



Sea Level Change using Vertical Land Motion from GNSS: Higher-Order Ionospheric Effects

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Sea level obtained from tide gauges and preserved in the PSMSL data centre is relative to a local reference point/tide gauge benchmark. To obtain absolute sea level change, vertical motion of the reference point must be taken into account utilising continuous observations typically from Global Navigation Satellite Systems(GNSS) to monitor motion at/near tide gauges over a period of years.

We present time series (1995 - mid 2007) showing the influence of the second and third order ionospheric effects on GNSS vertical rates for stations in the GPS Tide Gauge Benchmark Monitoring Project (TIGA). The ionospheric effects are obtained using the International Geomagnetic Reference Field and Total Electron Content(TEC) obtained from IONEX files. Higher order ionospheric effects are quantified in terms of phase residuals and reference frame translation, rotation and scale change effects. The GNSS processing used a modified version of the GAMIT software using a global network of stations, and includes recent developments such as improved tropospheric mapping functions and antenna phase centre corrections.

Finally, we present preliminary data showing the effects on sea level change from correcting PSMSL Revised Local Reference(RLR) tide gauge records with the state of the art GPS data described above.