

### **The African easterly jet, cyclogenesis, and tropical storms**

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This study investigates the basic structure of the African Easterly Jet focusing on instability processes on a seasonal and sub-seasonal time scale, with the goal of identifying features that could provide increased predictability of Atlantic tropical cyclogenesis. The Modern-Era Retrospective analysis for Research and Applications (MERRA) is used as the main investigating tool. Results are compared with other reanalyses data sets such as the ECMWF, ERA-Interim, NCEP-R2, JRA-25. A key result is that the barotropic instability condition computed from seasonal means is found to define well the location where observed tropical storms are detected. In addition, two prominent modes of variability of the waves are found based on a spectral analysis that uses the two-Dimensional Ensemble Empirical Mode Decomposition based on Hilbert Huang transform: a 2.5-6day mode which corresponds well to the African Easterly waves, and also a 6-9day mode which seems to be associated with a tropical-extratropical interaction.