Range Forecasters Impressions and Comparisons Between the RTFDDA WRF and MM5 Systems

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Methodology

For 1 year the WRF has been running parallel to the MM5 over the Great Basin

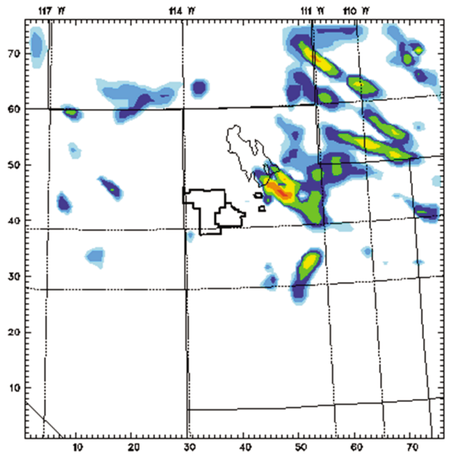
Forecasters at Dugway Proving Ground have been subjectively evaluating the two side by side within mesoscale boundaries

Goals

Identify systematic errors of the WRF through a forecasters perspective

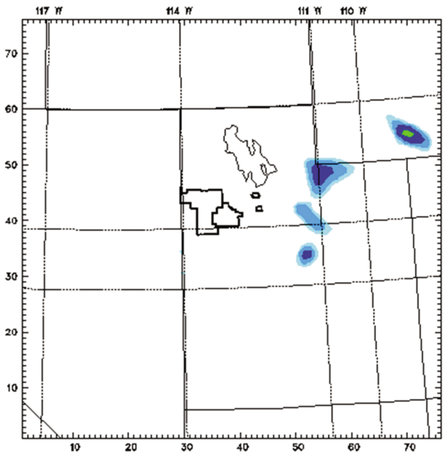
Transition from using both models to relying exclusively on the WRF

The WRF has widespread precipitation around the northeastern domain. The lake effect precipitation is shown with rates of up to 0.50 inch of precipital water within an hour.



WRF

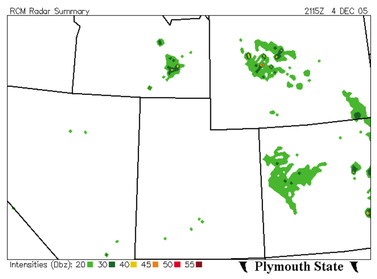
The MM5 indicates light precipitation falling within the Wasatch Mountain Range. No lake effect precipitation is shown during this hour.



MM5

04 DEC 2005 at 2100 UTC

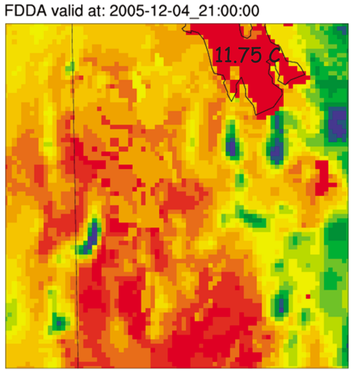
Below is a radar composite of NEXRAD reflectivity data. While no lake effect precipitation is falling at this time, the National Weather Service in Salt Lake City does indicate that trace amounts fell within the hour.

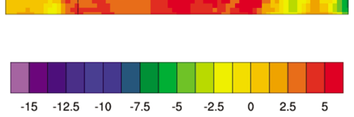


04 DEC 2005 at 2115 UTC

WRF Ground Temperature (C)

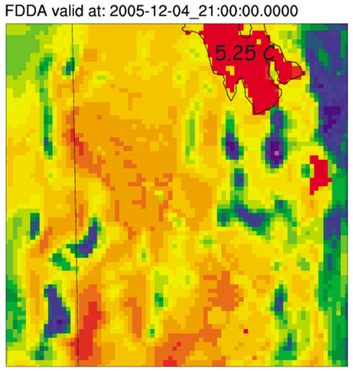
FDDA valid at: 2005-12-04_21:00:00

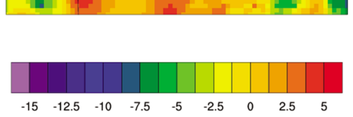




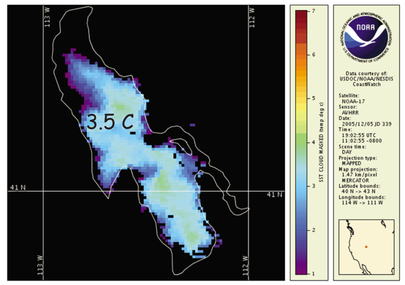
MM5 Ground Temperature (C)

FDDA valid at: 2005-12-04_21:00:00.0000



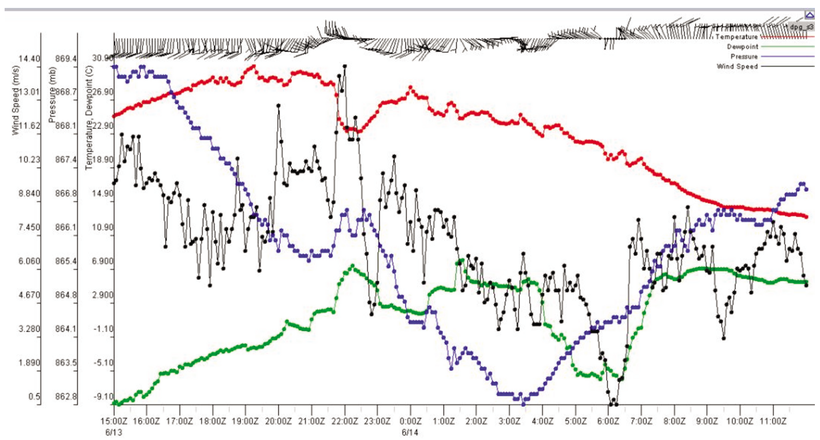


Observed Temperature of the Great Salt Lake



The temperature of the Great Salt Lake has a big impact on lake effect precipitation. The WRFs excessive lake effect band was the product of the models 11.75 degree Celsius lake temperature. This is being resolved by inclusion of the AVHRR data into lake surface initialization.

Time Series of a Frontal Passage at Dugway Proving Ground in Utah
SAMS 08 - Horizontal Grid



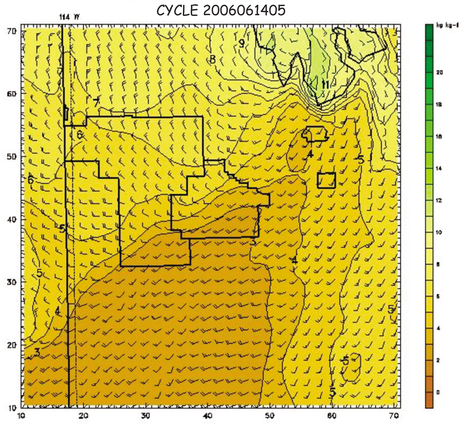
Temperature Dewpoint Pressure Wind Speed

To the right are snapshots of the WRF and MM5 at the most current forecast period prior to the frontal passage.

Plotted are surface wind vectors (m/s) and mixing ratio values (g/kg).

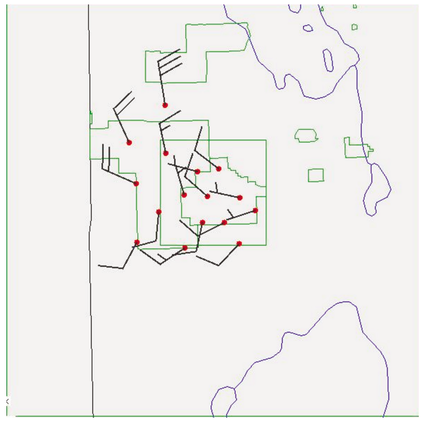
WRF

14 JUNE 2006 at 0600 UTC
CYCLE 2006061405



The WRF has brought the front through the range with quite accurate timing. Although, the pre-frontal winds appear to be to strong.

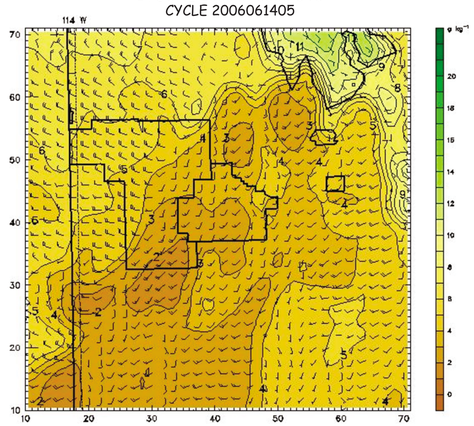
14 JUNE 2006 at 0600 UTC



Observed data from SAMS stations across the range. Using surface winds, the front is visible moving in from northwestern corner of Dugway Proving Ground.

MM5

14 JUNE 2006 at 0600 UTC
CYCLE 2006061405



The MM5 is a little slow on the location of the front, placing it in the northwestern corner of the range. Lighter pre-frontal winds appear, which is more closely related to the observed data.

Conclusions

~ The WRF displays both positive and negative qualities within its domains, but the model is still being upgraded continually
~ Range forecasters confidence in the WRF has increased since the start of this project
~ The WRF tends towards widespread convective activity, which in the Great Basin is more common than lines of storms
~ The WRF generally keeps the winds strong and unidirectional when they should be light and variable
~ The WRF will do better with the winds when there are no synoptic events occurring
~ This project will continue during the upcoming summer months and into the fall, concluding a full year of comparisons

This work was supported by the US Army Test and Evaluation Command