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Seasonal climate conditions during the Medieval Warm Period and the Little Ice Age in Canada

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Climatic variations in Canada during the Medieval Warm Period and the Little Ice Age are analysed from historical archives, instrumental measurements and multiproxy data. They are examined in parallel with the critical relationship between human and their environment, with the aim to give a better portrait of climatic changes from different perspectives, taking into consideration regional and seasonal disparities and show long-term climate anomaly (proxy-data) and weather-related extreme events (human archives).

The results are represented with a focus on the summer and winter signals. Summer temperatures are reconstructed from lake sediment, tree-ring, ice core and instrumental sources. Winter temperatures are reconstructed from ice advances, iconographic, documentary and instrumental sources. In addition, weather-related extreme events are illustrated, mostly from documentary sources. The Medieval Warm Period was recorded from ∼700-1000 AD to ∼1100-1300 AD. It lasted longer in Southern Canada (∼400 years) than in Northern Canada (∼200 years). The Little Ice Age was recorded from ∼1150-1300 AD to 1850 AD. It was characterized by 2 or 3 cooling pulses of 50 to 200 years each occurring around 1400-1450, 1600-1650 and 1800-1850 AD. Most of the reconstructions showed an ending in ∼1850 AD, with exception of the Eastern part of Canada where cold conditions were recorded until the late 19th century. The Year Without a Summer (1816) was recorded in most regions. It was associated with the Tambora eruption and amplified by cold conditions in early-19th century.