Processing of COSMIC and GRAS data from level 1a (phases, amplitudes, orbits) to level 1b (bending angles) and level 2a (refractivity) using the Radio Occultation Processing Package (ROPP)

Kjartan Kinch and K. B. Lauritsen

Danish Meteorological Institute

mkm@dmi.dk

The EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites) Radio Occultation Meteorology Satellite Application Facility (ROM SAF) is responsible for dissemination of a number of radio-occultation data products. ROM SAF operates both a near-realtime and an offline processing chain. In the offline processing chain RO data from a number of instruments are processed from phases, amplitudes and orbits to bending angles and refractivity. From refractivity data are further processed to atmospheric temperature, pressure and humidity using a 1-dimensional variational scheme and monthly-mean gridded data are produced and disseminated.

Here we report on the first processing steps of this offline processing chain going from level 1a data (phases, amplitudes, orbits) through level 2a (refractivity). This processing relies on algorithms encoded in the Radio Occultation Processing Package (ROPP). Bending angles are found from phases, amplitudes and orbits using the Canonical Transform of the second kind (CT2) below 25 km and using the standard geometric-optics inversion above 25 km. Refractivities are found from the Abel Transform initialized using a profile from the MSIS global climatology.

We show processing output of recent data from the COSMIC mission as well as data from the GRAS instrument on Metop-A. We compare with co-located profiles drawn from the European Center for Medium-range Weather Forecasts (ECMWF). We also compare processing output based on level 1 a input from two different sources (EUMETSAT and UCAR). We discuss and compare several approaches to quality control of resulting output data