



The Trend and Seasonal Change of Sediment in the East China Sea Detected by GRACE

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The deposition of land sediments onto the broad continental shelf of the East China Sea (ECS) is controlled by complex, dynamic hydrological mechanisms. In this study, we apply the data from Gravity Recovery and Climate Experiment (GRACE) satellite to detect the gravity signal caused by changes in sedimentation. The gravity signal observed by GRACE is an integrated and complicated one, caused by many physical sources, like the sedimentary mass change, the sea water mass changes, sea water replaced by sediment, and glacial isostatic adjustment (GIA) effect. Due to the smooth processing to GRACE data, the land signal and other ocean signal outside ECS will leaked to the study region. The signals need to be cautiously restored and separated to obtain the realistic sediment change. To solve the above problems, in this study, we investigate the sediment change rate and its annual change in ECS by applying GRACE data, in-situ sediment core data, and other auxiliary data. We separate the gravity signals observed by GRACE into different mass sources to obtain the sediment signal. Then, we recover the sediment gravity signal using a space domain inverse (SADI) method. The results indicate that the total GRACE-inverted sediment deposition rate was 0.82 ± 0.3 Gt/yr from 2005 to 2015, which is in agreement with in-situ sediment observations. The seasonal sediment change is also calculated and discussed. It is caused by sediment transport between the ECS and the Yellow Sea.