Correction of earth tidal gravity observations using GPS-measurements

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Abstract: Residuals of earth tidal gravity observations are mainly generated by air pressure changes. The largest part of this effect can be corrected by using the linear air pressure regression coefficient $\Delta p/\Delta g$ [ngal/HPa]. This regression coefficient considers mainly the radial symmetric air pressure distribution over the earth tidal station. Asymmetric effects are not taken into consideration.
GPS-measurements are strongly disturbed by tropospheric effects. Radial symmetric changes of the troposphere are estimated by continous stationary GPS-observations. However the usual zenith path delay of GPS-signals reflects similar effects as the air pressure regression coefficient.
In a pilot study we have investigated the possibilities to determine residual gravity changes due to asymmetric air pressure distributions over the stations. As awaited zenith pathe delay shows no correlation with the residual gravity changes. Strong correlations are found however, if we determine azimuth dependend tropospheric effects on GPS-measurements.