UNIVERSITY of HAWAI'I MĀNOA

Department of Atmospheric Sciences Joint Seminar Announcement

SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

Department of Atmospheric Sciences, S.O.E.S.T., University of Hawai'i at Mānoa
2525 Correa Road, HIG 350; Honolulu, HI 96822 ☎956-8775
&
Department of Oceanography, S.O.E.S.T., University of Hawai'i at Mānoa
1000 Pope Road, MSB 205; Honolulu, HI 96822 ☎956-7633

The climate of the Indo-Pacific warm pool during the Last Glacial Maximum

Pedro DiNezio
Department of Oceanography
University of Hawai'i at Mānoa

Date: **Wednesday, March 11, 2015**
Refreshments: **3:00pm – 3:30pm at MSB Lanai**
Free Cookies, Coffee & Tea Provided
Seminar Time: **3:30pm**
Location: **Marine Sciences Building, MSB 100**

Abstract:

During the Last Glacial Maximum (LGM), temperatures within the Indo-Pacific warm pool (IPWP) were cooler than today and precipitation patterns were altered, but the mechanism responsible for these shifts remains unclear. Previous proxy and model studies have emphasized the role of the Pacific Ocean, in particular changes in the zonal sea-surface temperature gradient driven by greenhouse gas forcing. In my talk I will present results showing the importance of the Indian Ocean, in particular changes driven by lowered glacial sea level. I will explore these ideas combining a network of 100+ proxy records with a multi-model ensemble of LGM simulations. This proxy-model synthesis suggests a key role for changes in tropical convection over the Sunda and Sahul shelves, which were subaerially exposed at the LGM due to the 120 m sea level drop. In the second part I will test this hypothesis using new climate model simulations performed with the Community Earth System Model Version 1 (CESM1). The simulations confirm that the changes in atmospheric circulation are initiated by the exposure of the shelves, in particular the Sahul shelf. More importantly, we find that ocean dynamical processes in the Indian Ocean amplify the response resulting in a large climatic reorganization in which a cold tongue develops in the eastern part of the basin, much like in the modern day Pacific. Last we explore the role of other LGM forcings, such as ice sheets and greenhouse gases (GHG). We find a role for the northern hemisphere ice sheets, which explain the drier conditions in the northern part of the IPWP. The GHG response shows wetter IPWP consistent with a stronger Walker circulation. This response is overwhelmed by the drying driven by sea level and ice sheets and therefore cannot be identified in the proxy data.