JOHNS HOPKINS
Center for Environmental
& Applied Fluid Mechanics

Weekly CEAFM Seminar: Spring 2013

Date: **Friday, May 3, 2013**

Time: 11:00 AM

Location: Gilman 50 (Marjorie M. Fisher Hall)

Speaker: **DR. AMIN DEZFULI** (EPS | Johns Hopkins University)

Title: ***"ATMOSPHERIC CIRCULATION AND RAINFALL VARIABILITY IN EQUATORIAL AFRICA"***

Abstract

We examined the mechanisms controlling the interannual variability of rainfall over western equatorial Africa (WEA) during two rainy seasons of April-May-June (AMJ) and October-November-December (OND). Our results suggest that the remote forcing from the Pacific Ocean modulates the circulation over WEA via an atmospheric bridge, only if either the Atlantic or Indian Ocean is also involved. This is particularly evident in the area stretching along the Atlantic coast wherein both seasons present a similar response to the variability of the global zonal circulation. However, the eastern sector (eastern Zaire Basin) during OND season shows an inverse pattern that is associated with an east-west shift in atmospheric cells. Such an opposition is not manifested in AMJ. In addition to the impact of the remote oceans, a strong direct relationship between the rainfall in coastal region and local SSTs is apparent. However, we argue that this association reflects the common remote forc ing by the large-scale atmosphere-ocean system. Indicative of this is the stronger association with atmospheric parameters than with SSTs. The results also underscore the significant role of local factors on short meteorological time-scales. Using daily precipitation data over the entire equatorial Africa of the Southern Hemisphere, we found a zonally-oriented dipole mode driven by the East African highlands. The highlands in conjunction with easterlies from the Indian Ocean appeared to be the major factors that determine the regional atmospheric circulation and the location of maximum moisture flux associated with the dipole mode.

Bio

100 YEARS JOHNS HOPKINS ENGINEERING

Dr. Dezfuli studies the remote and local factors controlling the rainfall variability over tropical Africa on sub-seasonal to multi-decadal time-scales. He analyzed the observations in order to improve the empirical foundation for hydroclimate studies in this historically data-limited region, and incorporate regional and global climate models to address dynamical questions and hypotheses on future climate change.