Low-frequency sea-level variability in the South China Sea and its relationship with ENSO

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Abstract Sea-level variability in the South China Sea was investigated based on satellite altimetry, tide-gauge data, and temperature and salinity climatology. The altimetric sea-level results clearly reveal three distinct amphidromes associated with the annual cycle. The annual sea level is higher in fall/winter in the coast and shelf region and in summer/fall in the central sea, agreeing well with independent tide-gauge data. Averaged over the deep basin (bottom depth > 2,000 m), the annual cycle can be approximately accounted for by the steric height relative to 700 db. Significant interannual sea-level change is observed from altimetry and tide-gauge data. The interannual and longer-term sea-level variability in the altimetric data is negatively correlated (significant at the 95% confidence level) with the El Niño - Southern Oscillation (ENSO), attributed in part to

the steric height change. The altimetric sea-level rise rate is 1.0 cm/year for the period from 1993 to 2001, which is consistent with the rate derived from coastal tide-gauge data and approximately accountable for by the steric height calculated relative to 700 db. The altimetric sea-level (steric height) rise rate of 1.05 (0.9) cm/year from 1993 to 2001 is much larger than that of 0.22 (0.12) cm/year for the period from 1979 to 2001, implying the sensitivity to the length of data as a result of the decadal variability. Potential roles of the ENSO in the interannual and longer-term sea-level variability are discussed in terms of regional manifestations such as the ocean temperature and salinity.

Unfortunately an error occurred in line 6 of the Abstract: the word “lower” should be removed.

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