

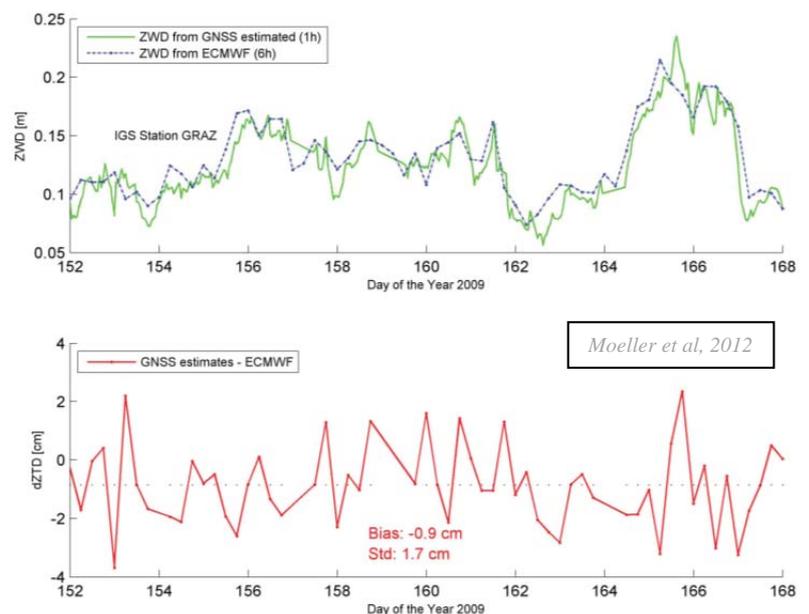


Current topic for a Master's Thesis

Wet troposphere path delay corrections for inland altimetry applications

Satellite altimetry was designed for monitoring the open ocean. Using this technique for the estimation of water levels of inland water bodies is challenging as the quality of the height measurements is degraded due to land contamination of the radar echoes (waveforms). Special signal analysis techniques (retracking) are necessary to account for this effect. In addition, some of the altimeter range corrections are less accurate or even unusable over land. Especially the wet troposphere correction, normally derived by an on-board radiometer, suffers from land contamination. As the radiometer footprint is even larger than the altimeter footprint, the derived correction is unreliable over smaller lakes and rivers.

Nowadays, for most inland altimetry applications, troposphere corrections are derived from weather models. The DAHITI software of DGFI-TUM applies corrections based on a coarse ECMWF model. The thesis aims at the investigation of the accuracy of such models and the quantification of the error contribution to inland water level measurements. Model corrections shall be compared with other corrections computed from finer ECMWF models, GNSS derived zenith path delays, and (if available) ground based microwave radiometers (MWR).



Main tasks:

- Derivation of theoretical connections between different troposphere quantities (water vapour, temperature, pressure, path delay, ...)
- Identification of a few representative water bodies as study cases (based on data availability, weather conditions, and station topography)
- Computation of troposphere path delays from different data sources (models, GNSS, MWR)
- Study the influence of distance/height difference between water body and GNSS station
- Development of an interpolation method for GNSS derived troposphere corrections
- Investigate the influence of errors in wet troposphere correction on water level time series of rivers and lakes

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