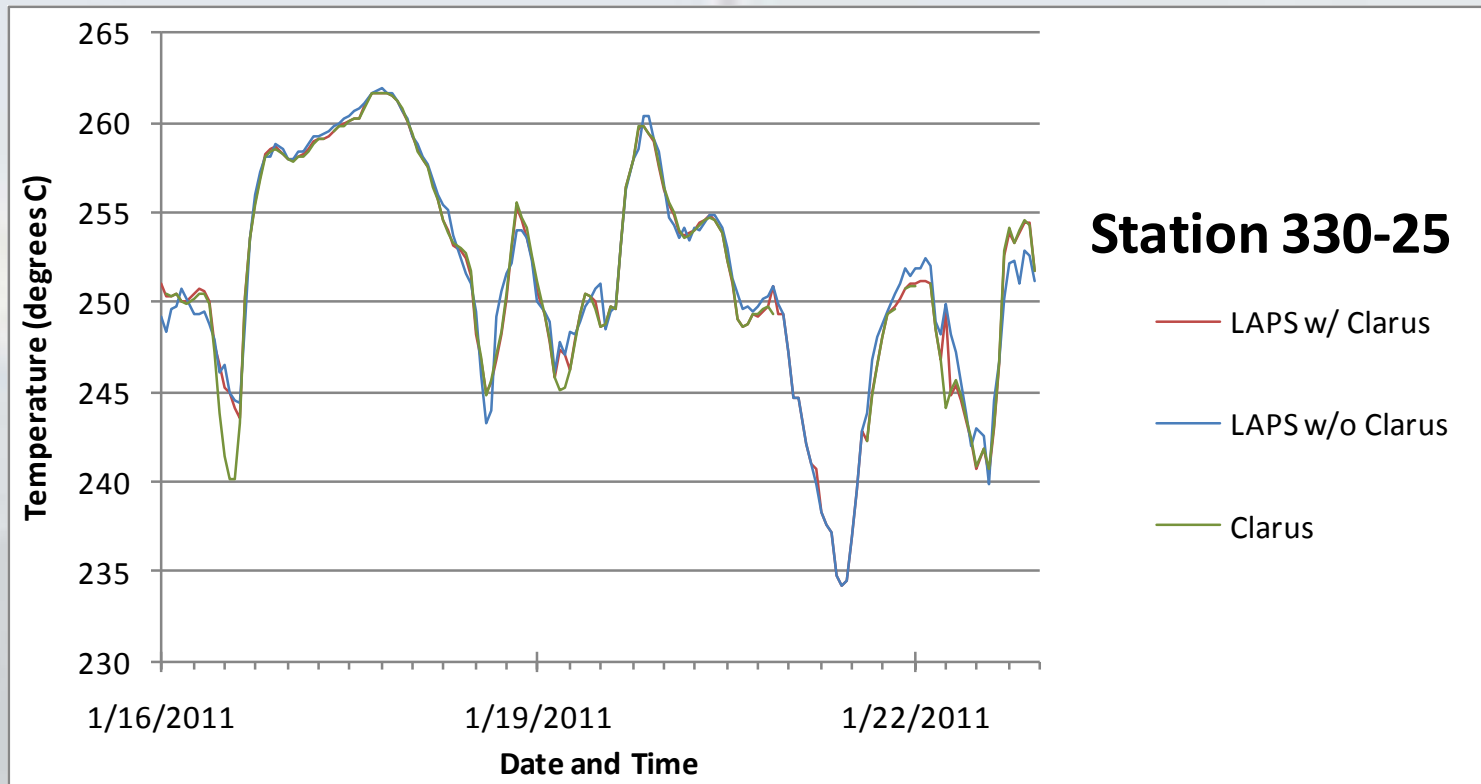
LAPS Temperatures w/ *Clarus* (1/16/2011)

Impact of *Clarus* on LAPS



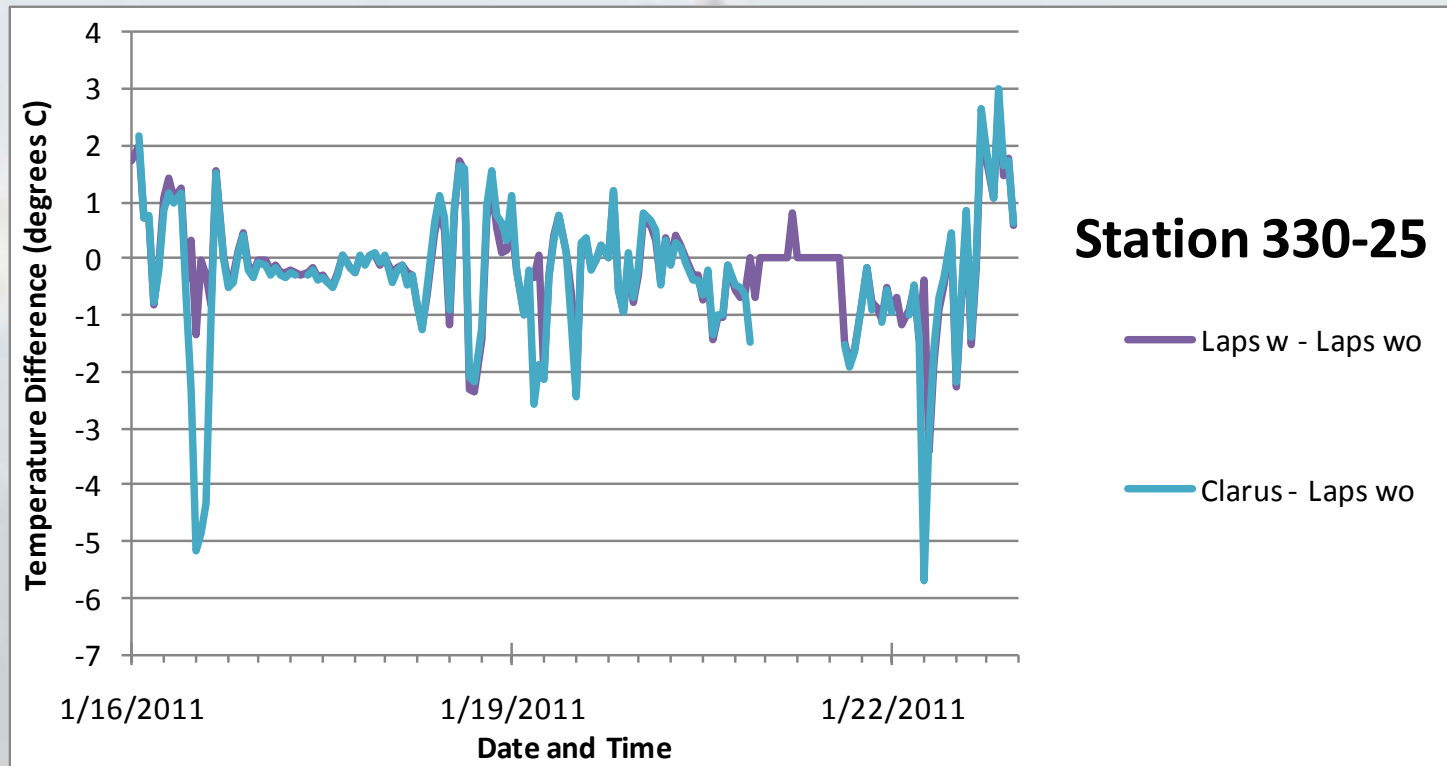
Difference in LAPS Temperatures, w/ *Clarus* minus w/o *Clarus* (1/16/2011)

Impact of *Clarus* on LAPS



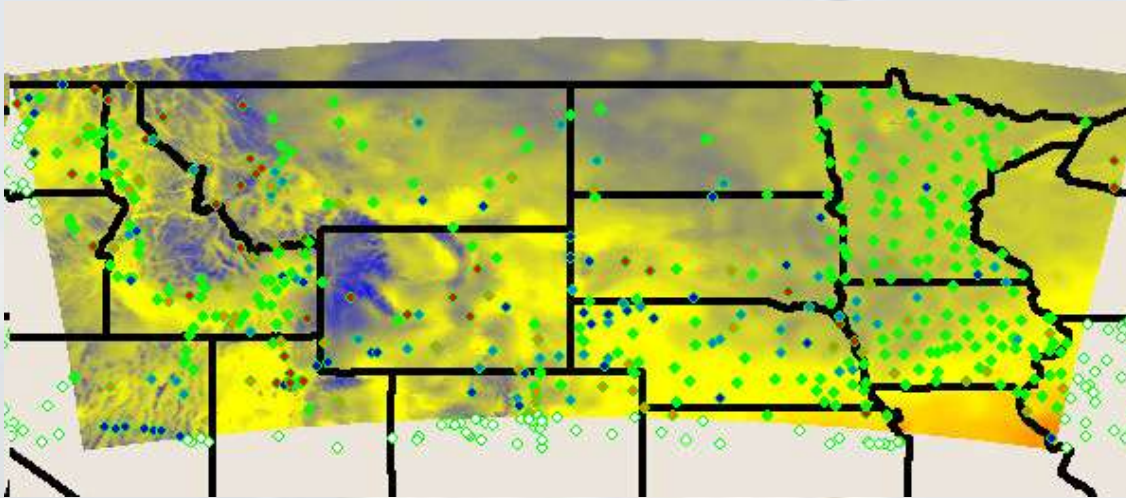
LAPS and Clarus Temperatures, Station 330-25

Impact of *Clarus* on LAPS

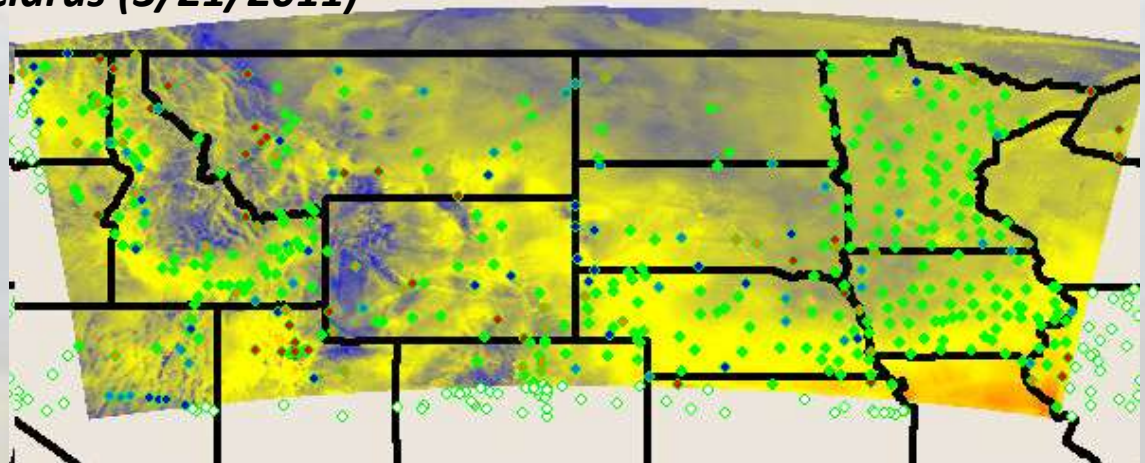


LAPS and Clarus Temperatures, Station 330-25

Impact of *Clarus* on LAPS

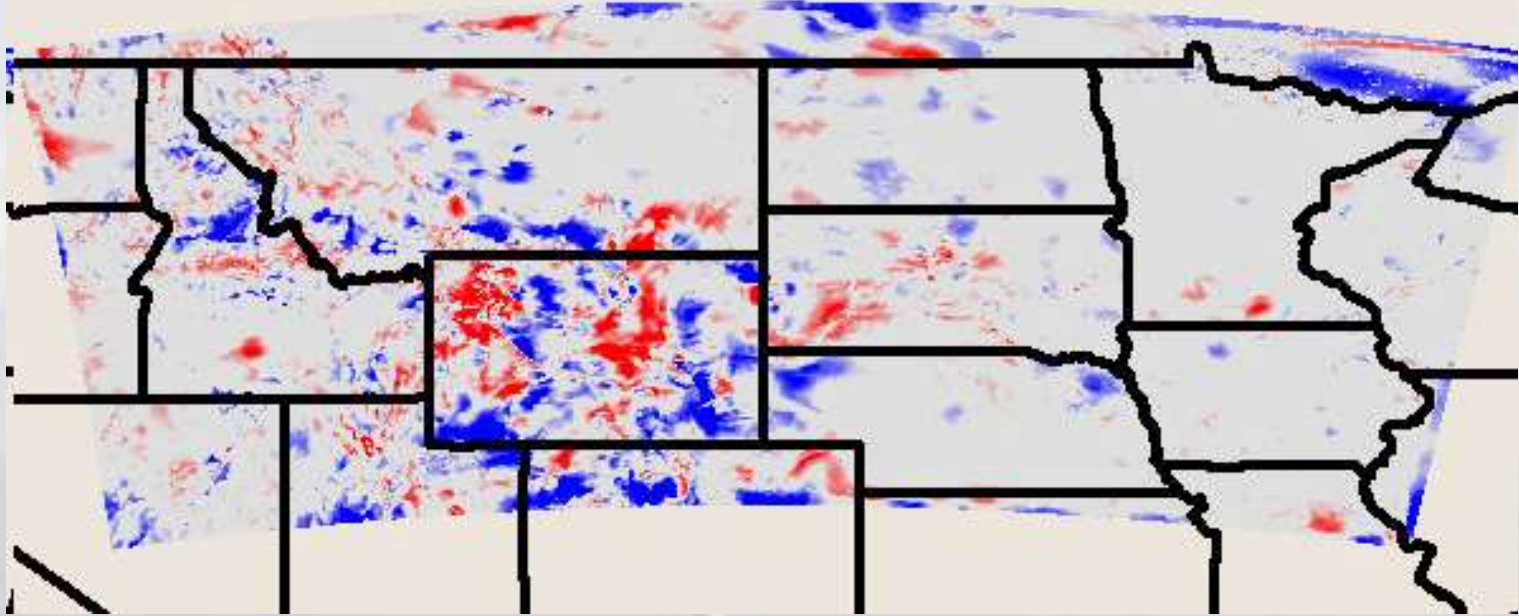


LAPS Temperatures w/o *Clarus* (3/21/2011)



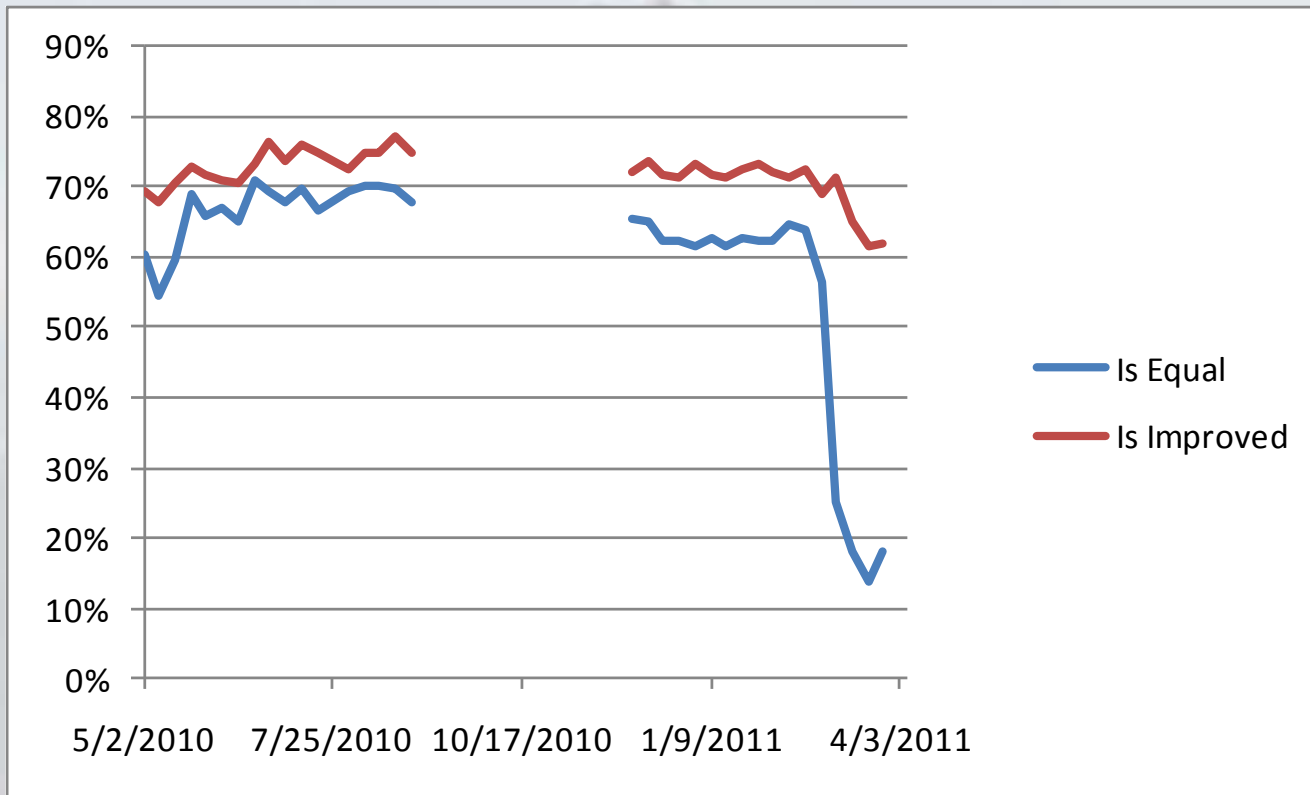
LAPS Temperatures w/ *Clarus* (3/21/2011)

Impact of *Clarus* on LAPS



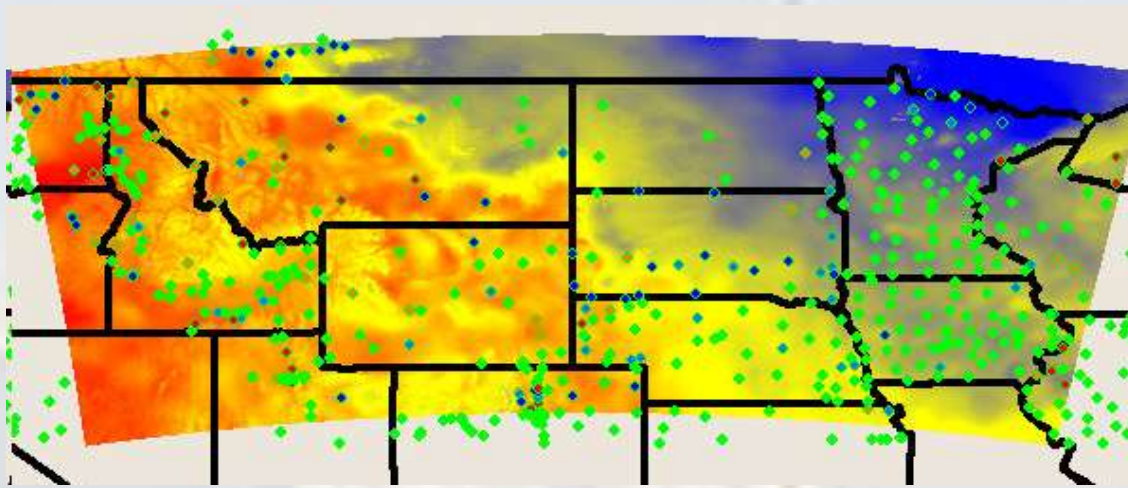
Difference in LAPS Temperatures, w/ *Clarus* minus w/o *Clarus* (3/21/2011)

Impact of *Clarus* on LAPS

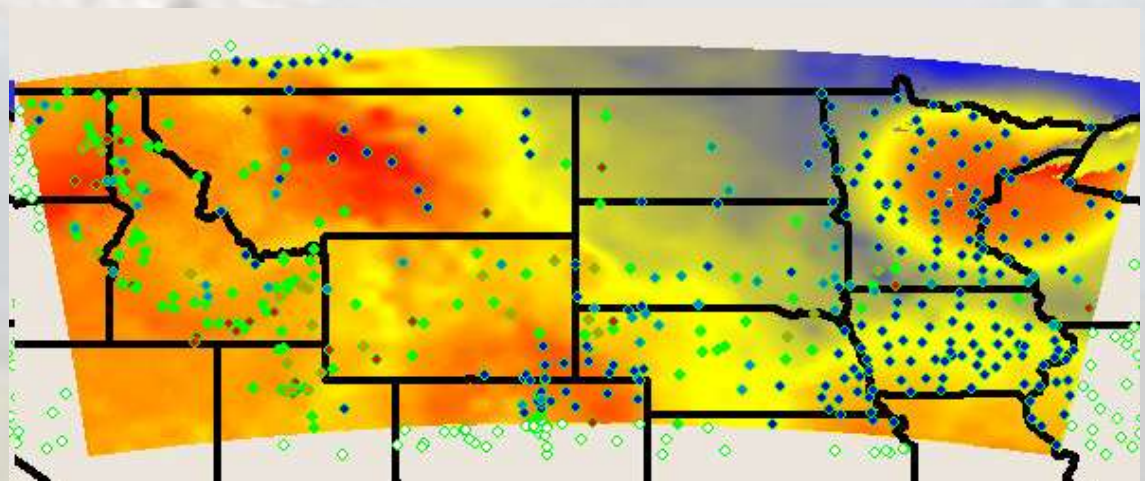


Clarus Impact on LAPS Temperature Estimates

Impact of *Clarus* on Forecasts

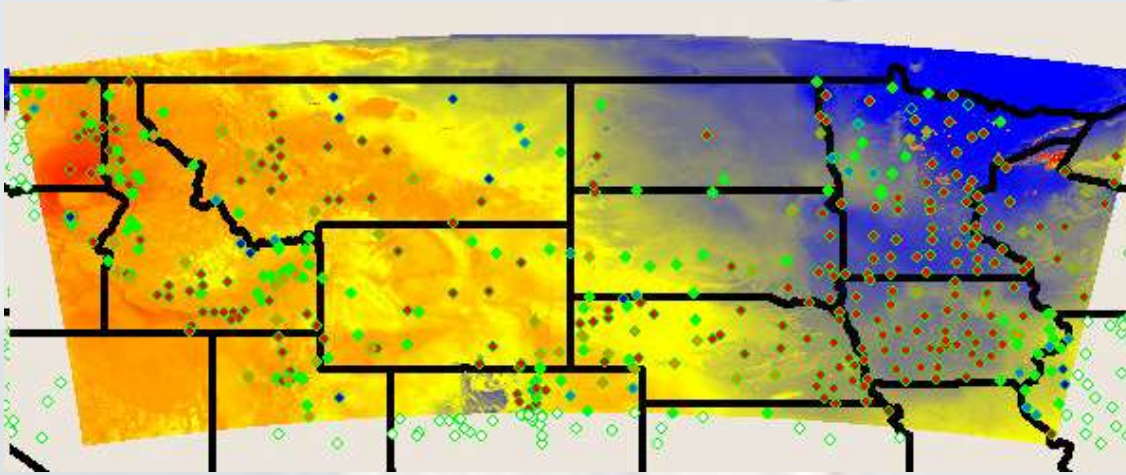


LAPS Temperatures w/ *Clarus* (1/16/2011 12:00 PM)

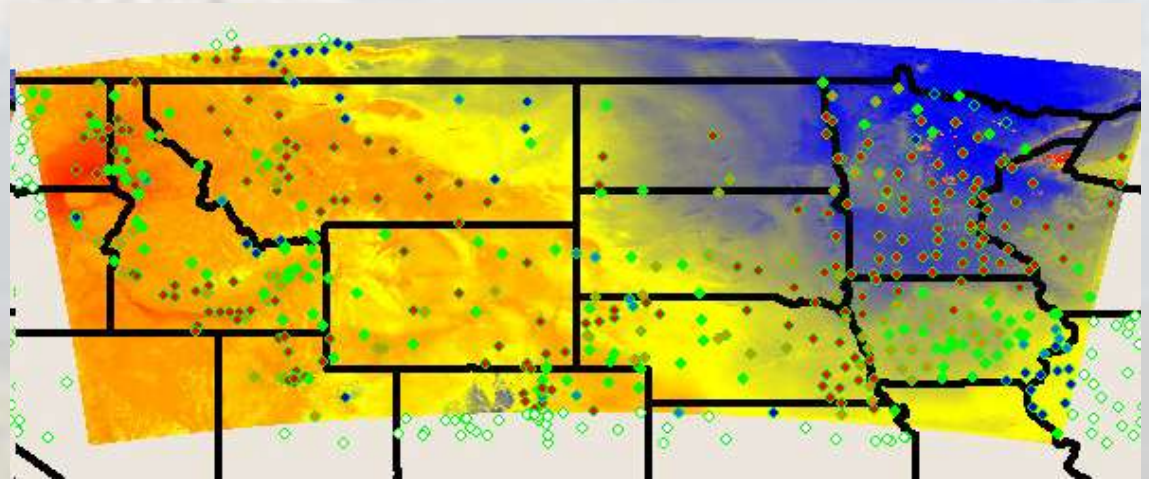


WRF Temperatures w/ *Clarus* (1/16/2011 12:00 PM)

Impact of *Clarus* on Forecasts

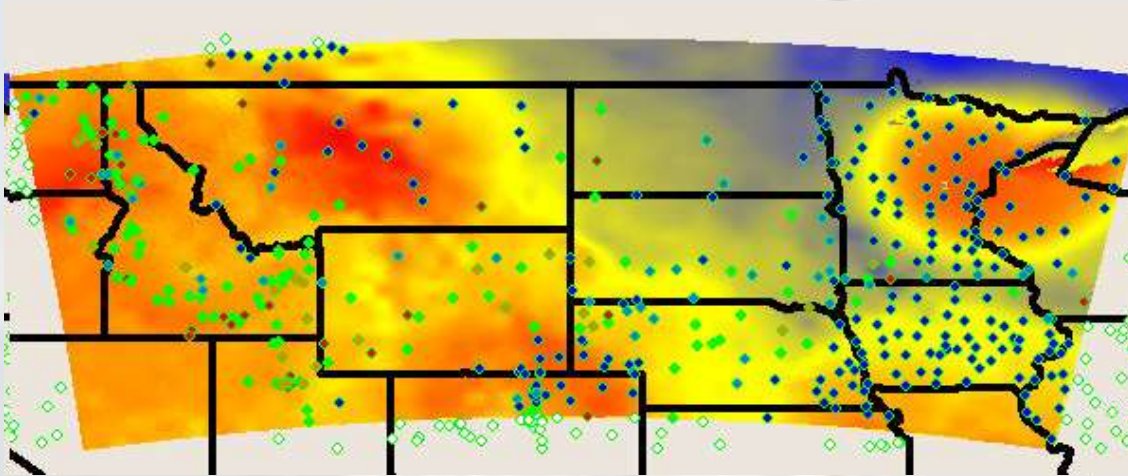


WRF Temperatures w/ *Clarus* (1/16/2011 2:00 PM)

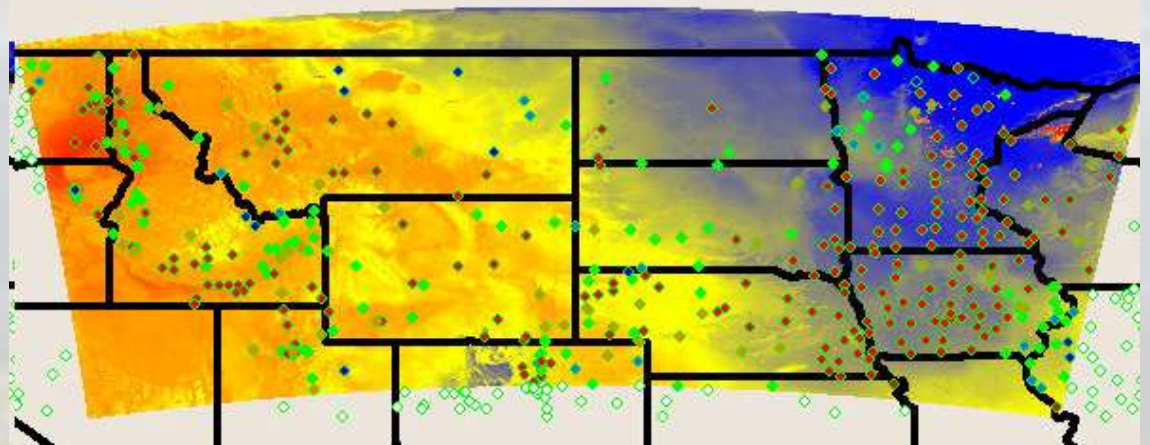


WRF Temperatures w/ *Clarus* (1/16/2011 3:00 PM)

Impact of *Clarus* on Forecasts

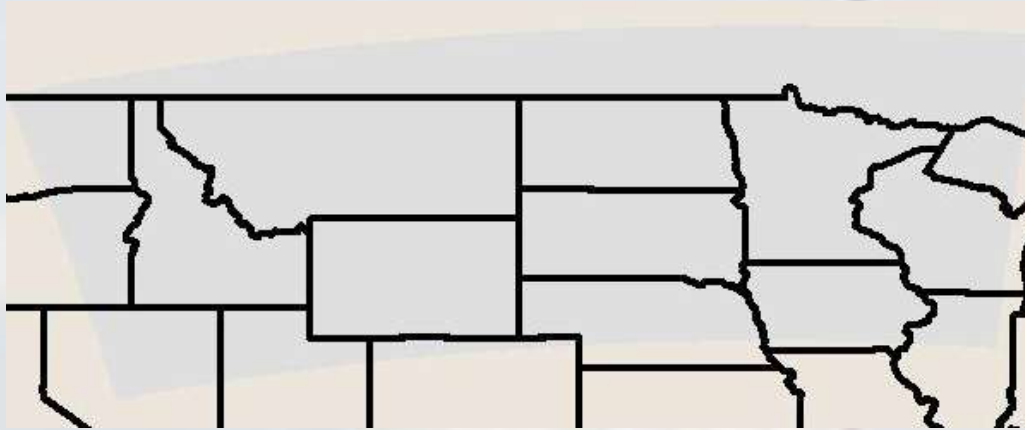


WRF Temperatures w/ *Clarus* (1/16/2011 12:00 PM)

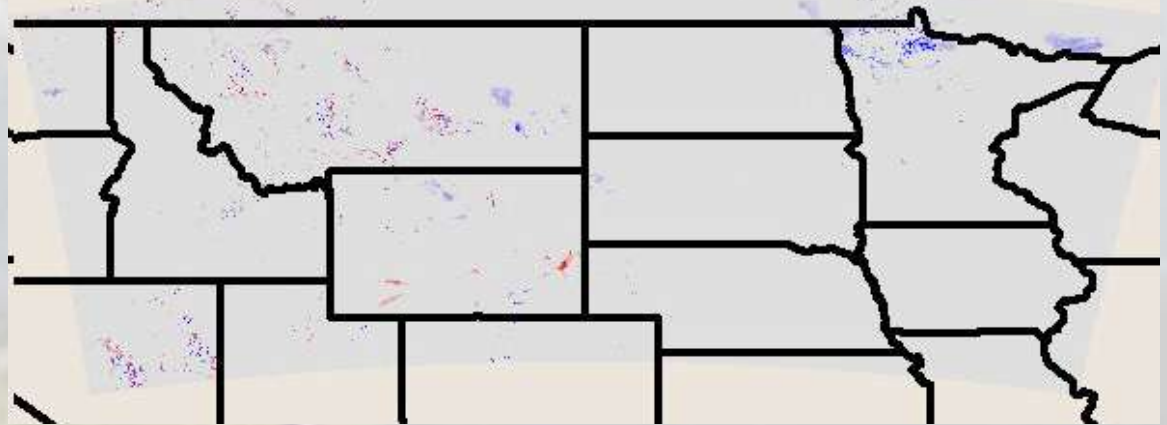


WRF Temperatures w/ *Clarus* (1/16/2011 2:00 PM)

Impact of *Clarus* on Forecasts



Difference in WRF Temperatures, w/ *Clarus* minus w/o *Clarus* (1/16/2011 12:00 PM)



Difference in WRF Temperatures, w/ *Clarus* minus w/o *Clarus* (1/16/2011 3:00 PM)

Summary and Conclusion

- The *Clarus* data impacted the LAPS estimates, resulting in estimates that matched closely to the *Clarus* observations.
- This impact gets washed out of the surface layer during the first steps of the model run, when the model is “spinning up”.
- The *Clarus* data does impact the results once spin up is complete