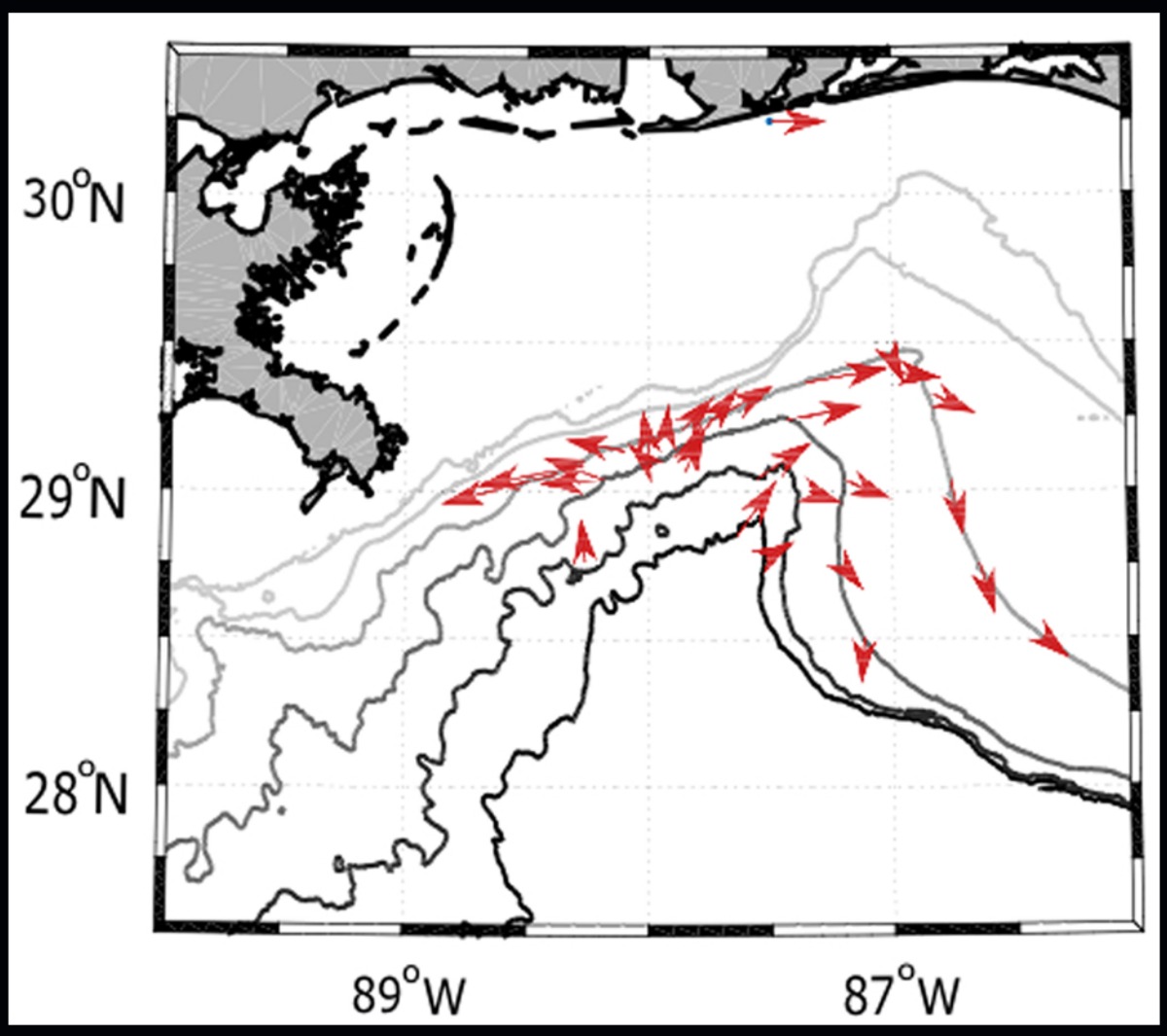
Slope Currents in the Northeastern Gulf of Mexico



Subsurface float data, mooring data and output from a five-year numerical ocean model simulation were used to investigate the subsurface flow patterns in the northeastern Gulf of Mexico (GoM). The combination of bathymetry, associated along-slope flows, and eddy activity sets the basic structure of the flow near 400m depth in the northeastern GoM. Years with persistent eastward or westward along-slope flow through De Soto Canyon (DSC) seed exit pathways into the Atlantic or western GoM, generating increased Lagrangian dispersion from the eastern GoM. Though Loop Current instability is responsible for much of the eddy activity in the northeastern GoM, certain eastward flow patterns along the Louisiana-Mississippi slope can produce cyclonic stationary eddies in DSC. This is due to the shape of the bathymetry within the canyon, created by the junction of the Mississippi-Alabama shelf with the West Florida Shelf. During periods of increased eddy activity in the northeastern GoM, simulated particles spread more uniformly throughout the region, with reduced exchange outside the eastern GoM. There is an increase in particle recirculation in DSC whenever eddy activity is high. The canyon is a natural pathway for particle transport across the slope, and recirculation in the canyon is also able to drive enhanced exchange of water masses between the deeper ocean and shelf waters locally. Large interannual variability is observed in eddy activity from the five-year model run, and this greatly affects Lagrangian particle transport, serving as a proxy for fluxes between the deeper ocean and shelf waters.

Virtual Colloquium

3:30 to 4:30 p.m. Eastern Time (U.S. and Canada)

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