



Central equatorial Pacific climate change over the last 7,000 years using a coral ensemble approach

Alyssa R Atwood¹, Kim M Cobb², Pamela M Grothe³, Hussein R Sayani¹, Sydney Garber¹, John R Southon⁴, and R Lawrence Edwards⁵

¹Florida State University, Earth, Ocean and Atmospheric Science, Tallahassee, United States of America (aatwood@fsu.edu)

²Brown University, Department of Earth, Environmental and Planetary Sciences, Providence, USA

³University of Mary Washington, Earth and Environmental Sciences, Fredericksburg, USA

⁴University of California Irvine, Department of Earth System Science, Irvine, USA

⁵University of Minnesota, Department of Earth Sciences, Minneapolis, USA

Identifying the processes that control tropical Pacific climate variations on long timescales is a pressing problem in climate research, given the outsized impacts of the El Niño/Southern Oscillation (ENSO) on global climate and the uncertainty in future ENSO behavior under anthropogenic climate change. By studying the characteristics of tropical Pacific climate under different climate states in the past, we can better assess its sensitivity to external forcing. Such paleoclimate constraints can serve as critically important test beds for coupled climate models that underlie future climate projections. In this talk, I will present a new set of climate reconstructions from the central equatorial Pacific spanning a range of timescales from seasonal to interannual to millennial, based on a large ensemble of coral oxygen isotope measurements from Kiritimati (aka Christmas Island) that span the past 7,000 years. Each of these timescales yields unique and complementary information about the climate of this region. We implement several new techniques to minimize the uncertainty in the climate reconstructions, which show a trend toward cooler and/or drier conditions and a reduced annual cycle going back in time that provide much needed context for understanding low-frequency changes in ENSO variability over the Holocene.