

內潮與表面潮汐之交互作用：呂宋海峽全日內潮 之產生及其對南海表面潮的影響

摘要

The predominance of diurnal surface tides over semidiurnal surface tides in the South China Sea (SCS) has been attributed to the near-resonance response of the former in the SCS. Recent observations further revealed vigorous internal tides in the northern SCS. Conceivably, internal tides generated in the Luzon Strait could modify the surface tide in the SCS. We use a three-dimensional tide model of the East Asian seas to address this issue. With a typical summertime stratification of the SCS as the initial condition, energy budget indicate that one third of the incident K_1 surface tide energy are converted to the baroclinic energy over topographic ridges in the Luzon Strait. In comparison with a global tidal model [Matsumoto et al., 2000], our numerical experiments that annihilated or reduced the K_1 internal tide in the Luzon Strait led to up to 50% amplification of the simulated K_1 surface tide in the SCS. This suggests that the baroclinic energy conversion substantially reduces the amplitude of K_1 surface tide in the SCS. The simulated phases in the SCS differ little from those calculated from Matsumoto's tide model, suggesting that the modification is primarily on the amplitude. Two-dimensional surface tidal models lack baroclinic energy conversion in the Luzon Strait; the consequent overestimation of surface K_1 tide can be reduced only through precise prescription of sea levels in the Luzon Strait or assimilation of sea level data.

簡歷

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