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Shoaling Large Amplitude Internal Solitary Waves in a Laboratory Tank[1] MICHAEL ALLSHOUSE, CONNER LARUE, HARRY SWINNEY, University of Texas at Austin — The shoaling of internal solitary waves onto the continental shelf can change both the wave dynamics and the state of the environment. Previous observations have demonstrated that these waves can trap fluid and transport it over long distances. Through the use of a camshaft-based wavemaker, we produce large amplitude shoaling waves in a stratified fluid in a laboratory tank. Simulations of solitary waves are used to guide the tuning of the wave generator to approximate solitary waves; thus nonlinear waves can be produced within the 4m long tank. PIV and synthetic schlieren measurements are made to study the transport of fluid by the wave as it moves up a sloping boundary. The results are then compared to numerical simulations and analyzed using finite time Lyapunov exponent calculations. This Lagrangian analysis provides an objective measure of barriers surrounding trapped regions in the flow.

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