Development and Applications of the GOES Sounder Products

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Since 1994 a new generation of Geostationary Operational Environmental Satellite (GOES) Sounders (GOES-8/9/10/11/12) has been measuring radiances in 18 infrared spectral bands, ranging from approximately 3.7μm - 14.7 μm. This data has been used to provide atmospheric sounding and cloud products for meteorological applications on an hourly basis over North America and adjacent oceanic regions. The products include atmospheric temperature and moisture profiles, total precipitable water, cloud-top pressure, water-vapor tracked winds, etc. Products are generated operationally by NOAA/NESDIS in Washington, D.C. Some Sounder products, including total column ozone, are also produced at the Cooperative Institute for Meteorological Satellite Studies at the University of Wisconsin-Madison. Applications of those products include: nowcasting and forecasting of weather events, assimilation of cloud products into regional numerical forecast models, and monitoring of temperature and moisture changes during active convective periods. The impact of GOES Sounder products on numerical model forecasts will be demonstrated. Furthermore, recent improvements to several of the products have been made by taking into account the GOES Sounder temporal and spatial information within the processing algorithms. These improvements and implications thereof will be presented and discussed.