



The Characteristics of Convective Systems During the West African Monsoon

Matthew Janiga and Chidong Zhang

RSMAS, University of Miami, Miami, United States (m.janiga@rsmas.miami.edu)

The seasonal variability of moist convection over tropical Africa and the East Atlantic is examined using observations from the Tropical Rainfall Measuring Mission (TRMM) satellite during 1998-2012 and related to the variability of the convective environment determined from reanalyses. We examine contrasts in the characteristics of convection between the oceanic, coastal, and Sahelian phases of the West African monsoon. Within the main rain belt, the highest rain rates and rain intensities are found during the coastal phase of the monsoon while the highest stratiform fractions occur during the Sahelian phase. To the north of the main rain belt, rain rates are lower but the rainfall which does occur comes from very deep convection. In contrast, to the south of the main rain belt, a large fraction of the rainfall comes from shallow convection.

The importance of different environmental factors (e.g., moisture, conditional instability, and shear) to the characteristics of convection (e.g., cloud types, rain intensity, and the size and echo tops of convective systems) is also examined. The convection which is dominated by high echo top convective systems occurs in the relatively dry but high convective available potential energy (CAPE) environment found to the north of the main rain belt. In contrast, the high stratiform fractions in the main rain belt are linked to the nearly saturated but more stable environment found there.