

GRACE detection of seasonal variations in total water storage in southern Lao PDR

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Abstract

In 2013, a new website domain for the Gravity Recovery and Climate Experiment (GRACE) was developed by the Australian National University. This website provides a Data Visualisation Tool (DVT) by which users can estimate the equivalent water height (EWH) from a user specified region (polygon) or point. However, this website does not explain clearly enough about the precision of areal and point data derived from the DVT. Therefore, this study investigated the GRACE data detection of the total water storage (TWS, expressed as EWH) fluctuation in wet and dry seasons in southern Lao PDR. A basin scale of about 25,000 km² was utilised to investigate the GRACE detection of TWS changes in southern Lao PDR, one of the main target areas for agricultural development. The total water availability in this area is currently not yet known exactly. This study compares the values of GRACE EWH derived from an area of 25,000 km² with EWH points and observed stream water level data of Mekong River at Pakse hydro-meteorology station, Champasack province. Additionally, this study also compares the values of GRACE EWH point derived from different soil types and different land - use types. The results suggest that the GRACE can detect the seasonal flux of EWH and the extreme flood events in southern Lao PDR. It can be concluded that GRACE data can be used to estimate the total groundwater storage, surface water storage and soil moisture in southern Lao PDR. The proportion of soil and land use types could have a high potential influence on the EWH values.

Keywords: GRACE, Seasonal variations, Equivalent water height, Total Water Storage, Southern Lao PDR