

Oceanography Seminar

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“Carbon Cycle and El Niño-Southern Oscillation Variability across Abrupt Climate Events”

Unlike the relatively stable climate Earth has experienced throughout the Holocene, the climate system underwent a series of abrupt oscillations and reorganizations during the last glacial and deglacial periods. My research seeks to elucidate the drivers and global impacts of past abrupt climate events using isotopic and trace metal proxies. The first part of my talk will investigate the initial trigger for atmospheric CO₂ rise that occurred during the last deglaciation. Abrupt changes in the Atlantic Meridional Overturning Circulation occurring synchronously with the initial increase in atmospheric CO₂ may have altered the oceanic biological pump, allowing CO₂ to accumulate in the surface ocean and atmosphere. Records of surface and intermediate water δ¹³C suggest that the biological pump weakened as the overturning circulation slowed, which would have decreased the sequestration of carbon in the deep ocean. In the second part of the talk, I will present initial results of an NSF-funded project aimed at reconstructing El Niño-Southern Oscillation dynamics across the abrupt climate events of the last glacial and deglacial periods. Thermocline temperature variability, reconstructed from individual foraminifera Mg/Ca analyses, suggests that background climate conditions and the ocean dynamical thermostat were the main drivers of ENSO variability across these events. Both of these studies have important implications for future climate variability.

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*The speaker is a candidate for a faculty position in the Department of Oceanography.