

Climate variability in the Barents Sea 2000-2005

Vidar Lien*, Randi Ingvaldsen, Harald Loeng and Øystein Skagseth

Main findings:

- The period 2001-2005 is the warmest five-year period ever observed since 1900.
- Changes in temperature occurs after changes in the volume flux of Atlantic Water.
- The observed temperature in the section between Norway and Bear Island is a very good indicator on the temperature in the interior Barents Sea.

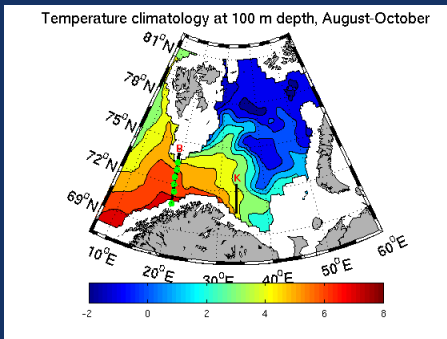


Figure 2: Climatological temperature at 100 m depth in the Barents Sea, August-October average. Norway-Bear Island (B) and Kola (K) sections are shown. Green dots show positions of moorings.

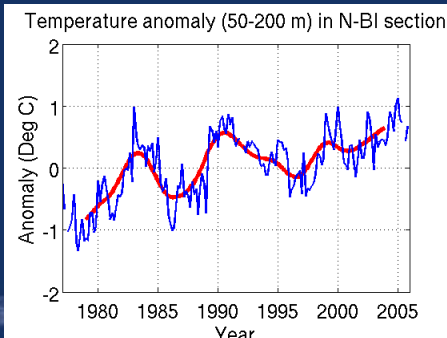


Figure 4: Temperature anomalies at 50-200 m in the Norway-Bear Island section.

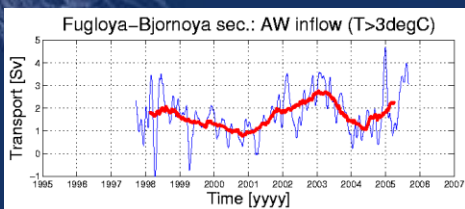


Figure 6: Observed inflow of Atlantic Water through the Norway-Bear Island section.

Data:

The Atlantic inflow to the Barents Sea through a section between Norway and Bear Island (Figure 2) is monitored regularly six times per year since 1977. In addition, the ice-free part is covered by hydrographic stations twice a year, and is used as bases for a temperature atlas.

Results:

The average temperature in August/September between 50 and 200 m depth in the Norway-Bear Island section is compared with the total volume occupied by the 3-degree isotherm computed from the temperature atlas for the Barents Sea. The result shows a high correlation ($R=0.89$, figure 3), indicating that the average temperature in the section is a very good indicator of the climatic situation in the Barents Sea.

The temperature development in the section between Norway and Bear Island is shown in figure 4. Although there is inter-annual variability, there is an overall trend towards higher temperature. If we use data from the Russian Kola section that has been observed since 1901, we note that the period 2001-2005 is the warmest 5-year period ever (figure 5).

Current measurements have been carried out in the Norway-Bear Island section since 1997 (figures 2, 6). The observations show that the velocity signal is not always in phase with and often leads the temperature signal.

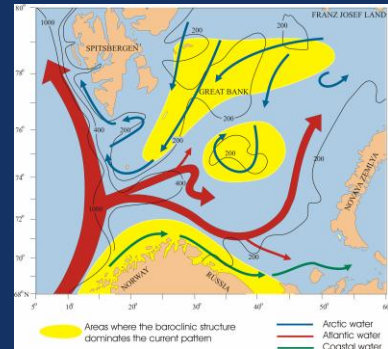


Figure 1: Barents Sea with general circulation pattern.

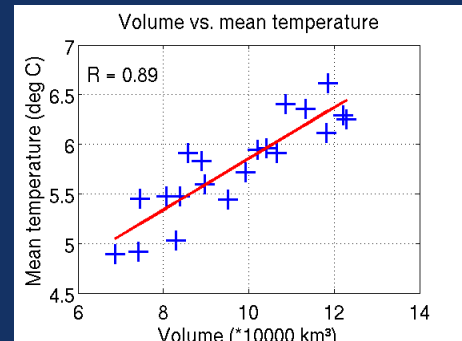


Figure 3: Correlation between temperature in the Norway-Bear Island section and volume occupied by the 3-degree isotherm, autumn 1977-1996.

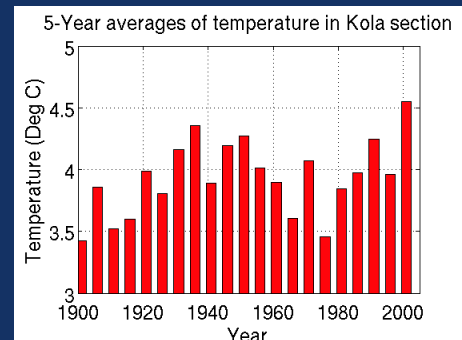


Figure 5: 5-Year averages of temperature between 0 and 200 meter in the Kola section.