CGD SEMINAR

NCAR

DATE: Tuesday 1 October, 2019

TIME: 11 am – 12 pm

LOCATION: NCAR, 1850 Table Mesa Drive
Mesa Lab, Main Seminar Room

TITLE: Tropical Pacific climate over the last 6,500 years - insights from a coral ensemble approach and an isotope enabled GCM

SPEAKER: Alyssa Atwood, Florida State University

ABSTRACT:

The processes that control El Niño/Southern Oscillation (ENSO) variability on long timescales are poorly understood, and as a consequence, limited progress has been made in understanding how ENSO will change under anthropogenic greenhouse gas forcing. The mid-Holocene provides an opportune case study on low-frequency ENSO modulation, as a large number of paleoclimate records spanning the tropical Pacific indicate that ENSO variability was reduced by as much as 50% around 3000-6000 years ago, a time when Earth's orbital parameters were substantially different than today. However the evolution of the background state of the tropical Pacific climate is poorly constrained during this period. Given that ENSO dynamics are tightly coupled to the tropical Pacific mean state, such mean climate constraints are needed to better understand the mechanisms of ENSO evolution during this period. I will present reconstructions of central equatorial Pacific climate from a large ensemble of $\delta^{18}O$ measurements on Kiritimati fossil corals that span the past 6,500 years. In addition to the traditional method of high-resolution sampling, I implement a bulk approach to produce a large ensemble of mean climate estimates. These coral records demonstrate a trend toward cooler and/or drier mean annual conditions in the central equatorial Pacific in the mid-Holocene, and a reduced annual cycle of the Pacific cold tongue. I compare these proxy reconstructions with simulations from two General Circulation Models forced with changes in Earth's precessional cycle. Results from these proxy-model comparisons indicate several opportunities for improved understanding of the tropical Pacific response to precessional forcing, and the linkages between the annual cycle of the tropical Pacific and ENSO.

Live webcast: http://ucarconnect.ucar.edu/live

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