Integrated management of biodiversity and paleontology data within GFBio and PANGAEA

Robert Huber
MARUM, University of Bremen, Bremen, Germany

Andree Behnken

03.05.2016
ODIP II, Boulder
Host institutions

AWI  marum

History
• Founded 1987
• Information system for long-term archiving and publication of data from earth & environmental sciences (*since 1993*)
• Accredited by the „International Council for Science“ (ICSU) as „Publisher for Earth & Environmental Science“ (World Data Center) (*since 2001*)
• Accredited by the „World Meteorological Organisation“ (WMO) as „World Radiation Monitoring Center“ (WRMC) (*since 2007*)

Activities & Services
• Long term archive
• Data publication
• Project data management
PANGAEA Data

- Profiles (ocean, core) -> doi:10.1594/pangaea.103958
- Environmental time series -> doi:10.1594/pangaea.323487
- Sea bed photos, movies -> doi:10.1594/PANGAEA.319877
- Sediment samples -> doi:10.1594/pangaea.51749
- Species occurrence data -> doi:10.1594/PANGAEA.123036
- Age models -> doi:10.1594/PANGAEA.787572
- Stable isotopes -> doi:10.1594/PANGAEA.52201
- Geophysics-> doi:10.1594/PANGAEA.786480
PANGAEA Data

Total number of data sets ~ 350,000
Data items ~ 9 billions
### Data Description

**Citation:** Fritsen, CH et al. (2011); (Table 1) Chlorophyll a content and microalgae abundance and biovolume in pack ice in the Bellinghausen Sea. doi:10.1594/PANGAEA.810069.

**Abstract:** Pack ice in the Bellinghausen Sea contained moderate to high stocks of microbial biomass (3-10 mg Chl a m^-2) spanning the range of general sea-ice microbial microhabitats (e.g., bottom, interior and surface) during the International Polar Year (IPY) Sea Ice Mass Balance in the Antarctic (SIMBA) studies. Measurements of irradiance above and beneath the ice as well as optical properties of the microalgae therein demonstrated that absorption of photoautotrophically active radiation (PAR) by particulates (microalgae and detritus) had a substantial influence on attenuation of PAR and irradiance transmission in areas with moderate snow covers (0.2-0.3 m) and more moderate effects in areas with low snow cover. Particulates contributed an estimated 20 to 90% of the attenuation coefficients for the first-year sea ice at wavelengths less than 800 nm. Strong ultraviolet radiation (UVR) absorption by particulates was prevalent in the ice habitats where solar radiation was highest - with absorption coefficients by ice algae often being as large as that of the sea ice. Strong UVR-absorption features were associated with an abundance of diatomflagellates and a general lack of diatoms - perhaps suggesting UVR may be influencing the structure of some parts of the sea-ice microbial communities in the pack ice during spring. We also evaluated the time-varying changes in the spectra of under-ice irradiances in the austral spring and showed dynamics associated with changes that could be attributed to coupled changes in the ice thickness (mass balance) and microalgal biomass. All results are indicative of radiation-induced changes in the absorption properties of the pack ice and highlight the non-linear, time-varying, biophysical interactions operating within the Antarctic pack ice ecosystem.

**Project(s):** International Polar Year (2007-2008) (IPY)


**Event(s):** Ice_station_Belgica (Brussels/Liege)

**Comment:** Weighted average Chl a concentration was originally given in mg m^-3 and was converted into μg Chl a m^-3 by dividing by 1000. Data extracted from the frame of a joint IOST/PANGAEA IPY effort, see http://doi.pangaea.de/10.1594/PANGAEA.150150

### Data

#### Download dataset as tab-delimited text (use the following character encoding: UTF-8 (Unicode/PANGAEA default))

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Chl a</th>
<th>Snow thick</th>
<th>Chl a conc (μg m^-3)</th>
<th>Snow thick (cm)</th>
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**Size:** 81 data points
PANGAEA data citation


Abstract: Pack ice in the Bellinghausen Sea contained moderate to high stocks of microbial biomass (3-10 mg Chl a/m²) spanning the range of general sea-ice microalgal microhabitats (a layer of microalgae at the ice surface). During the International Polar Year (IPY) Sea Ice Mass Balance in the Antarctic (SIMBA) studies, measurements of irradiance above and beneath the ice as well as optical properties of microalgae therein demonstrated that absorption of photosynthetically active radiation (PAR) by particulates (microalgae and detritus) has a substantial influence on attenuation of transmission in areas with moderate snow cover (0.2-0.3 m) and more moderate effects in areas with low snow cover. Particles contributed an estimated 20 to 90% of the first-year sea ice at wavelengths less than 500 nm. Strong ultraviolet radiation (UVR) absorption by particulates was prevalent in the ice habitats where solar radiation was high by ice algae often being as large as that of the sea ice. Strong UVR-absorption features were associated with an abundance of diatoms and a general lack of diatoms influencing the structure of some parts of the sea ice microbial communities in the pack ice during spring. We also evaluated the time-varying changes in the spectra of underwater spring and showed dynamics associated with changes that could be attributed to coupled changes in the ice thickness (mass balance) and microalgae biomass. All results are in agreement with changes in the absorption properties of the pack ice and highlight the non-linear, time-varying, biophotonic interactions operating within the Antarctic pack ice ecosystem.

Project(s): International Polar Year (2007-2008) (IPY)


Event(s): Ice_stations_Bellica (Brussels/Liege) * Latitude: -70.560000 * Longitude: -90.9295000 * Location: Bellinghausen Sea * Campaign: NBP07-09 (SIMBA) * Basis: Nathaniel B. Palmer * Device: Multiple investigations (MUST) * Comment: IPY/SIMBA

Comment: Weighted average Chl a concentration was originally given in ng/m³ and was converted into µg/m³ by dividing by 1000. Data extracted in the frame of a joint ICS/IC/PA/GAE IPY effort, see http://doi.pangaea.de/10.1594/PANGAEA.150150

Data

Download dataset as tab-delimited text (use the following character encoding: UTF-8 (Unicode PANGAEA default) )

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Size: 81 data points
PANGAEA data citation


Abstract: Pack ice in the Bellingshausen Sea contained moderate to high stocks of microbial biomass (3-10 mg C/m²) spanning the range of general sea-ice microbial habitats (e.g., sea-ice surface) during the International Polar Year (IPY) Sea Ice Mass Balance in the Antarctic (SIMBA) studies. Measurements of ice biomass and beneath the ice as well as optical microalgae therein demonstrated that absorption of photosynthetically active radiation (PAR) by particulates (microalgae and detritus) had a substantial influence on attenuation and transmission in areas with moderate snow cover (0.2-0.3 m) and more moderate effects in areas with low snow cover. Particulate contributions and estimated 25 to 30% of the first-year sea ice at wavelengths less than 500 nm. Strong ultraviolet radiation (UVR) absorption by particulates was prevalent in the ice habitats where solar radiation was high by ice algal being as long as that of the sea ice. Strong UVR-absorption features were associated with an abundance of dinoflagellates and a general lack of diatoms influencing the structure of some parts of the sea-ice microbial communities in the pack ice during spring. We also evaluated the time-varying changes in the spectra of under ice and showed dynamics associated with changes that could be attributed to coupled changes in the ice thickness (mass balance) and microalgae biomass. All results are in changes in the absorption properties of the pack ice and highlight the non-linear, time-varying, biophysical interactions operating within the Antarctic pack ice ecosystem.

Project(s): International Polar Year (2007-2008) (IPY)


Comment: Weighted average Chl a concentration was originally given in mg/m³ and was converted into μg/m³ by dividing by 1000. Data extracted in the frame of a joint ICSTI/PANGAEA IPY effort, see http://doi.org/10.1594/PANGAEA.150150

Data

Download dataset as tab-delimited text in the following character encoding: UTF-8, Unicode (PANGAEA default)
PANGAEA data citation


Abstract: Pack ice in the Bellinghausen Sea contained moderate to high stocks of microalgal biomass (3-10 mg Chl a/m²) spanning the range of general sea-ice microalgal habitats (bottom to surface) during the International Polar Year (IPY) Sea Ice Mass Balance in the Antarctic (SIMBA) studies. Measurements of irradiance above and beneath the ice as well as optical microalgal therein demonstrated that absorption of photosynthetically active radiation (PAR) by particulates (microalgae and detritus) had a substantial influence on attenuation of transmission in areas with moderate snow cover (0.2-0.3 m) and more moderate effects in areas with low snow cover. Particulates contributed an estimated 25-50% of the all first-year sea ice at wavelengths less than 500 nm. Strong ultraviolet radiation (UV)-absorption by particulates was prevalent in the ice habitats where solar radiation was high by ice-algae often being as large as that of the sea ice. Strong UV-absorption features were associated with an abundance of biofiltering and a general lack of diatoms influencing the structure of some parts of the sea-ice microbial communities in the pack ice during spring. We also evaluated the time-varying changes in the spectra of undersea spring and showed dynamics associated with changes that could be attributed to coupled changes in the ice thickness (mass balance) and microalgal biomass. All results are mean changes in the absorption properties of the pack ice and highlight the non-linear, time-varying, biophysical interactions operating within the Antarctic pack ice ecosystem.

Project(s): International Polar Year (2007-2008) (IPY)

Data Description

Parameter(s)

Download dataset as tab-delimited text (use the following character encoding: UTF-8 (Unicsede PANGAEA default))

License: CC BY-NC-ND

Size: 81 data points

Data
PANGAEA cross-linking services

Deep Sea Research Part II: Topical Studies in Oceanography

Bio-optical properties of Antarctic pack ice in the early austral spring

Abstract

Pack ice in the Bellinghausen Sea contained moderate to high stocks of microalgae biomass (0.10 mg Chl a m^-2) spanning the range of general ice-microalgae microhabitats (e.g., bottom, interior and surface) during the International Polar Year (IPY) Sea Ice Mass Balance in the Antarctic (GIAO) studies. Measurements of irradiance above and beneath the ice as well as optical properties of the microalgae therein demonstrated that absorption of photosynthetically active radiation (PAR) by particulates (microalgae and detritus) had a substantial influence on attenuation of PAR and irradiance transmission in areas with moderate snow covers (0.2-0.3 m) and more moderate effects in areas with low snow cover. Particulates contributed an estimated 20 to 40% of the attenuation coefficients for the first-year sea ice of wavelengths less than 500 nm. Strong ultraviolet radiation (UVR) absorption by particulate algae prevalent in the ice habitats where solar radiation was highest—absorption coefficients by ice algae often being as large as...
German Federation for Biological Data (GFBio)

- National data infrastructure project
- DFG funded
- Multidisciplinary consortium
- 19 partners
- September 2015: start of implementation phase
- Coordinated by PANGAEA

**Overall Goal:** Sustainable, service oriented, national data infrastructure facilitating data sharing for biological and environmental research.
Linking data domains: collection, molecular & environmental data
Integration: taxonomy

Citation: Mohtadi, M et al. (2005): Surface sediment samples from the Chilean continental slope between 23°S and 44°S with the stable isotopic data of *Neogloboquadrina pachyderma dextral* and *Globigerina bulloides*. doi:10.1594/PANGAEA.351144.


Project(s): Geosciences, University of Bremen (GeoB) &
Center for Marine Environmental Sciences (MARUM) &

Coverage: Median Latitude -32.898823 * Median Longitude -72.440580 * South-bound Latitude -44.284160 * West-bound Longitude -75.854990 * North-bound Latitude -23.959030 * East-bound Longitude -70.555160

Date/Time Start: 2001-04-07T22:37:00 * Date/Time End: 2001-05-10T17:18:00

Minimum DEPTH, sediment/rock: 0.0 m * Maximum DEPTH, sediment/rock: 0.0 m

Event(s): GeoB7115-1 & Latitude: -23.999630 * Longitude: -70.555160 * Date/Time: 2001-04-07T22:37:00 * Elevation: -523.0 m * Recovery: 0.18 m * Location: off Chile & * Campaign: SO156/2 (PUCk) & * Basis: Some & * Device: MultiCorer & * Comment: core recovery 7/8, 4/4

GeoB7121-1 & Latitude: -25.999500 * Longitude: -70.901500 * Date/Time: 2001-04-09T16:04:00 * Elevation: -1442.0 m * Recovery: Campaign: SO156/2 (PUCk) & * Basis: Some & * Device: MultiCorer & * Comment: core recovery 7/8, 4/4


Parameter(s):

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Size: 156 data points

Download dataset as tab-delimited text (use the following character encoding: ISO-8859-1, ISO Western (PANGAEA default)
Integration: taxonomy

Tricky parameters

Prokaryotes, abundance as single cells per carbon biomass
Linuche unguiculata, body weight, wet
Calanus finmarchicus, egg production rate per female
Calanus finmarchicus, n2-n3
Calanus finmarchicus, female, prosome length, standard deviation
Calanus finmarchicus, fecal pellet volume
Calanus finmarchicus, egg production rate
Calanoides carinatus, d13C
Calanoides carinatus, d15N
Susceptibility, specific, partial
Anammox 16s rRNA
Anammox 16s rRNA

(9Z)-2,6,10,14-Tetramethyl-7-(3-methylpent-4-enyliden)pentadeca-9-en per unit mass organic carbon
14Carbon dioxide assimilation rate
14Carbon dioxide, assimilation rate

Ca. 130.000 parameter, many of them very complex
Integration: taxonomy

Workflow:

- Identify taxon names [PoS tagging, term chunking, Regex]
- Use external ontologies/services (WORMS/ITIS etc.) to verify taxon names
- Ingest these terms into PANGAEA ontology
- Link taxon names with PANGAEA parameter
- Gap analysis -> Feedback to external ontologies (WORMS)
Networking

data management &
longterm archiving
catalogues
protocols
catalogues
Frontends /
portals

RDB

marshaller

PANGAEA

Index

WS
(SOAP/WSDL)

REST

kml

OGC CSW

OAI-PMH

DIF

Dublin
Core

harvester

ISO19139

harvester

DIGIR

DIF

harvester

Darwin
Core

DataCite
3.0

DOI registration

DataCite
MDS

ISO690

DOI registry

PANGAEA
web frontend

Elsevier, Scopus,…

INSPIRE / SDN

GEOSS

IODP

MANIDA

World Data System

HYPOX

PAGES

PubMed

OpenAire

OCLC

Google

OBIS

GBIF

PubMed

OpenAire

OCLC

Google

Robert Huber
9.3.2016
slide 16
Thank you.