

## **GOES sounding system – the current applications and future needs**

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The current Geostationary Operational Environmental Satellite (GOES) Sounders (GOES-8/9/10/11/12/13) have provided hourly infrared (IR) radiances and derived products over the continental U.S. (CONUS) and adjacent oceans for over 15 years. The GOES-10 Sounder now also provides hourly coverage over portions of South America. The products derived include: clear-sky radiances; temperature and moisture profiles; Total Precipitable Water vapor (TPW) and layer PW; atmospheric stability indices such as Convective Available Potential Energy (CAPE), Lifted Index (LI) and K-Index; cloud-top properties; water vapor motion winds through radiance tracking; and total column ozone. These products are used in numerical weather prediction (NWP), short range forecasts and nowcasts, including severe weather forecasts.

GOES-R and -S will not carry an IR sounder dedicated to acquire high-vertical-resolution atmospheric temperature and humidity profiles. The Advanced Baseline Imager (ABI) on the GOES-R series will provide some continuity of the current sounder products to bridge the gap until the advent of the GOES advanced IR sounder. NOAA continues to have validated requirements for measurements from advanced sounders in geostationary orbit, studies has been conducted on the needs of hyperspectral IR sounding system for future GOES. The potential applications of future geostationary advanced sounder on severe storm nowcasting are demonstrated with International H<sub>2</sub>O Project (IHOP) case. In addition, NCAR (National Center for Atmospheric Research) WRF/DART (Weather Research and Forecasting / Data Assimilation Research Testbed) ensemble assimilation is performed for hurricane forecasts using single field-of-view AIRS (Atmospheric InfraRed Sounder) soundings. Studies shows that the track error for Hurricane Ike (2008) is reduced by half when AIRS data are used compared with the control run which includes other observations such as radiosonde, satellite cloud winds, aircraft data, ship, and land surface data, etc. The hurricane intensity forecast is also improved when AIRS data are assimilated. This study demonstrates the importance of high spatial and hyperspectral resolution IR data in forecasting the hurricanes, and an improved temporal resolution will help even more.