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Response of a stable stratified jet to surface wind and buoyancy forcing HIEU PHAM, SUTANU SARKAR, University of California, San Diego — The fine-scale response of a subsurface linearly-stable stratified jet to the forcing of surface wind stress and surface cooling (downward buoyancy flux) is investigated using Direct Numerical Simulation. The simulation involves a symmetric jet situated below a laminar surface layer driven by a constant windstress. The surface layer is well mixed while the jet is stably stratified such that the gradient Richardson number inside the jet is larger than the critical value for linear shear instability. The simulation setup follows the background conditions in the Equatorial Undercurrents (EUC) and, similar to the EUC, internal waves and intermittent patches of intense dissipation are observed in spite of nominally stable conditions. However, the wave momentum flux is significantly smaller than the Reynolds turbulent stress extracted from the background velocity in the surface layer. The wave energy flux is also smaller than the turbulent production. Intermittent patches of intense turbulence are observed inside the jet upper-flank where the background gradient Richardson number is larger than 0.25. The dissipation rate inside the patches is at least three orders of magnitude larger than the ambient value. The patches are the results of ejections of fluid parcels into gravitationally unstable regions. The ejections are observed to direct both upward and downward and are driven by the formation of vortex tubes.

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