



## **A reference atmosphere from GPS radio occultation profiles**

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The Global Positioning System (GPS) Radio Occultation (RO) method provides estimation of atmospheric parameters such as bending angle, refractivity, temperature, pressure and water vapor with high accuracy, high vertical resolution and global coverage.

We have used the WEGC OPSv5.6 dataset of GPS RO, collected in the period 2001-2012 from different missions, for creating a global reference atmosphere with vertical sampling of 100 meters, horizontal sampling of one degree and horizontal resolution of 5 degrees. For assessing the strength and the sensitivity of this climatology, we compared to the full dataset mean with the monthly means, seasonal means, and single mission means, highlighting seasonal variations and possible issues due to single satellite sensors.

This reference dataset is well suited for studying remote areas and extreme events, since the GPS signals are not affected by clouds and the acquisitions are well distributed around the globe. An old version of this dataset has already been used in the past as reference for studying tropical cyclones and convective systems, allowing to reach satisfactory results and suggesting further possible applications such as volcanic ash clouds detection and convective overshooting detection.

An updated standard atmosphere, representing the real climatological variability especially also in winter and at high latitudes and altitudes, could become a reference for meteorologists and climate modellers.