Geophysical Research Abstracts
Vol. 20, EGU2018-18670, 2018
EGU General Assembly 2018

The Role of Oceanic Processes in the Initiation of Indian Summer Monsoon Intraseasonal Oscillations over the Indian Ocean

B. Jason West (1), Weiqing Han (2), and Yuanlong Li (3)

(1) University of Colorado Boulder, Atmospheric and Oceanic Sciences, United States (b.jason.west@colorado.edu), (2) University of Colorado Boulder, Atmospheric and Oceanic Sciences, United States (whan@colorado.edu), (3) University of Colorado Boulder, Atmospheric and Oceanic Sciences, United States (yuanlong.li@colorado.edu)

Observational analyses and a hierarchy of ocean general circulation model (OGCM) experiments were performed to understand the influence of oceanic processes on the warm sea surface temperature anomalies (SSTAs) prior to the convection initiation of Indian summer monsoon intraseasonal oscillations (MISOs) in the equatorial Indian Ocean. Satellite observations documented 41 strong MISO events that initiated over the central equatorial Indian Ocean and propagated northward to the Indian subcontinent and/or eastward to the Maritime Continent during the May–October season of the 2001–2012 period. Eight of those events were preceded by SSTAs that were most significantly contributed by wind stress-driven oceanic processes. Composite analyses for the eight events showed that more than one third of the pre-convection warming in the initiation region resulted from oceanic processes, including advection and entrainment. Case studies of two strong ocean-dynamically-induced SSTA events in June of 2004 and 2006 showed unmistakable evidence for the co-location of pre-convection SSTAs and sea surface height anomalies (SSHAs) associated with intraseasonal oceanic Rossby waves. In those two case studies, a mixed layer heat budget analysis of the OGCM results showed that entrainment played a weak role, while horizontal advection was the dominant oceanic process in elevating SSTAs. Further analysis showed that intraseasonal currents associated with the Rossby waves advected high seasonal mean SSTs into the initiation region. As current forecasting skills for the onset of the MISO are low, these results underscore the importance of thoroughly understanding the ocean's role in affecting SSTAs which contribute to MISO initiation.