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Water Storage Changes over the Tibetan Plateau Revealed by GRACE Mission

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Abstract

We use GRACE gravity data released by the Center for Space Research (CSR) and the Groupe de Recherches en Geodesie Spatiale (GRGS) to detect the water storage changes over the Tibetan Plateau (TP). A combined filter strategy is put forward to process CSR RL05 data to remove the effect of striping errors. After the correction for GRACE by GLDAS and ICE-5G, we find that TP has been overall experiencing the water storage increase during 2003-2012. During the same time, the glacier over the Himalayas was sharply retreating. Interms of linear trends, CSR's results derived by the combined filter are close to GRGS RL03 with the Gaussian filter of 300-km window. The water storage increasing rates determined from CSR's RL05 products in the interior TP, Karakoram Mountain, Qaidam Basin, Hengduan Mountain, and middle Himalayas are 9.7, 6.2, 9.1, –18.6, and –20.2 mm/yr, respectively.

These rates from GRGS's RL03 products are 8.6, 5.8, 10.5, –19.3 and –21.4 mm/yr, respectively.

Key words: GRACE, Tibetan Plateau, water storage, filter method, equivalent water height.