



Conceptual Models of High Winds in Marine Extratropical Cyclones: What We Know and What We Don't

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Strong windstorms in marine extratropical cyclones occurring at the tail end of bent-back fronts in Shapiro–Keyser cyclones often are attributed to the sting jet, a descending airstream from the midtroposphere. However, not all strong winds around the low center are due to the sting jet, as is sometimes incorrectly assumed. Another airstream responsible for such strong winds is the cold conveyor belt, the airstream passing under the warm front and around the cyclone at low levels. To help discriminate between the sting jet and the cold conveyor belt, two cases of marine extratropical cyclones with hurricane-force surface winds are presented. One possessed a strong sting jet but weak winds in the cold conveyor belt; the other possessed a strong cold conveyor belt but no sting jet. Horizontal maps and vertical cross sections illustrate the distinct characteristics of the sting jet and cold conveyor belt, providing guidance to aid their discrimination and serving as two endpoints along a spectrum of possible extratropical cyclone structures. A revised conceptual model illustrates the path of these two airstreams through a cyclone. This presentation will also discuss what more remains to be learned about such windstorms.