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Department of Marine Sciences
Presents a Seminar by

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Gulf Stream: Barrier, blender, hotspot and harbinger of change

The Gulf Stream is one of the ocean's strongest jets, transporting tropical waters poleward, and providing the conduit for the warm branch of the Atlantic Meridional Overturning Circulation. Accordingly, property gradients across the current are among the strongest in the world ocean, indicating that rapid down-stream advection outpaces and suppresses cross-stream mixing. Thus, the Gulf Stream has long been viewed as a barrier to transport between the subtropical gyre and the Slope Sea, an effect that we show influences even the swimming animals of the mesopelagic. Yet, when Gulf Stream cold core rings are formed, packets of Slope Sea water enter the subtropical gyre, where they provide a critical source of nutrients to the subtropical ecosystem. In this way, the Gulf Stream can also be seen as a blender, with its eddies mixing together waters with extremely different properties and altering gyre biogeochemistry. Moreover, because the Gulf Stream advects warm, low-buffer factor, tropical water poleward, it becomes strongly out of equilibrium with the atmosphere with respect to both sea surface temperature and the partial pressure of carbon dioxide. Frigid air moving off the North American continent at mid-latitudes then drives some of the largest ocean-to-atmosphere heat fluxes and atmosphere-to-ocean carbon fluxes anywhere. I will preview our upcoming field work using an autonomous surface platform to quantify the Gulf Stream as a hotspot of this heat and carbon exchange. Finally, I will show evidence that this important current has subtly shifted over the 20th century, dramatically changing properties on the North American shelf, perhaps a harbinger of continued future change.

Host: Samantha Siedlecki

Time & Date: 11:00 am, Friday, September 21, 2018

Place: Marine Sciences Building, Seminar Room 103

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