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Effect on Ex on internal waves created by tidal flow over near-critical topographic features MASOUD JALALI B., NARSIMHA R. RAPAKA, SUTANU SARKAR, Mechanical and Aerospace Engineering, UC san Diego — Topographic bumps with small horizontal length under energetic surface tides with large velocity lead to internal tide generation in a regime with O(1) values of the excursion number, Ex, the ratio of fluid tidal advection to the topographic length scale. DNS is performed for a smoothed triangular ridge to study how internal gravity waves and turbulence change when Ex is varied from a low to O(1) values, keeping the Reynolds number constant. The near-field internal wave field looses it beam like character with increasing values of Ex. Analysis of the baroclinic energy shows significant reduction in the radiated wave flux higher Ex cases owing to a substantial rise in advection and baroclinic dissipation. There is small change in energy conversion consistent with the linear approximation. Turbulence changes qualitatively with increasing Ex. When $Ex \sim 0.1$, turbulence is intensified at the near-critical regions of the slope, and is also significant in the beams adjacent to the top of the ridge. However, at $Ex \sim 1$, turbulence is confined a narrow boundary region spanning the ridge and the adjacent flat bottom. The size of the turbulent overturns increases with increasing Ex until $Ex \sim 0.5$, followed by a substantial decrease.

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