

**AN EVALUATION OF JANUARY TEMPERATURE ANOMALIES
IN THE UNITED STATES UTILIZING A SYNOPTIC
CLIMATOLOGICAL APPROACH**

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ABSTRACT

The January Thaw is a singularity that describes a recurring, several-day period of anomalously warm temperatures experienced around the coldest time of winter. Exact spatial and temporal parameters of the phenomenon are difficult to define as a causal mechanism for the Thaw is unknown. This investigation seeks to identify a Thaw signal, and assess the inter- and intra-regional variability across the United States, while examining the relationship of these events to synoptic climatological air mass frequency over the past 50 years.

Daily temperatures are standardized using a five-day moving window. Singularities are defined as dates of anomalous temperature departures from a determined temperature trend. For all events, temperature changes during a Thaw and an identified cold episode, a January Freeze, are correlated to air mass frequency changes and Pearson correlation coefficients are tested for significance.

Results indicate that a regionally coherent Thaw signal exists across the northern United States. The Freeze exhibits a consistent regional trend in the western United States. The cold singularity generally occurs the first week of January and is often followed by a Thaw. The Thaw has an apparent systematic movement eastward, with an exception in the Great Plains, and occurs at eastern stations from 23–26 January. These episodes correspond to variable warm air mass types more frequent during a Thaw in combination with variable cold air masses less frequent, with the inverse pattern observed during a Freeze.