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Reflection of internal gravity waves at a bottom topography with near-critical slope VAMSI KRISHNA CHALAMALLA, BISHAKHDATTA GAYEN, SUTANU SAKAR, UCSD, ALBERTO SCOTTI, UNC — Direct numerical simulation is performed to study plane internal wave reflection at a sloping bottom at different values of Froude number, Fr . The slope angle is also varied in a range of near-critical values. At low Fr , the numerical results agree well with linear inviscid theory of near-critical internal wave reflection. With increasing Froude number, the reflection process becomes increasingly nonlinear with the formation of higher harmonics and subsequently fine scale turbulence. At a critical value of Fr , turbulence is initiated via convective instability. Also, turbulent intensities are more pronounced for somewhat off-critical reflection compared to exactly critical reflection. As the Froude number increases, the near wall shear plays a dominant role in critical reflection by enhancing turbulence compared to off-critical reflection. For a fixed slope angle, as the Froude number increases the fraction of the input energy converted into the turbulent kinetic energy increases and saturates at higher Froude numbers.

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