

Gravity tidal factors obtained from the GGP network data and comparison with the theoretical values

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Superconducting gravimeter data obtained from GGP network were analyzed to compare the observed tidal factor and phase with those inferred from the recent tidal theory by Dehant et al. (1999). The four sites are compared here; Esashi and Matsushiro in Japan, Membach in Belgium, and Canberra in Australia.

At all observation sites compared here, the observed tidal factors for the main three waves of O1, K1 and M2 tidal waves are consistent with those expected from the theory within about $\pm 0.5\%$ in magnitude. However, within that magnitude, the observed factors clearly show some systematic discrepancies from theory. The discrepancies are discussed in connection with the effect of fluid core on the estimations of theoretical tidal factor and the accuracy in the ocean tide correction.

We have analyzed the superconducting gravimeter data obtained from GGP (Global Geodynamics Project, Crossley et al., 1999) network to compare the observed tidal factor and phase with those inferred from the recent tidal theory by Dehant et al. (1999), which takes into account the three dimensional structure inside the earth. The following four sites are compared here; Esashi and Matsushiro in Japan, Membach in Belgium, and Canberra in Australia.

For comparison, we applied the two corrections to the observed tides, namely,

(1) for the phase delaying induced by the analog filter of SGs and (2) for the ocean tide effects. At all observation sites compared here, the observed tidal factors for the main three waves of O1, K1 and M2 tidal waves are consistent with those expected from the theory within about $\pm 0.5\%$ in magnitude. However, within that magnitude, the observed factors clearly show some systematic discrepancies from theory. The error in calibration of the scale factor of SGs may be excluded from possible sources making this discrepancy, because it is estimated less than 0.1% in magnitude for all SGs.

The discrepancies are discussed in connection with the effect of fluid core on the estimations of theoretical tidal factor and mass loading Green's function. Related to the discrepancies, the accuracy of the ocean tide correction is also discussed.