

GCOS Reference Upper Air Network (GRUAN): NOAA Products Validation System (NPROVS) in support of GRUAN exploitation and satellite product validation

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The National Oceanic and Atmospheric Administration/National Environmental Satellite Data and Information Service (NOAA/NESDIS) produces global temperature and moisture sounding products from operational polar-orbiting and geostationary satellites. Within the NESDIS Office of Satellite Applications and Research (STAR), the NOAA PROducts Validation System (NPROVS) now provides a centralized, real-time monitoring and validation function for inter-comparing these products against collocated radiosonde, dropsonde, real time numerical weather prediction (NWP) and longer-term re-analysis forecast data. The satellite product suites compared include Advanced-TOVS (ATOVS), Atmospheric Infrared Sounder (AIRS), Microwave Integrated Retrieval System (MIRS), GOES, Infrared Atmospheric Sounding Interferometer (IASI) and Constellation Observing System for Meteorology Ionosphere and Climate (COSMIC) Global Positioning System Radio Occultation (GPSRO) derived sounding products. The following report presents results comparing ATOVS, MIRS, GOES, IASI, AIRS and COSMIC atmospheric sounding products against collocated radiosonde, NWP and climate re-analysis using collocation data sets routinely compiled by NPROVS. Special aspects of these results are presented, including impacts due to satellite and radiosonde quality control, radiosonde type, spatial and temporal windows, clouds, terrain and respective retrieval approaches. Results include relatively short term (weekly) vertical statistics and longer term (monthly, seasonal and annual) trend analysis and as available special suites of collocations anchored to GPSRO. Special case observations and respective product performance, for example, profiles containing temperature inversions and/or complex vertical moisture structures are also presented. Results from experimental research observations integrated into NPROVS, including AEROSE, CIMO Inter-comparison China 2010, Antarctic Concordia and in particular from selected GCOS Reference Upper Air Network (GRUAN) sites are included as available. The above work is supported by the NOAA Joint Polar Satellite System (JPSS) in conjunction with CrIS/ATMS Cal/Val team activities in preparation for NPOESS Preparatory Project (NPP) products in 2011. Latest results and status of NPROVS integration into JPSS Cal/Val program and overall program plans are presented. Special efforts to integrate into NPROVS respective measurements and derived "site atmospheric state best estimates" from GRUAN, the later modeled from previous ARM site studies and pending plans for JPSS Cal/Val of sensor, physical model and derived product validation conclude this report.