

Archiving data from earth system research

an overview

Hannes Grobe & Rainer Sieger



Search engines

12 years



Libraries

5000 years



Common Library Network

harvesting

Scientific Commons *beta*



Portals



libraries



science



earth science

Airglow
Astronomy
Atmospheric Trace Gases
Aurora
Biodiversity
Climate
Cosmic Rays
Earth Tides
Geology
Geomagnetism
Glaciology
Human Interactions in the Environment
Ionosphere
Land Cover Data
Marine Environmental Sciences
Marine Geology and Geophysics
Meteorology
Nuclear Radiation
Oceanography
Paleoclimatology
Remotely Sensed Data
Renewable Resources and Environment
Rockets and Satellites
Rotation of the Earth
Seismology
Soils
Solar Activity
Solar Radio Emissions
Solar Terrestrial Physics
Solid Earth Geophysics
Space Science
Sunspot Index



ICSU **World Data Center System** [USA Home](#) [Russia Home](#) [UK Home](#)
[ICSU](#) > [WDC Home](#)

World Data Center System

Data constitute the raw material of scientific understanding. The World Data Center system works to guarantee access to solar, geophysical and related environmental data. It serves the whole scientific community by assembling, scrutinizing, organizing and disseminating data and information.

The World Data Center System

Principles



operation for the benefit of
the scientific community



long-term archival



freely available



(data exchange) ->



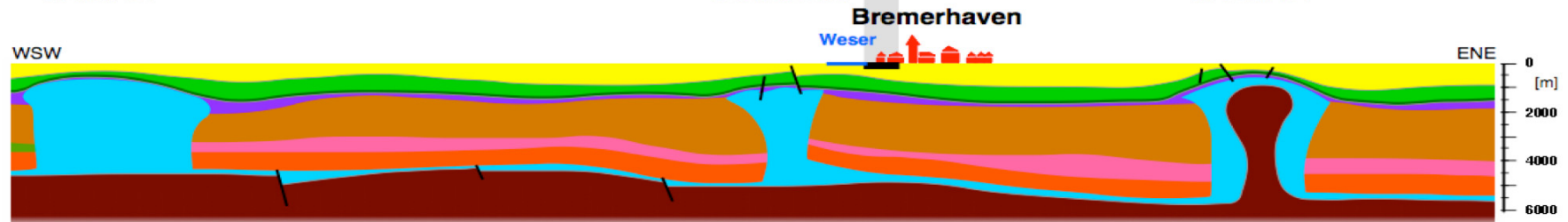
The World of Geo-Data



ARNGAST

DEDESORF

ALFSTEDT



- Perm, Rotliegend
- Perm, Zechstein
- Trias, Bundsandstein u+m

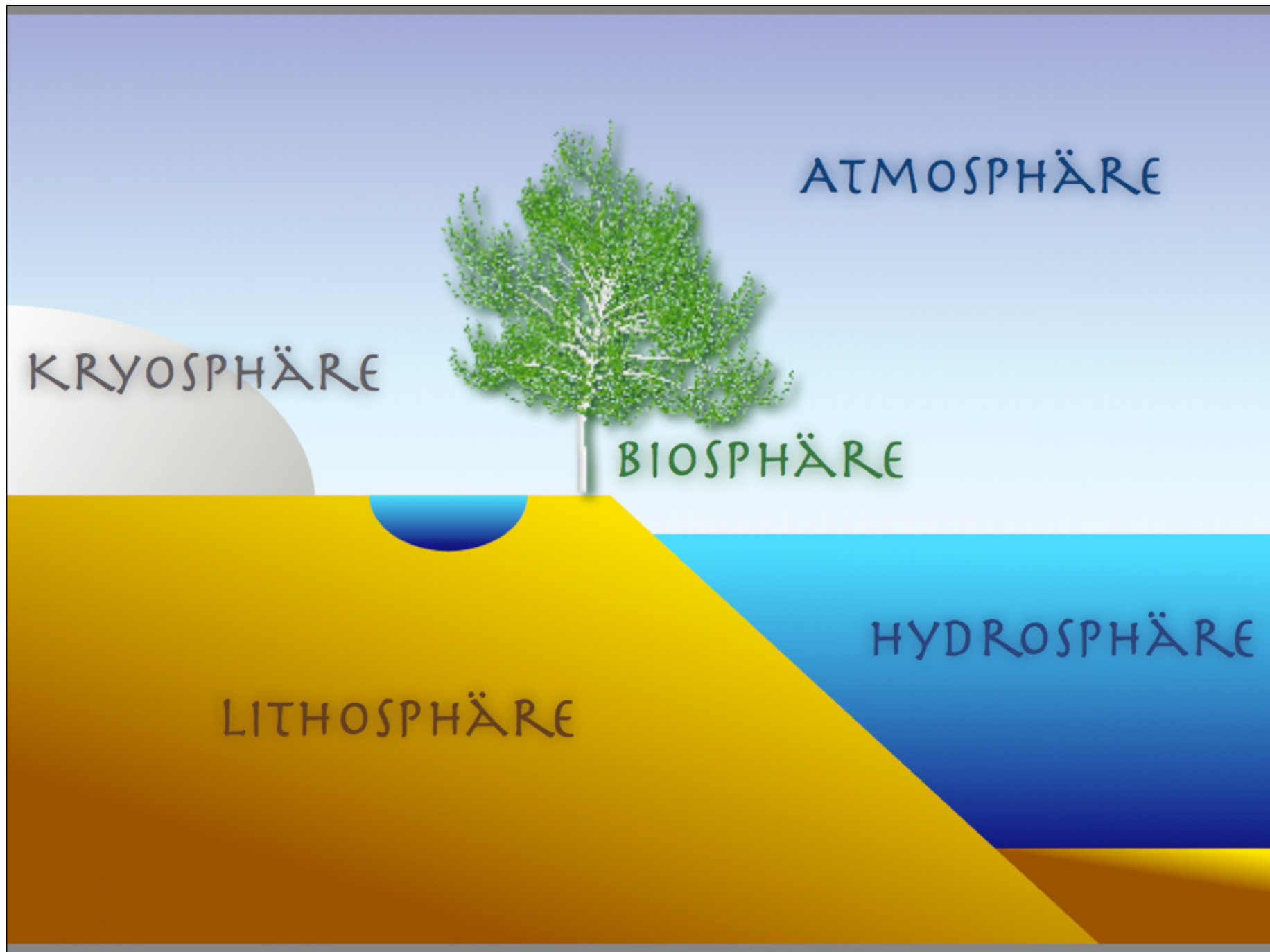
- Trias, Bundsandstein o + Muschelkalk
- Trias, Keuper
- Jura, unt.

- Kreide, unt.
- Kreide, ob.
- Tertiär/Quartär

The physical, chemical, and biological processes that shape the world are complex and interdependent. To understand them requires observations with sufficient *spatial and temporal resolution and coverage* to characterize the phenomena of interest ...

Therefore, the **lifeblood of Earth sciences is observational data**, sometimes global in coverage, and taken repeatedly over time.

Bits of Power, CODATA/ICSU, 1997



ATMOSPHERE

KRYOSPHERE

BIOSPHERE

HYDROSPHERE

LITHOSPHERE

Hydrosphere

International Council for the Exploration of the Sea - Conseil International pour l'Exploration de la Mer



From 120 national and community
scientists in 90+21 the Ocean



Intergovernmental Oceanographic Commission of UNESCO
International Oceanographic Data and Information Exchange

Home

IODE is...



The IOC's International Oceanographic Data and Information Exchange (IODE) was established in 1961 to enhance marine research, exploitation and development by facilitating the exchange of oceanographic data and information between participating Member States and by meeting the needs of users for data and information products.

The IODE Meeting & Training Centre



IOC Project Office for IODE
Ostend, Belgium



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Oceanographic
Data Center

NOAA Satellite and Information Service

NODC All of NOAA

Search

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[Ocean Data Access](#)

[Originators' Data Archive](#)

[Processed/Project Data](#)

[Parameters & Data Types](#)

[Data Formats & Codes](#)

NODC
National Oceanographic Data Center



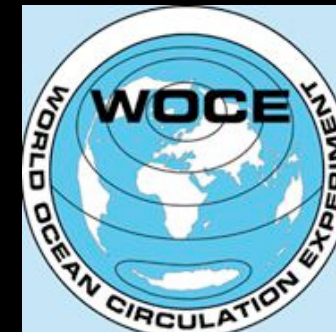
The National Oceanographic Data Center is a national repository and dissemination facility for global oceanographic data which acquires and preserves a historical record of the Earth's changing environment to be used for operational applications and ocean climate research.

NODC is an organization made up of the Oceanographic Data Center, [National Coastal Data Development Center](#), [World Data Center for Oceanography](#), and the [NOAA Central Library](#) which are integrated to provide access to the world's most comprehensive sources of marine environmental data and information.

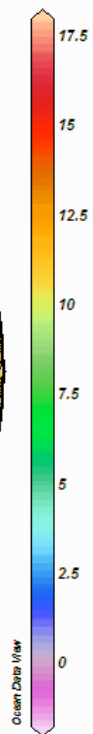
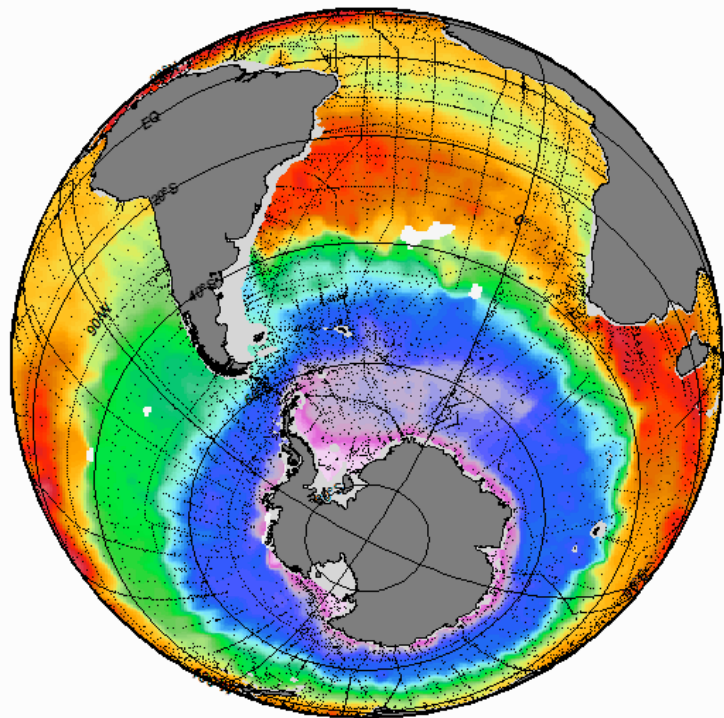


[Data Sets & Products](#)

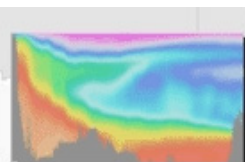
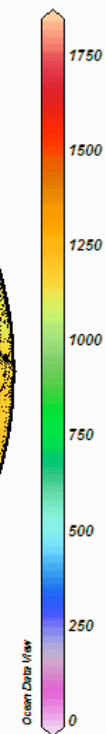
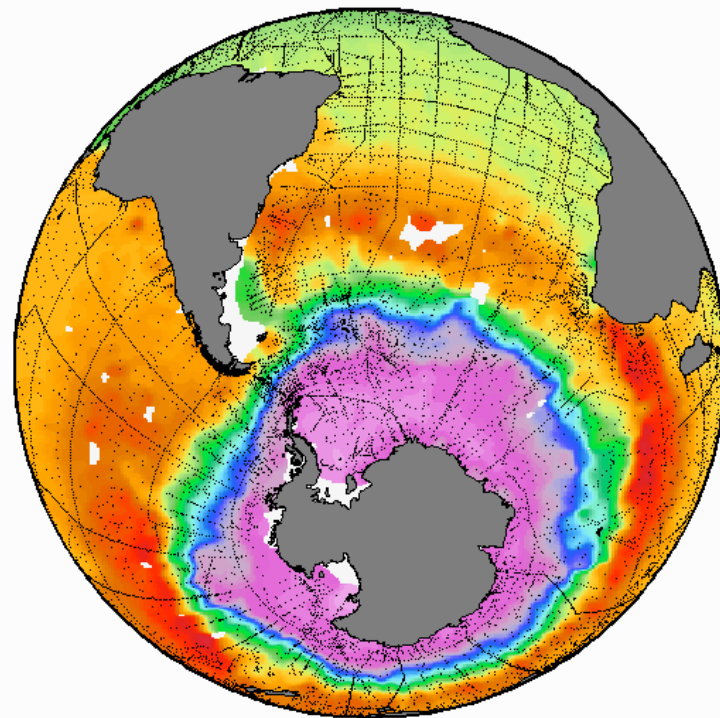
[World Ocean Database and World Ocean Atlas Series](#)



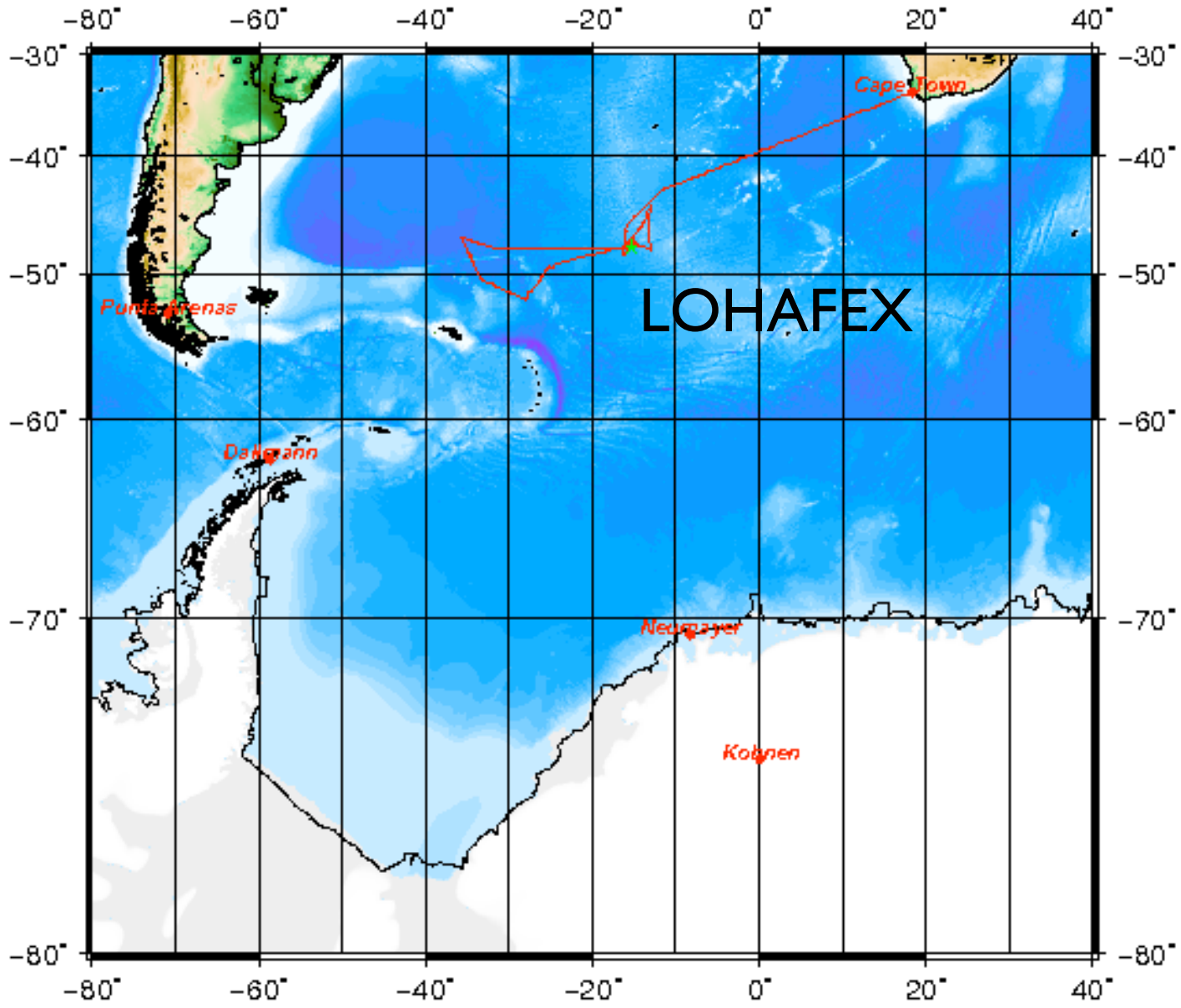
Temperature [C] @ Depth [m]=300



Depth [m] @ Sigma-0 [kg/m³]=27.5

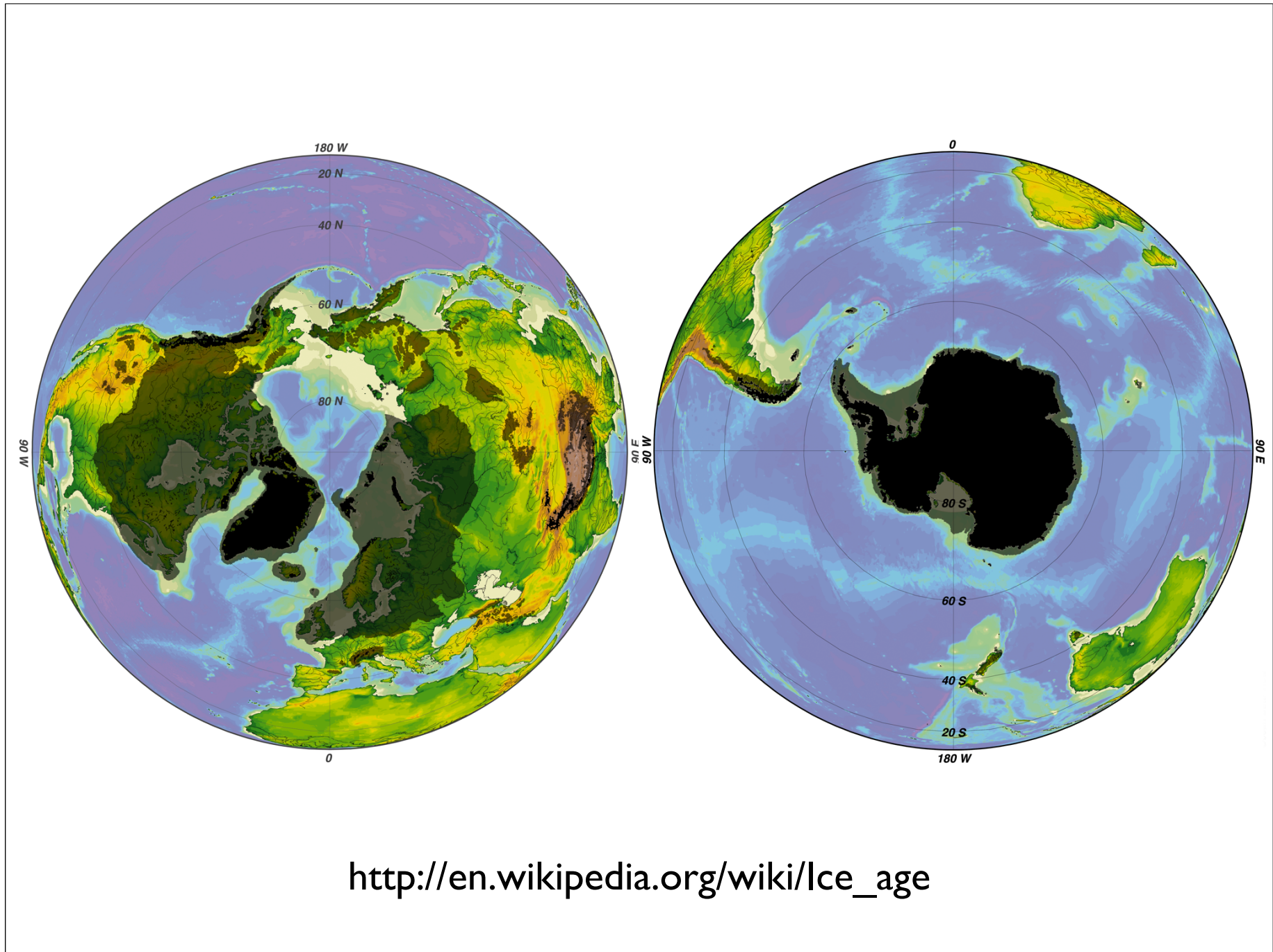


Ocean Data View



Cryosphere

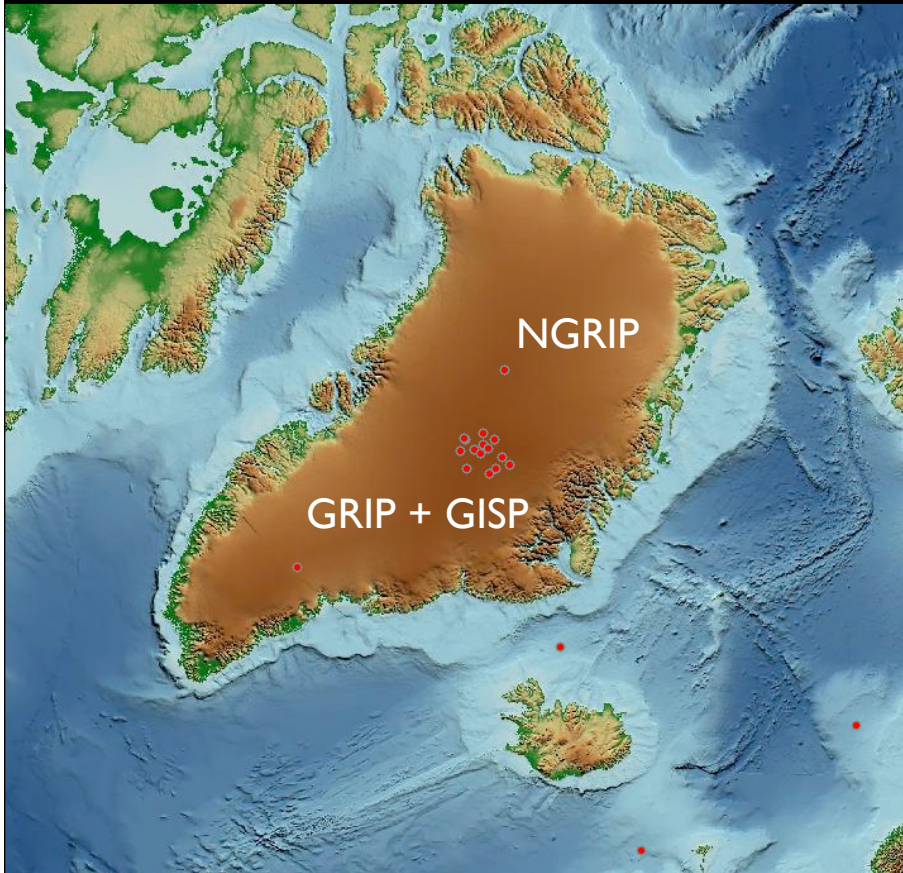




http://en.wikipedia.org/wiki/Ice_age

Hannes Grobe / AWI





WDC for Paleoclimatology

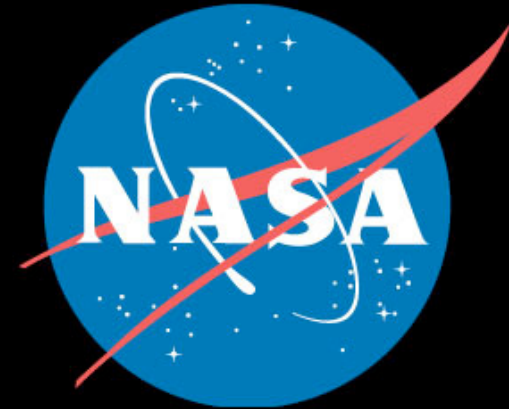


National Snow and Ice Data Center

DAAC

Distributed Active Archive Centers

for earth system science



- * Alaska Satellite Facility (ASF)
- * Crustal Dynamics Data Information System (CDDIS)
- * Global Hydrology Resource Center (GHRC)
- * Goddard Earth Sciences Data and Information Services Center (GES DISC)
- * Land Processes (LP)
- * Level I Atmosphere Archive and Distribution System (MODAPS)
- * NASA Langley Research Center Atmospheric Science Data Center (LaRC ASDC)
- * National Snow and Ice Data Center (NSIDC)
- * Oak Ridge National Laboratory (ORNL)
- * Ocean Biology Processing Group
- * Physical Oceanography (PO)
- * Socioeconomic Data and Applications Data Center (SEDAC)

Atmosphere

World Meteorological Organisation

WMO



CDIAC

Carbon Dioxide Information Analysis Center • <http://cdiac.ornl.gov>

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Carbon Dioxide Information Analysis Center



The Carbon Dioxide Information Analysis Center (CDIAC) is the primary climate-change data and information analysis center of the [U.S. Department of Energy \(DOE\)](#). CDIAC is located at DOE's [Oak Ridge National Laboratory \(ORNL\)](#) and includes the [World Data Center for Atmospheric Trace Gases](#).

CDIAC's data holdings include records of the concentrations of carbon dioxide and other radiatively active gases in the atmosphere; the role of the terrestrial biosphere and the oceans in the biogeochemical cycles of greenhouse gases; emissions of carbon dioxide to the atmosphere; long-term climate trends; the effects of elevated carbon dioxide on vegetation; and the vulnerability of coastal areas to rising sea level.



CDIAC provides data management support for major projects, including the [AmeriFlux Network](#), continuous observations of ecosystem level exchanges of CO₂, water, energy and momentum at different time scales for sites in the Americas; the [Ocean CO₂ Data Program](#) of CO₂ measurements taken aboard ocean research vessels; DOE-supported [FACE](#) experiments, which evaluate plant and ecosystem response to elevated CO₂ concentrations, and [NARSTO](#), which assesses ozone and fine particle processes in the troposphere over North America.



Earth System Science Data

The Data Publishing Journal

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Online Library ESSDD

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Earth System Science Data (ESSD)

Chief Editors: David Carlson & Hans Pfeiffenberger

Open Access – Public Peer-Review & Interactive Public Discussion – Personalized Copyright under a Creative Commons License

Included in the [Directory of Open Access Journals \(DOAJ\)](#) as well as in the [Bodleian Library \(UK\)](#), [Deutsche Bibliothek \(D\)](#) and [Library of Congress \(USA\)](#). Long-term e-archived in [Portico](#).

Aims and Scope

Earth System Science Data (ESSD) is an international, interdisciplinary journal for the publication of articles on original research data(sets), furthering the reuse of high (reference) quality data of benefit to Earth System Sciences. The editors encourage submissions on original data or data collections which are of sufficient quality and potential impact to contribute to these aims.

The journal maintains sections for regular length articles, brief communications (e.g., on additions to datasets) and commentary, as well as review articles and "Special Issues".



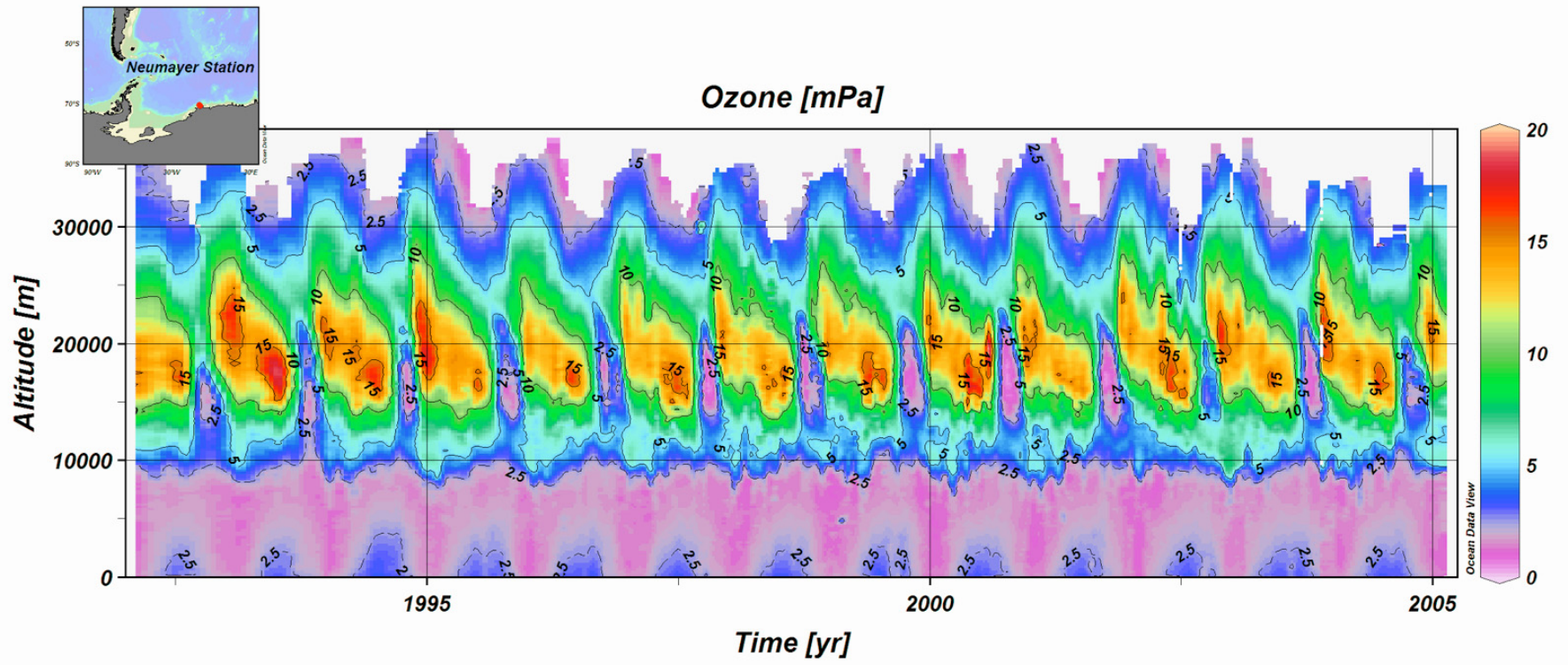
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01 | ESSD, 12 Jan 2009:
Compilation of ozonesonde profiles from the Antarctic Georg-Forster-Station from 1985 to 1992



König-Langlo & Gernandt (Earth Syst. Sci. Data, 1, 1-5, 2009)



WRMC-BSRN

World Radiation Monitoring Center- Baseline Surface Radiation Network

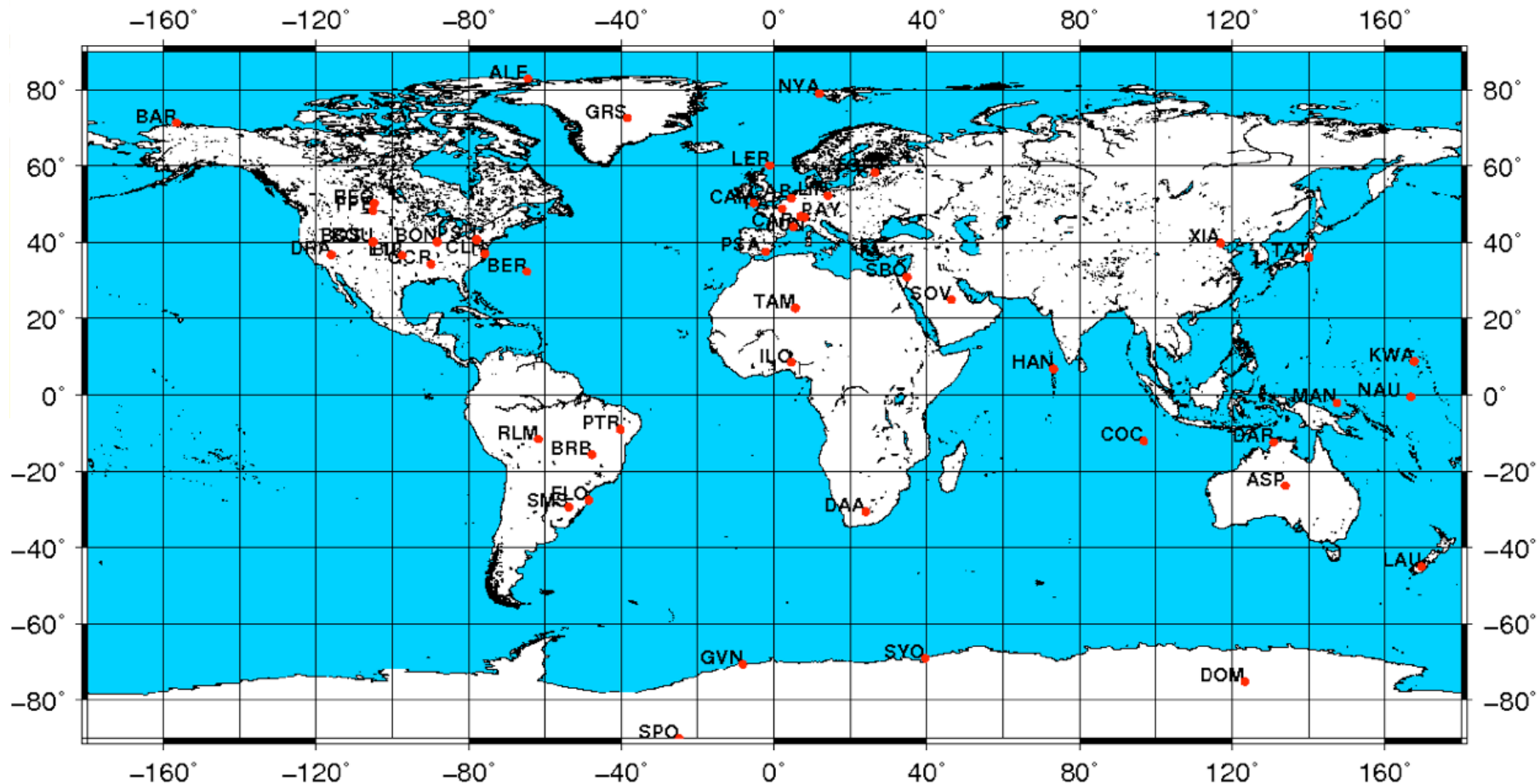
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Running and planned BSRN stations, June 2008



Biosphere

Distribution of species

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GBIF


... free and open access to biodiversity data

GLOBAL BIODIVERSITY INFORMATION FACILITY

SITE SEARCH:



OBIS
OCEAN BIOGEOGRAPHIC
INFORMATION SYSTEM

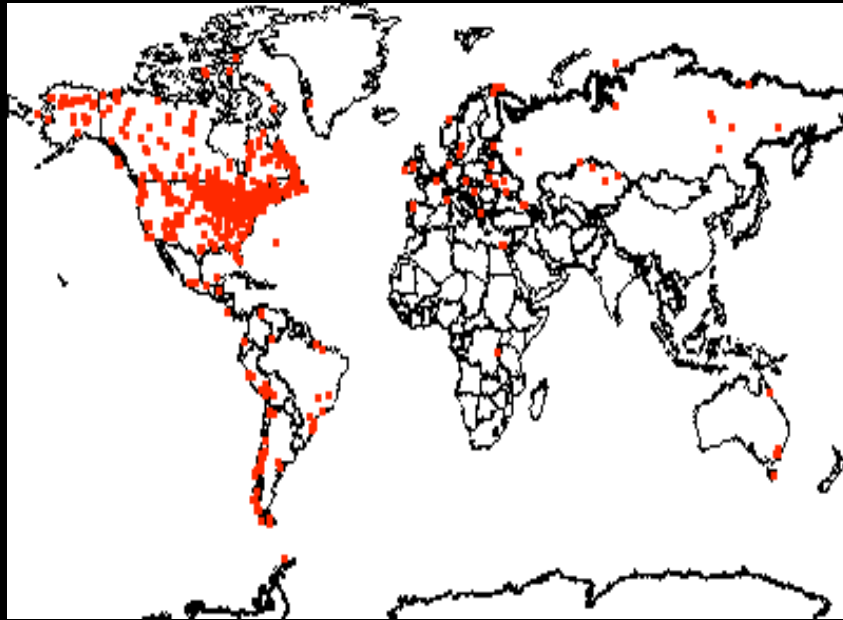
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EXPLORE DATA ON LOCATIONS OF MARINE ANIMALS AND PLANTS

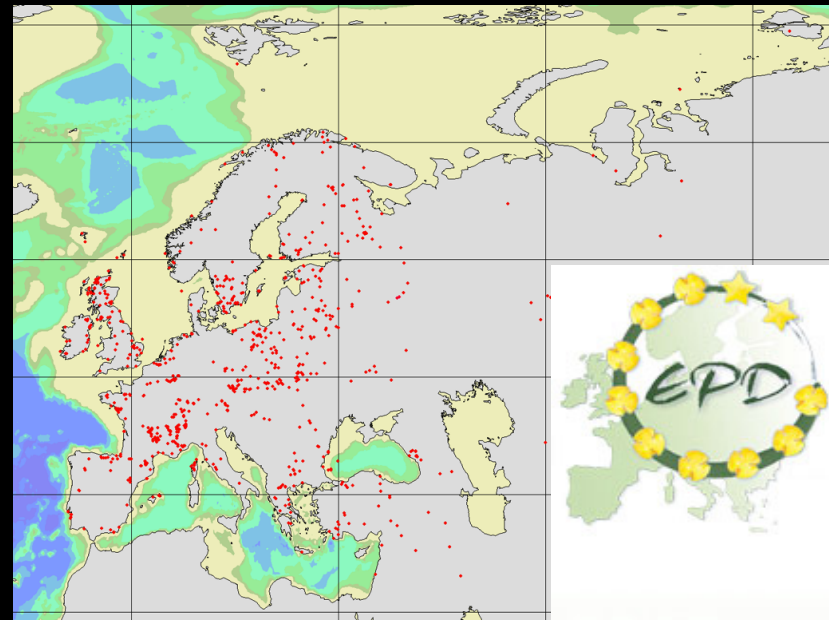
Obtain data tables, maps and predict distributions using environmental information

Occurrence of Pollen

Global Pollen Database



European Pollen Database



WDC for Paleoclimatology

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National Climatic Data Center, Asheville, North Carolina

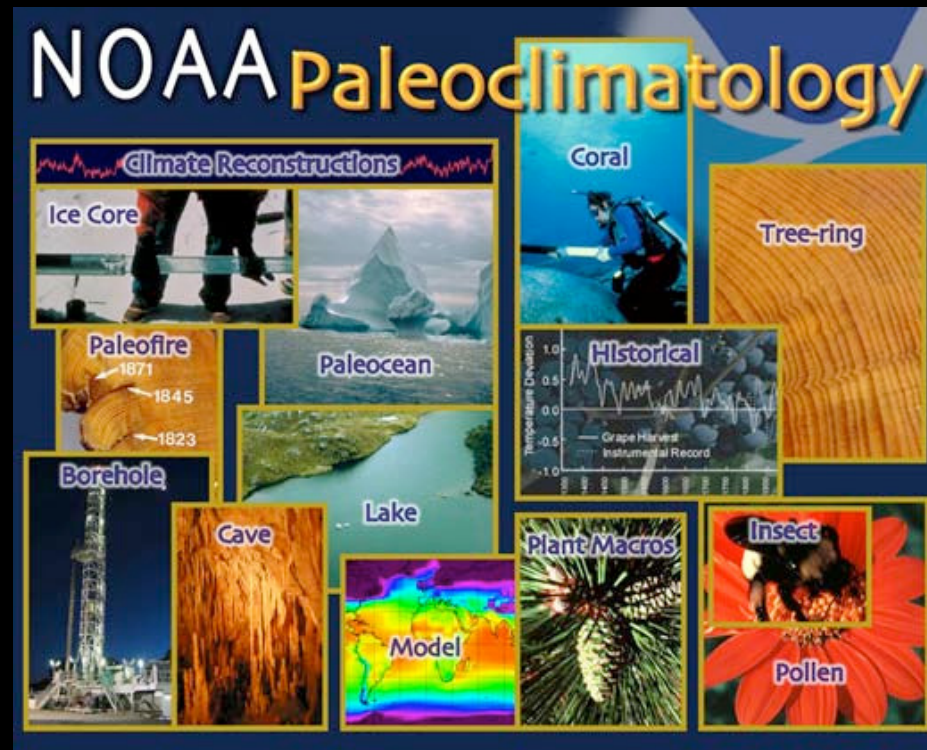
Tilia

Lithosphere

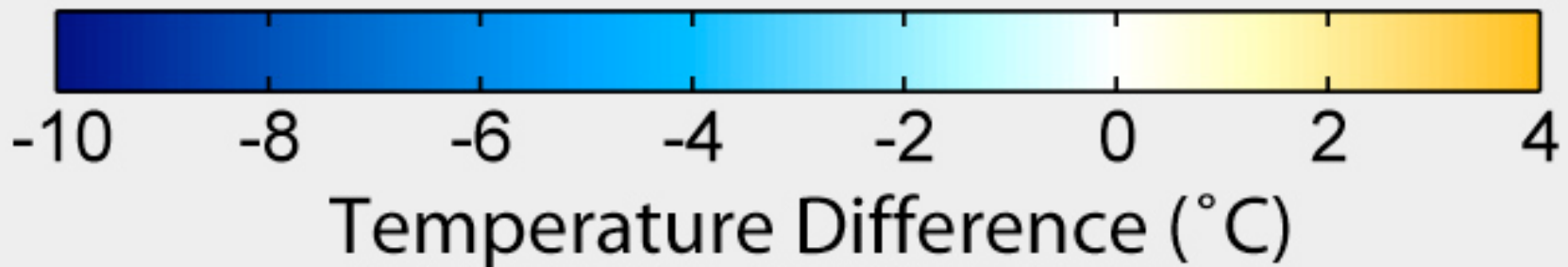
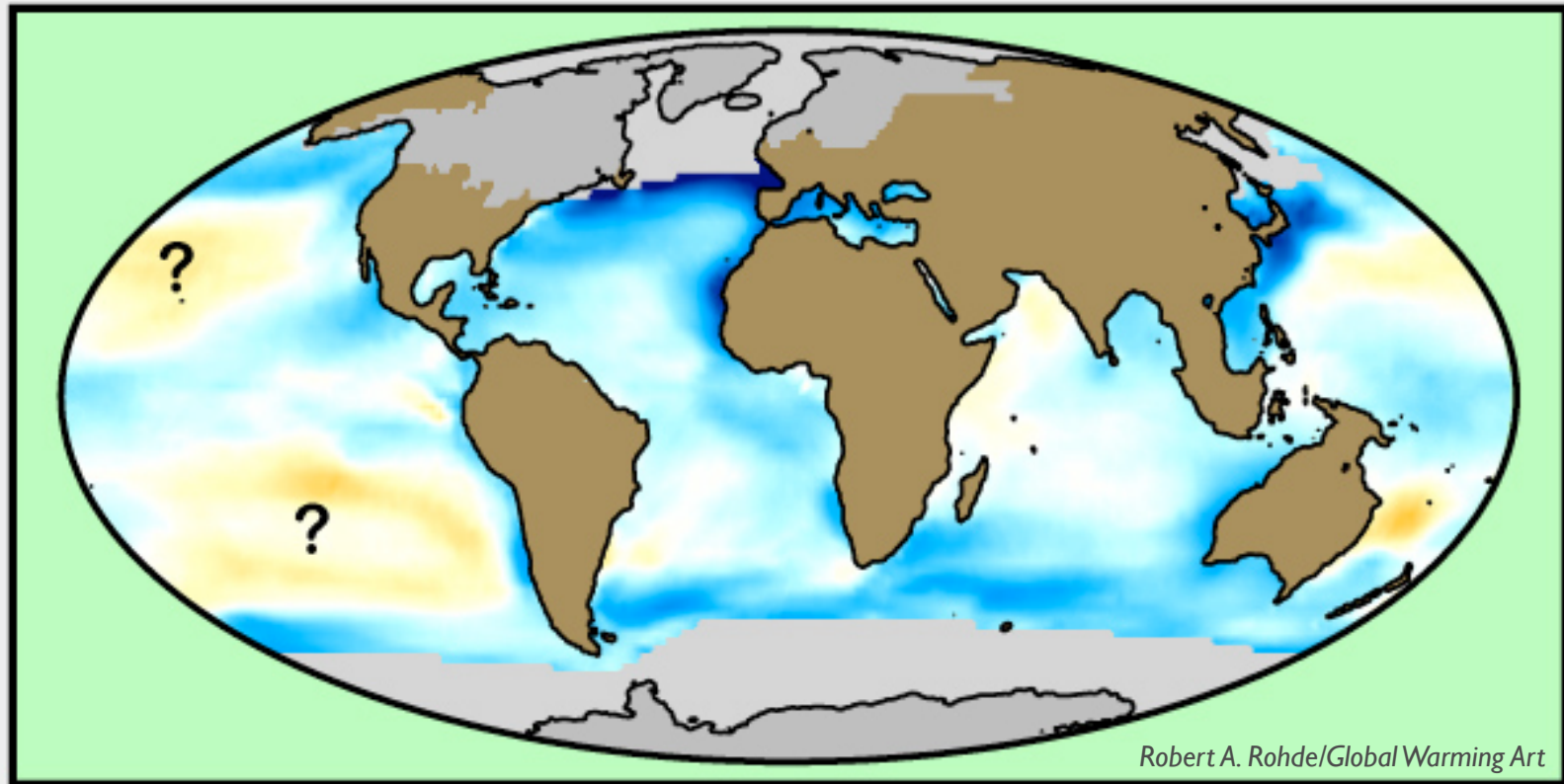
National geological surveys

WDC Paleoclimatology

NCDC Boulder USA



CLIMAP: The Last Glacial Maximum





DSDP - 1968-1983

ODP - 1984-2003

IODP - since 2004

JANUS

BRG/LDEO

Literature > GeoRef



learned so far ...

- no metadata without data
no data without metadata
- persistent access
- standard format
- machine readable

How to provide data for long-term archiving

- Documentation (metadata)
- Georeference
- Parameter with unit
- Standards
- Citation
- Persistent identifier

DATA MANAGEMENT LIFE ...

SPIEGEL ONLINE WISSENSCHAFT

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15. August 2006

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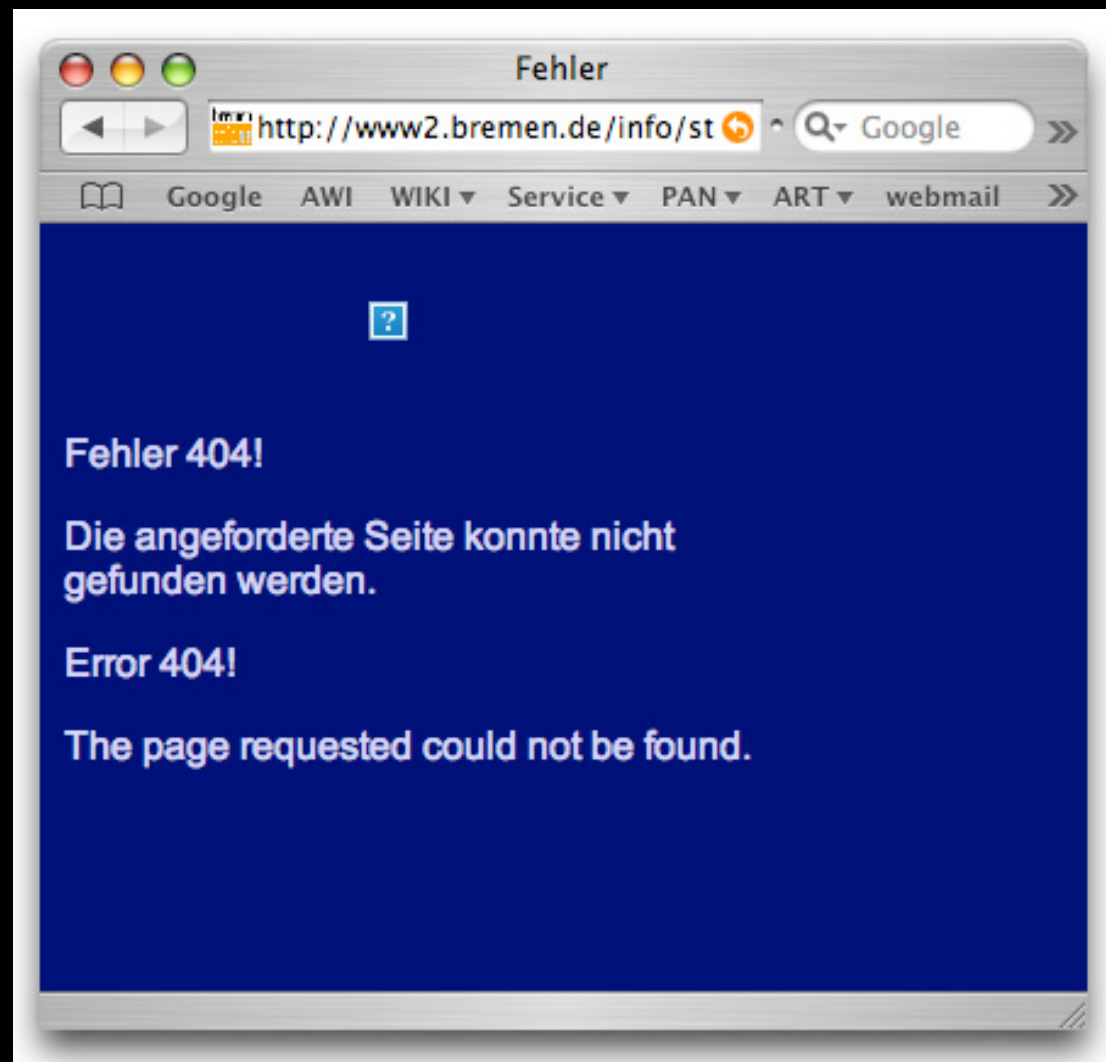
PEINLICHE PANNE

Schrift:

Nasa hat Mondlandungs-Videos verbummelt

Es klingt wie in einem schlechten Film: Die Kassetten mit den Bildern der ersten Mondlandung sind weg. Nasa-Mitarbeiter haben über ein Jahr nach den Videos gesucht - und sie nicht gefunden.

Error 404



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Computers & Geosciences
Volume 28, Issue 10, December 2002, Pages 1201-1210

DOI: [10.1016/S0098-3004\(02\)00039-0](https://doi.org/10.1016/S0098-3004(02)00039-0)

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PANGAEA--an information system for environmental sciences

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Abstract

PANGAEA is an information system for processing, long-term storage, and publication of georeferenced data related to earth science fields.

International
DOI Foundation



Registration Agency
for scientific primary data

TIB | GERMAN NATIONAL LIBRARY
OF SCIENCE AND TECHNOLOGY



Data library
PANGAEA



Data center
WDC



Data center
DAAC



Data system
xyz...



doi:10.1594/PANGAEA.547955

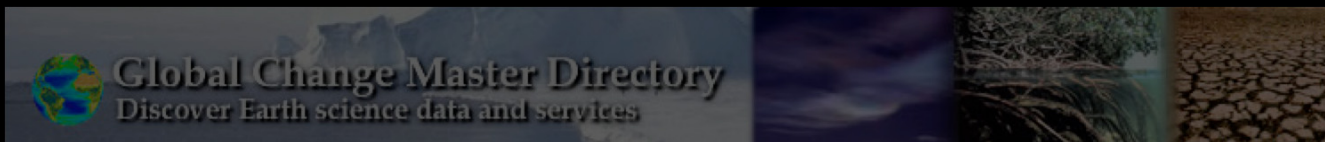
Portals



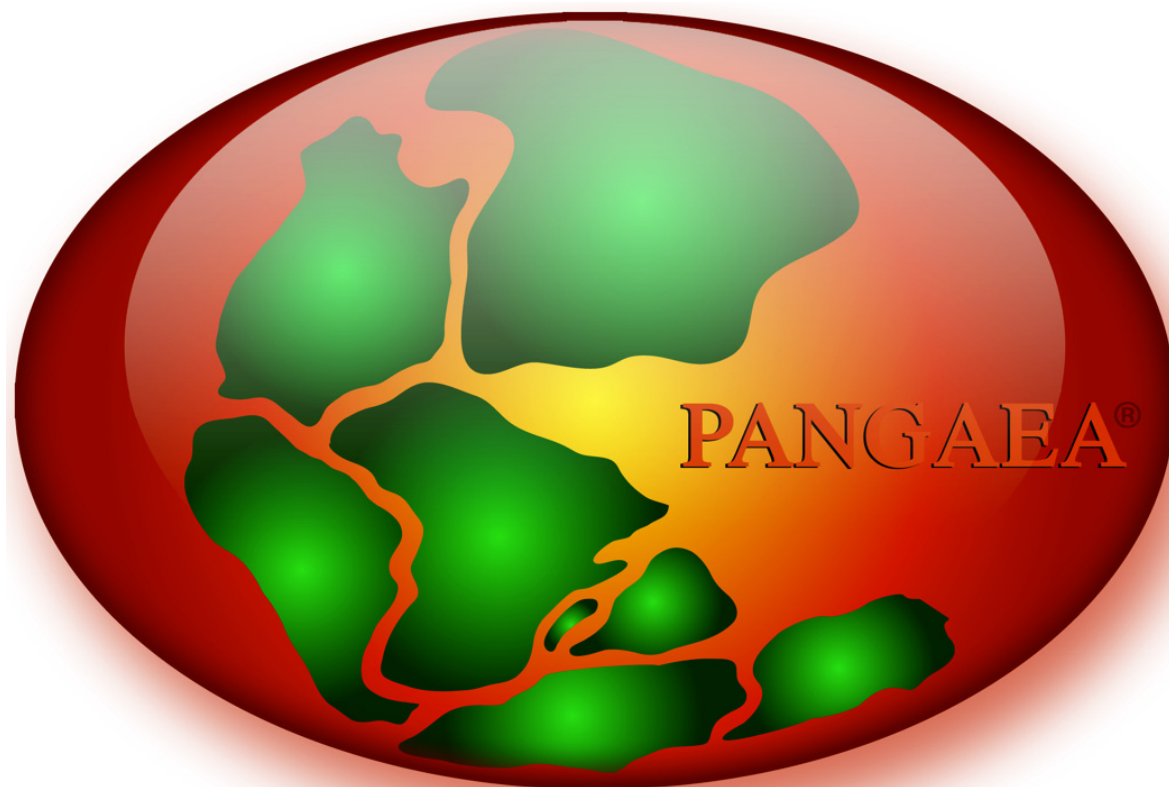
libraries



science



earth science



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