UNIVERSITY of HAWAI'I MĀNOA

Department of Atmospheric Sciences Seminar Announcement

Department of Atmospheric Sciences, S.O.E.S.T., University of Hawai'i at Mānoa
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SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

SEMINAR TITLE:

Influence of natural modes of oceanic variability on the Eastern Pacific hurricane activity – (Implications for hurricane activity forecasts)

Dr. Julien Boucharel
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Date:	**Wednesday, March 2, 2016**
Refreshments:	**3:00pm at MSB courtyard**
	Free Cookies, Coffee & Tea Provided
Seminar Time:	**3:30pm**
Location:	**Marine Sciences Building, MSB 100**

Abstract:

The Eastern Pacific (EPac) is the second most active region in terms of Tropical Cyclone (TC) activity, and yet environmental factors regulating this activity on subseasonal to interannual timescales are poorly documented.

Here, we present a fundamental mechanism related to the El Niño Southern Oscillation (ENSO), the dominant mode of interannual variability in the Tropics, as one of the main driver of TC intensity in the EPac. It operates through meridional redistribution of ocean subsurface heat following an El Niño towards the EPac cyclogenesis region, consistently with the well-known recharge-discharge (RD) mechanism. We show that this process plays a major role during Eastern Pacific (EP) ENSO events, which have a stronger influence in the EPac but remains only marginal during Central Pacific (CP) El Niño. CP events are indeed characterized by a meridional heat discharge in the center of the basin, mostly directed to the south of the Equator, far from the EPac cyclogenesis region. In contrast, the altered atmospheric circulation, in particular the reduction of vertical wind shear is more influential in controlling TC activity during those CP events. Although every El Niño is quite different, the RD mechanism overall accounts for a significant part of the interannual variability of TC intensity in the EPac and sheds light on the previously overlooked subsurface ocean dynamics as a major driver of hurricane activity.

Then, we investigate the influence of equatorial oceanic intraseasonal variability on TC activity in the EPac. In particular, we examine the role of sub-annual and intraseasonal Equatorial Kelvin Waves (EKW) in modulating hurricane intensity in the EPac on seasonal and monthly timescales. We first show that these planetary waves have a clear control on the sub-annual and intraseasonal variability of thermocline depth in the EPac cyclogenesis region. This in turn is found to affect upper ocean heat content that fuels hurricane intensification with a marked seasonal-phase locking. Similarly to the RD mechanism, this EKW mechanism of TC fuelling, which explains up to 30% of the monthly variability of TC activity, is embedded in the large-scale equatorial dynamics and therefore offers some predictability with substantial lead-time.