

Abstract Submitted
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Internal Solitary Wave Tunnelling BRUCE SUTHERLAND, SCOTT KEATING, University of Alberta, ISHITA SHRIVISTAVA¹, IIT Mumbai — In a two-layer fluid, solitary waves of depression (elevation) propagate in a shallow upper (lower) layer. The transition from depressed to elevated is known to occur as a solitary wave of depression passes over a bottom slope. If impacting a coastline the shoaling waves deposit some energy and partially reflect. Here we consider what happens if a solitary wave passes over a sill or the shoulder of an island. Specifically, through lock-release laboratory experiments, we examine the evolution of a solitary wave of depression incident upon a submerged thin vertical barrier and triangular submarine topography. From the measured interface displacement, we determine the available potential energy associated with the wave. The method of Hilbert transforms is used to subdivide the displacement signal into rightward- and leftward-propagating disturbances, from which we measure the available potential energy of the transmitted and reflected waves. These are used to measure the relative transmission, reflection and deposition of energy in terms of the barrier height and slope, the relative depths of the ambient fluid and the amplitude of the incident wave. Implications for internal wave scattering around Dongsha Atoll in the South China Sea are discussed.

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