

## **Developments on the interpretation and assimilation of GPSRO data at Environment Canada**

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Since the operational implementation of GPSRO data at Environment Canada, new research directions have been initiated for improving their impact on Numerical Weather Prediction (NWP). Among them is the revision of the quality of the traceability chain. GPSRO has an excellent link between its raw measurement of phase and fundamental metrological measurements of time and frequency. However, in order to take full advantage of this potential, other elements in the processing and use of these data have to be carefully considered.

We have focused on the part of the traceability chain that pertains to the use of these data within an NWP system. This includes the relationship between pressure and density, our knowledge of the refractivity of air, and the hydrostatic approximation. Among the detailed issues raised by these, we can identify the impact of the non-ideal behavior of air, the accurate relationship between refractivity and other thermodynamic quantities, and the comparison against other data that are also considered as absolutely calibrated, notably radiosondes.

A qualitatively new direction was explored as well, through the analysis of the reflected signals off the ocean, which can provide supplemental information to direct propagation profiles, particularly in the lower atmosphere.

We will present the current status of the ensemble of these research directions, including those that have already been implemented, and those still at the research stage.