



Validation of atmospheric profiles retrieved with GPS Radio Occultation observations applying numerical inversion techniques

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The use of GPS Radio Occultation technique (GPS RO) has been deeply and widely investigated for retrieving physical and chemical parameters of Earth atmosphere (namely Pressure, Temperature and Water Vapour) with an high vertical resolution and accuracy. The refractivity profiles are usually obtained indeed for the dry part of atmosphere solving the system of two equations (Smith & Weintraub equation for refractivity and the hydrostatic equilibrium law) in two unknown (Hydrostatic Pressure P and temperature T). It is impossible to solve this system through the atmosphere, where the water vapour content is not negligible, unless some additional external information are included such as the temperature/pressure given by the models (ECMWF or NCEP).

Nevertheless, the Boundary Profiles eValuation approach (BPV) developed by the authors proved to be a useful technique able to retrieve the wet content in the atmosphere using GPS RO observations alone. BPV is an alternative method to the Abel inversion and it can be used to retrieve the refractivity profiles performing a linearization of its integral relationship with the bending angles using a dry atmosphere model (namely Hopfield). Then, the water vapour content is determined removing the dry contribution given by the model from the overall refractivity retrieved by GPS RO data and applying the Smith & Weintraub relationship.

We plan to apply the BPV approach to retrieve refractivity and water vapour profiles using two dry models: Hopfield and CIRA-Q. We will use mainly the data coming from COSMIC GPS-RO space mission. The final objective is to perform an extensive validation of the results against the models (namely ECMWF and/or NCEP), Radiosonde data as well as GPS RO profiles achieved with other algorithms.