

PROCESSING OF GRAS RADIO OCCULTATION DATA RECORDED IN RAW-SAMPLING MODE

F. Zus*(1), C. Marquardt(2), M. Bonnedal(3), and the GRAS Raw Sampling Study Team

(1) Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Potsdam, Germany (2) EUMETSAT, Darmstadt, Germany (3) RUAG Space AB, Göteborg, Sweden

The RO (Radio Occultation)-instrument GRAS (GNSS Receiver for Atmospheric Sounding) on-board of EUMETSAT's (European Organisation for the Exploitation of Meteorological Satellites) MetOp satellite is designed for observing setting and rising occultations from the GPS (Global Positioning System) satellite constellation. A dedicated ESA (European Space Agency, contract 21995/08/NL/FM) funded study was set up to investigate the potential of RO data recorded in RS (raw-sampling) mode. Results from GRAS RO data recorded in RS mode processed at the GFZ are presented. The experimental processing software includes full spectrum inversion and enables in connection with RS data to retrieve refractivity profiles down to the Earth's surface. The retrievals are validated against co-located ECMWF (European Centre for Medium-Range Weather Forecasts) profiles. The focus is on data from October 2007 provided by EUMETSAT. The intercomparison indicates good quality of the retrieved profiles. 50% of the profiles reach below 1.6 km, indicating that RS and the application of an advanced retrieval algorithm work as intended. The global mean fractional refractivity deviation from 0 to 5 km varies between -1.8% to +0.1%. The meridional distribution of the fractional refractivity deviation at low altitudes shows that the observed negative/positive bias mainly stems from the tropical lower troposphere. From 10 to 35 km we notice an increasing bias with altitude in the global mean fractional refractivity ranging from -0.1% to -0.5%. Sensitivity tests are performed to estimate to which extent specific components in the processing contribute to biases present at low/high altitudes.