Geophysical Research Abstracts
Vol. 15, EGU2013-11583, 2013
EGU General Assembly 2013

Energy dissipation of low-mode internal waves on a critical slope

Johannes Gemmrich and Jody Klymak
University of Victoria, Physics & Astronomy, Victoria, Canada (gemmrich@uvic.ca)

Low mode internal waves can propagate long distances without noticeable loss of energy. However, observations have shown enhanced near bottom-mixing at mid-slope regions of isolated ridges and continental slopes. Particularly at near-critical slopes internal waves interacting with topography may break and contribute to mixing and energy dissipation.
Here we present a systematic characterization of the dynamic processes at mid-slope, based on high-resolution model results (2-d MITgcm) of an oscillating flow across an isolated ridge with near-critical slope. The velocity structure in the bottom boundary layer as well as total energy dissipation above the slope are obtained as function of stratification, latitude and barotropic forcing. Energy dissipation is strongest for critical slope angles, but for small deviations, say less than 30%, dissipation values are expected to be at least within a factor 2 of the maximum value. High rates of energy dissipation on the slope are confined to a shallow boundary layer, but may be estimated from coarse grid velocity values based on an empirical fit of the data, presenting a first step of a parameterization suitable for global scale models.