Department of Atmospheric Sciences
Joint Seminar Announcement

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Predictable Mode Analysis of Asian Summer Monsoon Rainfall Predictability

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Date: **Wednesday, January 28, 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:

To what extent the Asian summer monsoon (ASM) rainfall is predictable has been an important and long-standing issue in climate science. Here we introduce a predictable mode analysis (PMA) method to estimate the predictability of the ASM rainfall. The PMA is an integrated approach combining empirical analysis of most important modes, understanding of physical processes governing these modes, establishing physics-based empirical prediction models and assessing dynamical models' hindcast to identify the "predictable modes", and estimating potential predictability using the predictable modes. This approach also provides a bias correction of spatial patterns of predictable modes to improve prediction skills.

For the ASM rainfall variability, four physically meaningful major modes are identified by analysis of the 1979-2010 observations: (1) a forced mode by developing central Pacific El Niño/La Nina, (2) an monsoon-ocean coupled mode sustained by a positive thermodynamic feedback with the aid of background mean circulations, (3) the Indian Ocean dipole (IOD)-like mode, and (4) a trend mode. We show that these four modes can be predicted reasonably well by a physical-empirical prediction model as well as the atmosphere-ocean coupled models' multi-model ensemble (MME), thus they are regarded as "predictable" modes. The PMA provides a useful approach for assessing the seasonal predictability and improve prediction skill. The predictability of the Indian summer monsoon rainfall is also explored with both P-E model and dynamical models.