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Internal Waves Generated by Mixed Region Collapse in the Ocean AMBER HOLDSWORTH, BRUCE SUTHERLAND, University of Alberta — Tropical cyclones are known to mix the relatively warm near-surface fluid with the cooler underlying fluid creating a well-mixed region of uniform density. The well-mixed region collapses into the stably stratified ambient and forms an intrusive gravity current. This motion is a mechanism for the generation of downward propagating internal waves. We will present a series of laboratory experiments used to examine the axisymmetric collapse of a well-mixed region in a uniformly stratified and rotating fluid. A square tank was filled with uniformly stratified fluid and a hollow cylinder of radius $R_c \sim 5\,\mathrm{cm}$ and depth H_m between 5 and 15 cm was suspended at the center of the tank. Synthetic Schlieren was used to determine wave characteristics such as the frequency ω and radial wavenumber k_r. We found that internal wave frequencies were set by the buoyancy frequency $\omega \approx 0.75N$, the radial wavenumber scaled with R_c so that $k_r R_c \approx 3.5$ and the vertical displacement amplitude increases with H_m. To explore a wider range of parameters the experimental data was used to calibrate a numerical model of the axisymmetric collapse. We examined the effects of changing the aspect ratio of the lock R_c/H_m and the Rossby number Ro.

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