Characteristics of tropopause parameters as observed with GPS RO data

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The tropopause is the transition layer where the atmosphere changes from tropospheric to stratospheric conditions. Its characteristics influence exchange between troposphere and stratosphere and contain a wide range of information about the atmospheric state. In this work we discuss general tropopause properties and spatio-temporal characteristics. Furthermore, we show inter-annual variability of tropopause parameters caused by changing tropospheric or stratospheric conditions.

We use data of different RO missions (including CHAMP, SAC-C, GRACE, and COSMIC) processed at WEGC from 2006 to 2012, when there are more than 30000 RO measurements globally available per month. The parameters tropopause altitude and temperature are computed from individual dry temperature profiles.

Spatio-temporal characteristics are analyzed on the basis of individual profiles as well as for averaged data. Temperature anomalies in the troposphere and stratosphere, such as El Niño–Southern Oscillation (ENSO) or Sudden Stratospheric Warming (SSW) events cause a signal in tropopause characteristics of first (lowest) as well as of second tropopauses. Therefore we discuss variations of both first and second tropopause properties due to ENSO and SSW events.

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