

**SSEC/CIMSS
Seminar**

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**Assimilation of AIRS profiles using an EnKF
approach: A case study**

Significant advancements in numerical weather prediction (NWP) have been made in the last two decades, many of which are due to the inclusion of satellite data into the model assimilation to gain information on the atmospheric state where traditional observations are not available. One satellite data product that has received significant interest of late is the temperature and humidity profiles derived from the Atmospheric InfraRed Sounder (AIRS) instrument on board the Aqua EOS satellite. Using these profiles, previous research efforts have shown that significant improvements can be made during 1-3 day forecast period in global NWP models, with the greatest improvements occurring over the ocean. Assimilation of AIRS profiles has recently been transitioned to smaller spatial scales within regional domains resulting in improvement of tropical cyclone track and intensity forecasts.

This research expands on this theme by assessing the impact of AIRS profiles on forecasts of severe weather convection in the Southern Plains using a tornado outbreak event occurring on 10 May 2010 as an example. To study the potential impact of AIRS profiles in high-resolution convective scale forecasts, the 45 km L2 temperature profiles are assimilated into WRF-DART using an EnKF assimilation scheme over 36 ensemble members. Afternoon AIRS profiles between 1500 and 2100 UTC 10 May 2010 are assimilated into WRF-DART with forecasts being generated starting at 2100 UTC. An hourly mesoscale run at 15 km over a CONUS domain assimilates the profiles with a 3 km nested run created at 15 minute time intervals over the Southern Plains region to study the convective forecasts. Over the CONUS domain, the AIRS profiles do not appear to measurably improve the forecast of mid-tropospheric temperature and humidity. However, improvements were observed in the nested grid domain, especially in the humidity profiles. The moistening of the mid-troposphere due to AIRS data assimilation created a forecast whose conditions were more favorable for severe convection. Comparing simulated radar reflectivity from both AIRS and NO-AIRS runs at 0000 UTC with actual radar observations shows that the AIRS enhanced model produces a more accurate forecast of the convective features at this time.

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10:30 a.m.

Room AOSS 351