



## **When during Their Life Cycle Are Extratropical Cyclones Attended by Fronts? And What is a Front? (Young Scientist Award Lecture)**

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For nearly a century, the study of atmospheric dynamics in the midlatitudes has presented dichotomic perspectives on one of its focal points: the birth and life cycle of cyclones. In particular, the role of fronts has driven much of the historical discourse on cyclogenesis. In the 1910s–20s, the Bergen School of Meteorology postulated that cyclogenesis occurs on a preexisting front. This concept was later replaced by the baroclinic instability paradigm, which describes the development of a surface front as a consequence of the growing cyclone rather than its cause. However, there is ample observational evidence for cyclogenesis on well-marked fronts (frontal-wave cyclones) as well as for cyclogenesis in the absence of fronts in broader baroclinic zones. Thus, after a century of research on the link between extratropical cyclones and fronts, this study has the objective of climatologically quantifying their relationship. By combining identification schemes for cyclones and fronts, the fraction of cyclones with attendant fronts is quantified at all times during the cyclones' life cycle. Additionally, the role of the front definition, and how it varied over the past, is discussed.