国際超伝導重力計観測データを用いて得られたδファクターの緯度依存性について

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Latitude dependence of the observed gravimetric factors by the GGP Network superconducting gravimeter data

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We performed a validation study of six ocean tide models (CSR4.0, GOT99.2b, NAO.99b, FES2004, TPXO7.1 and TPXO7.2) using superconducting gravity data at Syowa Station. From comparison with the observed loading effects, the most optimal ocean tide model was found to be TPXO7.2, which had a combined root mean square (RMS) misfit of 0.194 μGal for the eight major (four diurnal and four semidiurnal) waves. The next best ocean tide model was NAO.99b, with a misfit of 0.277 μGal. To see the effect of inclusion of regional tide gauge and bottom pressure data around Syowa Station, we estimated the combined RMS errors for all eight waves; incorporation of these regional data into the TPXO7.2 model resulted in a 5% reduction in the misfit. Our phase lag anomalies indicated that the scatter of the out-phase component was greater than that of the in-phase component in the final residuals; this tendency was especially clear for K1 and M2 waves. Improvement of phase differences, especially for semidiurnal bands, was the key to determine the optimum ocean tide model. From similar consideration of optimal ocean tide model to other superconducting gravimeter observation sites (Metsahovi in Finland, Strasbourg in France, Sutherland in South Africa, and Canberra in Australia), we derived the most probable gravimetric factors of diurnal waves. The observational result of its latitudinal dependence for K1 wave may resolve which theory between Dehant et al. (1999) and Mathew (2001) is more appropriate.

References

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