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Deep Eddies and Cross-Slope Exchange in the Gulf of Mexico

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A major Lagrangian program is currently underway to map the deep (1500-2500) circulation of the entire Gulf of Mexico. Beginning in 2011, more than 120 acoustically tracked RAFOS floats have been released in the eastern, central and western Gulf, many in pairs and triplets. The floats are programmed to drift for two years, obtaining position fixes and temperature/pressure measurements three times daily. The trajectories will be described with a focus on mesoscale eddying behavior as it relates to cross-slope exchange. In particular, the first-ever observations of deep energetic anticyclonic eddies (possibly lenses) forming at and separating from a northeastward-flowing boundary current west of Campeche Bank will be discussed. The existence of this eddy formation region has major implications for exchange between the newly-observed deep boundary current along the Mexican continental slope and the interior Gulf. The Campeche Bank exchange region appears to be the dominant deep pathway from the boundary into the western Gulf for heat, salt, and nutrients, and also for oil spill pollutants. Cross-slope exchange via eddies is also seen in other regions of the Gulf, and will be presented. The project is being supported by the U.S. Bureau of Ocean Energy Management (BOEM).