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Do West African Thunderstorms Predict the Intensity of Atlantic Hurricanes?

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Since 85% of all major Atlantic hurricanes originate as thunderstorm clusters in equatorial Africa, we have investigated the connection between these African thunderstorms and the consequent development of these disturbances into tropical storms. We have analyzed METEOSAT infrared cloud-top temperature data to determine the areal coverage of cold cloud tops over a six year period from 2005-2010. In addition, hurricane statistics from the same period (intensity, date of generation, location, maximum winds) were obtained from the National Hurricane Center (NHC) data base. We first show that the areal coverage of cold clouds (with brightness temperatures Tb<-50oC) in tropical Africa is a good indicator of the monthly number of African Easterly Waves (AEWs) leaving the west coast of tropical Africa. Furthermore, the AEWs that develop into tropical storms have a significantly larger area covered by cold cloud tops compared with non-developing waves. Finally, we show that on a storm-by-storm basis, the cold cloud coverage in West Africa is positively correlated (r=0.57) with the accumulated cyclone energy (ACE) of the future tropical cyclones that develop out of these waves.