

Gravity loading change due to minor ocean tidal constituents

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The ocean tidal loading is generally calculated as a sum of contribution from finite number of constituents. It is an usual case to include only major 11 constituents ignoring minor constituents with smaller amplitude. Matsumoto et al. (2001) suggested an admittance interpolation technique to include minor constituents in loading displacement correction for GPS network. The similar way can be adopted to gravity loading calculation, but one have to pay attention to the admittance structure due to free core nutation resonance, because such instruments as superconducting gravimeters have very high sensitivity.

The amplitude and phase of gravity loading tide are calculated for minor 33 constituents at every 20km grid inside Japan by using NAO.99b (Matsumoto et al., 2000) ocean tide model and new interpolation technique of admittance with resonance structure. The contribution of the minor constituents are estimated by computing RMS of 1-year gravity change, which amount 0.2 to 0.8 micro Gals.

We also compared theoretical tidal constants with observed ones by the superconducting gravimeter, and found that the new interpolation technique gives more consistent results than the simple interpolation technique without resonance consideration.