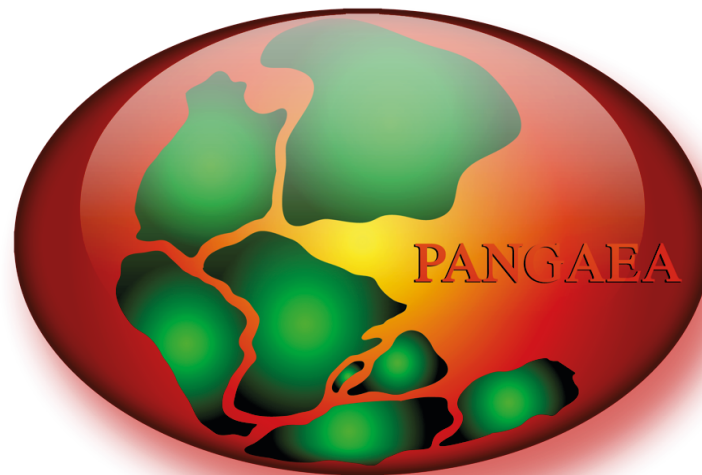


# Ways of interaction between WoRMS and PANGAEA<sup>®</sup> to improve biodiversity data discovery and re-use



Stefanie Schumacher, Alexandra Kraberg, Stephan Frickenhaus  
Alfred Wegener Institute  
[hdl:10013/epic.46014](https://nbn-resolving.org/hdl:10013/epic.46014)



## What is PANGAEA<sup>®</sup> ?

Pangaea is an **open access data library** for **earth system research**. Data are stored **georeferenced** in space and time in a relational database and a tape archive.

The data content is accessible on the internet via a search engine, a data warehouse and web services.

The system is open to any scientist or project to archive and publish data.

# PANGAEA hosts

---



*Both institutions have committed to long-term operate PANGAEA*

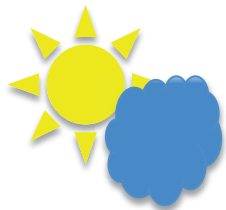
# Data model



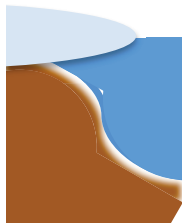
where?



*Latitude/Longitude*



*Air*



*Ice*

*Water*

*Sediment*

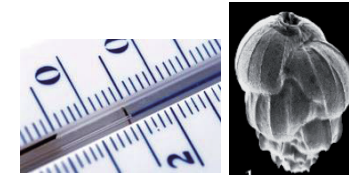
when?



Epoch / Era	Series / Epoch	Stage / Age	GSSP	numerical age (Ma)
Quaternary	Holocene	Upper	▲	0.0117
		Middle		0.126
		Calabrian	▲	0.781
	Pleistocene	Gelasian	▲	1.806
Piacenzian		▲	2.588	
Pliocene	Zanclean			3.600
				---

*Date/Time or geol. Age*

what?



*Parameter [unit]*

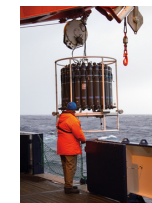
numerical	text	object										
<table border="1"> <tr><td>16</td></tr> <tr><td><b>B. dilatata</b> [#]</td></tr> <tr><td>178</td></tr> <tr><td>17</td></tr> <tr><td>4</td></tr> </table>	16	<b>B. dilatata</b> [#]	178	17	4	<table border="1"> <tr><td>3</td></tr> <tr><td><b>Lithology</b></td></tr> <tr><td>Aleuritic clay</td></tr> <tr><td>Aleuritic clay</td></tr> <tr><td>Nannofossil clays</td></tr> </table>	3	<b>Lithology</b>	Aleuritic clay	Aleuritic clay	Nannofossil clays	
16												
<b>B. dilatata</b> [#]												
178												
17												
4												
3												
<b>Lithology</b>												
Aleuritic clay												
Aleuritic clay												
Nannofossil clays												

who?



*Investigator/Reference*

how?



*Method*





## Data Description

Show Map Google Earth RIS BISTEX

**Citation:** Koizumi, I; Yamamoto, H (2010): Vertical distribution of diatoms in North Pacific sediments.

doi:10.1594/PANGAEA.776366,

Supplement to: Koizumi, Itaru; Yamamoto, Hirofumi (2010): Paleooceanographic evolution of North Pacific surface water off Japan during the past 150,000 years. *Marine Micropaleontology*, **74**(3-4), 108-118, doi:10.1016/j.marmicro.2010.01.003

### Abstract:

Hydrographic variability in the Mixed Water Region of the Northwest Pacific Ocean at latitudes 35°-40°N, between the Kuroshio Extension and Oyashio Front, causes complex upwelling, leading to large primary productivity and thus great fishery resources. We reconstructed the periodicity of the variability in North Pacific Intermediate Water upwelling and surface ocean hydrography based on the high-resolution analysis of diatom assemblages in seven cores, representing the last 150,000 years. We derived annual sea surface temperatures (SSTs) through a diatom-based proxy (Td'). The Td'-derived annual SSTs (°C) are controlled by orbital forcing, and show a reversed saw-tooth in southern cores, in contrast to a normal saw-tooth pattern in the northern cores. Oceanic diatom abundances along the northern margin of the Mixed Water Region are twice times as high as beneath the axis of the Kuroshio Extension, and fluctuated in a revised saw-tooth pattern with higher overall abundances interglacials. After the last deglaciation, annual SSTs declined markedly during Heinrich and Bond events in the northern North Atlantic, when ice-rafted detritus transported by icebergs was abundant. Wavelet analyses of the record of oceanic diatom abundances show significant variability at 2.0-kyr, 2 to 5.6-kyr and 3.2 to 9.6-kyr periods. Wavelet analyses of the annual SST records show significant periodicity at 1.4 to 2.6-kyr, 3.3 to 4.0-kyr, 7.2 to 12.8-kyr cycles.

**Project(s):** [Ocean Drilling Program \(ODP\)](#) 🔍

**Coverage:** *Median Latitude:* 38.477916 \* *Median Longitude:* 146.055987 \* *South-bound Latitude:* 36.000000 \* *West-bound Longitude:* 141.780000 \* *North-bound Latitude:* 40.560000 \* *East-bound Longitude:* 152.000000

*Minimum Age:* 0.000 ka BP \* *Maximum Age:* 152.580 ka BP

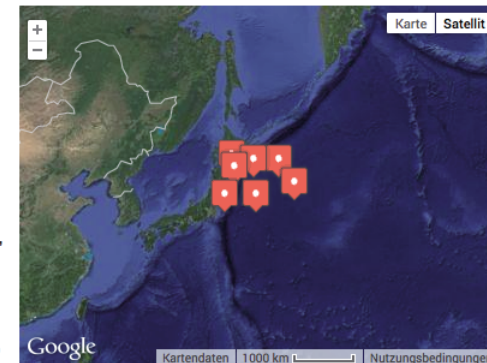
**Event(s):** [186-1150A](#) 🔍 \* *Latitude:* 39.181910 \* *Longitude:* 143.331910 \* *Date/Time Start:* 1999-06-22T18:30:00 \* *Date/Time End:* 1999-06-26T22:15:00 \* *Elevation:* -2680.8 m \* *Recovery:* 566.40 m \* *Penetration:* 722.60 m \* *Location:* North Pacific Ocean 🔍 \* *Campaign:* [Leg186](#) 🔍 \* *Basis:* [Joides Resolution](#) 🔍 \* *Device:* [Drilling](#) 🔍 \* *Comment:* 76 cores; 722.6 m cored; 0 m drilled; 78.4 % recovery

[MD01-2421](#) (MD012421) 🔍 \* *Latitude:* 36.023500 \* *Longitude:* 141.780000 \* *Date/Time:* 2001-06-16T04:33:00 \* *Elevation:* -2286.0 m \* *Recovery:* 45.84 m \* *Location:* [Japan Trench](#) 🔍 \* *Campaign:* [MD122 \(IMAGES VII - WEPAMA\)](#) 🔍 \* *Basis:* [Marion Dufresne](#) 🔍 \* *Device:* [Giant piston corer](#) 🔍

[MR00-05-2PC](#) 🔍 \* *Latitude:* 40.000000 \* *Longitude:* 146.000000 \* *Elevation:* -5177.0 m \* *Location:* [Northwest Pacific](#) 🔍 \* *Device:* [Piston corer](#) 🔍

**License:**  [Creative Commons Attribution 3.0 Unported](#)

**Size:** 7 datasets



## Download Data

Download ZIP file containing all datasets as tab-delimited text (use the following character encoding: [ISO-8859-1: ISO Western \(PANGAEA default\)](#))

## Datasets listed in this Collection

1. Koizumi, I; Yamamoto, H (2010): (Table A1) Diatom abundance in sediment core MD01-2421. doi:10.1594/PANGAEA.775547
2. Koizumi, I; Yamamoto, H (2010): (Table A2) Diatom abundance in sediment core MR02-03-2. doi:10.1594/PANGAEA.776118



## Marine Micropaleontology

Volume 74, Issues 3–4, April 2010, Pages 108–118



### Paleoceanographic evolution of North Pacific surface water off Japan during the past 150,000 years

Itaru Koizumi<sup>a</sup>, , , Hirofumi Yamamoto<sup>b</sup>

 [Show more](#)

DOI: 10.1016/j.marmicro.2010.01.003

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#### Abstract

Hydrographic variability in the Mixed Water Region of the Northwest Pacific Ocean at latitudes 35°–40°N, between the Kuroshio Extension and Oyashio Front, causes complex upwelling, leading to large primary productivity and thus great fishery resources. We reconstructed the periodicity of the variability in North Pacific Intermediate Water upwelling and surface ocean hydrography based on the high-resolution analysis of diatom assemblages in seven cores, representing the last 150,000 years. We derived annual sea surface temperatures (SSTs) through a diatom-based proxy ( $T_d$ ). The  $T_d$ -derived annual SSTs (°C) are controlled by orbital forcing, and show a reversed saw-tooth in southern cores, in contrast to a normal saw-tooth pattern in the northern cores. Oceanic diatom abundances along the northern margin of the Mixed Water Region are twice times as high as beneath the axis of the Kuroshio Extension, and fluctuated in a revised saw-tooth pattern with higher overall abundances interglacials. After the last deglaciation, annual SSTs declined markedly during Heinrich and Bond events in the northern North Atlantic, when ice-rafted detritus transported by icebergs was abundant. Wavelet analyses of the record of oceanic diatom abundances show significant variability at 2.0-kyr, 2 to 5.6-kyr and 3.2 to 9.6-kyr periods. Wavelet analyses of the annual SST records show significant periodicity at 1.4 to 2.6-kyr, 3.3 to 4.0-kyr, 7.2 to 12.8-kyr cycles.

#### Keywords

#### Recommended articles

##### Oceanographic variations over the last 150,000yr ...

2011, Journal of Asian Earth Sciences [more](#)

##### Rapid warming and ostracods mass extinction at t...

2010, Marine Micropaleontology [more](#)

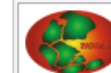
##### Age and significance of Miocene diatoms and diat...

2009, Palaeogeography, Palaeoclimatology, Palaeoecology [more](#)

[View more articles »](#)

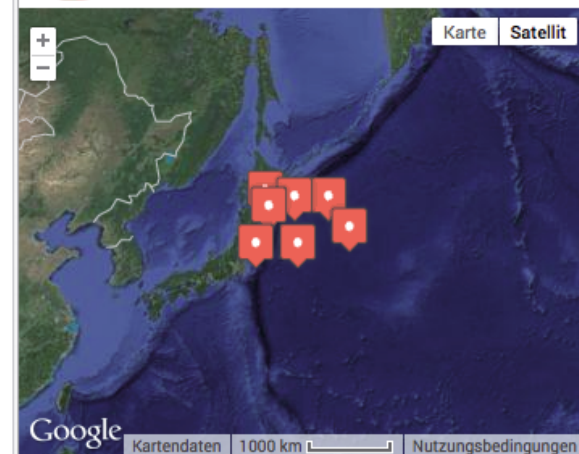
#### Citing articles (2)

#### Related book content



#### PANGAEA® – Related Data

Vertical distribution of diatoms in North Pacific sediments



# Parameter

**Current status:** fixed **parameter term** combined with **unit**

Cibicidoides wuellerstorfi, d13C

[per mil PDB]

combined with a method, e.g. Mass spectrometer

all relevant information about e.g., live (Rose Bengal stained), size fractions,  
multi chamber or single chamber measurements in comments

**Next step:** Feature Catalogue, **components**

Cibicidoides wuellerstorfi

WoRMS

measurement of delta 13C

ChEBI

[per mil PDB]

further components for relevant information can be added



**faceted search**

# Semantic relation



Gottschalk, J et al. (2014): P...

doi.pangaea.de/10.1594/PANGAEA.837067?format=html#download

Suchen

Meistbesucht AWI Intranet EZ3 AWI Biblio Google SEDIS Issue WDC PangaWiki LEO Wikipedia Vorsätze für Maßel... Einheiten Umrechn... Ocean Drilling Cita... DOI

Logged in as ssschumacher (log out, profile)

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Always quote citation when using data! [Show Map](#) [Google Earth](#)

**Data Description**

**Citation:** Gottschalk, J et al. (2014): Planktonic foraminifer assemblage changes in the sub-Antarctic Atlantic over the last 68 ka of sediment core MD07-3076Q. doi:10.1594/PANGAEA.837067. In Supplement to: Gottschalk, Julia; Skinner, Luke C; Waelbroeck, Claire (2015): Contribution of seasonal sub-Antarctic surface water variability to millennial-scale changes in atmospheric CO2 over the last deglaciation and Marine Isotope Stage 3. *Earth and Planetary Science Letters*, 411, 87-99, doi:10.1016/j.epsl.2014.11.051

**Coverage:** Latitude: -44.153330 \* Longitude: -14.228170  
Minimum DEPTH, sediment/rock: 0.1 m \* Maximum DEPTH, sediment/rock: 8.0 m

**Event(s):** MD07-3076 \* Latitude: -44.153330 \* Longitude: -14.228170 \* Elevation: -3770.0 m \* Device: Calypso Square Core System (CASQ)

**Parameter(s):**

#	Name	Short Name	Unit	Principal Investigator	Method	Comment
1	DEPTH, sediment/rock	Depth	m			Geocode
2	AGE	Age	ka BP			Geocode
3	Neogloboquadrina pachyderma sinistral	N. pachyderma s	%	Gottschalk, Julia	Counting >150 µm fraction	
4	Globigerina bulloides	G. bulloides	%	Gottschalk, Julia	Counting >150 µm fraction	
5	Globorotalia inflata	G. inflata	%	Gottschalk, Julia	Counting >150 µm fraction	
6	Neogloboquadrina pachyderma dextral	N. pachyderma d	%	Gottschalk, Julia	Counting >150 µm fraction	
7	Turborotalita quinqueloba	T. quinqueloba	%	Gottschalk, Julia	Counting >150 µm fraction	
8	Giobigerina falconensis	G. falconensis	%	Gottschalk, Julia	Counting >150 µm fraction	
9	Globorotalia truncatulinoides	G. truncatulinoides	%	Gottschalk, Julia	Counting >150 µm fraction	

**License:** Creative Commons Attribution 3.0 Unported

**Size:** 2477 data points

**Data**

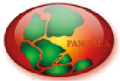
Download dataset as tab-delimited text (use the following character encoding: UTF-8: Unicode (PANGAEA default))

1	2	3	4	5	6	7	8	9
Depth [m]	Age [ka BP]	N. pachyderma s [%]	G. bulloides [%]	G. inflata [%]	N. pachyderma d [%]	T. quinqueloba [%]	G. falconensis [%]	G. truncatulinoides [%]
0.105	2.416	11.40	49.82	21.32	2.39	2.21		6.80
0.205	4.495	10.40	55.09	24.12	1.11	1.11		3.10
0.305	6.395	15.03	52.85	20.50	0.68	2.51		3.19
0.405	8.216	19.24	48.22	18.29	1.19	3.09		5.23
0.505	10.144	17.36	46.45	16.63	4.40	5.13		5.62
0.605	11.407	15.96	35.32	14.68	9.15	6.38	3.62	4.68
0.625	11.690	20.75	21.19	17.88	9.27	8.39	7.73	1.99
0.645	12.015	16.56	25.93	22.00	9.80	3.27	5.45	2.83
0.665	12.362	15.56	22.58	22.96	8.73	8.73	8.73	3.04



# Semantic relation





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Data Publisher for Earth & Environmental Science

**Data Description**


**Citation:** Gottschalk, J et al. (2014): Planktonic foraminifer assemblage over the last 68 ka of sediment core MD07-3076Q. doi:10.1594/PANGAEA.837067?format=html#download  
*In Supplement to: Gottschalk, Julia; Skinner, Luke C; Waelen, Sjoerd; Waelen, Sjoerd* seasonal sub-Antarctic surface water variability to millennial-scale over the last deglaciation and Marine Isotope Stage 3. *Earth and Planetary Science Letters*, 2014, 247, 87-99, doi:10.1016/j.epsl.2014.11.051

**Coverage:** *Latitude:* -44.153330 \* *Longitude:* -14.228170  
*Minimum DEPTH, sediment/rock:* 0.1 m \* *Maximum DEPTH, sediment/rock:* 12.362 m

**Event(s):** MD07-3076 \* *Latitude:* -44.153330 \* *Longitude:* -14.228170 \* *Elevation:* 0 m  
System (CASQ)

**Parameter(s):**

#	Name	Short Name	Unit	Principal Investigator
1	DEPTH, sediment/rock	Depth		
2	AGE	Age	ka BP	
3	Neogloboquadrina pachyderma sinistralis	N. pachyderma s	%	Gottschalk, Julia
4	Globigerina bulloides	G. bulloides	%	Gottschalk, Julia
5	Globorotalia inflata	G. inflata	%	Gottschalk, Julia
6	Neogloboquadrina pachyderma dextral	N. pachyderma d	%	Gottschalk, Julia
7	Turborotalita quinqueloba	T. quinqueloba	%	Gottschalk, Julia
8	Globigerina falconensis	G. falconensis	%	Gottschalk, Julia
9	Globorotalia truncatulinoides	G. truncatulinoides	%	Gottschalk, Julia


**License:**  Creative Commons Attribution 3.0 Unported

**Size:** 2477 data points

**Data**

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

1	2	3	4	5	6	7
Depth [m]	Age [ka BP]	N. pachyderma s [%]	G. bulloides [%]	G. inflata [%]	N. pachyderma d [%]	T. quinqueloba [%]
0.105	2.416	11.40	49.82	21.32	2.39	
0.205	4.495	10.40	55.09	24.12	1.11	3.10
0.305	6.395	15.03	52.85	20.50	0.68	3.19
0.405	8.216	19.24	48.22	18.29	1.19	5.23
0.505	10.144	17.36	46.45	16.63	4.40	5.62
0.605	11.407	15.96	35.32	14.68	9.15	4.68
0.625	11.690	20.75	21.19	17.88	9.27	1.99
0.645	12.015	16.56	25.93	22.00	9.80	2.83
0.665	12.362	15.56	22.58	22.96	8.73	3.04



**WoRMS**  
World Register of Marine Species

**Home**  
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Match taxa  
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Manual  
Log in

**WoRMS taxon details**  
AphiaID: 113449

**Classification:** Biota > Chromista (Kingdom) > Harosa (Subkingdom) > Rhizaria (Infrakingdom) > Foraminifera (Class) > Rotallida (Order) > Globigerinina (Suborder) > Globorotaliidea (Superfamily) > Globorotalia (Genus) > **Globorotalia inflata (Species)**

**Status:** accepted

**Rank:** Species

**Parent:** [Globorotalia Cushman, 1927](#)

**Orig. name:** [Globigerina inflata d'Orbigny, 1839](#)

**Synonymised names:** [Globigerina inflata d'Orbigny, 1839](#)  
[Globigerina nipponica Asano, 1957](#) (Subjective synonym)

**Sources:** **basis of record** [Gross, O. \(2001\). Foraminifera, in: Costello, M.J. et al. \(Ed.\) \(2001\) species: a check-list of the marine species in Europe and a bibliography of guides to Patrimoines Naturels, 50: pp. 60-75 \(look up in IMIS\) \[details\]](#)

[show all]

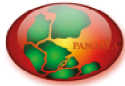
**Direct child taxa (1)**  
[show all]  
[Subspecies \[Globorotalia inflata subsp. triangula Theyer, 1973\]\(#\)](#)

**Environment:** marine

**Fossil range:** recent + fossil

**Distribution:** **FROM EDITOR OR GLOBAL SPECIES DATABASE**  
**China**  
[Chinese Exclusive Economic Zone \[details\]](#)  
**New Zealand**  
[New Zealand Exclusive Economic Zone \[details\]](#)

# Semantic relation



**PANGAEA®**  
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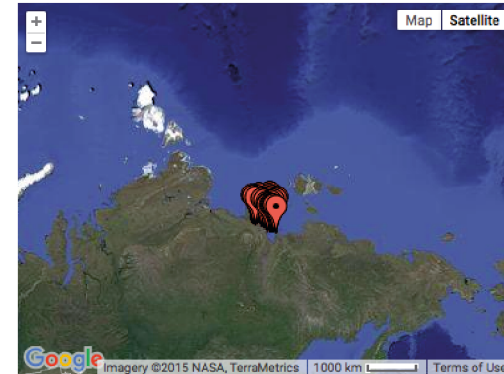
Always quote citation when using data!

## Data Description

Show Map Google Earth RIS BiTeX

**Citation:** Kraberg, AC et al. (2013): Phytoplankton abundance measured on water samples from rivers of the Lena Delta in 2010. doi:10.1594/PANGAEA.793226,  
*Supplement to: Kraberg, Alexandra C; Druzhkova, Elena I; Heim, Birgit; Löder, Martin G J; Wiltshire, Karen Helen (2013): Phytoplankton community structure in the Lena Delta (Siberia, Russia) in relation to hydrography. Biogeosciences, 10(11), 7263-7277, doi:10.5194/bg-10-7263-2013*

**Abstract:** The Lena Delta in Northern Siberia is one of the largest river deltas in the world. During peak discharge, after the ice melt in spring, it delivers between 60-8000 m<sup>3</sup>/s of water and sediment into the Arctic Ocean. The Lena Delta and the Laptev Sea coast also constitute a continuous permafrost region. Ongoing climate change, which is particularly pronounced in the Arctic, is leading to increased rates of permafrost thaw. This has already profoundly altered the discharge rates of the Lena River. But the chemistry of the river waters which are discharged into the coastal Laptev Sea have also been hypothesized to undergo considerable compositional changes, e.g. by increasing concentrations of inorganic nutrients such as dissolved organic carbon (DOC) and methane. These physical and chemical changes will also affect the composition of the phytoplankton communities. However, before potential consequences of climate change for coastal arctic phytoplankton communities can be judged, the inherent status of the diversity and food web interactions within the delta have to be established. In 2010, as part



50	Cyanophyte filaments, other	Cyanophyte fila oth
51	Aphanocapsa spp.	Aphanocapsa spp.
52	Lyngbya spp.	Lyngbya spp.
53	Desmodesmus spp.	Desmodesmus spp.
54	Scenedesmus cf. acuminatus	S. cf. acuminatus
55	Scenedesmus	Scenedesmus
56	Scenedesmus cf. ornatus	S. cf. ornatus
57	Scenedesmus	Scenedesmus
58	Scenedesmus	Scenedesmus
59	Pediastrum spp.	Pediastrum spp.
60	Pediastrum boryanum	P. boryanum
61	Pediastrum boryanum var. longicoe	P. boryanum var. longicoe
62	Pediastrum duplex	P. duplex
63	Pediastrum duplex var. gracillimum	P. duplex var. grac
64	Pediastrum tetras	P. tetras
65	Oocystis spp.	Oocystis spp.
66	Flagellates, green	Flag gr
67	Actinastrum cf. hantzschii	A. cf. hantzschii
68	Closterium spp.	Closterium spp.
69	Spondylosium spp.	Spondylosium spp.
70	Coelastrum spp.	Coelastrum spp.
71	Crucigenia spp.	Crucigenia spp.

**WoRMS**  
World Register of Marine Species

**WoRMS taxon details**

**Search taxa** ✓ ***Pediastrum duplex* Meyen, 1829**  
AphiaID: 164061

**Classification:** Biota > Plantae (Kingdom) > Chlorophyta (Phylum) > Chlorophyceae (Class) > Sphaeropleales (Order) > Hydrodictyaceae (Family) > Pediastrum (Genus) > Pediastrum duplex (Species)

**Status:** accepted  
**Rank:** Species  
**Parent:** ✓ Pediastrum Meyen, 1829  
**Orig. name:** ✓ Pediastrum duplex Meyen, 1829  
**Synonymised names:** ✓ Pediastrum duplex var. clathratum (A.Braun) Lagerheim, 1882 (synonym)  
✓ Pediastrum duplex var. reticulatum Lagerheim, 1882 (synonym)  
✓ Pediastrum napoleonis Ralfs (synonym)  
✓ Pediastrum pertusum Kützing (synonym)  
✓ Pediastrum pertusum var. clathratum A.Braun, 1855 (synonym)  
✓ Pediastrum selenaeae Kützing, 1845 (synonym)

our coastal  
from 23 coastal



## Interaction PANGAEA ↔ WoRMS

PANGAEA submits unrecognized species to WoRMS

### Workflow?

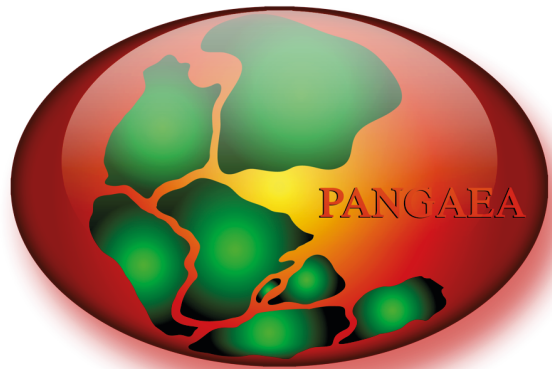
WoRMS:

- Bundle size?
- What kind of support from PANGAEA? e.g., related datasets including references?
- Taxonomic concept from data-author/related publication/ AWI scientist?

PANGAEA:

- Filter the taxonomic list for undescribed taxa
- Check taxa for correct spelling
- List Taxa in georeferenced context?
- Recent/fossil?

## Interaction PANGAEA ↔ WoRMS



## Open Discussion