Abstract Submitted
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Low-mode internal tide generation by topography: an experimental and numerical investigation[1] MORRIS FLYNN, Univ. of Alberta, PAULA ECHEVERRI, TOM PEACOCK, Mass. Inst. of Technology (MIT), KRAIG WINTERS, Scripps Inst. of Oceanography - UCSD — We summarize recently published work (J. Fluid Mech.) and analyze the low-mode structure of internal tides generated in laboratory experiments and numerical simulations by a two- dimensional ridge in a channel of finite depth. The height of the ridge is approximately half of the channel depth and the regimes considered span sub- to super-critical topography. For small tidal excursions, on the order of 1% of the topographic width, our results agree well with linear theory. For larger tidal excursions, up to 15% of the topographic width, we find that the scaled mode one conversion rate decreases by less than 15%, in spite of nonlinear phenomena that break-down the familiar wave-beam structure and generate harmonics and inter- harmonics. Modes two and three, however, are more strongly affected. For this topographic configuration most of the linear baroclinic energy flux is associated with the mode-1 tide, so our experiments reveal that nonlinear behavior does not significantly affect the barotropic to baroclinic energy conversion in this regime, which is relevant to large scale ocean ridges. This may not be the case, however, for smaller scale ridges that generate a response dominated by higher modes.

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