Ramon
Padullés
Institut de Ciències de l'Espai (IEEC-CSIC), Barcelona, Spain
Estel Cardellach, Institut de Ciències de l'Espai (IEEC-CSIC), Barcelona, Spain
Chi O. Ao, NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA
Kuo-Nung Wang, NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA
F. Joseph Turk, NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA
Manuel de la Torre-Juárez, NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA
Oral
Multiple years (2006–2015) of COSMIC Radio Occultation (RO) mission products have been collocated with the Tropical Rainfall Measurement Mission (TRMM) three dimensional orbital products, looking for coincidences in space (RO events within TRMM radar swath) and time (less than 15 minutes). These collocated profiles have allowed us to associate an occultation with precipitation and to investigate the impact of precipitation on RO products.

In this study we focus on the comparison of the RO tropospheric refractivity profiles with global weather analyses and reanalyses, accounting for the presence of precipitation in the surroundings of a RO sounding. The analyses data used are the ECMWF TOGA 2.5 degree Global Upper Air Analysis, the ECMWF Reanalysis (ERA) Interim, the NCEP Global Forecast System (GFS), and the ECMWF high resolution gridded analysis. Our results show a clear positive bias in the RO refractivity, of around 1 - 1.5 % with respect to the analyses, between 3 and 5 km of altitude when heavy precipitation is present.

The analysis of such bias is presented here. First, regional and geometric reasons are excluded as potential causes of the bias. Then, a rigorous analysis of several RO events has been performed, accounting for the three dimensional intersection of the RO plane and the precipitation structure provided by TRMM. The latter has consisted in simulations of the RO excess phase caused by the rain, using T-matrix simulations and realistic ray trajectories obtained by ray-tracing techniques, and to attempt the refractivity retrieval with and without such contribution. Therefore, the impact of the precipitation into the RO retrievals is assessed, and the causes of the bias can be investigated.

The implications of the bias, its possible causes, and the assessment of the impact of the precipitation into the RO retrievals will be discussed in this presentation.
OSTS session
Regional and Global CAL/VAL for Assembling a Climate Data Record
Download to PDF