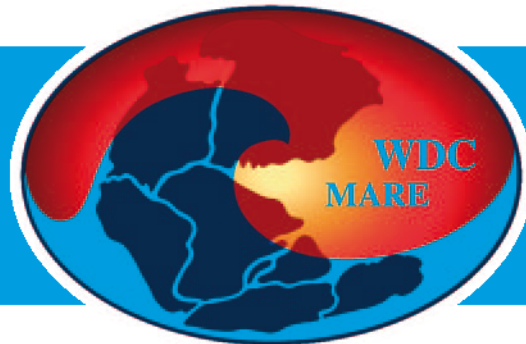


# **WDC-MARE Reports**

**0001  
2005**



**Integrated Data Sets of the DFG Research Project SFB 313**

**Environmental Change: The Northern North Atlantic  
(Veränderungen der Umwelt: Der nördliche Nordatlantik)**

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**Hannes Grobe, Michael Diepenbroek, Priska Schäfer,  
Uwe Schindler, Jörn Thiede & Gerold Wefer**

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**WORLD DATA CENTER FOR MARINE ENVIRONMENTAL SCIENCES**

**Alfred Wegener Institute for Polar and Marine Research, Bremerhaven  
MARUM Center for Marine Environmental Sciences, Bremen**

# WDC-MARE Reports

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Hannes Grobe, Alfred Wegener Institute for Polar and Marine Research, 27515 Bremerhaven, Germany  
Phone: +49 471 4831 1220 - Fax: +49 471 4831 1923 - e-mail: [hgrobe@wdc-mare.org](mailto:hgrobe@wdc-mare.org)

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**Integrated Datasets of the  
DFG Research Project SFB 313**

**Environmental Change:**

**The Northern North Atlantic**

(Veränderungen der Umwelt: Der nördliche Nordatlantik)

**Hannes Grobe, Michael Diepenbroek, Priska Schäfer,  
Uwe Schindler, Jörn Thiede & Gerold Wefer**

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## Preface from the Directors of WDC-MARE

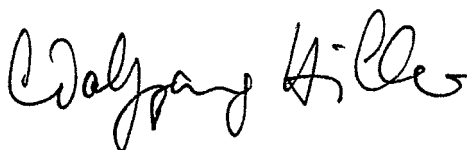
The World Data Center for Marine Environmental Sciences (WDC-MARE) was founded in 2001 as a member of the World Data Center System of ICSU (International Council for Science). The first WDC in Germany is located in Bremen/Bremerhaven and is operated by two major marine research institutes, the Alfred Wegener Institute for Polar and Marine Research (AWI) and the Center for Marine Environmental Sciences (MARUM).

WDC-MARE is aimed at collecting, scrutinizing, and disseminating data related to Global Change research in the fields of environmental oceanography, marine geology, paleoceanography, and marine biology. It focuses on georeferenced datasets using the information system PANGAEA – Publishing Network for Geoscientific and Environmental Data as its long-term archival and distribution system.

The center offers a complete set of data management services, in particular project data management and data publication with Digital Object Identifier (DOI). It maintains a global inventory of site locations and samples for geological oceanography. It also provides software products for the analysis, visualization and transformation of marine data.

The ‚WDC-MARE Reports‘ have been established to publish and distribute data collections from projects, archived in PANGAEA. The exchange agreement with about 500 libraries worldwide includes countries with limited access to the Internet and is intended to help bridge the digital divide. All data published in the future in the ‚WDC-MARE Reports‘ will also be available online through the PANGAEA information system at <http://www.pangaea.de>.

The first volume contains the basic collection of scientific data as the major outcome of the special research project ‚Global Environmental Change: The Northern North Atlantic‘ which was funded under the acronym SFB313 by the Deutsche Forschungsgemeinschaft. The project was operated between 1985 and 1998 by the Institute for Geosciences, the Institute for Marine Research and the GEOMAR Research Center for Marine Geosciences at the Christian Albrechts University of Kiel. The scientific results have been published in the series ‚Berichte aus dem Sonderforschungsbereich 313, Christian-Albrechts-Universität zu Kiel‘, with its scientific primary data made available through this publication.



Prof. Dr. Wolfgang Hiller



Prof. Dr. Gerold Wefer

Bremen/Bremerhaven, 2004





## About this publication

During the years 1985 to 1998 a special research project (SFB313) was carried out at the Christian Albrechts University, Kiel named ‚Sedimentation im europäischen Nordmeer‘ (1985-1990), later renamed ‚Veränderungen der Umwelt: Der nördliche Nordatlantik‘ (1990-1998, The Northern North Atlantic, a Changing Environment). Most of the data coming out from the SFB313 have been compiled, harmonized and archived in the PANGAEA information system. With the first volume of the ‚WDC-MARE Reports ‘ a consistent collection of 1186 datasets with related metadata was exported from PANGAEA and is published on CD-ROM added to the report. Data can be found with a search engine, being locally installed on the computer when the CD is inserted.

## Introduction to the project SFB 313

The northern North Atlantic is the key region in the modern global thermohaline circulation system of the ocean, well known as the "conveyor belt". In the Greenland-Iceland-Norwegian Seas, fresh and cold deep water is formed and spreads out through the Atlantic into the world oceans. In contrast to the North Pacific, temperate and ice-covered surface waters are meridionally separated by distinct oceanic fronts in the northern North Atlantic. The latitudinal extension of a fairly mild climate as far north as northwestern Europe is the result of this large-scale hydrography, and of the oceanic circulation pattern in the Greenland-Iceland-Norwegian Seas. The intensity of deep-water renewal and its variability not only control the climate of the northern hemisphere but also have a direct impact on the environmental conditions for the organisms in the ocean and on the surrounding continents. Rapid climatic changes, as documented in ice cores from Greenland, strongly effect the oceanic circulation pattern and hydrography of the Nordic Seas as well as the exchange of their surface and deep-water masses with the adjacent oceans.

The interdisciplinary research project "Global environmental change: The northern North Atlantic" (SFB 313) was a long-term scientific program at the University of Kiel, funded from 1985 to 1998 by the German Science Foundation with additional financial support from the University and the State of Schleswig-Holstein. The project focussed on the temporal and spatial variability of climatic and environmental changes in the northern North Atlantic and their effects on the marine ecosystem of the present and the past, as documented in the composition of living and extant communities of marine organisms and deep-sea sediments of the Late Quaternary.

The SFB 313 combined a wide variety of disciplines, such as marine biology including planktology, benthology and polar ecology, microbial biology, bio- and biogeochemistry, marine geology and micropaleontology, paleoceanography and paleoclimatology, geophysics and numerical modelling. These disciplines were organized into two subgroups, firstly focussing on the modern biological, chemical and sedimentological processes in the water column and in the surface sediments, secondly trying to deconvolute the climate and environmental history and the development of marine life during the Late Quaternary.

The original concept for the scientific program of the SFB 313 was addressed to processes controlling sedimentation in the Norwegian-Greenland Sea in real and past time, with the specific aim of understanding how ocean currents and their historic variability are recorded in sediments. This was intended to be accomplished through the distribution patterns of their terrigenous and biogenic components at the seafloor (formal title of the SFB 313 in German: "Sedimentation im Europäischen Nordmeer: Abbildung und Geschichte der ozeanischen Zirkulation"). The SFB was preceded by a pilot phase to evaluate the existence of suitable areas with undisturbed sediment records. This was easily achieved by high resolution seismic reflection profiling.

From 1985 to 1990, the SFB 313 had a strong regional focus on the Norwegian Sea including the Vøring Plateau and the Barents Shelf slope. The program was directed towards three key issues, namely (1) to reconstruct the paleoceanographic history of the main current systems of the Norwegian-Greenland Sea, (2) to understand the biological, chemical, and physical processes which result in the formation of sediment particles and sediment fluxes from the water column to the seafloor, and (3) to investigate the short- and long-term variability of this oceanographic system.

During its second half, the SFB 313 extended its focus on global phenomena using data from the Norwegian-Greenland Sea to exemplify properties of the global environment. While continuing to investigate the modern processes, paleoceanographic studies were restricted to the last two to three climatic cycles. In this latter part, new subtasks addressed the history of pelagic biota (under the acronym SYNPAL), and a major effort was launched to model ancient paleoceanographic scenarios.

Some of the scientific results of SFB313 have been published in the book

*Priska Schäfer, Will Ritzrau, Michael Schlüter & Jörn Thiede (eds.) 2001*  
**The Northern North Atlantic – A Changing Environment**  
Springer Verlag, Berlin Heidelberg, 500 pages

## Technical description of the CD-ROM

As its operating platform, data base and archive system WDC-MARE makes use of the information system PANGAEA – Publishing Network for Geoscientific & Environmental Data (<http://www.pangaea.de/>) which is a universal library for georeferenced data to be published on the Internet. The system is operated in the sense of the *Budapest Open Access Initiative* 2002:

<http://www.soros.org/openaccess/>

and guarantees long-term availability of scientific primary data related to publications following the *Recommendations of the Commission on Professional Self Regulation in Science for safeguarding good scientific practice* 1998:

[http://www.dfg.de/aktuelles\\_presse/reden\\_stellungnahmen/download/self\\_regulation\\_98.pdf](http://www.dfg.de/aktuelles_presse/reden_stellungnahmen/download/self_regulation_98.pdf).

The policy of data management and archiving at WDC-MARE follows the *Principles and Responsibilities of ICSU World Data Centers* 1987:

<http://www.ngdc.noaa.gov/wdc/guide/gdsystema.html>).

The data on this CD is a copy of the PANGAEA content at the time of publication. The CD enables the user to access the data through a computer system locally. Datasets are archived in the folder `\docs\datasets\`. To browse the data inventory without the use of the search engine start **browse.html** from the CD.

Datasets are provided as ASCII files which are stored as tab-delimited text files. Each file consists of the data description (meta-information) and the scientific primary data itself.

(1) **Data Description** consists of:

- *Citation* - is the formal correct citation to use if you refer to a specific dataset (e.g., in a publication). Part of the citation is a persistent *Digital Object Identifier* (DOI);
- *Reference(s)* - is/are the related publication(s) in which the dataset is used;
- *Project(s)* - is/are the framework under which the dataset has been produced or compiled;
- *Spatial Coverage* - gives the four geographic boundaries (W-E-S-N) of a rectangle around a dataset; if the data are related to one point, W and E as well as N and S have similar values;
- *Event(s)* - corresponds to the label of the sample taken by a device at a certain geographical spot (sometimes named as “site”, “station” or “sample”) Further event specification include latitude, longitude, and elevation, as well as device type, campaign label, and the name of the basis (ship) used;
- *Parameter(s)* - shows the list of parameters (modellers use the term *variable* as synonym) with unit for which scientific data exist in the dataset. Each parameter is related to at least one column showing a ‘Short Name’ as used in the header of the data matrix, the ‘Principle Investigator’ (PI), the method and optional comments;

- *Further details* - may provide a link to a detailed dataset description as provided by the PI;
- *Size* - displays either the number of data values or points of the dataset. The size of the downloaded dataset approximates a tenth of the number of data points in Kilobyte.

Additional information may be given for some fields in the data description as hot link: PIs whose names are archived in the data base together with an e-mail address/personal home page, and Internet links are marked in a different colour and will automatically connect to your preferred mail or browser software. A link with the projects name will lead the user to the projects home page, the DOI or URL given with a reference enables the download of the publication or shows the related abstract in e.g. Science Direct. Similar may appear for optionally hyper-linked fields like 'Method', 'Parameter' or 'Further details'. Any further meta-information behind the links given in the metaheader can be very variable and may come from different external sites. Links can only be accessed if your computer is connected to the Internet.

- (2) **Data** consist of a header as the first line of the data table followed by the data matrix. Datasets display in its header:
1. Event label which is the name of the station/sample (only in tables with several events);
  2. One to several geo-codes as "Depth water [m]", "Depth sediment [m]", "Age [kyr BP]", "Date/Time", etc.;
  3. One to several parameters (or variables) with units;
- Surface or space related datasets display latitude and longitude for each data point, time series may include date/time;
  - Any line of the data table comprises at least one respective Geo-Code with one value.

#### CD-ROM Access

To read the CD, you need access to a computer with a CD-ROM reading device. In order to attain full performance we recommend the following software (minimum requirement):

- *Linux*: SUSE, Novel Linux, Gentoo, Debian, Redhat
- *Macintosh*: Mac OS X
- *Solaris*: Version 8
- *Windows*: Windows 2000/XP using Java Runtime Engine JRE 1.3 or higher

**Usually, no manual installation is needed since the CD starts automatically while inserted.**

The data collection is supplied with a simple search engine, allowing a sophisticated access to the inventory. The search engine is running on a web server supplied with the CD. Both the web server and the database engine are built on Java™ Technology.

In order to run the database properly, your computer must have a Java Runtime Engine (JRE) installed. On *Linux*, *Macintosh*, and *Solaris* computers JRE is already part of the operating system. Computers using the *Windows* operating system need separate installation of JRE. The

start-up routine supplied on the CD will automatically detect the respective computer system, the version of its operating system, and whether JRE is available and which version. If JRE is not yet installed or the version number is not appropriate, the start-up routine will offer to install the most recent JRE version.

The CD will start automatically once you have inserted it in your CD-ROM device. If the CD does not start automatically, you can launch it manually.

- *Linux, Solaris, Unix, etc.:* execute **.*unixstart.sh*** from terminal and follow the instructions;
- *Macintosh:* double click the **start** application on the CD;
- *Windows:* double click the file **winstart.exe** on the CD.

If the Java™ environment is not found on your system, the starting procedure offers the option to install the latest JRE (cf. <http://www.java.com/> ). Be aware that *JavaScript* must be enabled in your browser configuration. If your browser does not display the homepage after having started the local web-server, you should disable *proxies* in your browser configuration. If you cannot do so due to firewall or access restrictions, ask your system administrator, add 127.0.0.1 to the proxy exemptions, or send an e-mail to [tech@pangaea.de](mailto:tech@pangaea.de).

### Creating search queries

Assuming that the search engine PANGAVISTA properly displays the search query mask you can create queries. To enter a search query, just type in a few descriptive words and hit the *Enter* key or click on the *Search* button. Since the search engine only returns datasets that contain all the words in your query, refining or narrowing your search is as simple as adding more words to the search terms you have already entered.

A search query typically results in a list of datasets that you subsequently access through striking a hot link. The outcome displays the *Data description* and at its end the options to:

- Download dataset as tab-delimited text or
- View dataset as HTML.

Additionally, you can download the entire result (i.e. all datasets found and listed) as a zip-archive.

Be aware that the first search query takes more time than any subsequent query since the search index has to be cached first in the memory of your PC, which in turn depends on the capacities of your computer and your JRE software. On all platforms (except Macintosh) you can visualize the locations of the datasets with the Java map supplied with the search engine. For this purpose click the *Show map* button.

When using data that have been downloaded from a CD/DVD published by WDC-MARE or from the web sites [www.wdc-mare.org](http://www.wdc-mare.org) and [www.pangaea.de](http://www.pangaea.de), please always:

**QUOTE THE ORIGINAL CITATION !**

**ACKNOWLEDGE THE RESPECTIVE PROJECT !**

## Acknowledgements

Most of the data were converted from printed tables to digital files by Anita Boecker and Michael Seebeck. The support of the computer center of AWI in the operation of PANGAEA was the essential background to make this compilation possible. The local web server software on the CD was developed by Karl-Heinz Niemann and Duc Tran. The review by Edith Dear has improved the text. SFB 313 was funded by the Deutsche Forschungsgemeinschaft.

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