Volume transport due to internal wave generation along the continental shelf in the South China Sea

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Abrupt topography in Luzon Strait and the continent shelf in the South China Sea spawns one of the most energetic internal wave generation sites in the global ocean. Besides of tremendous momentum and energy flux, recent mooring observations reveal measurable volume or mass transport which is possibly related to internal waves. Local dissipation of internal waves mixes seawater. Inhomogeneous distribution of mixing may generate density or pressure gradient, thus inducing mean flow under the geostrophic balance. On the other hand, divergence of internal wave momentum flux acts as a stress on seawater, which may also force a mean flow. In the South China Sea, internal waves are generated by different topographic features, such as ridges, canyons and shelf break, resulting in different mean flows. High-resolution numerical models are implemented for the topography of ridges, canyons and shelf break in the South China Sea, to evaluate the mean flow caused by internal waves. The effects of nonlinearity, viscosity and bottom drag, as well as the characteristics of bottom topography, are also investigated through sensitivity experiments. Through this study, we expect to further reveal the role of internal waves in the exchange between shelf sea and open ocean.

Keywords: Internal waves, Volume transport, Numerical models