

# Data submission to GEOMAR OPeNDAP-Server (<https://data.geomar.de>)

## GEOMAR OPeNDAP Service



Please choose one of the following links to browse available data

NOTICE: access to some internal data may be restricted to GEOMAR intranet and/or requires a username and password!

[Start here for complete overview](#) or proceed directly with available datasets:

- MODIS-T satellite data now directly available per OPeNDAP from [NASA's OceanColorWEB website!](#)
- Published data related to journal articles (in discussion and peer reviewed) - OpenAccess:
  - [Abel et al. \(2017\), OS \(in discussion\)](#) :: DOI [10.5194/os-2017-24](#) :: [Details in OceanRep](#)
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  - [Duteil et al. \(2012\), BG](#) :: DOI [10.5194/bg-9-1797-2012](#) :: [Details in OceanRep](#)
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## 1. What is the GEOMAR OPeNDAP-Server?

The GEOMAR OPeNDAP-server ([data.geomar.de](http://data.geomar.de)) allows access to published data of model experiments. The server provides data access to scientific geo-referenced datasets (netCDF, HDF, GRIB, etc.) mostly from GEOMAR researcher. Via OPeNDAP datasets can be downloaded with the web browser or data subsets can be used without downloading whole datasets. The datasets related to journal articles (in discussion and peer-reviewed) are interlinked in [OceanRep GEOMAR](#) and [OSIS \(Ocean Science Information System\)](#).

## 2. Submit your data for publication on [data.geomar.de](http://data.geomar.de)

Before you submit your data for publication on the GEOMAR OPeNDAP-Server you have to prepare your datasets by taking in account the following points.

### 2.1. Preparation of data

#### 2.1.1 Structure your dataset and prepare your files

1. **Label your files and directories** for making reuse and proper citation possible.
  - a. Special characters and spaces in file and directory names should be avoided.
  - b. Label your data with the controlled vocabulary (your community or project standard).
2. Check that the **file formats** are correct: Only open source data formats and for model data **Network Common Data Format (NetCDF)** is accepted: „NetCDF is a set of software libraries and self-describing, machine-independent data formats that support the creation, access, and sharing of array-oriented scientific data.“  
(<https://www.unidata.ucar.edu/software/netcdf/>)  
You need to publish other data formats (e.g. HDF or GRIB)? In that case contact the data management team ([datamanagement@geomar.de](mailto:datamanagement@geomar.de)).
3. Check that the file formats have a **file name extension**: It is necessary for a computer application for interpretation the data within a file.
4. Ensure that your dataset is complete and check the **data size** (important information for the data management team).

5. **Create checksums** of all files before your data submission (either md5 checksum or sha256 checksum (md5 is faster than sha256)). That will help us to guard data integrity during the data submission workflow and when published.

### Create checksums on command line

#### MD5

##### Create checksum of a file:

Linux: `md5sum FILE_NAME`

MAC: `md5 -r FILE_NAME`

##### Create checksums for all files of your dataset (including all subdirectories) and write them in one txt file:

Linux: `cd YOUR_DIRECTORY`

```
find ./ -type f -exec md5sum {} \; > Checksums.md5
```

MAC: `cd YOUR_DIRECTORY`

```
find ./ -type f -exec md5 -r {} \; > Checksums.md5
```

#### SHA256

##### Create checksum of a file:

Linux: `sha256sum FILE_NAME`

MAC: `shasum -a 256 FILE_NAME`

##### Create checksums for all files of your dataset (including all subdirectories) and write them in one txt file:

Linux: `cd YOUR_DIRECTORY`

```
find ./ -type f -exec sha256sum {} \; > Checksums.sha256
```

MAC: `cd YOUR_DIRECTORY`

```
find ./ -type f -exec shasum -a 256 {} \; > Checksums.sha256
```

## 2.1.2 Prepare metadata and documentation

Metadata within your netCDF files is essential for long-term archiving and subsequent data reuse.

1. We recommend to follow the **NetCDF Climate and Forecast (CF) Metadata Convention** (<http://cfconventions.org/>) to write metadata in your netCDF files (recommended standard by [Unidata](#)). **Information about the CF are well summarized by CEDA:** <https://help.ceda.ac.uk/article/4507-the-cf-metadata-convention>.

(There is also a CF-Checker to test your files for compliance with the CF Convention: Visit the [CF-checker website](#) to use this service or alternatively download and install the [CF-checker software](#).)

2. **Create a README file for your dataset: The following attributes are intended to provide information about where the data come from and what has been done to it.**

### **Recommended content for README file**

#### **Introduction:**

- Dataset Title
- Authors contact information
- For each file or group of similar files, a short description of what data it contains
- Explanation of file naming convention and description of file relations (if there multiple files that relate to each other) or description of the file structure

#### **Information about methodology:**

- Description of methodology used for generating the dataset and for processing data (if there are other than raw data contributed)
- Description of the Software being used (including version number) to produce, render, analyse and /or needed to read the dataset
- Information about used standards and calibration
- Description of quality-assurance procedures performed on the data

#### **Data specific information:**

- Full names and definitions (e.g. for column headings)
- Units of measurement
- Definitions for codes or symbols used to record missing data
- Formats and abbreviations used

#### **Licence information:**

- Licences and restrictions placed on the data. Licenses allow you to specify the 'terms-of-use' for your data. The [public license selector](#) can help you to choose the right license for the use of your data.

## **2.2 Submit your dataset for publication**

After the preparation of your datasets you need to submit your data for publication to the data management team:

1. **Upload the dataset** you want to publish into your user folder on the **GEOMAR FTP-Server**: <https://ftp3.geomar.de/> (contact [helpdesk@geomar.de](mailto:helpdesk@geomar.de) for providing a user folder; get more information about [data exchange](#) in GEOMAR intranet) or alternatively upload the dataset to the git repository <https://git.geomar.de/pendap-publications> to your project, which will be provided by the data management team (for

this contact the data management team: [datamanagement@geomar.de](mailto:datamanagement@geomar.de)). If you use Git and your data volume is bigger than 2GB you have to use Git LFS. For more information about Git see our [Git Tutorial](#). By this, the data management team will have access to your data for performing the publication process.

2. **Fill in the data submission form** <https://portal.geomar.de/thredds-data-submission>: By this, the data management team will get all necessary information to submit your data to the GEOMAR OPeNDAP-Server ([data.geomar.de](http://data.geomar.de)).

### 3. How to use OPeNDAP?

The following chapter describes how to access datasets via OPeNDAP.

#### 3.1 Datasets overview

Go to <https://data.geomar.de> and you will get an overview of all published datasets related to peer reviewed journal articles. You will have also access to open access software/code, bathymetric and satellite data (MODIS-T) and some other datasets.

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If you click on **‘Start here for complete overview’** you will get the catalogue dataset overview of OPeNDAP.



Catalog <http://data.geomar.de/thredds/catalog.html>

Dataset	Size	Last Modified
 <a href="#">Bathymetric Data/</a>		--
 <a href="#">Cruise Data/</a>		--
 <a href="#">Numerical Modelling - OpenAccess/</a>		--
 <a href="#">Numerical Modelling - Internal/</a>		--
 <a href="#">FB1-PO/</a>		--
 <a href="#">FB2-BM/</a>		--
 <a href="#">SFB 754/</a>		--

Catalog of Gridded Data at [GEOMAR OPeNDAP Service](#) see [Info](#)  
 THREDDS Data Server [Version 4.6.0 - 20150326.1318] [Documentation](#)

### 3.2 View on one dataset

Click on one dataset publication related to one journal article and you will get an overview of the directories including the README-file where the information about the dataset is summarised, so the data can be interpreted correctly. You get also information about the data size and the date of the last data modification.



Catalog [http://data.geomar.de/thredds/catalog/open\\_access/feng\\_et\\_al\\_2017\\_ef/catalog.html](http://data.geomar.de/thredds/catalog/open_access/feng_et_al_2017_ef/catalog.html)

Dataset	Size	Last Modified
 <a href="#">Feng et al. (EF 2017)</a>		--
<a href="#">README.txt</a>	5.532 Kbytes	2017-11-13T15:45:52Z
 <a href="#">data_processing/</a>		--
<a href="#">feng_et_al_2017_ef_listing.txt</a>	146.6 Kbytes	2017-11-15T15:01:05Z
 <a href="#">figure_sources/</a>		--
 <a href="#">model_runs/</a>		--

Catalog of Gridded Data at [GEOMAR OPeNDAP Service](#) see [Info](#)  
 THREDDS Data Server [Version 4.6.0 - 20150326.1318] [Documentation](#)

Click on one dataset e.g. a netCDF file and you will get the following information:

#### Catalog of Gridded Data

#### THREDDS Data Server

Catalog [http://data.geomar.de/thredds/catalog/open\\_access/feng\\_et\\_al\\_2017\\_ef/model\\_runs/oliv1000\\_Omega3.4/results/catalog.html](http://data.geomar.de/thredds/catalog/open_access/feng_et_al_2017_ef/model_runs/oliv1000_Omega3.4/results/catalog.html)

Dataset: **results/tavg.02021.01.01.nc**

- Data format: netCDF
- Data size: 2.384 Gbytes
- Data type: GRID
- ID: feng\_et\_al\_2017\_ef/model\_runs/oliv1000\_Omega3.4/results/tavg.02021.01.01.nc

#### Access:

1. **OPeNDAP:** [/thredds/dodsC/open\\_access/feng\\_et\\_al\\_2017\\_ef/model\\_runs/oliv1000\\_Omega3.4/results/tavg.02021.01.01.nc](/thredds/dodsC/open_access/feng_et_al_2017_ef/model_runs/oliv1000_Omega3.4/results/tavg.02021.01.01.nc)
2. **HTTPServer:** [/thredds/fileServer/open\\_access/feng\\_et\\_al\\_2017\\_ef/model\\_runs/oliv1000\\_Omega3.4/results/tavg.02021.01.01.nc](/thredds/fileServer/open_access/feng_et_al_2017_ef/model_runs/oliv1000_Omega3.4/results/tavg.02021.01.01.nc)

#### Dates:

- 2017-11-13T14:42:45Z (**modified**)

#### Viewers:

- [NetCDF-Java ToolsUI \(webstart\)](#)
- [Integrated Data Viewer \(IDV\) \(webstart\)](#)

In the **Access** section you can choose between downloading the netCDF file via the HTTPServer-Link or accessing the data via the OPeNDAP-Link.

### 3.3 OPeNDAP Data Link

By clicking on the OPeNDAP-Link, you will get the OPeNDAP Dataset Access Form. Via OPeNDAP you can work on a subset of the dataset file without the need to download it to your computer. You can copy the **Data URL** and use it with your favorite software like Matlab etc. . In the other form fields, all variables of the dataset are listed.

## OPeNDAP Dataset Access Form

Tested on Netscape 4.61 and Internet Explorer 5.00.

**Action:**

**Data URL:**

**Global Attributes:**

```
Conventions: CF-1.0
experiment_name:
run_stamp:
Unlimited_Dimension: time
```

**Variables:**  **time:** Array of 64 bit Reals [time = 0..79]

time:   
FillValue: 9.969209968386869E36  
missing\_value: 9.969209968386869E36  
axis: T  
long\_name: time  
standard\_name: time  
units: years since 0-1-1

**T\_avgper:** Array of 32 bit Reals [time = 0..79]

time:   
FillValue: 9.96921E36  
missing\_value: 9.96921E36  
long\_name: averaging period  
units: day

**longitude:** Array of 64 bit Reals [longitude = 0..99]

longitude:   
FillValue: 9.969209968386869E36  
missing\_value: 9.969209968386869E36  
axis: X  
edges: longitude\_edges  
long\_name: longitude  
standard\_name: longitude

You can get one subset of the data by checking the box of the interested variable (here e.g. L\_soilmois). Then click on the ,**Get ASCII**' button at the top of the form.

**L\_soilmois:** Grid

time:  latitude:  longitude:

```
valid_range: 0.0, 1000.0
FillValue: 9.96921E36
missing_value: 9.96921E36
long_name: soil moisture
standard_name: soil_moisture_content
units: kg m-2
```

## OPeNDAP Dataset Access Form

Tested on Netscape 4.61 and Internet Explorer 5.00.

**Action:**

**Data URL:**

**Global Attributes:** Conventions: CF-1.0  
experiment\_name:  
run\_stamp:  
Unlimited\_Dimension: time

You will get the following result:

```
Dataset {
  Grid {
    ARRAY:
      Float32 L_soilmois[time = 1][latitude = 1][longitude = 1];
    MAPS:
      Float64 time[time = 1];
      Float64 latitude[latitude = 1];
      Float64 longitude[longitude = 1];
  } L_soilmois;
} open_access/feng_et_al_2017_ef/model_runs/oliv1000_Omega3.4/results/tavg.02021.01.01.nc;
-----
L_soilmois.L_soilmois[1][1][1]
[0][0], 150.0

L_soilmois.time[1]
2020.5

L_soilmois.latitude[1]
-89.0999984741211

L_soilmois.longitude[1]
1.7999999523162842
```

If you have a look at the Data URL again, you will see that your subset of interest was added to the URL: e.g.

[http://data.geomar.de/thredds/dodsC/open\\_access/feng\\_et\\_al\\_2017\\_ef/model\\_runs/oliv1000\\_Omega3.4/results/tavg.02021.01.01.nc?L\\_soilmois\[0:1:0\]\[0:1:0\]\[0:1:0\]](http://data.geomar.de/thredds/dodsC/open_access/feng_et_al_2017_ef/model_runs/oliv1000_Omega3.4/results/tavg.02021.01.01.nc?L_soilmois[0:1:0][0:1:0][0:1:0])

You can also use this URL with your favorite software and you will get your subset of interest.

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