



Weather and Climate Applications of Ultraspectral IR Radiance Measurements

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High vertical resolution surface and satellite infrared ultraspectral radiance measurements are enabling improved characterization of the atmosphere for improved weather and climate prediction. Ground-based interferometer spectrometers enable quasi-continuous measurements of the Planetary Boundary Layer thermodynamic structure and Green House Gas (GHG) concentrations. The satellite AIRS, IASI, and CrIS instruments enable global high vertical resolution thermodynamic sounding measurements. For the first time, 0-50 minute tendencies of surface and atmospheric properties, important for forecasting tornadic weather development and hurricane intensification, are being obtained from the soundings from the Aqua/NPP and Metop-A/Metop B satellites, as a result of each satellite pair being in the same orbital plane. Combined ground-based and space-based radiance measurements at satellite overpass times can be used together to provide a more detailed depiction of atmospheric vertical structure than can be provided by either measurement alone. Algorithms used for retrieving these new weather and climate data and example applications of the retrieved products are presented.