

IMPACTS OF CLIMATE CHANGE ON SEA TEMPERATURE

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Executive Summary

Long term records of coastal sea surface temperature are available at three sites in Scotland: East Coast - Peterhead, Northern – Fair Isle and West Coast – Millport (FRS, *in preparation*).

From these data we can calculate a warming trend of between 0.2-0.6°C per decade over the last 25 years (calculated for the period 1980-2005). The warming trend appears to be strongest on the west coast of Scotland.

Further offshore, sea temperature data are available from four standard sections: North Sea - JONSIS, Faroe-Shetland Channel – NOL, FIM and West Coast - Rockall. From these data, temperature indices have been created, representing the temperature of waters flowing at key points around Scotland (Rockall, NAW, MNA, FIC). From these data we can also see a clear rising trend in temperature since 1980.

For many of the records temperatures observed in 2003-2004 were the warmest since 1950. As well as the long-term trend, a decadal scale variability is evident in these datasets.

Level of Confidence

Temperature data from coastal stations are recorded at a high frequency (daily-hourly) giving us confidence in the calculated trends. Instrument calibration is thought to have been most thorough at Millport. Least confidence should be applied to data at Peterhead as these are taken from a cooling water intake at a power station, calibration procedures are not known. However, the three coastal temperature datasets are from independent sources and as such are unlikely to have coincidental errors leading to the same long-term trend. Offshore, measurements are made less frequently (1-3 times per year). Calibration is good, so high confidence can be put on actual measurements; however, trends are more likely to be affected by natural variability.

Key sources of Information

Fisheries Research Services (In preparation) The Scottish Ocean Climate Status Report for 2004 and 2005. Hughes S.L (ed.) Aberdeen: Fisheries Research Services.

International Council for the Exploration of the Sea (ICES) 2006. The ICES Report on Ocean Climate 2005. ICES Cooperative Research Report No. 280, 47 pp.

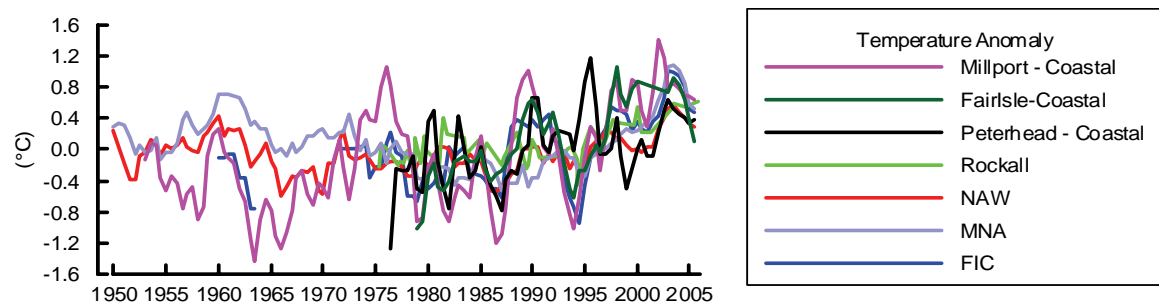


Figure 1 Sea Surface Temperature anomaly for the period 1950-2005 at selected stations around the UK (FRS, *In Preparation*)

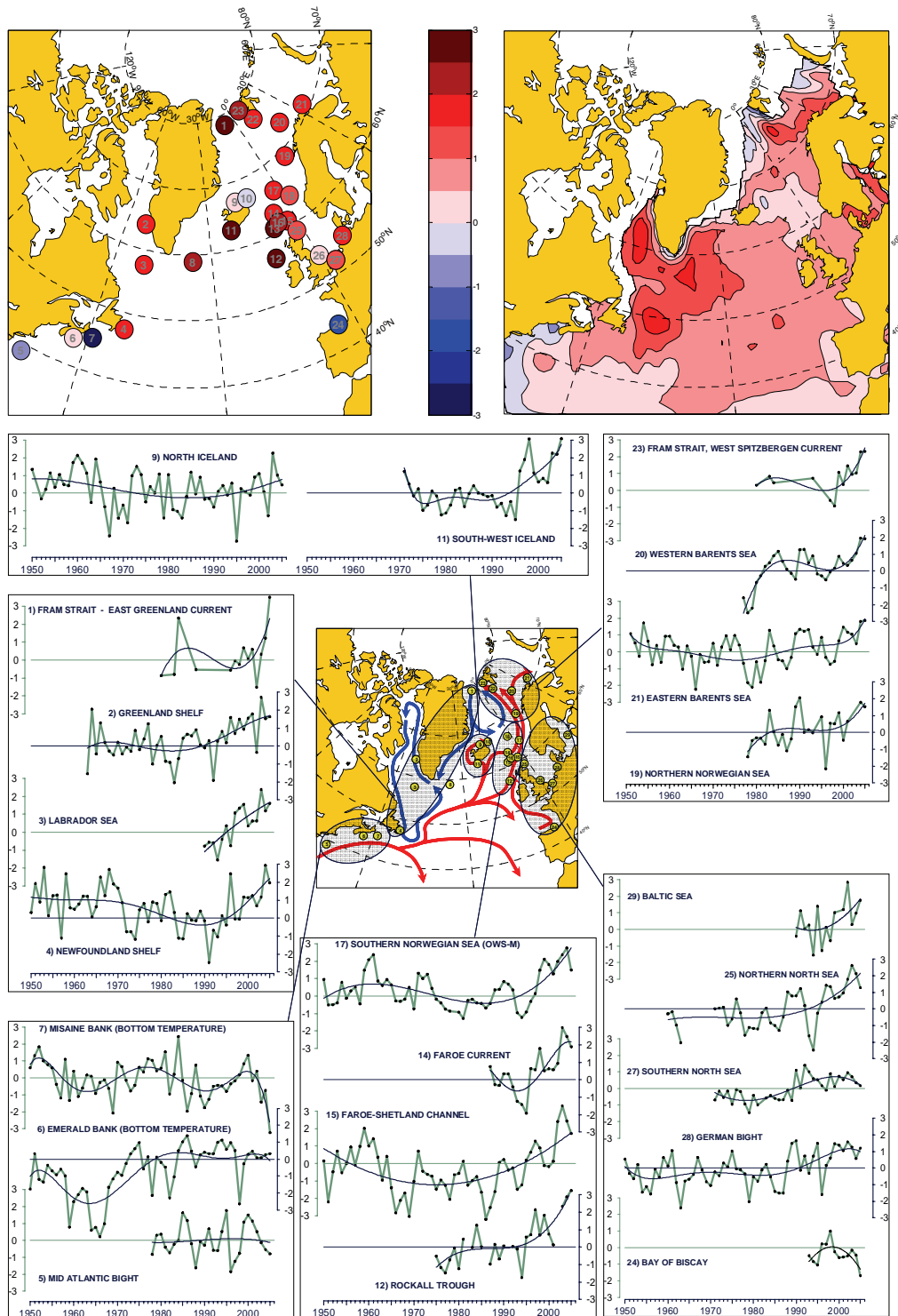


Figure2: Upper ocean temperature anomalies across the North Atlantic. Temperature data are presented as anomalies from the long term mean; sectiona and station anomalies are normalized with respect to the standard deviation, e.g. a value of +2 indicates 2 standard deviations above normal. The maps show conditions in 2005 (colour intervals are 0.5, reds are positive/warm, blues are negative/cool); the curves below show selected timeseries. Figure extracted from ICES Report on Ocean Climate 2005 (ICES, 2006).

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