



Tropical cyclogenesis in Eastern Atlantique: Impact of earlier passage of African Easterly Wave trough on the evolution of Mesoscale Convective Systems and air-sea interaction

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Abstract:

A large part of Atlantic tropical depressions is generated in the Eastern basin in relation with the African Easterly Waves and the Mesoscale Convective Systems coming from the African continent. But initial surface oceanic and atmosphere conditions favoring such evolution are largely unknown.

This study analyzes the structures of strengthening and dissipating MCSs evolving near the West African coast and evaluates the role of the surface oceanic condition on their evolutions. Satellite brightness temperature from Meteosat Second Generation over the summer season of 2006 and radar data for the same season between 1993 and 1999 are used to subjectively select fourteen cases of strengthening (dissipating) MCSs when they cross the Senegalese coast. With these observed MCSs locations, a lagged composite analysis is then performed using Era interim and CFSR reanalyses.

Results show that the strengthening MCS composite is preceded by prior passage of an AEW near the West African coast. This first trough wave was associated with a cyclonic circulation in the low and middle troposphere and has enhanced southwest wind flow behind him feeding humidly to the strengthening MCS composite which was located in the vicinity of the second AEW trough. The contraction of the wave length associated with the two troughs was probably facilitated this supply in humidity. The Sea Surface Temperature seem contribute to the MCS enhancement through surface evaporation flux but this contribution is less important than humidity advection by the first system. These conditions were not found in the dissipating MCS case which dissipated in a drying environment air dominated by subsidence and anticyclonic circulation.

Key words: Mesoscale Convective System, African Easterly Wave, Sea Surface Temperature, tropical depression.