



Sub-arctic and Arctic sea surface temperature and its relation to ocean heat content 1982-2010

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This is an examination of SST variability in the Subarctic and Arctic during the 29 year period 1982-2010, based primarily on data from the Pathfinder AVHRR data set as well as the operational SST products from NOAA and the UK Meteorological Office. A goal is to explore the connection between SST variations in the subpolar gyres and SST variations further north, with emphasis on the Nordic Seas because of their atmospheric exposure and connection to the overturning circulation. After identifying and correcting for biases in Pathfinder AVHRR (also present in the operational products at Arctic latitudes) the seasonal cycle and 29-year warming trend is described. The analysis shows that much of the warming of the North Atlantic subpolar gyre occurred during the 10-year period of the 1990s and compensated for a cooling trend in this same region that had prevailed throughout the first 90 years the 20th century.

Superimposed on this warming trend the analysis reveals a succession of residual SST anomalies with 0.5°C amplitudes that seem to move out of the North Atlantic subpolar gyre into the Nordic Seas following the North Atlantic and Norwegian Currents. Within the Nordic Seas these SST anomalies slowly advect in a counterclockwise direction. After approximately six years part of these anomalies exit the Nordic Seas via the East Greenland Current. The connection between these SST anomalies and underlying anomalies of 0/300m heat content is discussed. The existence of these SST anomalies and their origin at lower latitudes highlights the importance of Atlantic-Nordic Seas ocean exchanges in influencing Arctic climate.