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Turbulence and Internal Waves in a Stratified Jet HIEU PHAM, SUTANU SARKAR, University of California, San Diego — Interaction between a stably stratified jet and internal gravity waves from an adjacent shear layer with mild stratification is investigated using 3D Direct Numerical Simulation. The streamwise velocity mimicks the Equatorial Undercurrents where a mixed shear layer situates on top of a strongly stratified jet. Despite the strong stratification, enhanced dissipation is observed in the jet. The evolution of the shear layer includes shear instability, Kelvin-Helmholtz rollers and subsequent breakdown to turbulence. Internal waves with wavelength larger than that of the rollers are found in and below the jet. The characteristics of the wave field follows linear theory. Analysis of the fluctuating energy budget indicates a balance mostly between the production and the transport for the wave field in the jet. The rate of change in the fluctuating kinetic energy in the wave field below the jet is balanced by the transport and the buoyancy flux. Hot fluid from the shear layer is entrained into the upper-flank of the jet, initiates turbulence and disrupts the internal wave field. The dissipation in the coherent patches of turbulence inside the stably stratified jet is strong, comparable to one inside the shear layer and up to three orders of magnitude stronger than that in the propagating wave field.

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