



Modern benthic foraminifera responding to recent environmental changes in the Barents Sea

M. Saher (1), D. Klitgaard-Kristensen (1), M. Hald (2), and L. Lindal Jørgensen (3)

(1) Norwegian Polar Institute, Norway, (2) University of Tromsø, Norway, (3) Institute of Marine Research, Norway

(Margot.Saher@npolar.no / Fax: +47-77750501 / Phone: +47-77750645)

The Barents Sea has received much scientific attention recently, as the area is under increasing stress from anthropogenic influences. Beside disturbing effects of hydrocarbon exploration, fishery and the introduction of foreign species (e.g. the king crab), this high latitude (70 to 80 degrees north) epi-continental sea is vulnerable to the amplified anthropogenic warming of the Arctic. In recent years, a temperature increase and a sea ice reduction (e.g. Francis and Hunter, 2007) have been observed. We show that the benthic foraminifera respond to these developments.

We have investigated living calcareous and agglutinated benthic foraminifera extracted from surface sediment samples. Calcareous benthic foraminifera have well-known environmental preferences, which makes them a useful tool for reconstructing and monitoring environmental changes. Assemblage studies on this microfossil group have been performed in the Barents Sea for several decades which allows for study of temporal changes in their distributions.

The study is based on material collected in summer 2006 by RV “*G.O. Sars*”, using a box core and grab sampler. The samples were stored in alcohol and stained with Rose Bengal in order to identify the recently live specimens. From the fraction 106-1000 micrometer approximately 300 stained foraminifera were counted.

The calcareous benthic foraminifera data from 2006 are shown in a comparison with a comparable study from the early nineties (Hald and Steinsund, 1996). The recent

environmental changes are reflected in changes in the distribution of specific species of foraminifera. *Nonionellina labradorica*, which has previously been associated with the polar front, was present in significant abundances (up to 10%) in the Hald and Steinsund (1996) samples, but it is practically absent in the 2006 samples. The 2006 distribution of *Melonis barleeaanum*, which is associated with Atlantic water and ice-free conditions, shows a significant shift towards the north-east with respect to the older database. This not only confirms the correspondence of environmental changes at the sea floor with the sea surface, but also confirms that benthic foraminifera can be used to monitor recent changes in the sensitive Barents Sea ecosystem.

In addition, we present results from the distribution of living benthic agglutinated foraminifera, including the species *Adercotryma glomerata*, *Cribrostomoides spp.*, *Cyclogyra spp.*, *Haplophragmoides bradyi*, *Textularia spp.*, and several species of *Reophax* and *Trochammina*. The fragile nature of agglutinated foraminifera has hampered their use as a palaeo-environmental proxy, though they are a valuable tool in the study of regions with high calcite dissolution.

Francis, J.A., and Hunter, E.2007: Drivers of declining sea ice in the Arctic winter: A tale of two seas, *Geophys. Res. Lett.*, 34, L17503, doi: 10.1029/2007GL030995

Hald, M. & Steinsund, P.I., 1996: Benthic foraminifera and carbonate dissolution in the surface sediments of the Barents and Kara seas. *Ber. Polarforsch.*, 212, 285-307