

High temporal resolution wet delay gradients estimated from multi-GNSS and microwave radiometer observations

SND-ID: 2021-219-1. **Version:** 1. **DOI:** <https://doi.org/10.5878/fyt8-bs80>

Download data

SND2021-219-V1.0.zip (49.7 MB)

Citation

Elgered, G., & Ning, T. (2021) High temporal resolution wet delay gradients estimated from multi-GNSS and microwave radiometer observations (Version 1) [Data set]. Chalmers University of Technology. Available at: <https://doi.org/10.5878/fyt8-bs80>

Creator/Principal investigator(s)

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Research principal

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Description

Abstract of the published paper using the dataset:

We have used one year (2019) of multi-GNSS observations at the Onsala Space Observatory on the Swedish west coast to estimate the linear horizontal gradients in the wet propagation delay. The estimated gradients are compared to the corresponding ones from a microwave radiometer. We have investigated different temporal resolutions from 5 min to one day. Relative to the GPS-only solution and using an elevation cutoff angle of 10° and a temporal resolution of 5 min the improvement obtained for the solution using GPS, Glonass, and Galileo data is an increase in the correlation coefficient of 11 % for the east gradient and 20 % for the north gradient. Out of all the different GNSS solutions, the highest correlation is obtained for the east gradients and a resolution of 2 h, while the best agreement for the north gradients is obtained for 6 h. The choice of temporal resolution is a compromise between getting a high correlation and the possibility to detect rapid changes in the gradient. Due to the differences in geometry of the observations, gradients which happen suddenly, are either not captured at all or captured but with much less amplitude by the GNSS data. When a weak constraint is applied in the estimation of process, the GNSS data have an improved ability to track large gradients, however, at the cost of increased formal errors.

Data contains personal data

No

Language

[English](#)

Time period(s) investigated

2019-01-01 - 2019-12-31

Data format / data structure

[Numeric](#)

Data collection 1

- Instrument: Global Navigational Satellite Systems
- Temporal resolution: 5 minute

Geographic spread

Geographic location: [Onsala Parish](#)

Geographic description: The atmosphere above the Onsala Space Observatory

Responsible department/unit

Space, Earth and Environmental Science

Research area

[Earth and related environmental sciences](#) (Standard för svensk indelning av forskningsämnen 2011)

[Meteorology and atmospheric sciences](#) (Standard för svensk indelning av forskningsämnen 2011)

[Climatology / meteorology / atmosphere](#) (INSPIRE topic categories)

Keywords

[Atmospheric structure](#), [Global navigational satellite systems](#), [microwave radiometry](#)

Publications

Ning T. and Elgered, G, (2021). High temporal resolution wet delay gradients estimated from multi-GNSS and microwave radiometer observations, Atmospheric Measurement Techniques.

If you have published anything based on these data, [please notify us](#) with a reference to your publication(s). If you are responsible for the catalogue entry, you can update the metadata/data description in DORIS.

Polygon (Lon/Lat)

11.913854934885, 57.401135504731

11.913854934885, 57.388281158941

11.939495980614, 57.388281158941

11.939495980614, 57.401135504731

11.913854934885, 57.401135504731

Accessibility level

Access to data through SND

Data are freely accessible

Use of data

[Things to consider when using data shared through SND](#)

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Versions

Version 1. 2021-07-21

Related research data in SND's catalogue

[On the information content in linear horizontal delay gradients estimated from space geodesy observations](#)

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[DataCite](#)

[DDI 2.5](#)

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