

Comparison of in-situ ocean bottom pressure data with GRACE gravimetry in the off Sanriku area

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GRACE measures global gravity fields at monthly intervals. It has been expected to study ocean mass variation of which in-situ observation is difficult. The gravity signal of ocean is smaller than ones of land. The estimate of ocean mass variation with early release of GRACE data has been difficult because of the striping, the aliasing and the leak signal from land. In the recent release (RL04 or later), The ocean bottom pressure derived by GRACE (D.Chambers, 2006) has become useful due to the developments of the destriping technique (Swenson and Wahr,2006) and the atmospheric and ocean model for dealiasing.

Some comparison studies have been done the evaluation between GRACE derived and in-situ ocean bottom pressure (OBP). GRACE has the coarse spatial and time resolution, and in-situ OBP recorder is spatially pointwise observation. Only a few studies have confirmed the strong correlation because of the difference of the comparing spatial scale. The cases with strong correlation are as follows,

- *comparison with GRACE data applied large scale smoothing filter in the area that large scale seasonal cycle dominates (e.g. R.Rietbroek et al.,2006),

- *comparison between GRACE and domain averaged in situ OBP (J.Park et al.,2008).

These studies indicate that GRACE is able to detect ocean mass variation accurately in the large scale ocean area dominated by seasonal fluctuation.

In this study, GRACE has been evaluated from the coast neighborhood to the offshore area using the several OBP data deployed to off Sanriku. The area of the off Sanriku sweeps away in order of continental shelf, trench and ocean. The OBP recorders have been distributed in this area. GRACE is compared spatially by matching in-situ OBP and OBP of ocean model (ECCO model). ECCO model can not explain about 40% of the power of the in-situ OBP variation for the low-frequency field over 1 month (Matsumoto et al. 2006). But it consists with each in-situ OBP with the correlation coefficients of 0.8 - 0.9. The correlation between GRACE and in-situ OBP is weak with about 0.4 as the correlation coefficient in the coastal area. However the ocean mass variation was found to depend on the bottom topography from GRACE compared with the in-situ and model matched OBP.