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Dense Gravity Currents with Breaking Internal Waves[1] YUKINOBU TANIMOTO, CHARLIE HOGG, NICHOLAS OUELLETTE, JEFFREY KOSEFF, Civil and Environmental Engineering Department, Stanford University — Shoaling and breaking internal waves along a pycnocline may lead to mixing and dilution of dense gravity currents, such as cold river inflows into lakes or brine effluent from desalination plants in near-coastal environments. In order to explore the interaction between gravity currents and breaking interfacial waves a series of laboratory experiments was performed in which a sequence of internal waves impinge upon a shelf-slope gravity current. The waves are generated in a two-layer thin-interface ambient water column under a variety of conditions characterizing both the waves and the gravity currents. The mixing of the gravity current is measured through both intrusive (CTD probe) and nonintrusive (Planar-laser inducted fluorescence) techniques. We will present results over a full range of Froude number (characterizing the waves) and Richardson number (characterizing the gravity current) conditions, and will discuss the mechanisms by which the gravity current is mixed into the ambient environment including the role of turbulence in the process.

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