

## **VALIDATION OF THE ATMOSPHERIC INFRARED SOUNDER OVER THE ANTARCTIC PLATEAU**

### ***Investigators:***

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### ***Overview:***

Dome Concordia is an ideal site for calibration and validation of infrared satellite instruments. The large continental ice sheet is one of the most homogeneous land surfaces on earth in terms of surface temperature and emissivity. Surface-based measurements of upwelling infrared radiation from the surface between 8-12 micrometers are very nearly equal to those measured by satellite instruments because of minimal atmospheric absorption and emission. Therefore, accurate measurements made at the surface of spectral infrared radiance can provide valuable validation data for satellite instruments. In January 2003 and in December 2003/January 2004, our group performed field work at Dome Concordia to validate NASA's Atmospheric Infrared Sounder (AIRS). We measured upwelling and downwelling spectral infrared radiances with the Polar Atmospheric Emitted Radiance Interferometer (PAERI) atop a tower. A narrow-band infrared radiometer, called the AIRS Mobile Observing System (AMOS), was dragged behind a snowmobile to map changes in surface radiation at spatial scales similar to the field of view of AIRS. Radiosondes were launched to obtain atmospheric temperature and humidity profiles. In addition, surface meteorological measurements and total-column ozone measurements were made by other groups at Dome C during January 2003.

### ***Validation Goals:***

The goals of this study are to provide validation data for both level 1 and level 2 products derived from the AIRS instrument. Our contributions to the level 1 validation will include top-of-the-atmosphere (TOA) radiances derived from radiative transfer calculations that use as input the model atmospheres and retrievals of the spectral emissivity and skin temperature of the snow surface. We will supply model atmospheres for the summertime Antarctic, derived from radiosondes and ancillary data (surface met obs and ozone measurements), and also provide retrievals of the surface spectral emissivity and cloud microphysical properties for Level 2 validation. We will make detailed comparisons to coincident AIRS data and provide our assessments of AIRS radiances and products.