

Proposal to the Lamont-Doherty Earth Observatory Climate Center 2011 RFP

Title: Determining Baseline and Extremes in Eastern Pacific Intertropical Convergence Zone (ITCZ) Variability For Assessing Future Changes

Principal Investigator:

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Budget = \$8,000 USD

Abstract: The position of the atmospheric convection systems in the Intertropical Convergence Zone (ITCZ) collectively control rainfall in much of the tropics. Limited instrumental data suggest that the ITCZ is becoming more active, a scenario predicted by some climate models (*Held et al., 2000; Chou and Neelin, 2004; Kumar et al., 2004*). However, what is the context for this change relative to past variability and extreme positions of the ITCZ since the Little Ice Age ~1700AD? Limited paleo-records from sites within the ITCZ may indicate substantial decadal and lower frequency variability of the ITCZ over the last several hundred years. More paleo-records of ITCZ variability are needed in order to understand ITCZ dynamics and baseline variability so that anomalous or extreme ITCZ events can be identified. The Gulf of Chiriquí Panamá is a unique location from which to monitor ITCZ variability. The ITCZ seasonally moves over this region and the land area that drains into the Gulf of Chiriquí serves to amplify the ITCZ rainfall effect on nearshore surface water $\delta^{18}\text{O}$ and also coral skeletal $\delta^{18}\text{O}$ (*Linsley et al., 1994*). The Secas Island coral $\delta^{18}\text{O}$ record of Linsley et al. (1994) shows pronounced decadal and secular trend changes back to the base of the coral at 1707 AD. Here I am proposing a project to better understand the significance of this $\delta^{18}\text{O}$ variability by replicating the last ~60 years of the Secas Island $\delta^{18}\text{O}$ record through the analysis of coral cores from Coiba Island 40km south in the Gulf of Chiriquí. I already have core slabs in-hand that were collected by my retired colleague Dr. Jerry Wellington in 1996. This is envisioned as a pilot project to develop the justification for a more extensive future project to generate replicated, multi-century long coral $\delta^{18}\text{O}$ and Sr/Ca time-series from this region.