Boulder Fluid and Thermal Sciences Seminar Series

Tuesday, October 30, 2018
3:30pm-4:30pm (refreshments at 3:15pm)
Mechanical Engineering Conference Rooms in the Engineering Center
University of Colorado, Boulder

The Western Alboran Gyre, its properties, and their exchange

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The Alboran Sea, the westernmost basin of the Mediterranean Sea, contains many of the circulation features of larger basins. Two of the largest and most persistent features are the Atlantic Jet (AJ), a surface-intensified jet that carries Atlantic Water eastward from the Strait of Gibraltar, and the Western Alboran Gyre (WAG), an anticyclonic recirculation extending through most of the water column. Although the Western Alboran Gyre is fairly well observed, very little work has addressed its typical features, leaving several outstanding questions. I use budgets from several months of a high-resolution regional MIT general circulation model run to examine the exchange of water between the AJ and the WAG, the salinity minimum and temperature maximum in the center of the WAG, as well as what drives the WAG rotation. I also perform a Lagrangian analysis of the stirring between the AJ and WAG. Overall, the net volume transport across the sides of the WAG is stirring water between the AJ and WAG near the edges, not driving water into or out of the core of the WAG. Relatedly, there is not a direct exchange from the AJ supporting the salinity minimum or temperature maximum: these are instead set during WAG formation. Finally, a vorticity budget shows that the WAG's anticyclonic rotation is driven by lateral diffusion, with the primary driver being the AJ pushing the WAG, plus a contribution from the deep outflow current.

Biography: Dr. Jay Brett is a Postdoctoral Fellow in the International Pacific Research Center at the University of Hawaii Manoa. She received her BA in physics and math from Skidmore College in 2008 and her PhD in physical oceanography from the MIT-WHOI Joint Program this June. Her research uses numerical modeling and dynamical systems analyses to investigate spatial patterns and biological-physical interactions in oceanographic flows.