

LAMINATED GLACIAL SEDIMENT HORIZONS IN THE NORTH ATLANTIC
(MAURY CHANNEL, 3300M WATER DEPTH)

S.J.A. Jung (Geologisch-Paläontologisches Institut, Kiel, Germany), H. Erlenkeuser, A. Rosell, and M. Sarnthein

Sediments in the NE Atlantic are crucial for reconstructing past changes in the surface and deep water circulation between the North Atlantic and the Norwegian-Greenland Sea especially, the variations of the North Atlantic Drift and the Norwegian overflow water, i.e., the source of the North Atlantic Deep Water.

Sediment core 17049 was retrieved from 3331m on the Hatton Sediment drift at the southeastern Maury Channel, which today forms under the control of bottom currents of southern (Antarctic) origin. Oxygen isotope stratigraphy shows that in this core, peak and early glacial stages 8.4, 6.4, 3/2 and the Younger Dryas are marked by an up to 30 cm thick laminated yellowish-gray and dark olive grey foram free mud. These are the first laminated sediments ever described from the deep northern Atlantic. Interesting to note that the concentrations of organic carbon in the dark laminae are lower than 0.1%, suggesting very low ocean productivity at that time. This is also supported by the high epibenthic $\delta^{13}\text{C}$ values at the top and the base of each laminae horizon. Based on Uk(37)- values, sea surface temperatures reached an absolute minimum lower than 8-10° C.

By now the laminated intervals are difficult to interpret since they were neither controlled by excessive carbon fluxes nor by unusually low oxygen content of the bottom water. A drastic lack of nutrients and strong remineralization are discussed as the possible origin.

VARIATIONS OF ^{18}O ISOTOPE AND CARBONATE CONTENT IN THE
GREENLAND BASIN SEDIMENTS

B. Jünger (GEOMAR, Germany) and H. Erlenkeuser

On two cores from the southern central Greenland Basin carbonate content and planktic oxygen isotope ratios have been measured for closer information on paleoceanography in this area of the Norwegian-Greenland Sea. The sediments record the last 340,000 years.

The generally low carbonate content of less than 20% in both cores reveals the dominance of the inflow of the cold polar waters to the Greenland Sea. The same is shown by the $\delta^{18}\text{O}$ profiles. There are no prominent (light isotope) peaks indicating advection of warm Atlantic waters. In general, the oxygen isotope shift between interglacials (stage 9, 7, 5) including stage 3 and glacial stages (2, 4, 6) is small, and just reflects the ice effect or is even less.

Pronounced light $\delta^{18}\text{O}$ signals are occasionally shown other than in interglacials, e.g., in stage 3.3, at the stage boundary 4/3, and indicate the impact of meltwater episodes. Isotope stages 7.5 and 5.5 have nearly the same $\delta^{18}\text{O}$ level in the west, while in the eastern core 5.5 is the lighter one. Stage 6 reveals the highest $\delta^{18}\text{O}$ -values, particularly in substages 6.6, 6.4 and 6.2. Notably, carbonate is on a high level during this time.

The carbon isotope profiles of both cores are very similar and appear far better suited for stratigraphical work than $\delta^{18}\text{O}$.

High carbonate contents are found only during stages 8 and 6 in both cores, and possibly in stage 5 in the eastern record. In stage 5 of the western core, two

distinct carbonate peaks occur at the end of the substages 5.5 and 5.1, while substages 5.4 through 5.2 are almost free of carbonate.

The discrepancy of high carbonate content in glacial sediments and low carbonate in the warm stages may be due to carbonate dissolution and likely relates to the impact of Greenland Sea deep water formation on carbonate sedimentation in the basin.

PALEOCEANOGRAPHIC DEVELOPMENT OF THE GREENLAND, ICELAND, AND NORWEGIAN SEAS THROUGH THE LAST 15 KA: THE DIATOM AND $\delta^{18}\text{O}$ EVIDENCE

N.K. Karpuz (Dept. of Geology, Univ. of Bergen, Norway), E. Jansen, and H. Hafliðason

Downcore studies of 8 sediment cores from the Greenland, Iceland and Norwegian (GIN) Seas reveal diatom abundance, assemblage succession, paleotemperature development and light isotopic peaks related to meltwater events in the area during the last deglaciation and the Holocene.

The chronology of the cores was established by using two distinct ash layers (Vedde ash-10,600 yrs BP and Saksunarvatn ash-9,100 yrs BP) and AMS ^{14}C -dated levels. Oxygen isotope records document presence of light isotopic peaks dated to 13,200 and 14,100 yrs BP or slightly before in the eastern GIN Seas and 14,600 yrs BP in the western GIN Seas implying at least two different episodes of meltwater supply with probably different sources. The diatom analyses indicate that the surface waters of the SE GIN Seas became seasonally ice free after 13,400 yrs BP. The Bølling/Allerød interstadial complex (13,200-11,200 yrs BP) was a climatically unstable period with changing arctic/subarctic conditions. The Younger Dryas period (11,200-10,200 yr. BP) was bounded by very rapid SST variations, and characterized by arctic/polar conditions in the SE GIN Seas. First appearance of diatoms in an E-W transect indicates a time transgressive opening of the GIN Seas with favorable conditions for diatom production and preservation throughout the Holocene. A general feature of the diatom assemblage successions is a dominance of the warm Atlantic assemblage in the first half of the Holocene indicating a strong influx of Atlantic waters into the GIN Sea.

This early Holocene climatic optimum occurred between 8,000-5,000 yrs BP in the SE GIN Seas. Duration of this optimum decreased both towards the west and the north. The second half of the Holocene is characterized by generally cooler assemblages and more variable surface water conditions.

A HIGH-RESOLUTION DIATOM RECORD OF THE LAST DEGLACIATION FROM THE SE NORWEGIAN SEA : DOCUMENTATION OF RAPID CLIMATIC CHANGES

N.K. Karpuz (Geological Institute, Univ. of Bergen, Norway) and E. Jansen

We studied high resolution sediment cores from the SE Norwegian Sea which display a detailed climatic record during the last deglaciation compatible with that of Greenland ice core Dye 3. The Accelerator Mass Spectrometry (AMS) ^{14}C age control of the cores also enables us to correlate this marine record in detail with other continental records. The results indicate that the surface waters of the SE Norwegian Sea became seasonally ice free after