EMS Annual Meeting Abstracts
Vol. 7, EMS2010-597, 2010
10th EMS / 8th ECAC

High resolution climatology
- towards climate change services

The Tropical Transition of Western Pacific Tropical Storm 16W

F. Schoenenberger (1), R. Moore (2), and O. Martius (1)

(1) Institute for Atmospheric and Climate Science, ETH-Zuerich, Zuerich, Switzerland, (2) Department of Meteorology, Naval Postgraduate School, Monterey, CA

The breaking of synoptic scale Rossby waves is a common occurrence along the extratropical waveguide. During such events, stratospheric intrusions into the troposphere of high potential vorticity (PV) air retain only a thin connection to the stratospheric body of air. In some cases, these so-called PV streamers can extend a significant distance equatorward, concomitantly serving as an atmospheric destabilization mechanism. As such, they have been observed to play a role in heavy precipitation events and subtropical cyclogenesis.

Intriguing evidence that PV streamers might also serve as extratropical precursors to tropical cyclogenesis events exists in the form of composite and case-study analyses of a limited number of Atlantic events. For this to occur, the system must transition from a cold to a warm core system. This process has been termed tropical transition (TT).

The Tropical Cyclone Structure (TCS) 2008 field program provided a unique opportunity to study the TT process in the western Pacific basin. TCS037 was a storm system identified in realtime during the field program as a possible candidate for a TT-like event: deep convection was associated with an upper-level disturbance emanating from the extratropics.

This study examines the evolution of TCS037 from this early stage of deep convection in an environment with significant vertical wind shear (a condition detrimental to tropical cyclone formation) to a weak tropical storm. Specifically, we invoke PV and Lagrangian frameworks to examine the processes via which (i) a distinct PV streamer served as a forcing mechanism for deep convection, and (ii) near-continuous convection aided in the erosion of the deleterious vertical wind shear, ultimately resulting in a conducive local environment for tropical cyclogenesis to ensue.