UNIVERSITY of HAWAI'I MĀNOA

Department of Atmospheric Sciences
Special Seminar Announcement

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SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

The tropical Pacific: a testbed for understanding climate variability and change

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Date: **Wednesday, May 4, 2016**
Refreshments: **3:30pm at MSB courtyard**
Free Cookies, Coffee & Tea Provided
(Please Bring Your Own Cup)
Seminar Time: **4:00pm**
Location: **Marine Sciences Building, MSB 100**

Abstract:

The tropics play a major role in the climate system on a variety of timescales: Large internal variability from seasonal to decadal timescales causes varying precipitation patterns with global impacts. Furthermore, the projected precipitation changes in response to greenhouse gas forcing exhibit some of the largest uncertainties in the tropical region. My research focuses on the dynamics of both, internal variability and projected changes in the tropics and how they both interplay with the Earth system at large.

Much of our current knowledge on tropical climate dynamics emerged from the fundamental assumption of linearity: Linear wave theory and frequently employed statistical methods such as linear correlations and regressions advanced our understanding in the past. However, recent studies highlight that these assumptions and methods overlook much of the deterministic nonlinear characteristics and impacts of climate variability in the tropics and beyond.

In this talk I am exploring the highly nonlinear behavior associated with one of the largest signals of natural climate variability in the tropics, the El Niño-Southern Oscillation (ENSO). Recently, I developed a novel framework to diagnose ENSO's nonlinear behavior in relation to the annual cycle. This framework has helped to elucidate the seasonal synchronization of ENSO, ENSO's impact on the East Asian monsoon, interhemispheric sea level variability in the Pacific, and extreme shifts of the South Pacific tropical rainband. Many climate extremes in the Indo-Pacific region, such as droughts and flooding events, can be attributed to the nonlinear behavior of ENSO. Much of this progress is currently being utilized with the goal to enhance seasonal predictions, for instance of regional sea level and monsoon precipitation.

My research approach will be expanded to further explore for instance the climate linkages between the tropics and the high-latitude cryosphere. This will lead to a better understanding of the role of future changes in the tropics on the icesheets and global sea level evolution.