

Impact of AIRS and AMSU-A data in regional data assimilation over the Antarctic

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The Antarctic Mesoscale Prediction System (AMPS) is an experimental, real-time numerical weather prediction capability that provides a twice-daily forecast covering Antarctica. The current version uses the regional mesoscale model Weather Research and Forecasting (WRF). The model can be initialized through a variational assimilation system (WRF-Var), which involves specific background error statistics. The impact of observations from the Atmospheric Infrared Sounder (AIRS) and the Advanced Microwave Sounding Unit (AMSU) is studied for the Antarctic region. Temperature and water vapor information are retrieved through the latest version of AIRS Standard Retrieval Products from NASA. The quality of the data is assessed for high latitudes and errors associated with these quantities are estimated. The performance of retrievals is then compared to the direct assimilation of radiances. Objective methods are used to estimate the radiance error statistics and to perform quality control. A cloud detection scheme is developed for AIRS and adapted to the polar regions where clouds are often more difficult to identify. The relevance of cloud-cleared radiances is also studied. Finally, a significant effort is focused on systematic errors in the innovations, which are a major problem for data assimilation in the polar regions. In particular, we will show results from the combination of a variational bias correction of observations with estimations of model bias.

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