

Evaluation of the Impact of Atmospheric Infrared Sounder (AIRS) Radiance and Profile Data Assimilation in Partly Cloudy Regions

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Improvements to global and regional numerical weather prediction have been demonstrated through assimilation of data from NASA's Atmospheric Infrared Sounder (AIRS). Current operational data assimilation systems use AIRS radiances, but impact on regional forecasts has been much smaller than for global forecasts. Retrieved profiles from AIRS contain much of the information that is contained in the radiances and may be able to reveal reasons for this reduced impact. Assimilating AIRS retrieved profiles in an identical analysis configuration to the radiances, tracking the quantity and quality of the assimilated data in each technique, and examining analysis increments and forecast impact from each data type can yield clues as to the reasons for the reduced impact. By doing this with regional scale models individual synoptic features (and the impact of AIRS on these features) can be more easily tracked. This project examines the assimilation of hyperspectral sounder data used in operational numerical weather prediction by comparing operational techniques used for AIRS radiances and research techniques used for AIRS retrieved profiles. Parallel versions of a configuration of the Weather Research and Forecasting (WRF) model with Gridpoint Statistical Interpolation (GSI) are run to examine the impact AIRS radiances and retrieved profiles. Statistical evaluation of 6 weeks of forecast runs will be compared along with preliminary results of in-depth investigations for select case comparing the analysis increments in partly cloudy regions and short-term forecast impacts.

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