Geophysical Research Abstracts
Vol. 18, EGU2016-10491, 2016
EGU General Assembly 2016

Water budget of the South China Sea in relation to ENSO as determined from space altimetric and gravimetric observations

Wan Hsin Yang (1) and Benjamin F. Chao (2)

(1) National Central University, Institute of Geophysics, Taoyuan, Taiwan, Province Of China (happy_hsin@hotmail.com), (2) Academic Sinica, Institute of Earth Sciences, Taipei, Taiwan, Province Of China

The South China Sea (SCS) is a semi-enclosed marginal sea surrounded by continents and islands, thus, water can only exchange through the straits. In this paper, we analyze the water budget variations of SCS during 1993-2014, using (i) the AVISO-released surface geostrophic current (SGC) daily data computed by combining the satellite altimeter data in reference to the GOCE geoid; (ii) the GRACE monthly time-variable gravity signifying the water mass variation; and (iii) daily sea level variation (SLV) from AVISO satellite altimeter data. We find from (i) that SGC water intrusion into SCS through the Luzon Strait, normally stronger in winter and weaker in summer, is correlated at the coefficient of 0.28 with the Multivariate ENSO Index (EMI) apparently under the influence of the variation of monsoon and the strength of Kuroshio in response to the El Niño Southern Oscillation (ENSO). As the water mass budget will also be reflected in the gravity and SLV, we use the GRACE data (ii) to find the water mass redistributions and the satellite altimeter data (iii) for the SLV in SCS, both showing similar annual variation patterns. We also conduct the Empirical Orthogonal Function (EOF) analysis on the non-seasonal datasets. We find both leading modes showing unison water rise-and-fall behavior in the whole SCS. Their time series have correlation coefficients up to 0.44 and 0.30, respectively, with the EMI. This means SCS water budget is under ENSO influence, not only in the intrusion but also reflected in the mass and sea level height. The SCS water budget variation is larger in normal winters and stronger during El Niño years.