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The Radio Occultation Meteorology Satellite Application Facility (ROM SAF) is a decentralized facility under EUMETSAT responsible for delivering radio occultation products for Numerical Weather Prediction (NWP) and climate monitoring. Recent ROM SAF activities have focused on the preparations toward a full reprocessing to generate Climate Data Records (CDRs) from a number of Radio Occultation (RO) missions, namely CHAMP, GRACE, COSMIC, and Metop. Together these missions span more than 15 years of high-quality information about the state and change of atmospheric key variables.

We here present results from the validation of the reprocessed profiles of bending angle, refractivity, and dry temperature. The reprocessing is based on low level data (phase, amplitude, and orbit data) provided by UCAR/CDAAC and the EUMETSAT Secretariat, and processed with the same software (ROPP) for all missions.

Comparisons to forecasts from ECMWF operations and ERA-Interim show that mean differences in the ionospheric corrected bending angle are consistent with those of refractivity and dry temperature up to about 60 km, indicating very little mean influence from the climatology (BAROCLIM) used in the statistical optimization at high altitudes. Comparisons between different missions reveal small mean differences between results from COSMIC and Metop, mainly in the lower troposphere, whereas differences to results from CHAMP and GRACE are larger.

For Metop, we have the opportunity to compare two different reprocessings, namely one based on UCAR/CDAAC low level data, and another one based on low level data from the EUMETSAT Secretariat. On top of that we will also compare to UCARs and EUMETSATs own reprocessed products. Such comparisons reveal the results of differences (structural uncertainty) in the low level processing at UCAR and EUMETSAT, as well as in the higher level processing at UCAR, EUMETSAT, and the ROM SAF.
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