On the fate of topographically-trapped internal tides

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Abstract

The Rockall bank (N-E Atlantic ocean) is known for hosting topographically-trapped diurnal tides that propagates anti-cyclonally around the bank. A recent mooring deployment in this area highlighted a diurnal succession of large amplitude (0 (10ˆ2m)) internal bores propagating upslope onto the bank. Breaking of freely propagating internal tides (such as f $<$ omega $<$ N) are well known to generate such motions. But because the main barotropic tide there is diurnal, our study focuses on one specific case of internal tide where omega $<$ f $<$ N. The results of an analytical mpodel and of a 2D non-hydrostatic model are presented. Results show that the trapped barotropic wave (or Edge wave) alone is sufficient to generate such internal waves. It is also shown that the internal waves generated by these motions cannot escape from the topography, raising questions about where the energy goes.

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