Validation of JRA-JCDAS LDA and GRiveT Terrestrial Water Storage Model Using GRACE Satellite Gravity Data

Keiko Yamamoto[1]; Tosiyuki Nakaegawa[2]; Takashi Hasegawa[1]; Yoichi Fukuda[1]; Makoto Taniguchi[3]

[1] Geophysics, Kyoto Univ.; [2] MRI/JMA; [3] RIHN

After the launch in 2002, GRACE (Gravity Recovery and Climate Experiment) satellite has provided monthly gravity field solution of the Earth as spherical harmonic coefficients. Using GRACE data, we can know temporally changing mass variation on and beneath the Earth's surface. It is well known that seasonal mass variations obtained from GRACE data relatively shows good correlation with some global landwater models. However, in regional scale, some differences are shown between GRACE seasonal signal and models' ones both in amplitude and phase.

Because of the difficulty of the observation most of currently released landwater models contain groundwater components with insufficient precision. On the other hand, because GRACE satellite observes vertical integration of mass variation of the Earth, it can detect total landwater variation including groundwater and it is useful to improve landwater models.

In this study, for the purpose of the improvement of the model, we validated terrestrial water storage data obtained from JRA-JCDAS LDA and GRiveT (JLG) terrestrial water storage model by using GRACE data. JLG mdoel is driven by JRA-25 reanalysis data and the obtained terrestrial water storage is composed by soil moisture, snow water equivalent, river water storage and groundwater storage. For 70 major river basins defined in JLG model, total terrestrial water mass variations were estimated by GRACE data and investigated the correlations of annual and interannual components with JLG model data. We also compared GRACE mass variation with total terrestrial storage estimated by combined water balance (CWB) method, which has been generally used for improvement of global landwater model, and discussed the precision of CWB method.