Numerical study of Internal tide energetics in the Andaman Sea

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The interactions of barotropic tides with irregular bottom topography generate internal waves with high amplitude known as large-amplitude internal waves (LAIW). The Andaman Sea is one of the potential region where such waves occur. These waves are an important phenomena in the ocean due to their influence on the density structure and energy transfer into the region. These waves are also important in submarine acoustics, underwater navigation, offshore structures, ocean mixing, biogeochemical processes, etc. over the shelf-slope region.

A three-dimensional MIT general circulation ocean model (MITgcm) is configured over the Andaman sea to investigate the generation and propagation of M_2 internal tides. Initially, the model simulations are validated by using *in-situ* observations of temperature, conductivity and currents from a buoy located at 10.5N, 94E. The spectral energy estimate of density shows that the peak estimate is associated with the semi-diurnal frequency at all the depths in both observations and model simulations. The vertical structure of baroclinic velocity is compared with observations and the analysis suggests that a multi-mode features of baroclinic tides are present at the buoy location. To understand the generation and propagation of internal tides over this region, energy flux and barotropic-to-baroclinic M_2 tidal energy conversion rates are also estimated. The model simulation suggests that the internal tides are mainly generated at the north of Sumatra coast and the regions around the Nicobar islands. The internal tides propagate away from the respective generation sites. The steepness of topography suggests that the internal tide mainly generate at the supercritical slope region and the energy flux reflected back to the deep water from the supercritical slope. The M_2 dissipation rate is also found to be maximum at the generation sites.

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