Geophysical Research Abstracts
Vol. 14, EGU2012-3200, 2012
EGU General Assembly 2012

Shoaling of internal solitary waves at the ASIAEX site in the South China Sea

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The interaction of barotropic tides with Luzon Strait topography generates westward propagating internal bores and solitary waves trains which eventually shoal and dissipate on the western side of the South China Sea. Numerical simulations of this shoaling process at the site of the Asian Seas International Acoustic Experiment (ASIAEX) have been undertaken in order to investigate the sensitivity of the shoaling process on a variety of environmental factors. The model parameters of the Luzon Strait region are tuned to yield solitary wave trains similar to those observed in the ASIAEX experiments. The sensitivity to details of the stratification, bathymetry, deep water depth and initial wave amplitude as well as the effects of dissipation in a bottom boundary layer are considered. On the slope secondary solitary waves are generated which propagate towards the shelf. In the vicinity of the shelf break a leading square-shaped wave of depression forms which is followed by a series of square-shaped waves of elevation in inviscid simulation. The presence of a bottom boundary significantly modifies the waves trailing the leading depression resulting in the emergence of many more smaller waves. Comparison against the measurements of Orr and Mignerey (2003) are conducted.