

## **Cold Lows in the Tropical Upper Tropospheric Trough and its relationship to severe thunderstorms outbreaks in Cuba.**

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The Tropical Upper Tropospheric Trough (TUTT) is a trough situated in upper-level (at about 200 hPa) tropics. Its formation is usually caused by the intrusion of energy and wind from the mid-latitudes into the tropics. When upper cold lows break off from their base, they tend to force the development of surface troughs inducing thunderstorm activity. Over Cuba, TUTT is a mandatory synoptic pattern for the summer and usually, its associated “cold lows”, seems to be responsible of severe thunderstorm outbreaks (STO). In this paper, data sets from 27 years of daily synoptic maps and occurrence of STO over the Cuban territory were used to perform a comprehensive analysis of various “cold lows synoptic patterns”, and their implications in STO. Statistical characteristics of the main synoptic fields, related with many of the most significant summer STO on the records, related to cold lows, were developed. Results were included into a pattern recognition system for severe thunderstorm outlook named ROSET, in operational use in the Cuban Meteorological Service. Capacity of cold lows to force a tornado environment in the Cuban severe thunderstorm was analysed, indicating that some cold lows over Cuba showed a tendency to create tornado-like vertical wind shear structure.