Air temperature variations on the Atlantic – Arctic boundary since 1802: the low-frequency pattern in observations and 20th Century Reanalysis (V. 2)

Kevin R. Wood, James E. Overland, Trausti Jónsson, and Brian V. Smoliak

A two-hundred year instrumental record of annual surface air temperature (SAT) in the Atlantic – Arctic boundary region was reconstructed from four station-based composite time series. Credibility is supported by ice core records, other temperature proxies, and historical evidence. This record (designated $T_{NA}$) provides long term perspective in a region where unexplained low-frequency climate variations were observed during the 20th century. No obvious analog was detected over the preceding 100 years. However, evidence of a strong teleconnection between $T_{NA}$ (and related SAT records) and SST anomalies in the western boundary current – southern recirculation gyre (WBC) region of the North Atlantic Ocean provides an opportunity to reframe the problem of low-frequency variability in the region in terms tractable to theory and empirical investigation. Here we examine the imprint of observed low-frequency SAT and SST variations in the 20th Century Reanalysis and related subsidiary data sets.