The Radio Occultation experiment on-board the Indian OCEANSAT-2 mission: data processing validation and preliminary results

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In September 2009, the Indian Remote Sensing OCEANSAT-2 satellite will be launched from the Satish Dhawan Space Centre located in Sriharikota (India). The Ocean Colour Monitor (OCM) and Ku-band Pencil Beam Scatterometer carried on-board OCEANSAT-2 will continue and improve the services of OCEANSAT-1, in particular for what concerns the identification of potential fishing zones, sea state forecasting and coastal zone studies. Moreover, OCEANSAT-2 will carry on-board a third payload, called ROSA (Radio Occultation Sounder for Atmospheric studies) and developed by the Italian Space Agency (ASI), which will give very accurate informations about the vertical structure of the atmosphere, through the exploitation of the GPS Radio Occultation technique. This technique is an emerging remote sensing technique for the profiling of atmospheric parameters (first of all refractivity, but also pressure, temperature, humidity and electron density). It is based on the inversion of L_1 and L_2 GPS signals collected on-board a Low Earth Orbit (LEO) platform, when the transmitter rises or sets beyond the Earth's limb. The relative movement of both satellites allows a "quasi" vertical atmospheric scan and the about 300 profiles per day extracted using this technique are characterized by a high vertical resolution (varying between 500 m near the surface up to 1500 m in the higher stratosphere and ionosphere) and a high accuracy ($< 0.5 \div 1\%$ in terms of refractivity fractional error up to 30 km height). The RO technique can be operatively applied for meteorological purposes, for climatological purposes (the accuracy of inferred Tropopause parameters is one of the most attractive aspect of the RO technique), for gravity wave observations and for Space Weather applications.

The Radio Occultation data processing for the ROSA receiver (which is called ROSA-ROSSA - ROSA-Research and Operational Satellite and Software Activities) has been supported by Italian Space Agency and has been developed by a pool of Italian Universities and Research Centers. The ROSA-ROSSA software will be integrated in the operative Ground Segment which will operate in Italy (at the ASI Space Geodesy Center) and will be mirrored in India (at the Indian National Remote Sensing Agency).

Within this contribution, results of the scientific validation of the products generated by the first release of the ROSA-ROSSA software will be shown. Since during the ROSA-ROSSA development phase no real ROSA observations were available, the software was validated following two procedures. The input dataset was defined considering one day of real observations carried out in the framework of the operative COSMIC (NASA-Taiwan), CHAMP (Germany) and METOP-1 (European Space Agency) Radio Occultation missions. Firstly, ROSA-ROSSA products at each level have been statistically compared with the correspondent products generated by the other processing software. On the other hand, ROSA-ROSSA and COSMIC refractivity and temperature profiles have been "individually" compared on a statistical base with collocated ECMWF 91 level analysis.

Moreover this Conference will be the first opportunity to present to the community the preliminary results obtained after the processing of the first ROSA RO observations on-board the OCEANSAT-2 mission.