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Coherent structures in a stratified and rotating shear layer with horizontal shear[1] ERIC AROBONE, SUTANU SARKAR, University of California, San Diego — One of the least understood scales of the ocean is the submesoscale. Here, rotation is important but does not necessarily control the dynamics, instabilities and nonlinear cascades are possible, and stable stratification affects the flow. Previous work by the authors has revealed the zigzag instability, coherent structures, and strong vertical mixing for turbulent horizontal shear flow in a stratified medium. Prior investigations into the rotating shear layer have shown the formation of longitudinal vortices and destabilization for weak anticyclonic rotation and two-dimensionalization for cyclonic and strong anticyclonic rotation. We will perform numerical experiments to examine the effect of both rotation and stratification on coherent dynamics with environmental parameters appropriate for submesoscale flows. Competition between the increased vertical correlations associated with rotation and decreased vertical correlations associated with stratification will be assessed. Additionally the statistical evolution and physical mechanisms driving the flow evolution will be discussed.

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