

GRACE-FO RADIO OCCULTATION DATA PROCESSING – A VALIDATION STUDY

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The major objective of the GRACE Follow On (GFO) mission with its two satellites GF1 and GF2 is to obtain precise global and high-resolution models for both the static and the time variable components of the Earth's gravity field. Additional goal is the continuation of the GPS radio occultation (RO) measurements from the predecessor GRACE, successfully performed between 2006 and 2017.

The GRACE/GRACE FO data contribute to the global RO dataset consisting of several missions provided by different centres since the pioneering GPS/MET mission in 1995/97.

Beside climate applications, GFO data are used for the assimilation in numerical weather forecast models by the leading weather service centres.

After several on-board software updates and raw data reader improvements since March 2020 rising occultations from GF1 and since September 2021 setting occultations from GF2 are continuously available. Both satellites provide about 500 atmospheric profiles daily.

The RO data are processed based on different measured observables: For different GPS satellites combinations of L1CA/L2P, L1CA/L2C, or L1CA/L5 amplitude and phase measurements are available.

In this study results of GFO processing and validation are presented. Bending angle, refractivity, and temperature data are compared with ECMWF operational analyses and ERA5 data. The quality of the different measured variables is evaluated for different geographical regions. In addition, GFO data are compared with co-located COSMIC-2 and Spire radio occultations.