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Unstable internal waves TIRON ROXANA, University of North Carolina at Chapel Hill, ANN ALMGREN, Lawrence Berkeley National Laboratory, CAMASSA ROBERTO, SALLERSON AMBER, University of North Carolina at Chapel Hill — Recent advancements in observational techniques have revealed that internal gravity waves are an ubiquitous phenomena in the ocean and in the atmosphere. In particular, internal waves propagating in a strati?ed ocean have been observed and reported to have large amplitudes. Understanding the breaking mechanisms of these waves is crucial for explaining mixing and transport phenomena within the ocean. As experimental observations show, for near two layer stratification, waves become unstable in large amplitude regimes and the wave-breaking closely resembles Kelvin Helmholtz shear instability originating in the maximum displacement of the pycnocline region. The instability is modulated by the stream-wise variation of the shear. We simulate numerically the generation and propagation of solitary waves starting from a step function initial condition and monitor the wave-induced shear instabilities. A conservative projection method for the variable density Euler equations is implemented in this scope. The code is validated against experimental data as well as theoretical results. In an effort to elucidate whether the instabilities are an intrinsic property of the wave or they are induced by the experimental generation, we study the time evolution of traveling wave solutions.

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