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## Wind-driven Modulation of Cross-shelf Exchange Driven by Gravitational Relaxation on a Shelf During Winter

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A field program was conducted during the Winter of 2012 at Long Bay, off the coast of South Carolina, USA. Previous studies have shown that this region has unusually high wintertime productivity. During winter, the water on this shallow shelf (shelf break at approximately 60m depth) is often well-mixed, characterized by nearly vertical isotherms and a horizontal density gradient. Interestingly, we observed several wintertime stratification events. Integrating data from several sources (gliders, moorings, towed body, weather buoy, satellite), we implemented an energetics analysis to quantify the various physical processes that influence stratification. The analysis shows the importance of the horizontal advection of buoyancy, driven by downwelling favorable winds and Gulf Stream filaments.