ABSTRACT

Efforts to understand the dynamics of teleconnection patterns have been ongoing and evolving over the last century. To date, scientific examination of the most prominent teleconnections, specifically the El Niño/ Southern Oscillation (ENSO) and the North Atlantic Oscillation (NAO), has placed emphasis on the seasonal mean impacts of these phenomena on spatially large-scale thermal and moisture anomalies. Further, teleconnection patterns are primarily understood for their individual influences on climate even though multiple teleconnection phases may influence a region at any given time (i.e., ENSO+ and NAO−). Even less is known about the amount of climatic variability a region may experience during neutral years of a teleconnection.

The goal of this research is to provide thorough documentation of the intra-seasonal variability of winter climate in North America as influenced by ENSO and the NAO. Fifty years of temperature and precipitation (liquid and frozen) extremes will be statistically assessed across the country through canonical correlation analyses and a clustering methodology from December to February during positive, negative, and neutral teleconnection years, along with additional stratifications of all pattern phase combinations. This will better determine the influence of the most dominant teleconnection patterns on United States winter storm track frequency, shifts, and geography and will likely improve intra-seasonal forecasts.