Unlike the relatively stable climate Earth has experienced throughout the Holocene, Earth's climate system underwent a series of abrupt oscillations and reorganizations during the last glacial period and termination. The first part of this seminar will investigate the trigger for the atmospheric CO₂ rise that occurred during the last deglaciation, beginning 17,500 years ago. I will show that abrupt changes in the Atlantic Meridional Overturning Circulation occurring synchronously with the initial CO₂ rise may have altered the oceanic biological pump, allowing CO₂ to accumulate in the surface ocean and atmosphere. Records of surface and intermediate water foraminiferal 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 seminar, I will present initial results of a newly funded project aimed at reconstructing tropical Pacific mean state and El Niño dynamics across the abrupt climate events of the last glacial period. Records of thermocline temperature and upwelling variability, reconstructed from foraminiferal Mg/Ca ratios and faunal analyses, respectively, suggest that abrupt warming events in the Eastern Pacific were characterized by warmer thermocline temperatures and decreased upwelling — conditions synonymous with an El Niño-like state. Both of these studies have important implications for future climate variability.