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# Detection and Understanding of the role of Split Cold Fronts in the Generation of Severe Convective Storms

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This paper provides an overview of techniques for detecting and predicting Split Cold Fronts, and an understanding of their role in generating organized outbreaks of severe storms. Emphasis will be placed on Split Fronts (SF) in the United States, though studies conducted by Holzman (1936), Lichtblau (1936) and Keith Browning over the UK developed our basic understanding of this phenomenon. The Split Front model is based upon the notion that air flowing through a cyclonic storm system can be simplified to be along one of three "conveyor belts" in a relative isentropic framework. In the U.S., Hobbs and Locatelli demonstrated that the Rocky Mountains can block the eastward progress of cold air at low levels and destroy thermal contrast due to strong sensible heating, while the Dry Conveyor Belt continues to advance at mid levels ahead of the surface pressure trough (dryline) in the form of an SF. Strong storms are generated due to a combination of frontogenetical forcing and destabilization that occurs as the SF crosses over the dryline.

A systematic method for identifying the existence of an SF is presented, consisting of the use of numerical model data, diagnostic analyses, satellite water vapor imagery, and Velocity-Azimuth Display radar data including a technique for retrieving geostrophic cold advection fields. This method is demonstrated for the case of 21 – 23 January 1999, in which two SF events emerged. This $1B event set the records for the most tornadoes in any state on any day in the month of January and for the most tornadoes in a single outbreak in Arkansas (56), thus a very high impact event.