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Analysis of Subtropical Cyclones within the Notheastern Atlantic

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Since no research has focused on subtropical cyclones (STCs) formed within the North Atlantic eastern basin, here we analyze them from a synoptic point of view, on a climatological basis (1979–2011), with the main aims of studying their common features, complementing other studies of these storms in the North Atlantic, and aiding the forecasting community.

Composite analysis reveals that an extratropical depression acts as a precursor when it is isolated from the westerlies and then suffers a deepening when becoming subtropical instead of decaying through occlusion. This process is accompanied by an atmospheric circulation, within the North Atlantic, whose main feature is characterized by notable departures from the climatological pattern with a statistically significant anomalous high pressure to the north of the STCs. Three conceptual models of synoptic pattern of subtropical cyclogenesis are derived and it is also found that the identified STCs predominantly formed in a highly sheared environment and over a relatively cold sea surface, which differs from the dominant features of STCs in the western region of North Atlantic. Finally, a recent (2010) STC is synoptically discussed in order to achieve a better interpretation of the general results.