

CONSISTENCY OF RADIO OCCULTATION CLIMATOLOGIES FROM DIFFERENT SATELLITES

U. Foelsche*(1), B. Scherllin-Pirscher (1), (2), A. Leuprecht (1), G. Kirchengast (1)

(1) Wegener Center and IGAM/IP, University of Graz, Austria, (2) COSMIC Project Office, UCAR, Boulder, CO, USA.

Data Consistency is an important prerequisite to build Radio Occultation (RO) climatologies based on a combined record of data from different satellites. The presence of different RO receiving satellites in orbit allows for testing this consistency. We used data from CHAMP (CHALLENGING Minisatellite Payload for geoscientific research), six Formosat-3/COSMIC satellites (Formosa satellite mission 3/Constellation Observing System for Meteorology, Ionosphere and Climate, F3C), and GRACE-A (Gravity Recovery and Climate Experiment). Thereby we applied the WEGC retrieval OPSv5.4 (Occultation Processing System, version 5.4) to phase delay profiles and precise orbit information (level 1 data) provided by UCAR/CDAAC, Boulder, CO, USA. We show results for a sample month (October 2007) and the temporal evolution of differences in monthly climatologies from Jan. 2007 - Dec.2009. Differences of latitude- and altitude-resolved refractivity and dry temperature climatologies clearly show the influence of different sampling characteristics. Mean (relative) differences from the satellite-mean over the altitude domain 8 km to 30 km typically reach 0.1 % and 0.2 K, respectively. Nevertheless, the 3-year averages (shorter for CHAMP) are less than 0.03 % and 0.03 K, respectively. There are no indications for temporal trends in sampling patterns. Based on gridded data from ECMWF (European Centre for Medium-Range Weather Forecasts), we can estimate and subtract the sampling from each climatology. After subtraction of the estimated respective sampling errors, relative refractivity differences are reduced to < 0.05 % in almost any case. Dry temperature differences are < 0.05 K for almost every satellite and month, only data from CHAMP show a small offset of -0.07 K. 3-year averages are even reduced to < 0.01 % and < 0.01 K (CHAMP: -0.07 K), respectively, proving an amazing consistency of RO climatologies from different satellites.