PROCESSING OF COSMIC RADIO OCCULTATION DATA AND CROSS-CENTER COMPARISON

K. B. Lauritsen*(1), M. E. Gorbunov (2), S. S. Leroy (3), A. V. Shmakov (2)

(1) Danish Meteorological Institute, Copenhagen, Denmark; (2) Obukhov Institute for Atmospheric Physics, Moscow, Russia; (3) Harvard School of Engineering and Applied Science, Cambridge, Massachusetts;

We have processed COSMIC data by the OCC processing system and present a statistical comparison of inversions of COSMIC data, UCAR data products, and ECMWF analyses. We processed 40 days of years 2007 and 2008 (5 days in the middle of each season) for comparison of OCC and ECMWF. We processed 20 days of April, 2009 for the comparison of OCC, UCAR, and ECMWF. The OCC and UCAR inversions are consistent. For the tropics, the systematic difference between OCC and UCAR in the retrieved refractivity in the height interval 2-30 km does not exceed 0.1%, in particular, in the interval 9-25 km it does not exceed 0.03%. Below 1 km in the tropics the OCC-UCAR bias reaches 0.2%, which is explained by different cut-off and filtering schemes implemented in the two systems. The structure of the systematic difference OCC-ECMWF below 4 km changes in years 2007, 2008, and 2009, which can be explained by changes in the ECMWF analyses and assimilation schemes. We estimate that in the 4-30 km height range the OCC occultation processing system obtains refractivities with a bias not exceeding 0.2%. The random error ranges from 0.3-0.5% in the upper troposphere-lower stratosphere to about 2% below 4 km. The estimate of the bias below 4 km can currently be done with an accuracy of 0.5-1% due to structural uncertainty of RO data reflecting our insuficient knowledge of the atmospheric smallest structures and instrumental errors. The OCC-UCAR bias is below the level of the structural uncertainty.