



Ocean loading signals derived from tide gauge and GPS sub-daily time series for Helgoland, North Sea

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We present highly resolved spectra of ellipsoidal height and water level in the range of the M2 tide for the island of Helgoland (North Sea). The analyses are based on two time series: a ten years tide gauge measurement time series and a five years time series derived from sub-daily GPS analysis.

This presentation shows how GPS technology can support oceanographic questions. Significant amplitudes at the tidal frequencies appear due to ocean loading even outside the common set of tides used in the GPS processing. In the height amplitudes no linear relationship to the tide generating forces is visible. Moreover, for different tidal lines in the M2 range there is no common admittance between amplitudes in water level and height.

This leads to the conclusion of different co-range distributions around Helgoland for the different tidal constituents mainly due to the contribution of non-linear shallow water tides.