UC **SANTA BARBARA**

Department of Earth Science

Speakers Club

WEBB 1100 • THURSDAY May 16th. • 2:00 PM

A Probabilistic Method to Calculate $\partial^{18}O$ Lag Times in Ocean Sediment Cores

Devin Rand
Department of Earth Science, UCSB

Ocean sediment core age models are often constructed by aligning a core's benthic $\partial^{18}O$ signal to another core, or stack, with age constraints. However, previous studies have demonstrated location-dependent lags between signals that introduce uncertainty in $\partial^{18}O$ age models (Stern & Lisiecki, 2014; Skinner & Shackleton, 2005). Here we present a novel method to calculate benthic $\partial^{18}O$ lag times by taking the difference between a core's radiocarbon age model and aligned $\partial^{18}O$ age model. Probabilistic alignment software similar to HMM-Match (Lin et al., 2014) is used to align individual $\partial^{18}O$ records to a multi-proxy reference stack. The reference stack is probabilistically constructed from the ^{14}C and $\partial^{18}O$ data of seven high-resolution Atlantic cores. Radiocarbon age models are constructed with Bayesian modeling software similar to Bacon (Blaauw & Christen, 2011). These probabilistic techniques produce 95% confidence bands for the age models and the reference stack. Uncertainties from both the $\partial^{18}O$ alignments and radiocarbon age models are used to generate 95% confidence bands for $\partial^{18}O$ lag time results. Lag times are calculated for a depth transect of twelve cores in the Brazil margin at 2 kyr increments from the Last Glacial Maximum to the Holocene and results are compared to the findings from Lund et al. (2015). A detailed description of $\partial^{18}O$ lag times will allow for improved sediment core age models and uncertainty estimates as well as a better understanding of deglacial ocean circulation changes and millennial-scale climate responses.

Methylphosphonate utilization by the pelagic *Sargassum* holobiont

Dani Cox
Department of Earth Science, UCSB

Pelagic *Sargassum*, a group composed of the two brown algal species *S.natans* and *S.fluitans*, are an ecologically important macroalgal community existing in rafts at the air-sea interface in offshore environments. As they provide nutrition and habitat for over 100 marine species, including over 50 economically important species, pelagic *Sargassum* are considered keystone species for offshore food webs in the northern Atlantic Ocean. The Sargasso Sea is characterized by phosphate-limited waters; yet, pelagic *Sargassum*, for which this area is named, thrives under these conditions, presenting a paradox within biological oceanography. Nitrogen-fixing bacteria with the putative genes for methylphosphonate (MPn) utilization have been identified on the surface of pelagic *Sargassum*; however, in situ utilization of this process has not yet been published. This study presents data to support the hypothesis that microbial epiphytes on the surface of pelagic *Sargassum* are cleaving MPn to supply a source of Phosphorus, allowing these seaweed communities to adapt to waters characterized by low nutrient levels.