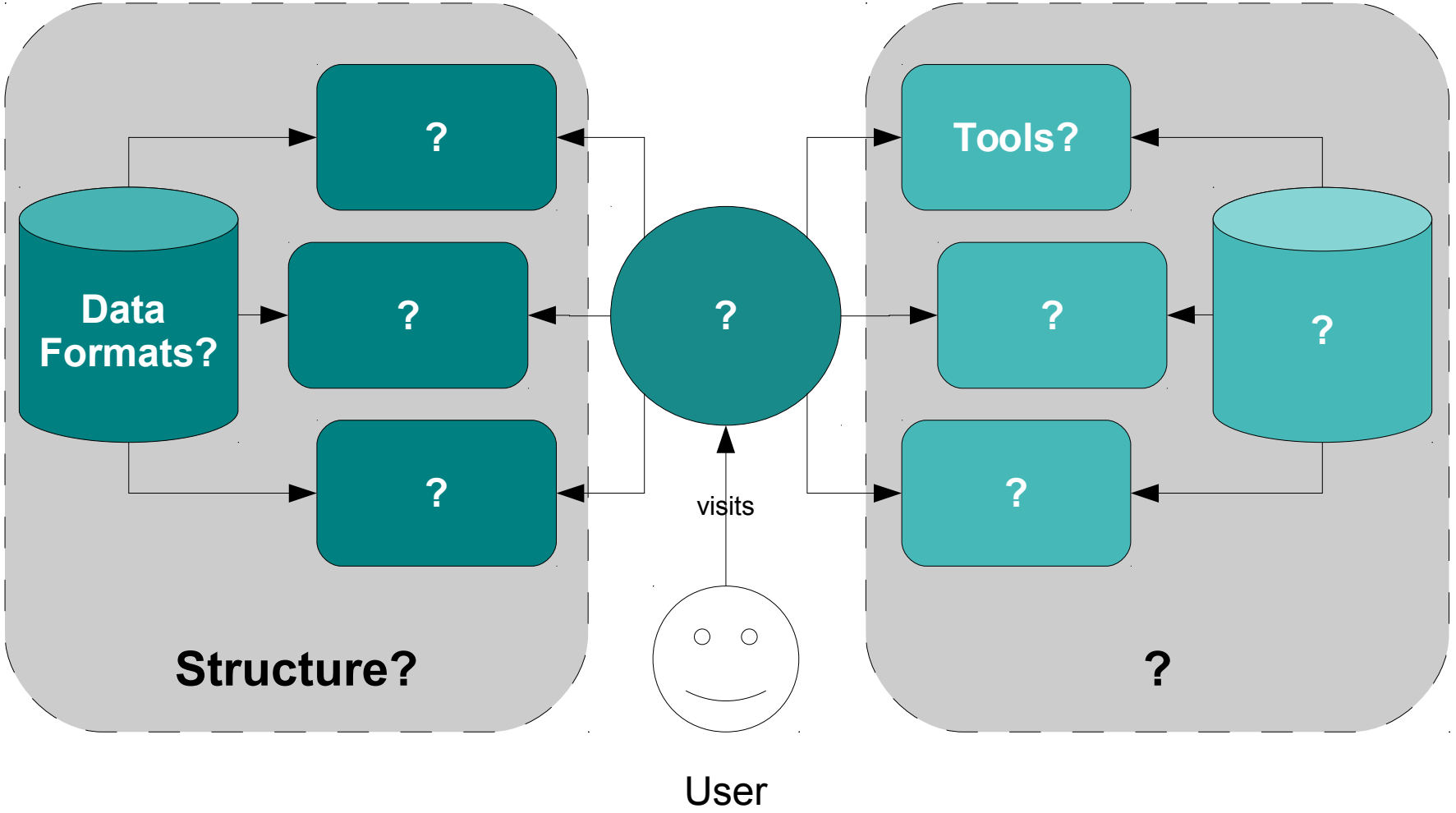
Integrated Climate Data Center

How to use the ICDC?



How to use the ICDC?

Contents

- **Which Data Formats do we offer?**
- **What is the Structure of our data center?**
- **Which Tools do we provide?**

How to use the ICDC?

Our Aims

- **Easy data access**
  - avoid complicated interfaces
  - standard data formats

How to use the ICDC?

Our Aims

- **Easy data access**
  - avoid complicated interfaces
  - standard data formats
- **Quick online visualizations**
  - To get an overview over the data
  - Interactive Maps, Time Series, Sections, Profiles

How to use the ICDC?

Our Aims

- **Easy data access**
  - avoid complicated interfaces
  - standard data formats
- **Quick online visualizations**
  - To get an overview over the data
  - Interactive Maps, Time Series, Sections, Profiles
- **Different data access for internal and external users**
  - Restricted access to some data sets:
    - Unlimited access inside the CEN/MPI network
    - Access via Authentication from the outside for CliSAP members

How to use the ICDC?

Data Formats

Integrated Climate Data Center - Remon Sadikni - remon.sadikni@uni-hamburg.de

How to use the ICDC?

Data Formats

- **netCDF**
  - Network Common Data Form
  - self-describing, machine-independent data format
  - array-oriented scientific data

How to use the ICDC?

Data Formats

- **netCDF**
  - Network Common Data Form
  - self-describing, machine-independent data format
  - array-oriented scientific data

- **ASCII**
  - American Standard Code for Information Interchange
  - Text Format with 128 characters

How to use the ICDC?

Data Formats

- **netCDF**
  - Network Common Data Form
  - self-describing, machine-independent data format
  - array-oriented scientific data
- **ASCII**
  - American Standard Code for Information Interchange
  - Text Format with 128 characters
- **OPeNDAP**
  - Open-source Project for a Network Data Access Protocol
  - allows remote data access over the internet

How to use the ICDC?

Data Formats: netCDF

Integrated Climate Data Center - Remon Sadikni - remon.sadikni@uni-hamburg.de

Data Formats: netCDF (1)

- **Self-Describing**
  - A netCDF file includes information about the data it contains.
- **Portable**
  - A netCDF file can be accessed by computers with different ways of storing integers, characters, and floating-point numbers.
- **Scalable**
  - A small subset of a large dataset may be accessed efficiently.

Data Formats: netCDF (2)

- **Appendable**
  - Data may be appended to a properly structured netCDF file without copying the dataset or redefining its structure.
- **Sharable**
  - One writer and multiple readers may simultaneously access the same netCDF file.
- **Archivable**
  - Access to all earlier forms of netCDF data will be supported by current and future versions of the software.

How to use the ICDC?

Data Formats: netCDF Header

```
netcdf reynolds_OISST__PODAAC__v2__0.25deg__200106 {
dimensions:
     lon = 1440 ;
     lat = 720 ;
     time = 1 ;
variables:
     float lat(lat) ;
          lat:units = "degrees_north" ;
     float lon(lon) ;
          lon:units = "degrees_east" ;
     double time(time) ;
          time:units = "days since 1981-01-01" ;
     short sst(time, lat, lon) ;
          sst:units = "deg.C" ;
          sst:scale_factor = 0.01f ;
     short land(lat, lon) ;
          land:units = "none" ;

// global attributes:
          :Conventions = "CF-1.0" ;
          :title = "Monthly average of the weekly Reynolds-SST (Original grid
     resolution 1.0deg) bilinearly interpolated onto 0.25 deg grid resolution" ;
}
```

How to use the ICDC?

Data Formats: netCDF excerpt

```
data:

 lat = -89.875, -89.625, -89.375, -89.125, -88.875, -88.625, -88.375,
    -88.125, -87.875, -87.625, -87.375, -87.125, -86.875, -86.625, -86.375,
    -86.125, -85.875, -85.625, -85.375, -85.125, -84.875, -84.625, -84.375,
    -84.125, -83.875, -83.625, -83.375, -83.125, -82.875, -82.625, -82.375,
    -82.125, -81.875, -81.625, -81.375, -81.125, -80.875, -80.625, -80.375,
    -80.125, -79.875, -79.625, -79.375, -79.125, -78.875, -78.625, -78.375,
    -78.125, -77.875, -77.625, -77.375, -77.125, -76.875, -76.625, -76.375,
    -76.125, -75.875, -75.625, -75.375, -75.125, -74.875, -74.625, -74.375,
    -74.125, -73.875, -73.625, -73.375, -73.125, -72.875, -72.625, -72.375,
    -72.125, -71.875, -71.625, -71.375, -71.125, -70.875, -70.625, -70.375,
     ...

 time = 7470 ;

 sst = -180, -180, -180, -180, -180, -180, -180, -180, -180, -180, -180, -180,
    -180, -180, -180, -180, -180, -180, -180, -180, -180, -180, -180, -180,
    -180, -180, -180, -180, -180, -180, -180, -180, -180, -180, -180, -180,
    -180, -180, -180, -180, -180, -180, -180, -180, -180, -180, -180, -180,
    -180, -180, -180, -180, -180, -180, -180, -180, -180, -180, -180, -180,
     ...
```

How to use the ICDC?

Data Formats: OPeNDAP

Integrated Climate Data Center - Remon Sadikni - remon.sadikni@uni-hamburg.de

Data Formats: OPeNDAP

Allows you to access remote data over the internet

- using your familiar data analysis and visualization package
  - Ferret
  - Matlab
  - IDL
  - GrADS
  - NCO
  - ...

Data Formats: OPeNDAP

Allows you to access remote data over the internet

- using your familiar data analysis and visualization package
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  - NCO
  - ...
- without worrying about data storage formats

How to use the ICDC?

Data Formats: OPeNDAP

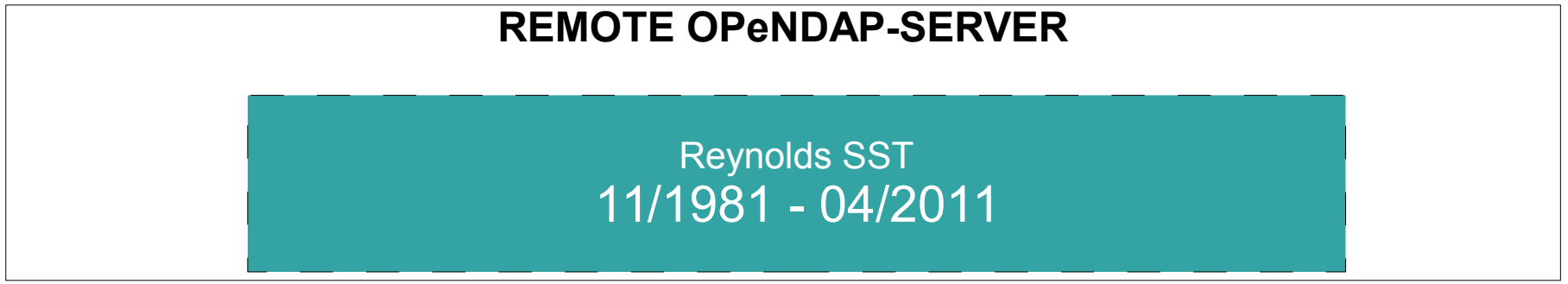
Allows you to access remote data over the internet

- using your familiar data analysis and visualization package
  - Ferret
  - Matlab
  - IDL
  - GrADS
  - NCO
  - ...
- without worrying about data storage formats
- access only the data subset of interest

How to use the ICDC?

Data Formats: OPeNDAP Example

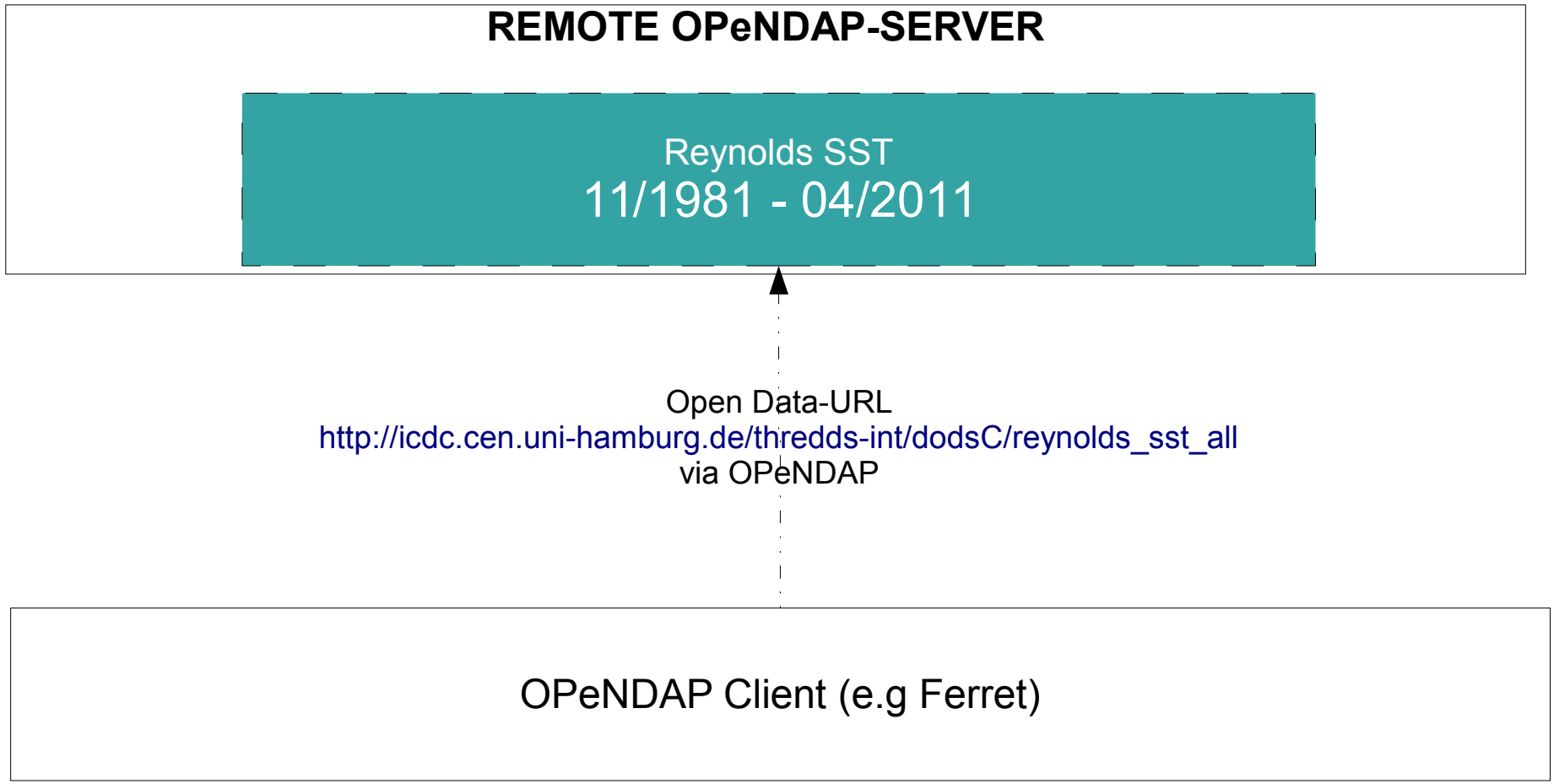
OPeNDAP access on remote data set:



How to use the ICDC?

THREDDS: OPeNDAP Example

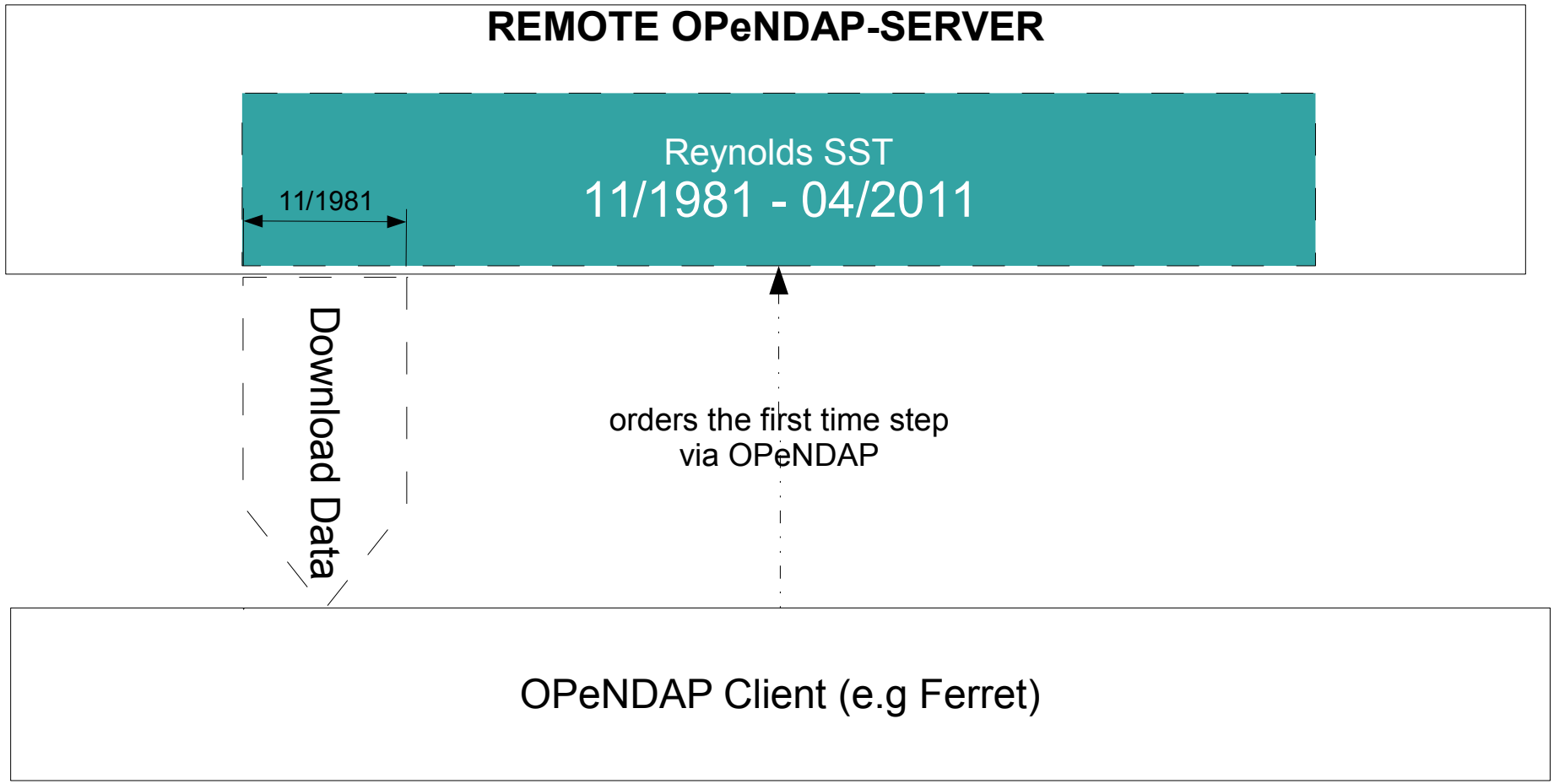
OPeNDAP access on remote data set:



How to use the ICDC?

THREDDS: OPeNDAP Example

OPeNDAP access on remote data set:



How to use the ICDC?

THREDDS: OPeNDAP in Ferret

OPeNDAP Access in Ferret is easy:

```
yes? set data "http://icdc.cen.uni-hamburg.de/thredds-int/dodsC/reynolds_sst_all"
yes? show data
     currently SET data sets:
    1> http://icdc.cen.uni-hamburg.de/thredds-int/dodsC/reynolds_sst_all  (default)
 name     title                                I          J          K          L
 LAND                                        1:1440     1:720      ...        ...
 SST                                         1:1440     1:720      ...        1:354
yes? shade/L=1 sst
```

How to use the ICDC?

Our Tools

How to use the ICDC?

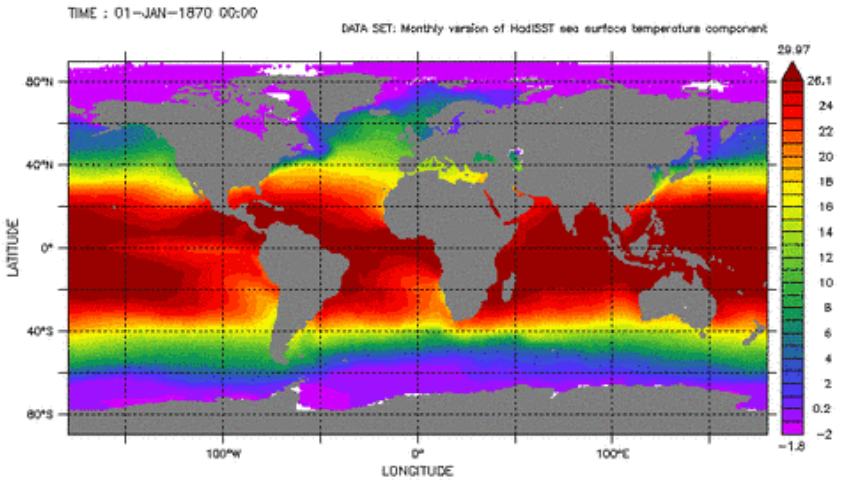
Website icdc.cen.uni-hamburg.de

ICDC Home | Data | Projects | Support | News & Workshops | Contact

UHH > MIN-Fakultät > CEN > ICDC Data Center > Data > Ocean > Sea surface temperature (HadISST1)

Integrated Climate Data Center - ICDC

Sea surface temperature (HadISST1)



Monthly 1 degree resolution SST (degC)

Access

UNRESTRICTED

This data set is only available for a restricted user group, please contact us if you want to access these data.

RESTRICTED only accessable in ZMAW net or via CliSAP login What does that mean?

View Data via LAS

Access data via OPeNDAP

Data access via file system: **/data/icdc/ocean/hadisst1/**

- Atmosphere
- Ice and snow
- Land
- **Ocean**
  - KLIWAS North Sea Climatology (hydrographic part)
  - AR5 Sea Level Rise
  - Ocean tides obtained by data assimilative HAMTIDE model
  - AVISO Sea Surface Heights (SSH)
  - Geostrophic Surface Velocity Anomaly
  - Sea surface temperature (AVHRR)
  - Sea surface temperature (Reynolds-SST)
  - Sea surface temperature (MODIS)
  - **Sea surface temperature (HadISST1)**
  - Subsurface Temperature And Salinity Analyses by Ishii et al.
  - Global Ocean Heat and Salt Content (Levitus et al., 2012)
  - Sea surface temperature (A
  - Sea surface salinity (S
  - Chlorophyll-a con
  - Chlorophyll-Co
  - Mechanical ba
  - Expendable b
  - WOCE Atlas
  - Global Hydrog
  - CTD profiles fr
    tre Cruises
  - Historical hydrogra

Basis of ICDC

How to use the ICDC?

Tools

- **FTP Server**
  - data download

How to use the ICDC?

Tools

- **FTP Server**
  - data download
- **Live Access Server (LAS)**
  - quick visualizations: Maps, Time Series, Sections, Profiles
  - download data subsets

How to use the ICDC?

Tools

- **FTP Server**
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- **THREDDS Data Server**
  - data access: HTTP, OPeNDAP

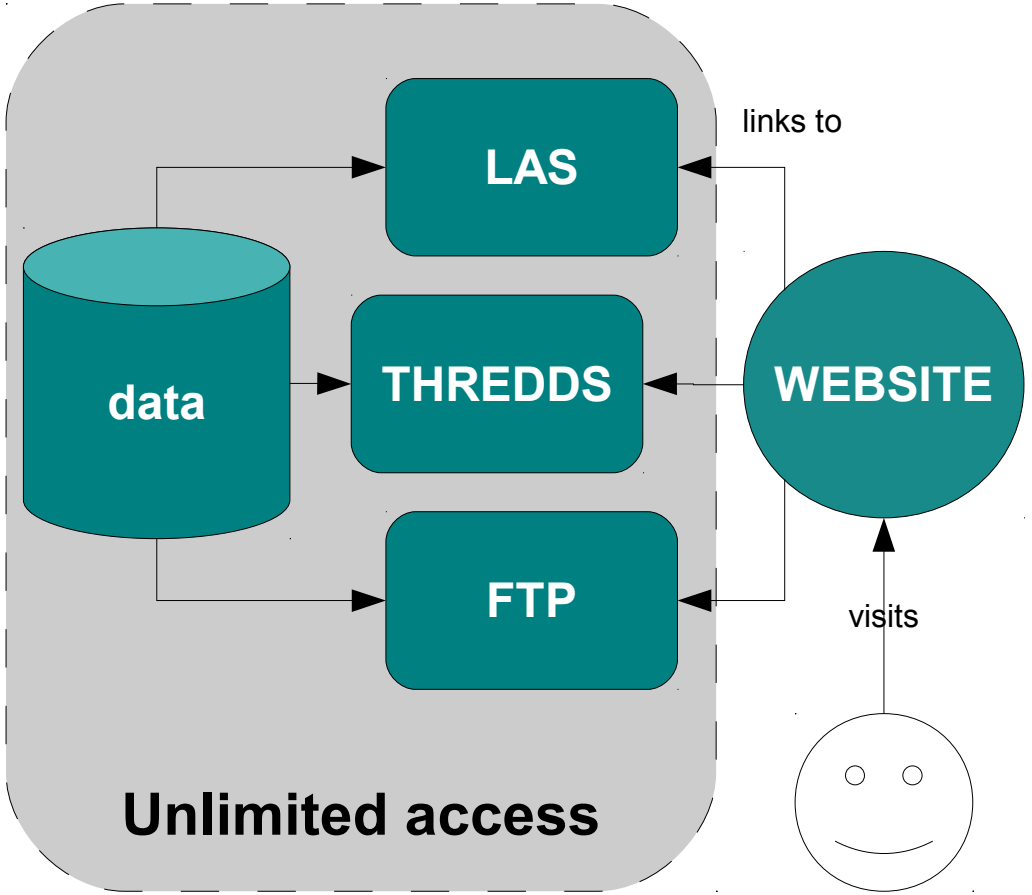
How to use the ICDC?

Tools

- **FTP Server**
  - data download
- **Live Access Server (LAS)**
  - quick visualizations: Maps, Time Series, Sections, Profiles
  - download data subsets
- **THREDDS Data Server**
  - data access: HTTP, OPeNDAP
- **File access**
  - for CEN/MPI users via /data/icdc

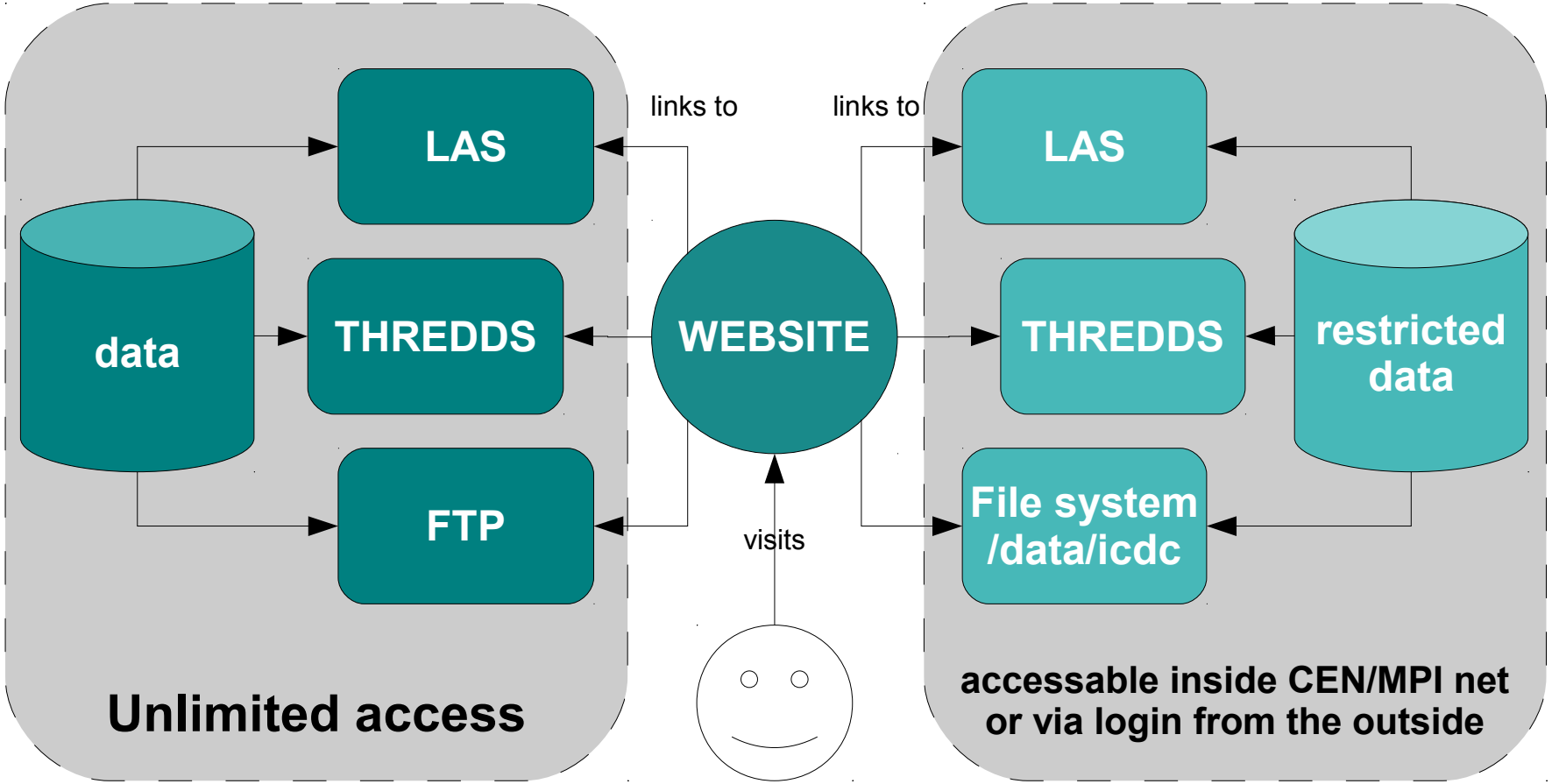
How to use the ICDC?

Structure: External Access



How to use the ICDC?

Structure: Internal Access



Internal User

How to use the ICDC?

Website icdc.cen.uni-hamburg.de

How to use the ICDC?

Website: finding data

Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

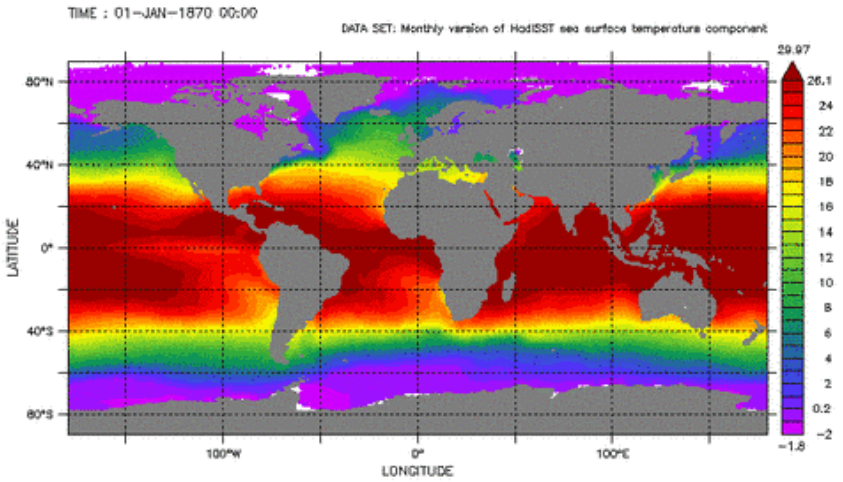
Search for data

ICDC Home | Data | Projects | Support | News & Workshops | Contact

UHH > MIN-Fakultät > CEN > ICDC Data Center > Data > Ocean > Sea surface temperature (HadISST1)

Integrated Climate Data Center - ICDC

Sea surface temperature (HadISST1)



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  - Global Ocean Heat and Salt Content (Levitus et al., 2012)
  - Sea surface temperature (AMSR-E)
  - Sea surface salinity (SMOS)
  - Chlorophyll-a concentration via GlobColour
  - Chlorophyll-Concentration (MODIS)
  - Mechanical bathythermograph (MBT)
  - Expendable bathythermograph (XBT)

Datasets are classified in categories

How to use the ICDC?

Website: all data sets at a glance

ICDC Home | Data | Projects | Support | News & Workshops | Contact

UHH ▸ MIN-Fakultät ▸ CEN ▸ ICDC Data Center ▸ Data ▸ All data

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Atmosphere

- MODIS Cloud Properties
- SOPRAN UV/VIS radiometer measurements
- Globale Regionalisierung der NCEP Reanalysis
- KLIWAS North Sea Climatology (meteorological part)
- HadCRUT and CRUTEM Surface (Air) Temperature Anomalies
- DWD Climate data
- Wind speed over water (QuikSCAT)
- Wind speed over water (ASCAT)
- Wind speed over water (WindSat)
- Global precipitation (GPCP)
- Global precipitation over Land (GPCC Monitoring Product)
- Global Precipitation over Land (GPCC Re-Analysis)
- Ocean-atmosphere parameters and fluxes (HOAPS 3.2)
- HOLAPS - High resOlution Land Atmosphere Parameters from Space
- MODIS Temperature Profiles
- MODIS Water Vapor & PWC
- MODIS Aerosol Properties
- CALIPSO/CloudSat Cloud Cover
- CERES Radiation Fluxes
- CERES Radiation Fluxes for CMIP5
- ISCCP Cloudcover and -type
- SRB Radiation Fluxes
- Hamburg Boundary Layer Measurement Tower
- Karlsruhe Boundary Layer Measurement Tower
- Lindenberg Boundary Layer Measurement Tower
- Cabauw Boundary Layer Measurement Tower
- Field Data of the Meteorological Institute, University of Hamburg

Ice and Snow

- MODIS Snow Cover
- ESA GlobSnow Snow Cover
- IMS Snow Cover

▸ Atmosphere
▸ Ice and snow
▸ Land
▸ Ocean
▸ Society
▸ Re-Analyses: Atmosphere
▸ Re-Analyses: Ocean / EasyInit
▸ Climate Indices
▸ **All data**

How to use the ICDC?

Website: data page

Access

UNRESTRICTED

View data via LAS

Get data via FTP

Access data via OPeNDAP

RESTRICTED only accessable in CEN/MPI network or via CliSAP login What does that mean?

Data access via file system: **/data/icdc/ice_and_snow/arctic_meltponds**

Links to data downloads and visualization tools

Description

MODIS data (MODIS Surface Reflectance 8-Day L3 Global 500m SIN Grid V005) of frequency bands 1, 3 und 4 are use in an artificial neural network to obtain the melt pond cover fraction on Arctic sea ice.

The method uses the fact that for surface types melt ponds, sea ice, snow, and open water different re- the above-mentioned MODIS frequency bands. An artificial neural network li et al. (2008) (see references) has been used to obtain a training and typical steps of melt pond cover development. This rk. After evaluation of the training results it has ojected into a 500 m grid-cell size polar-stereographic

Data description and reference links

is analysed and converted into a 12.5 km x 12.5 km grid-cell size product. The melt pond fraction is ***weighted with the sea ice concentration*** to obtain the relative melt pond fraction on sea ice. See section references for more information.

- Sea-ice type from ship observations (Antarctic)
- Snow depth on sea ice from ship observations (Antarctic)
- NSIDC Snow water equivalent (SWE)
- ESA GlobSnow Snow water equivalent (SWE)
- ding Line of Antarctic Ice Sheet
- f Antarctic Ice Sheet
- iety
- Re-Analyses: Atmosphere
- Re-Analyses: Ocean / EasyInit
- Climate Indices
- All data

How to use the ICDC?

Tools: THREDDS Data Server

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How to use the ICDC?

THREDDS Data Server

- **Provides data access for geo-referenced data**
  - e.g. netCDF

How to use the ICDC?

THREDDS Data Server

- **Provides data access for geo-referenced data**
  - e.g. netCDF
- **Offers remote data access protocols**
  - HTTP: download datasets via web browser
  - OPeNDAP: use subsets without downloading the entire dataset

How to use the ICDC?

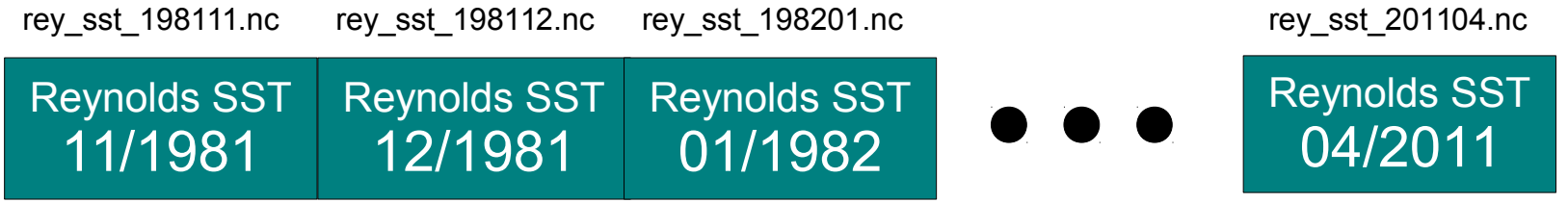
THREDDS Data Server

- **Provides data access for geo-referenced data**
  - e.g. netCDF
- **Offers remote data access protocols**
  - HTTP: download datasets via web browser
  - OPeNDAP: use subsets without downloading the entire dataset
- **Creates virtual datasets through aggregation**
  - merge a chronological sequence of datasets
  - and access it via OPeNDAP

How to use the ICDC?

THREDDS: Aggregation Example

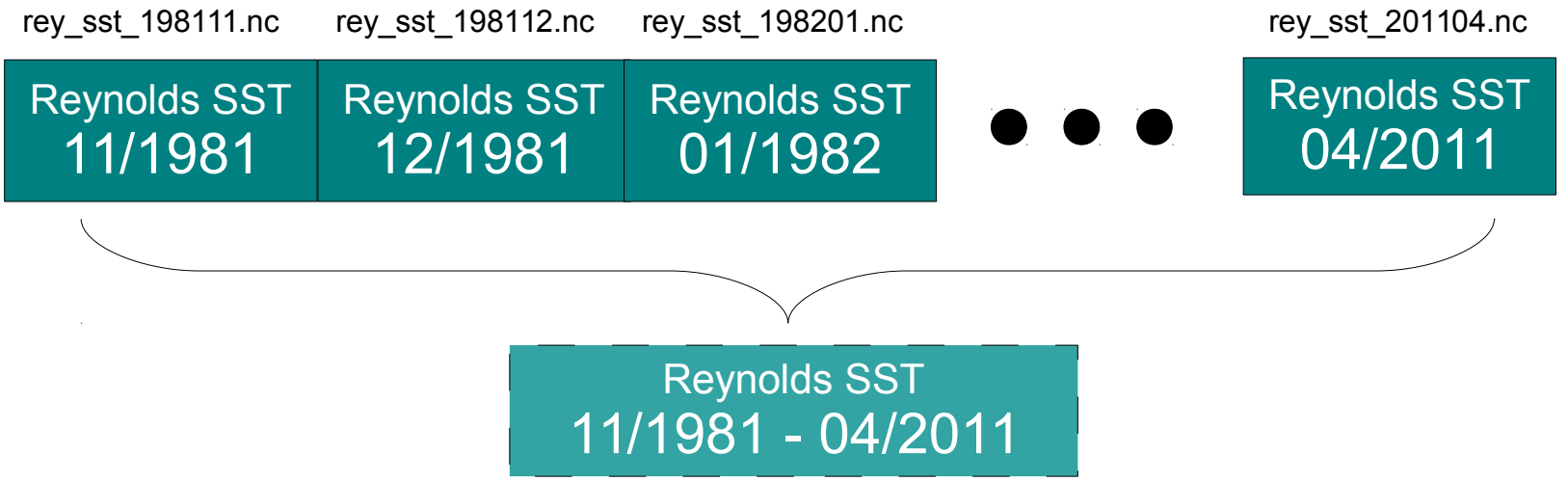
THREDDS merges a sequence of SST monthly means:



How to use the ICDC?

THREDDS: Aggregation Example

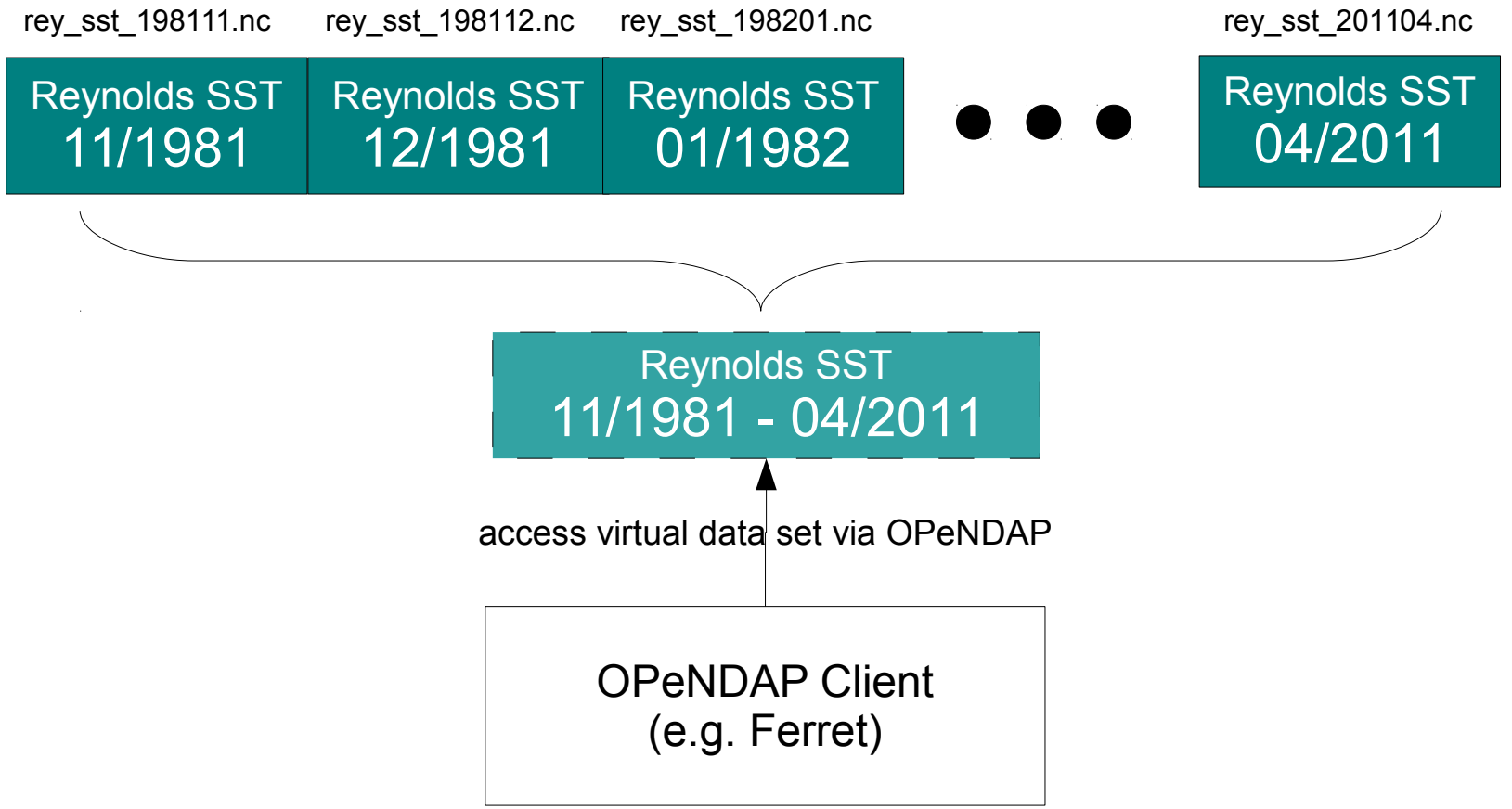
THREDDS merges a sequence of SST monthly means:



How to use the ICDC?

THREDDS: Aggregation Example

THREDDS merges a sequence of SST monthly means:



How to use the ICDC?

File System /data/icdc

Integrated Climate Data Center - Remon Sadikni - remon.sadikni@uni-hamburg.de

How to use the ICDC?

File System Access

- **/data/icdc**
  - mounted on every Linux / Unix system in CEN/MPI network
  - no need to download / copy the data

How to use the ICDC?

File System Access

- **/data/icdc**
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- **Datasets are classified in folders (analog to website)**
  - atmosphere, land, ocean, ice_and_snow, reanalyses, ocean_syntheses, society

How to use the ICDC?

File System Access

- **/data/icdc**
  - mounted on every Linux / Unix system in CEN/MPI network
  - no need to download / copy the data
- **Datasets are classified in folders (analog to website)**
  - atmosphere, land, ocean, ice_and_snow, reanalyses, ocean_syntheses, society
- **Dataset Folder**
  - contains README file providing URL of associated webpage
  - contains a DATA directory with data files
  - e.g. the Reynolds SST dataset can be found in
    - /data/icdc/ocean/reynolds_sst

How to use the ICDC?

Live Access Server (LAS)

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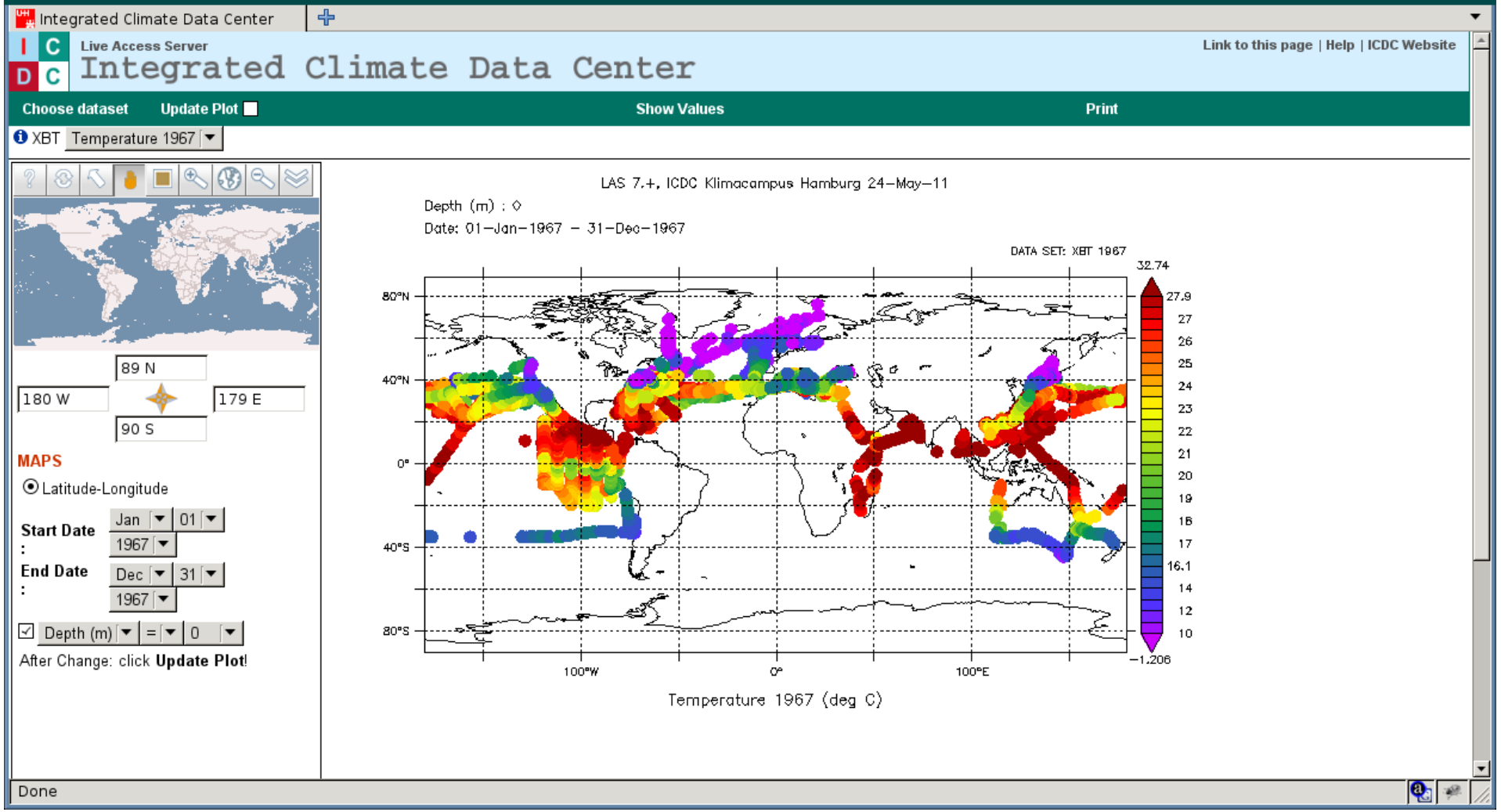
How to use the ICDC?

LAS: Features

- **provides visualizations of geo-referenced data**
  - gridded data
  - insitu measurements

How to use the ICDC?

LAS: Insitu data example



How to use the ICDC?

LAS: gridded data example

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Live Access Server

Integrated Climate Data Center

Link to this page | Help | ICDC Website

Choose dataset | Update Plot | Set plot options | Compare | Google Earth | Show Values | Export to Desktop Application | Save As ... | Print

GECCO State Estimation | POTENTIAL TEMPERATURE

79.5 N

0.5 E | 0.5 W

79.5 S

MAPS

- (•) Latitude-Longitude

LINE PLOTS

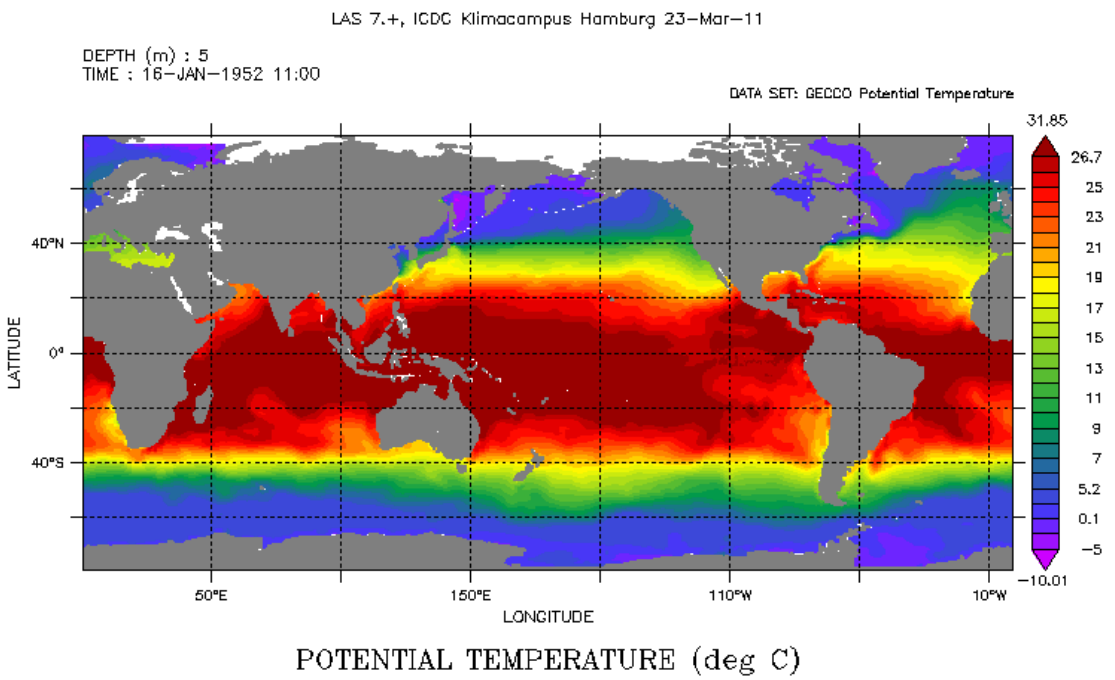
- ( ) Time series
- ( ) Depth
- ( ) Longitude
- ( ) Latitude

VERTICAL SECTION PLOTS

- ( ) Longitude-depth
- ( ) Latitude-depth

Date : Jan | 1952

Depth (meters) : 5



Done

How to use the ICDC?

LAS: Features

- **provides visualizations of geo-referenced data**
  - gridded data
  - insitu measurements
- **quick visualizations**
  - interactive maps
  - time series
  - sections
  - profiles
  - comparisons

How to use the ICDC?

LAS: Interactive Map

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Link to this page | Help | ICDC Website

Choose dataset | Update Plot | Set plot options | Compare | Google Earth | Show Values | Export to Desktop Application | Save As ... | Print

GECCO State Estimation | POTENTIAL TEMPERATURE

79.5 N

0.5 E | 0.5 W

79.5 S

MAPS

- (•) Latitude-Longitude

LINE PLOTS

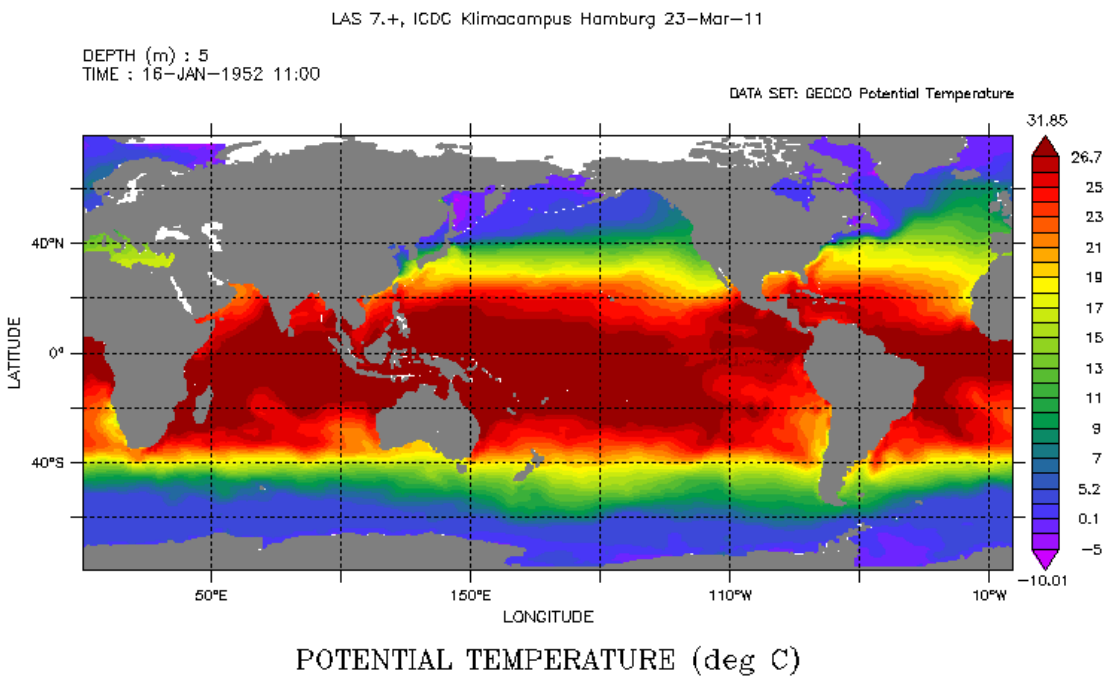
- ( ) Time series
- ( ) Depth
- ( ) Longitude
- ( ) Latitude

VERTICAL SECTION PLOTS

- ( ) Longitude-depth
- ( ) Latitude-depth

Date : Jan | 1952

Depth (meters) : 5



Done

How to use the ICDC?

LAS: Time Series

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Live Access Server

Integrated Climate Data Center

Link to this page | Help | ICDC Website

Choose dataset | Update Plot | Set plot options | Compare | Show Values | Export to Desktop Application | Save As ... | Print

GECCO State Estimation | SEA SURFACE HEIGHT

0 S

180 E | 180 E

0 S

MAPS

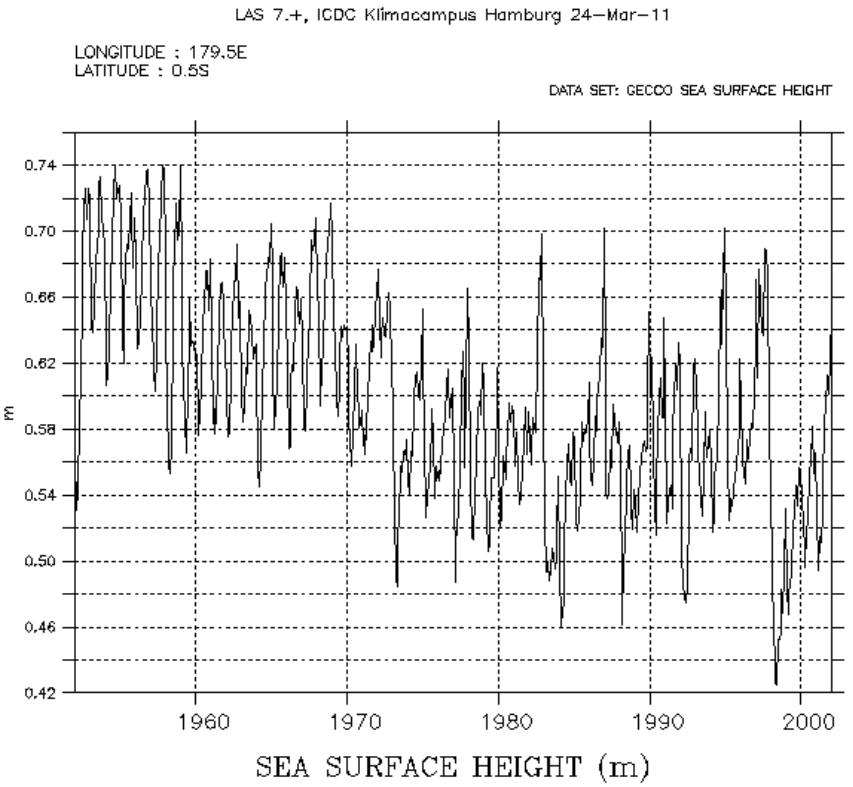
- Latitude-Longitude

LINE PLOTS

- Time series
- Longitude
- Latitude

Start Date : Jan 1952

End Date : Dec 2001



Link to this plot.

Done

How to use the ICDC?

LAS: Section

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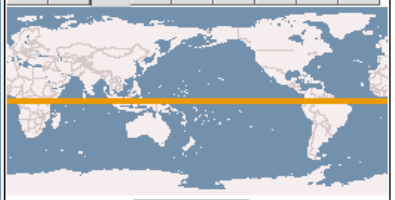
Integrated Climate Data Center

Link to this page | Help | ICDC Website

Choose dataset | Update Plot | Set plot options | Compare | Show Values | Export to Desktop Application | Save As ... | Print

GECCO State Estimation | SALINITY



0 S

0.5 E | 0.5 W

0 S

MAPS

- Latitude-Longitude

LINE PLOTS

- Time series
- Depth
- Longitude
- Latitude

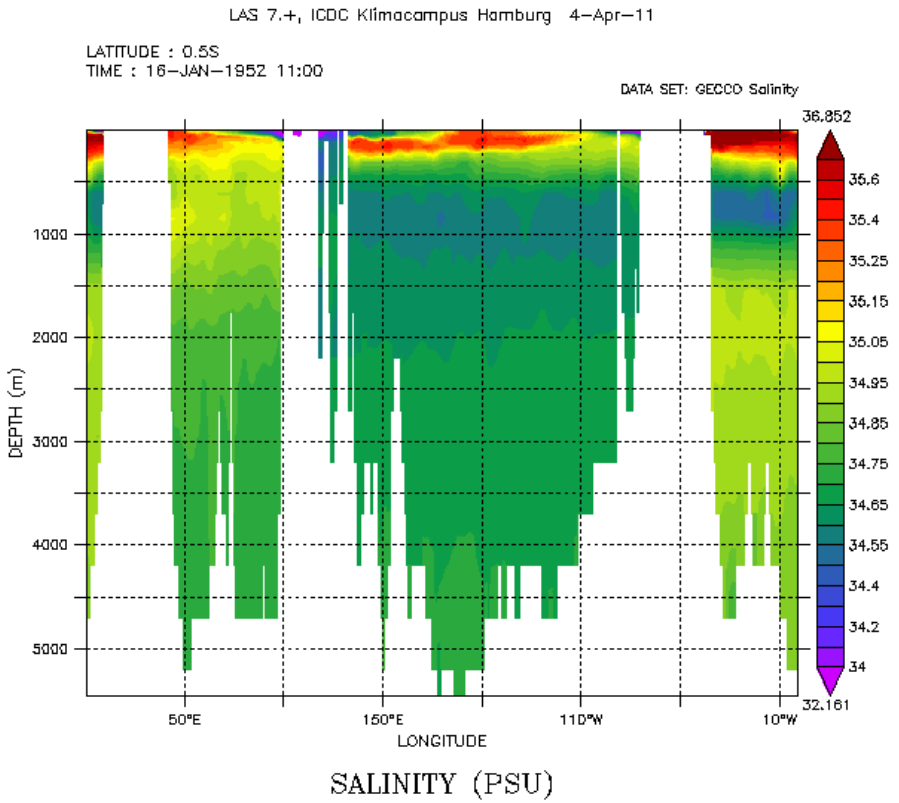
VERTICAL SECTION PLOTS

- Longitude-depth
- Latitude-depth

Date : Jan | 1952

Minimum Depth (meters) : 5

Maximum Depth (meters) : 5450



Link to this plot.

Done

How to use the ICDC?

LAS: Profile

The Matlab-Structs Comman... | Integrated Climate Data Cent...

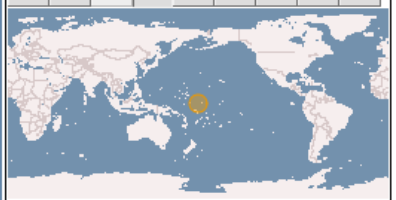
Live Access Server

Integrated Climate Data Center

Link to this page | Help | ICDC Website

Choose dataset | Update Plot | Set plot options | Compare | Show Values | Export to Desktop Application | Save As ... | Print

GECCO State Estimation | POTENTIAL TEMPERATURE



0 S

180 E | 180 E

0 S

MAPS

- Latitude-Longitude

LINE PLOTS

- Time series
- Depth
- Longitude
- Latitude

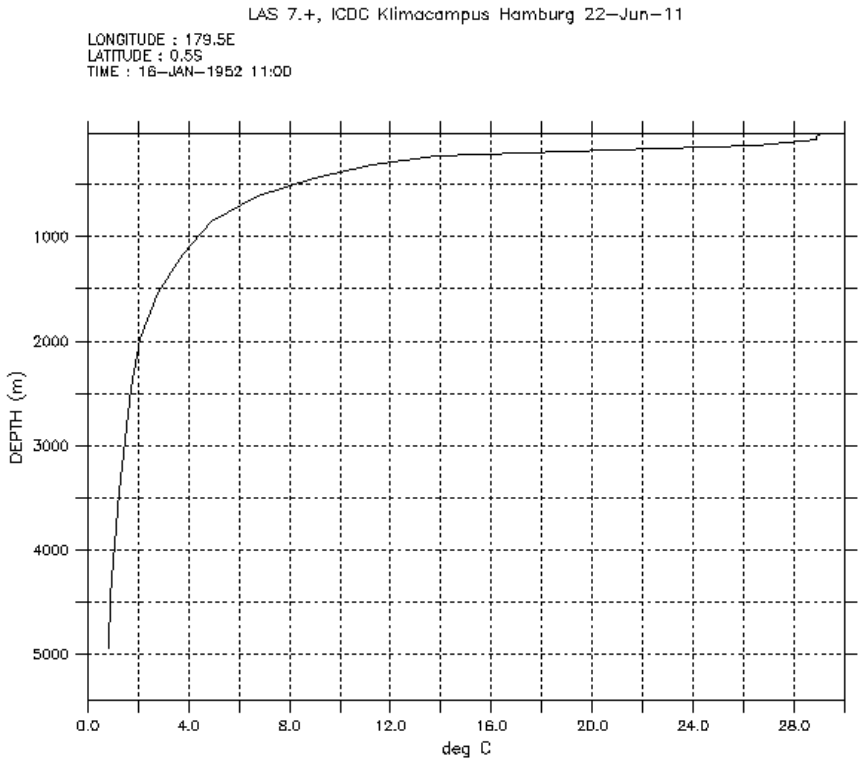
VERTICAL SECTION PLOTS

- Longitude-depth
- Latitude-depth

Date : Jan | 1952

Minimum Depth (meters) : 5

Maximum Depth (meters) : 5450



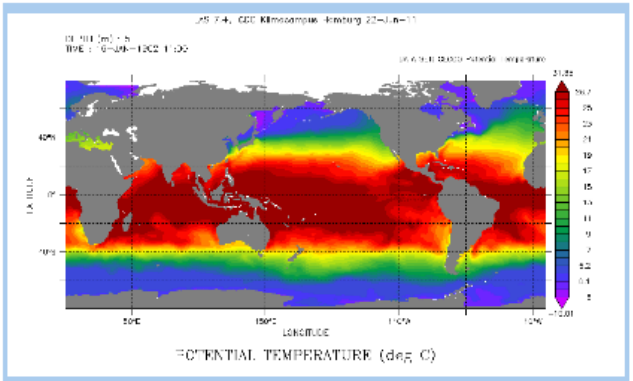
Link to this plot.

How to use the ICDC?

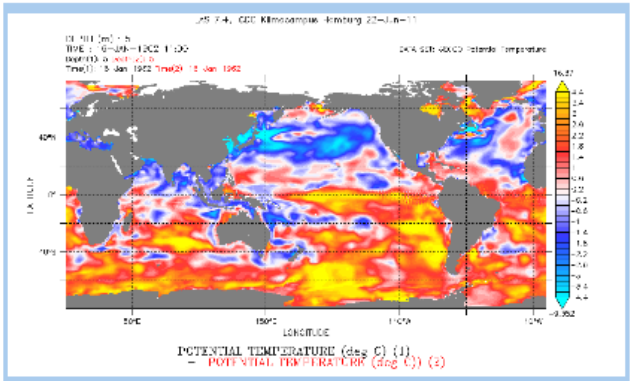
LAS: Comparisons

Integrated Climate Data Cent... | LAS vizGal

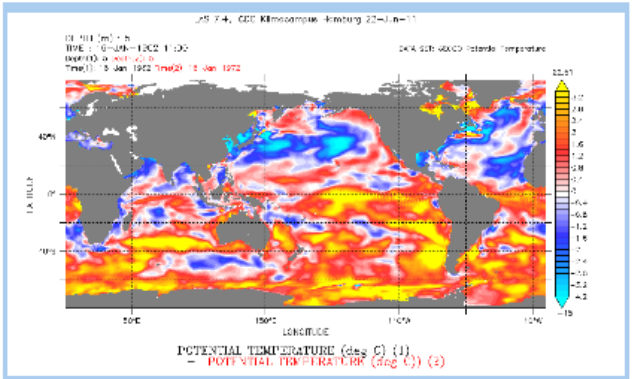
Difference Mode | Select Axis to Vary in Panels | Z (meters): 5 | Start date: 1952 Jan | Auto Set Color Fill Levels for Gallery | Image zoom: 40%



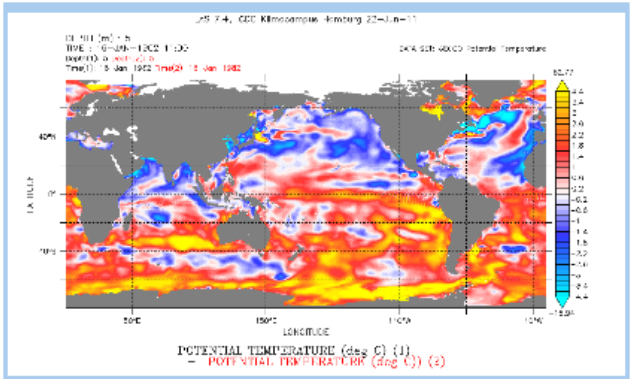
Start date: 1952 Jan



Start date: 1962 Jan



Start date: 1972 Jan



Start date: 1982 Jan

How to use the ICDC?

LAS: Features

- **provides visualizations of geo-referenced data**
  - gridded data
  - insitu measurements
- **quick visualizations**
  - interactive maps
  - time series
  - sections
  - profiles
  - comparisons
- **data downloads**
  - ASCII
  - netCDF
  - OPeNDAP
  - Google Earth

How to use the ICDC?

LAS: Drawbacks

- **shows only equirectangular projection**
  - ICDC extended LAS to show other projections
- **only one view in Insitu mode: interactive map**
  - ICDC works on extending insitu views (e.g. time series)

Thanks

Thank you very much for your attention!

If you have further questions
don't hesitate to contact us:
http://icdc.cen.uni-hamburg.de