



15-year ROMSAF radio occultation climate data record: inter-mission consistency

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Numerous studies have demonstrated the accuracy of GNSS Radio Occultation (RO) data, and their usefulness as a stable climate reference. Homogeneity of the data records are obtained by reprocessing of the data using uniform processing software and a priori data throughout the length of the climate record. We here present results from a validation of the 15-year ROM SAF RO Climate Data Record (CDR), based on a new reprocessing of Metop, CHAMP, GRACE, and COSMIC data using excess-phase and amplitude data from EUMETSAT (the Metop mission) and UCAR/CDAAC (the CHAMP, GRACE, COSMIC, and Metop missions).

A central issue for the generation of RO-based CDRs is whether data from different satellite missions can be combined to form long time series of multi-mission data. This presentation explores the consistency of gridded monthly-mean data from different RO missions through comparison with ERA-Interim reanalysis data, and through a study of mission differences during mission overlap periods. The sources and magnitudes of RO mission differences are discussed. It is shown that within a core region from the upper troposphere to the middle stratosphere, roughly 8 to 35-40 kilometers (depending on latitude and geophysical variable), there is a high consistency amongst the RO missions, allowing for the construction of long-term stable data sets for use in climate studies and climate monitoring.