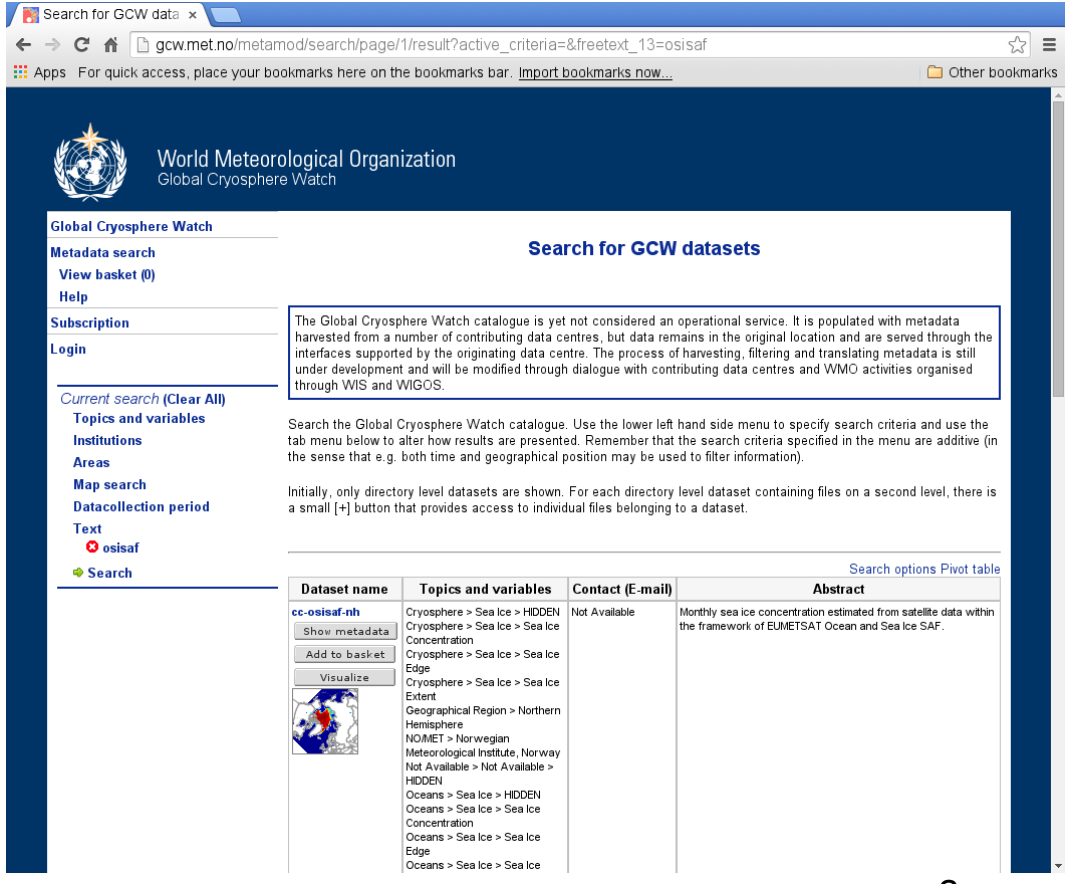
GCW Data Management

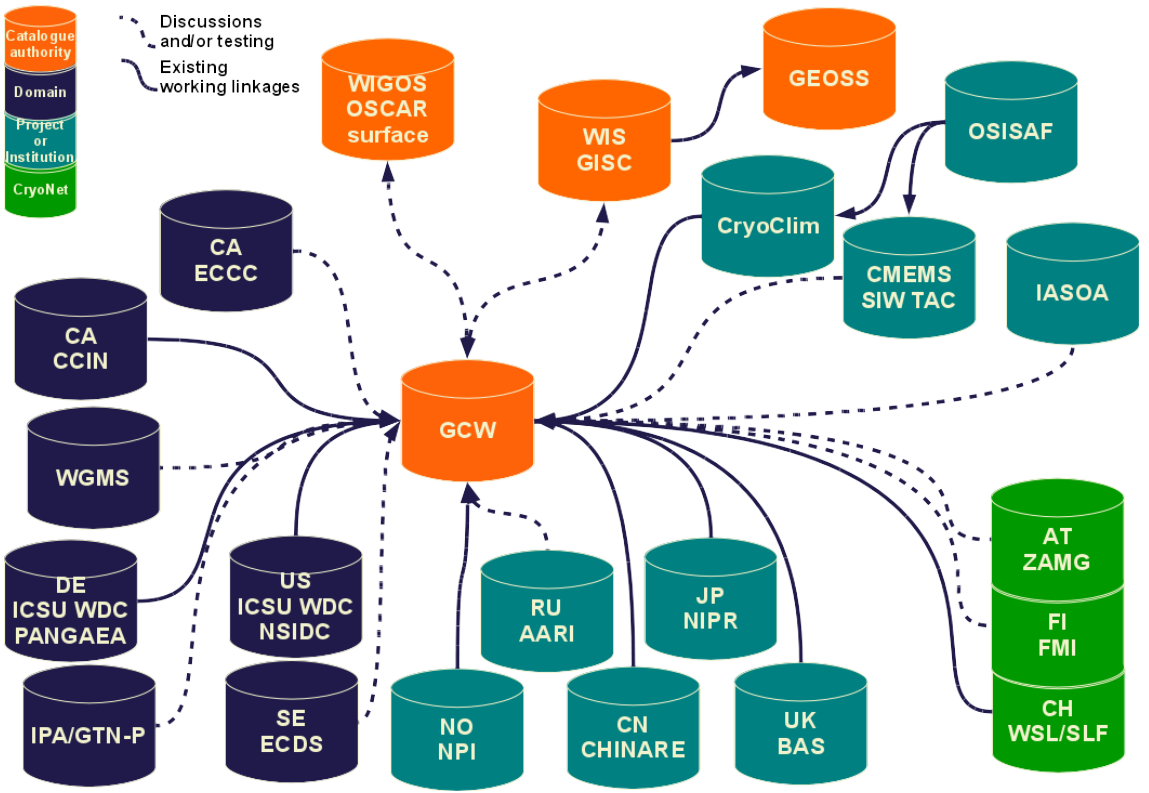
Øystein Godøy

Purpose of GCW Data Management

- To provide an overview of the datasets that are relevant for GCW
- To provide access to datasets
  - Real time data streams
  - Archive access
- Distributed Data Management
  - Metadata driven
  - *Not hosting data*
- To connect GCW with
  - WMO Information System
  - WIGOS

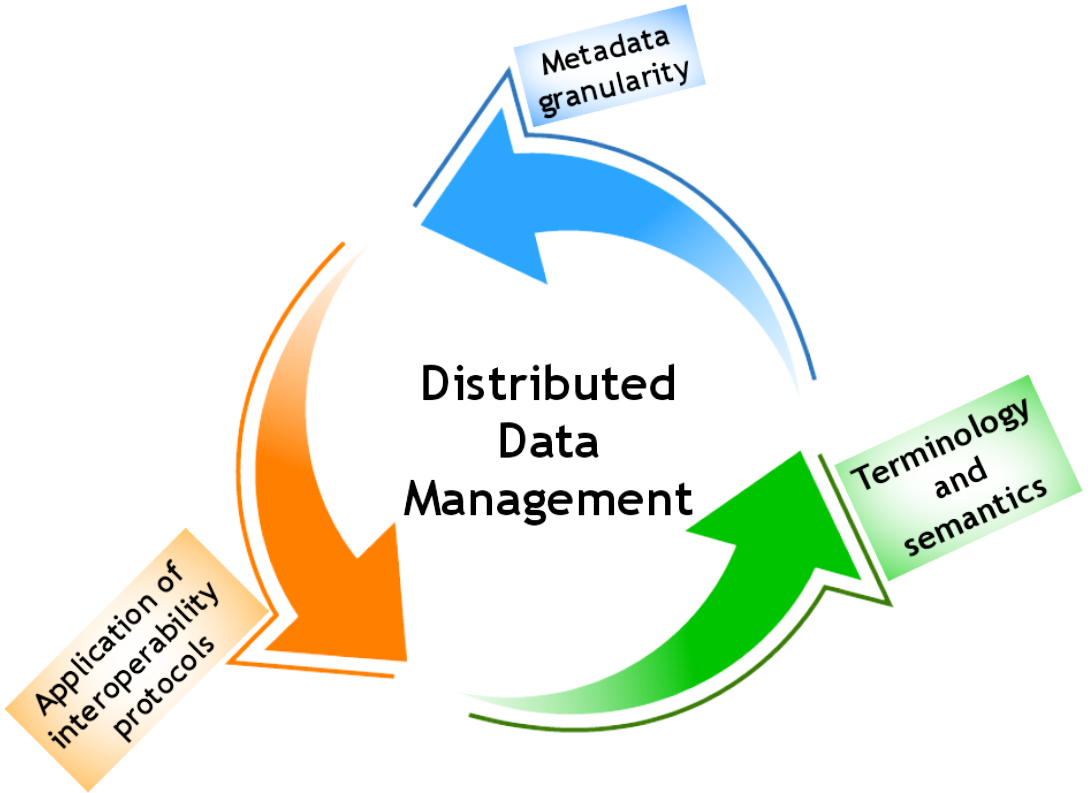


Heterogeneous community



- National Meteorological and Hydrological Services
- Universities
- Independent research institutions
- Varying degree of structured data management
- Varying degree of interoperability for
  - metadata
  - data
- Mutual benefit of standardisation
- Not necessarily the same objective

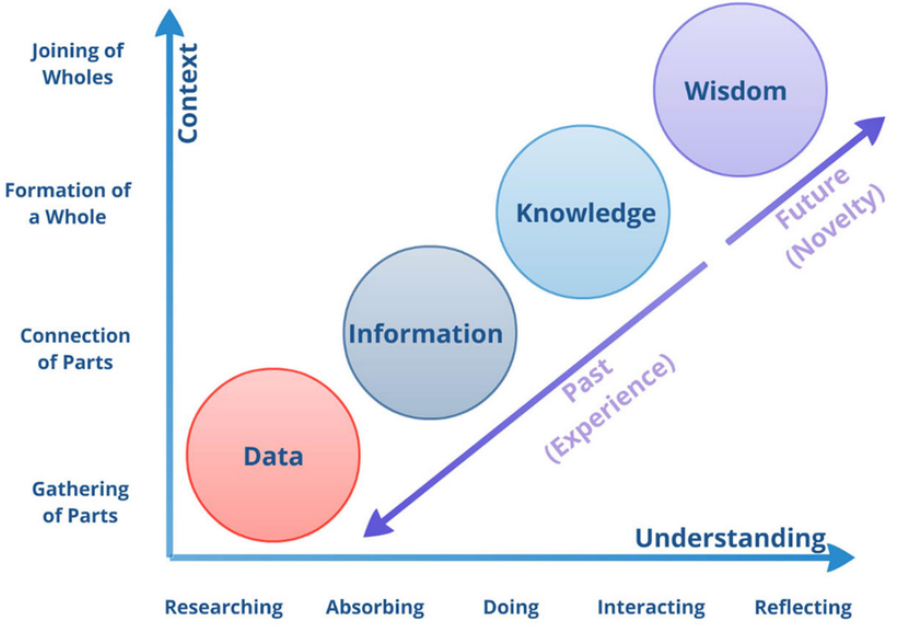
Challenges



- Interoperability
  - Metadata
    - Protocols (✓)
    - Structures (✓)
    - Semantics/terminology (-)
  - Data
    - Protocols (✓)
    - Formats (-)
    - Semantics/terminology (-)
    - Common data model (-)

DIKW chain

- How to transition from data to knowledge and understanding...
  - The illustration is a common redrawing of Russ Ackoff “From Data to Wisdom”
    - Journal of Applied Systems Analysis, Volume 16, 1989 p 3-9
- Take home...:
  - Take care of data for the future
  - Data is the basis for knowledge
    - Now and in the future
  - Knowledge based management depends on national, regional and global interaction



http://www.easterbrook.ca/steve/2012/09/what-is-climate-informatics/

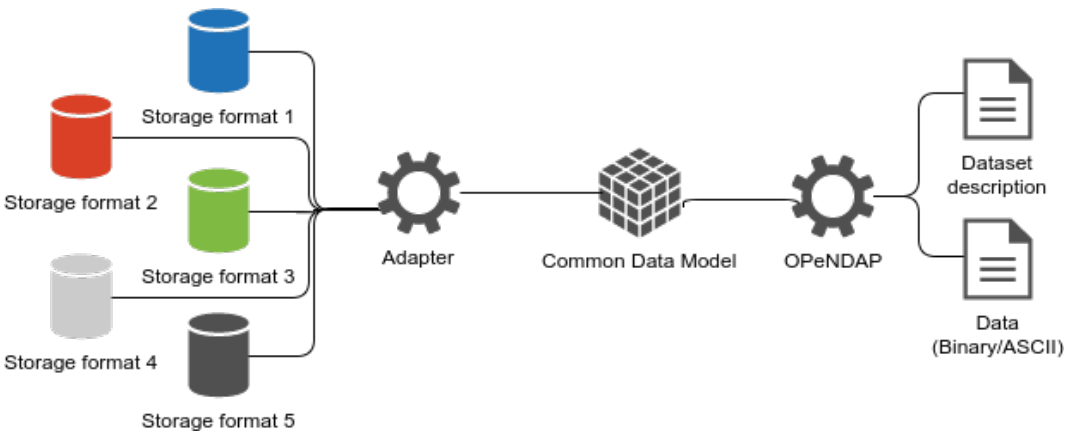
Metadata and data standards

- Discovery
  - Information encoding in
    - GCMD DIF
      - Also keywords
    - ISO19115
  - Exchange through
    - OAI-PMH
    - (OGC CSW)
    - (OpenSearch)
- Use
  - Formatting
    - NetCDF4 classic
  - Documentation standard
    - Climate and Forecast
  - Exchange through
    - OPeNDAP
      - Allows transformation into BUFR

- Discovery metadata is required for every physical file unless aggregation is used
- Updating interoperability guidelines when collaborating with contributing data centres
- Must also align WIGOS and CF efforts

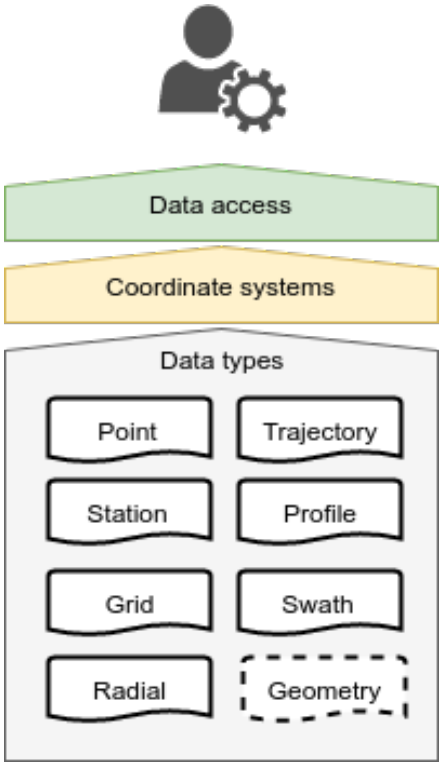
Interoperability with CryoNet stations

- Dedicated effort with Davos (WSL/ SLF)
  - Software for discovery and data interoperability developed in Davos
  - Solution capable of integration a wide range of input streams, including RDBMS
- Takes care of data from measurement to published data where it can be picked up by services



Why OPeNDAP and NetCDF/CF?

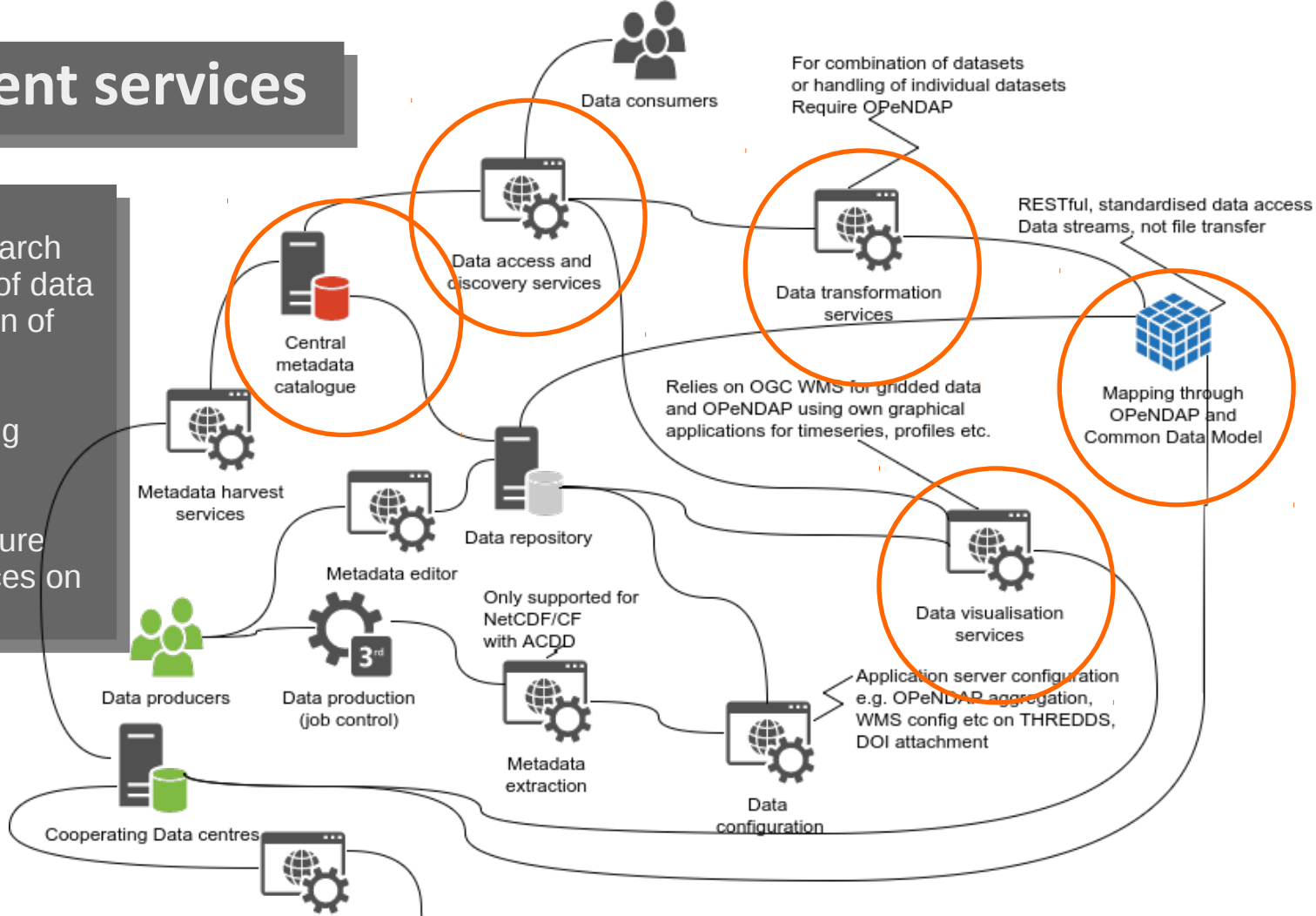
- Do not start from scratch
- WMO formats not used nor accepted within the science community
- NetCDF/CF well developed concerning annotation and self explaining data encoding
- OPeNDAP provides software that allows you to access data over the internet,
  - from programs that weren't originally designed for that purpose,
  - as well as some that were.
- Allows connecting to data streams
  - Delivers data, not files
  - Segmenting data in time and space(s)
  - Bridges the message approach of operational data with the long time series approach of climate analysis



Data management services

Relies quite heavily on:
- OAI-PMH for federated search
- OPeNDAP for integration of data
- OGC WMS for visualisation of gridded data

The GCW Data Portal is being restructured
- Modularised
- Service Oriented Architecture
- Enabling distributed services on distributed data



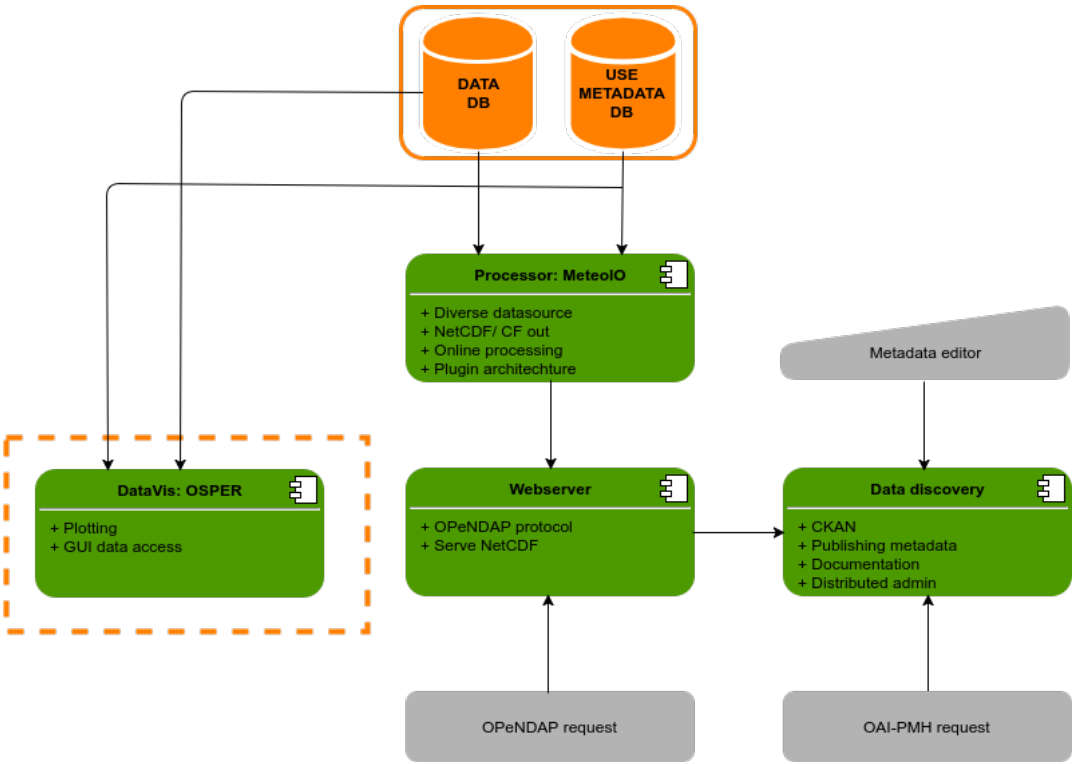
WMO OMM

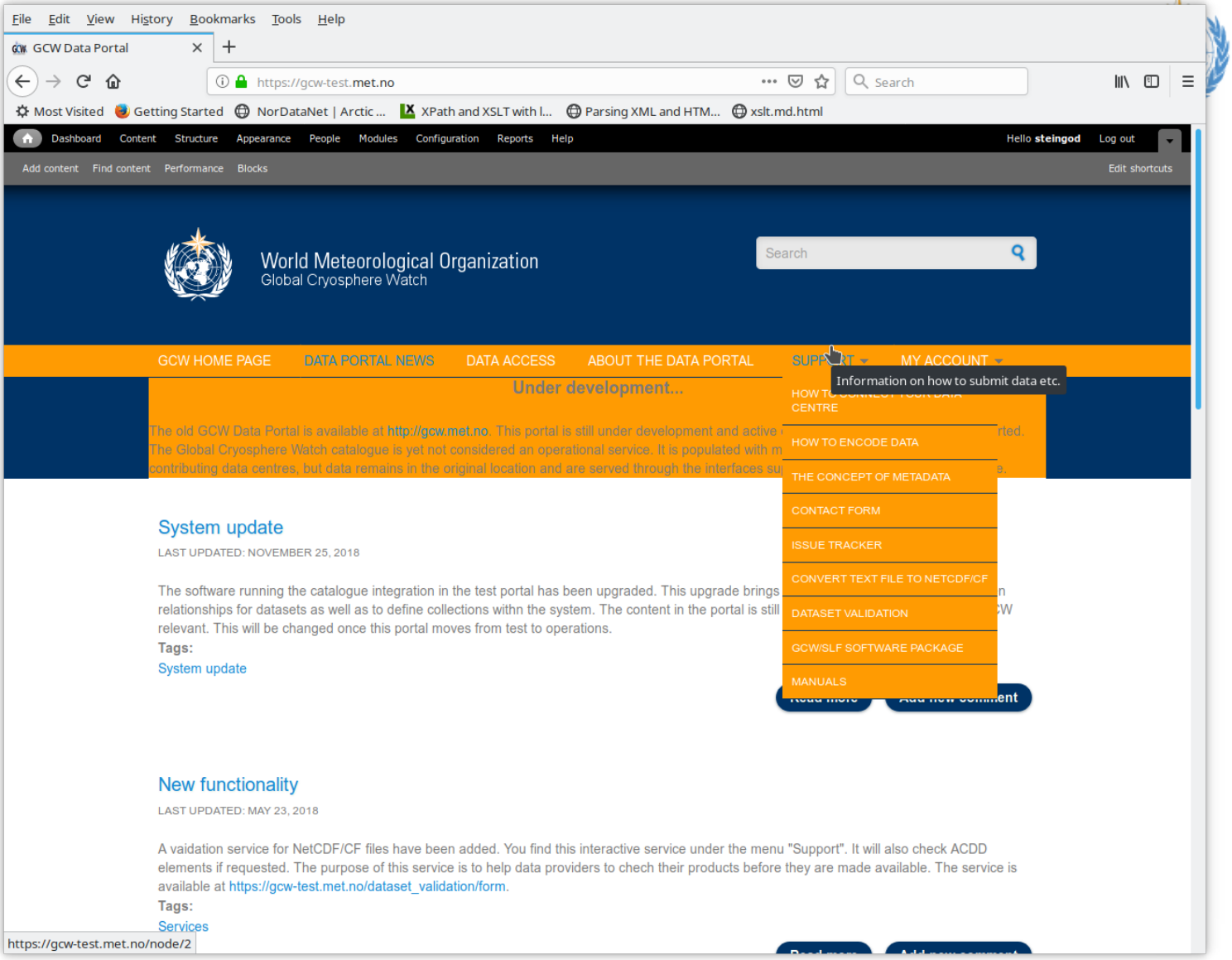
GCW Global Cryosphere Watch

Norwegian Meteorological Institute

Challenges and next steps

- Harvesting information from legacy systems
  - No standardisation at the data level
  - But can show what is available when datasets relevant to cryosphere are identified
    - Gaps in discovery metadata
- Need to get data from CryoNet stations
  - Must be harmonised to service downstream purposes
    - Common annotation
  - Varying degree of existing data management capabilities and understanding
  - Building software and services to help stations
  - Selected datasets to be integrated with WMO GTS
- Need to get descriptions of CryoNet stations
  - WMDS required
    - Transparency in e.g. glossary development
  - Facilitating light weight implementation
  - Discussing governance aspects
  - Joining forces with GAW
- Semantic annotation
  - Need to align WIGOS and CF keywords

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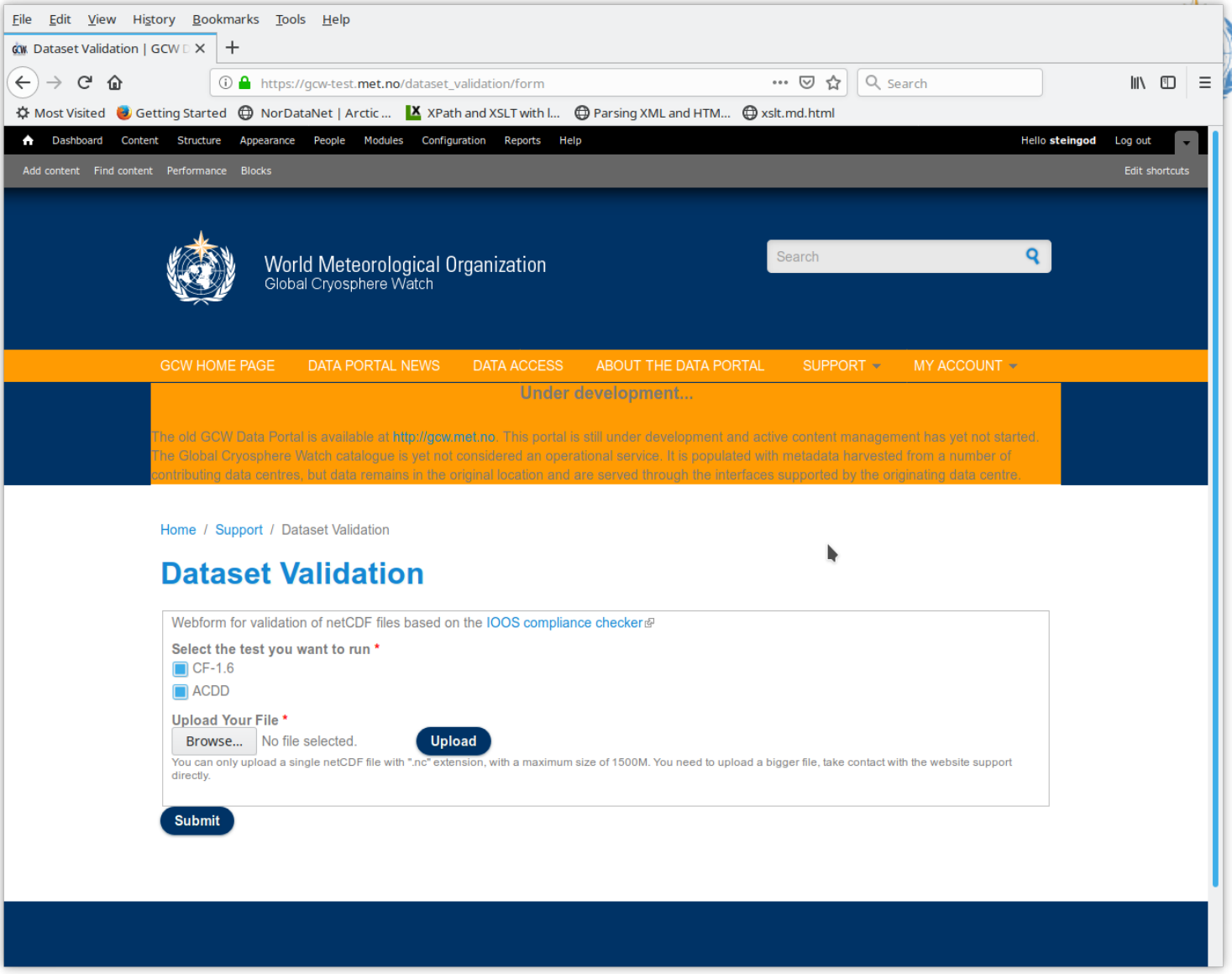
THE CONCEPT OF METADATA
CONTACT FORM
ISSUE TRACKER
CONVERT TEXT FILE TO NETCDF/CF
DATASET VALIDATION
GCW/SLF SOFTWARE PACKAGE
MANUALS
Under development...
The old GCW Data Portal is available at http://gcw.met.no. This portal is still under development and active
The Global Cryosphere Watch catalogue is yet not considered an operational service. It is populated with m
contributing data centres, but data remains in the original location and are served through the interfaces su
System update
LAST UPDATED: NOVEMBER 25, 2018
The software running the catalogue integration in the test portal has been upgraded. This upgrade brings
relationships for datasets as well as to define collections withn the system. The content in the portal is still
relevant. This will be changed once this portal moves from test to operations.
Tags:
System update
New functionality
LAST UPDATED: MAY 23, 2018
A vaidation service for NetCDF/CF files have been added. You find this interactive service under the menu "Support". It will also check ACDD elements if requested. The purpose of this service is to help data providers to chech their products before they are made available. The service is available at https://gcw-test.met.no/dataset_validation/form.
Tags:
Services
https://gcw-test.met.no/node/2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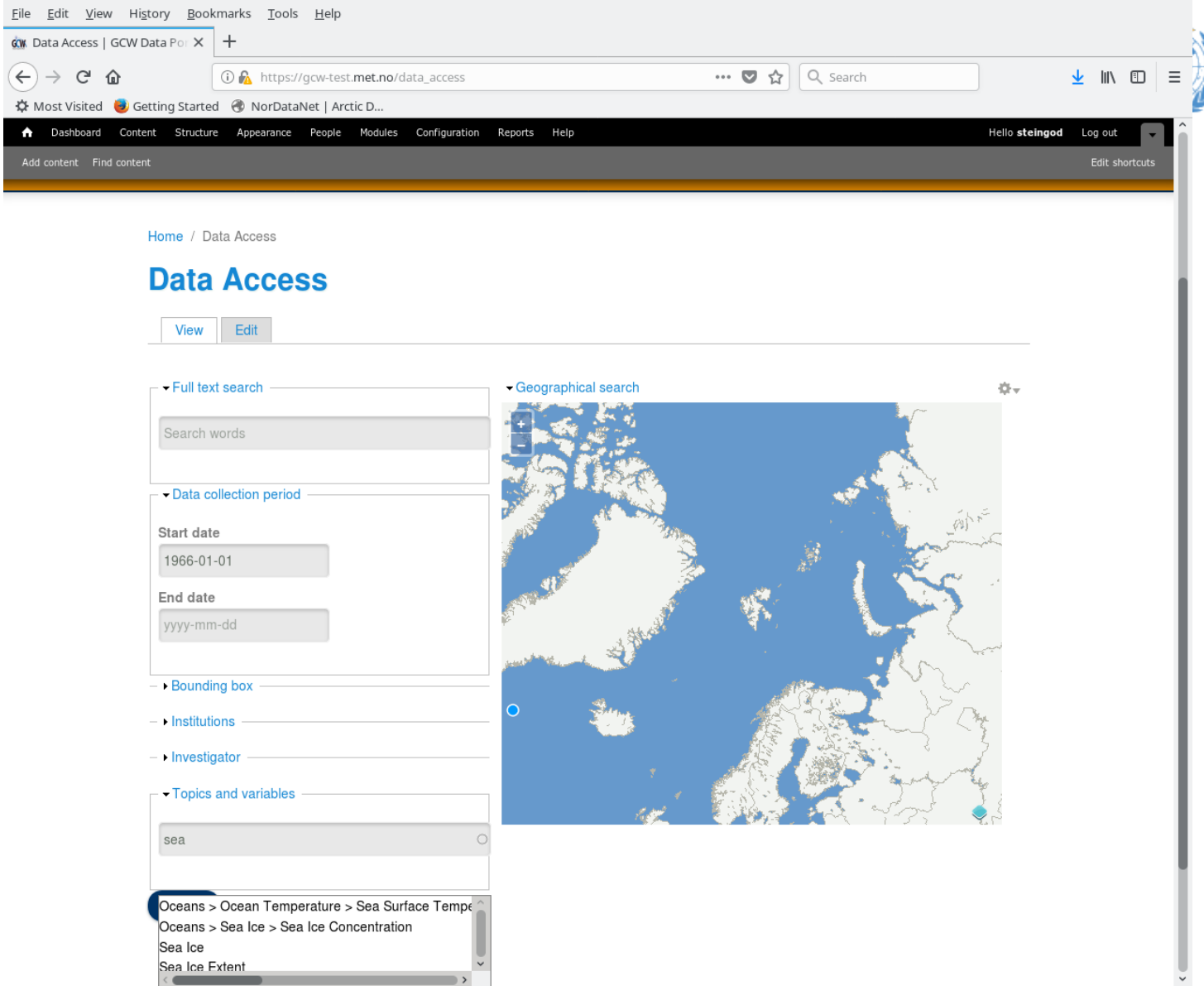
The old GCW Data Portal is available at http://gcw.met.no. This portal is still under development and active content management has yet not started. The Global Cryosphere Watch catalogue is yet not considered an operational service. It is populated with metadata harvested from a number of contributing data centres, but data remains in the original location and are served through the interfaces supported by the originating data centre.
Home / Support / Dataset Validation
Dataset Validation
Webform for validation of netCDF files based on the IOOS compliance checker
Select the test you want to run *
CF-1.6
ACDD
Upload Your File *
Browse... No file selected.
Upload
You can only upload a single netCDF file with ".nc" extension, with a maximum size of 1500M. You need to upload a bigger file, take contact with the website support directly.
Submit

Global Cryosphere Watch

WMO

Questions?

What can we do in the front end?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Sea Ice
Sea Ice Extent
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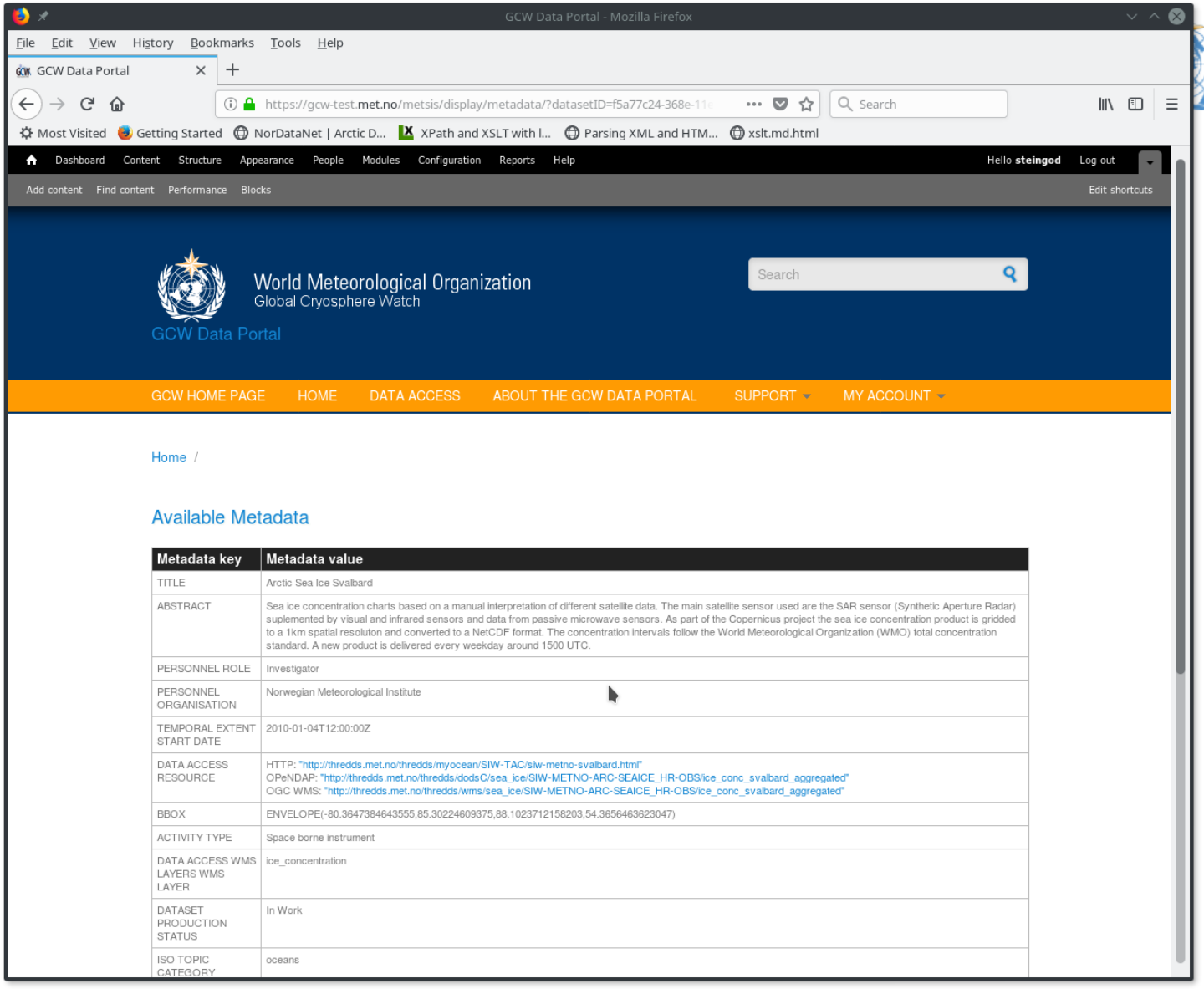
	Dataset name	Institutions	Keywords	Abstract	Collection period
☐	Arctic Sea Ice Svalbard Download .NetCDF product Metadata Transform 	Norwegian Meteorological Institute	Arctic Sea Ice Climate Indicators > Cryospheric Indicators > Sea Ice Concentration Oceans > Sea Ice > Sea Ice Concentration Cryosphere > Sea Ice > Sea Ice Concentration	Sea ice concentration charts based on a manual interpretation of different satellite data. The main satellite sensor used are the SAR sensor (Synthetic Aperture Radar) suplemented by visual and infrared sensors and data from passive microwave sensors. As part of the Copernicus project the sea ice concentration product is gridded to a 1km spatial resoluton and converted to a NetCDF format. The concentration intervals follow the World Meteorological Organization (WMO) total concentration standard. A new product is delivered every weekday around 1500 UTC.	2010-01-04T12:00:00Z to
☐	Sea Ice Extent Download .NetCDF product Metadata Visualize ASCII	Norwegian Meteorological Institute	Climate Sea Ice Oceanography Sea Ice Extent Meteorology Remote Sensing Cryosphere > Sea Ice > Sea Ice Extent Geographic Region > Northern Hemisphere Oceans > Sea Ice > Sea Ice Extent Vertical Location > Sea Surface EUMETSAT/OSISAF > Satellite Application Facility on Ocean and Sea Ice, European Organisation for the Exploitation of Meteorological Satellites	Arctic Sea Ice Extent estimates based upon EUMETSAT Ocean and Sea Ice SAF products. Both reprocessed and operational datasets have been used. See http://cryoclim.met.no/indicators/seaiceextent/ for details.	1978-11-16T12:00:00Z to 2013-09-16T12:00:00Z
☐	Satellite based sea ice charts from the national sea ice service in Norway	Norwegian Meteorological Institute	Arctic Sea Ice Ice chart Climate Indicators > Cryospheric Indicators > Sea Ice Concentration	The product is based on a manual interpolation of available satellite data and insitu observations and provides a gridded map. It is a continuation of the previous sea ice chart which basically identified the ice edge.	1967-01-07T12:00:00Z to 2015-12-30T12:00:00Z

WMO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Metadata value
TITLE
Arctic Sea Ice Svalbard
ABSTRACT
Sea ice concentration charts based on a manual interpretation of different satellite data. The main satellite sensor used are the SAR sensor (Synthetic Aperture Radar) suplemented by visual and infrared sensors and data from passive microwave sensors. As part of the Copernicus project the sea ice concentration product is gridded to a 1km spatial resoluton and converted to a NetCDF format. The concentration intervals follow the World Meteorological Organization (WMO) total concentration standard. A new product is delivered every weekday around 1500 UTC.
PERSONNEL ROLE
Investigator
PERSONNEL ORGANISATION
Norwegian Meteorological Institute
TEMPORAL EXTENT START DATE
2010-01-04T12:00:00Z
DATA ACCESS RESOURCE
HTTP: "http://thredds.met.no/thredds/myocean/SIW-TAC/siw-metno-svalbard.html"
OPeNDAP: "http://thredds.met.no/thredds/dodsC/sea_ice/SIW-METNO-ARC-SEAICE_HR-OBS/ice_conc_svalbard_aggregated"
OGC WMS: "http://thredds.met.no/thredds/wms/sea_ice/SIW-METNO-ARC-SEAICE_HR-OBS/ice_conc_svalbard_aggregated"
BBOX
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DATASET PRODUCTION STATUS
In Work
ISO TOPIC CATEGORY
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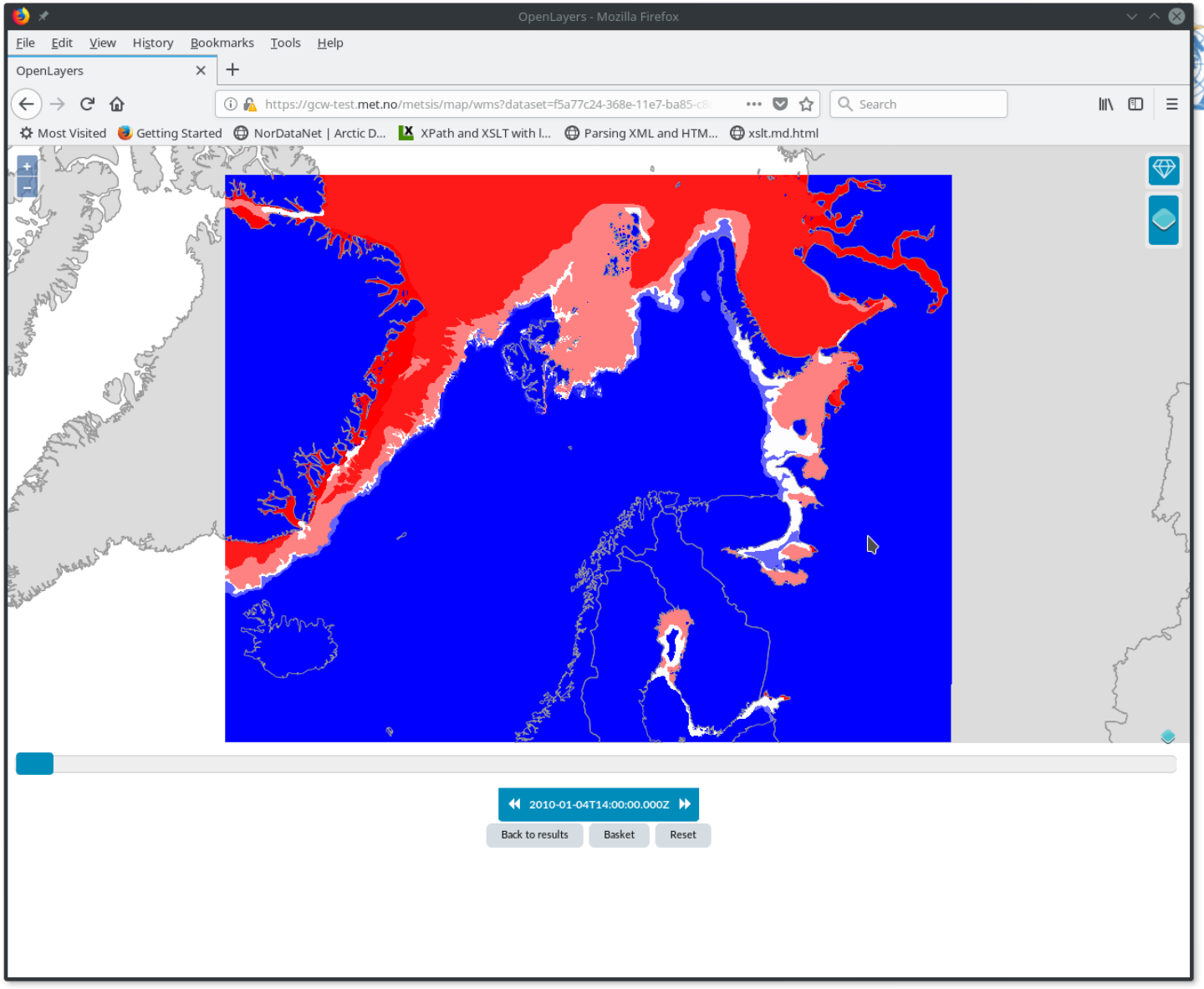
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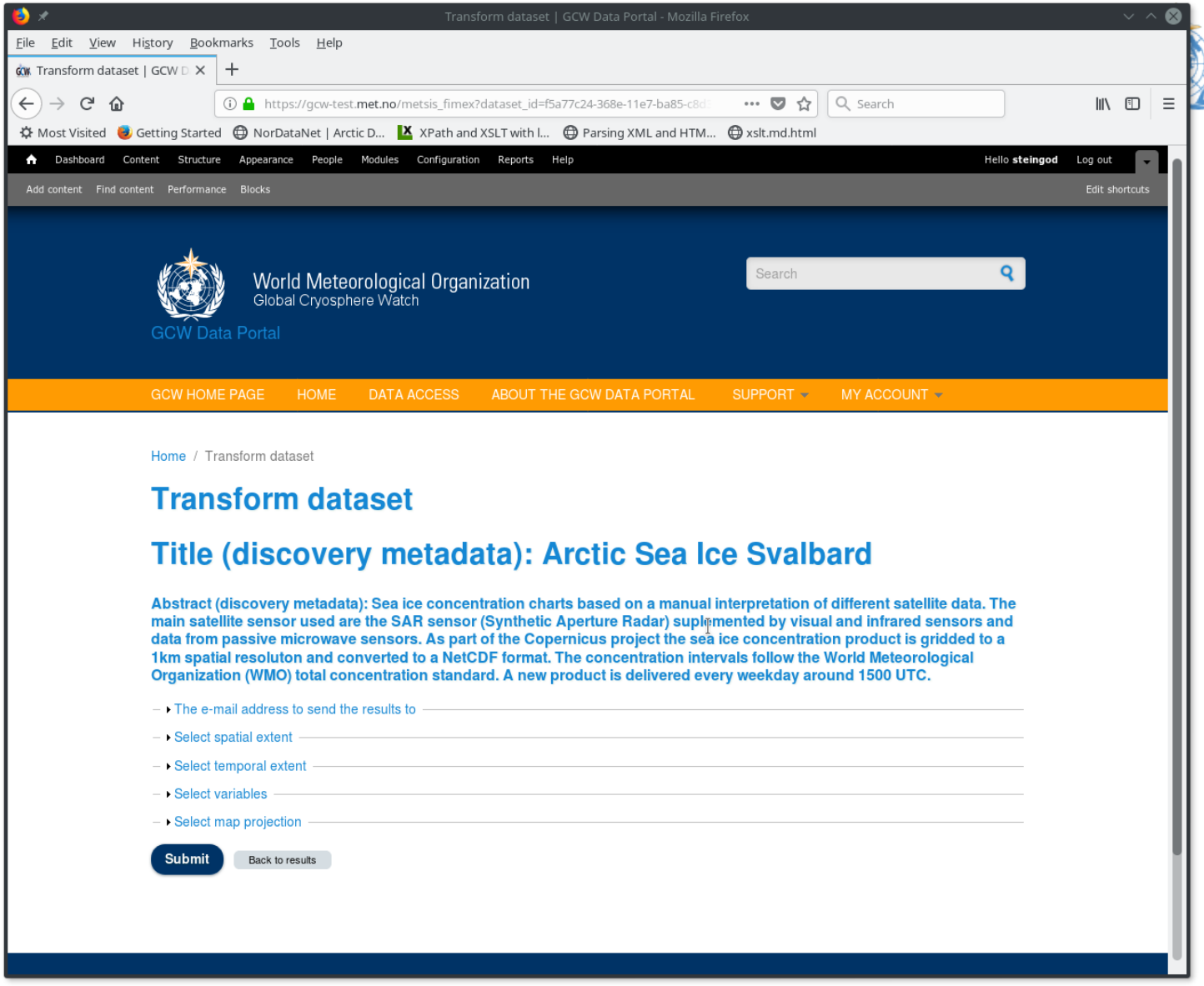
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Title (discovery metadata): Arctic Sea Ice Svalbard
Abstract (discovery metadata): Sea ice concentration charts based on a manual interpretation of different satellite data. The main satellite sensor used are the SAR sensor (Synthetic Aperture Radar) supplemented by visual and infrared sensors and data from passive microwave sensors. As part of the Copernicus project the sea ice concentration product is gridded to a 1km spatial resoluton and converted to a NetCDF format. The concentration intervals follow the World Meteorological Organization (WMO) total concentration standard. A new product is delivered every weekday around 1500 UTC.
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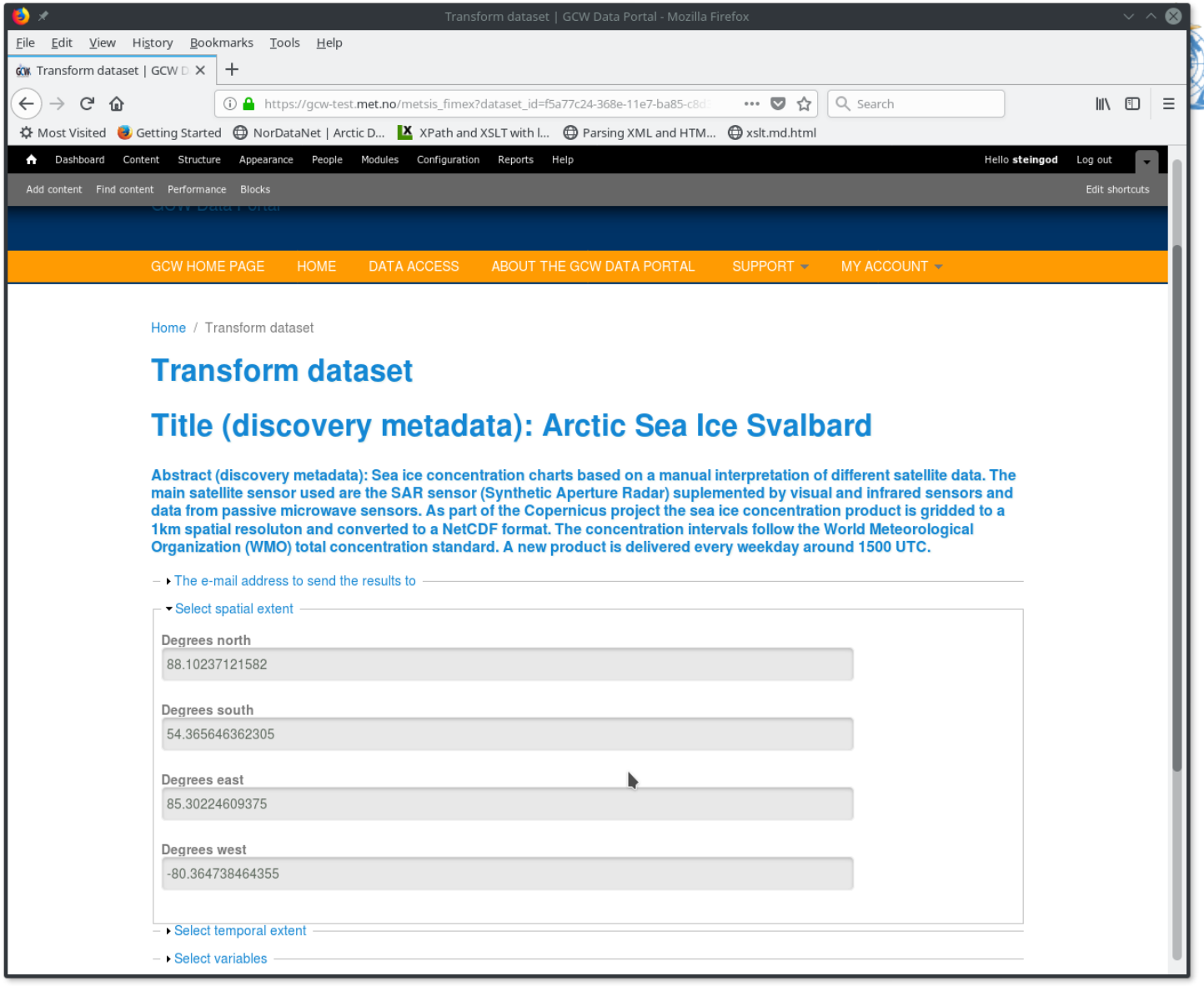
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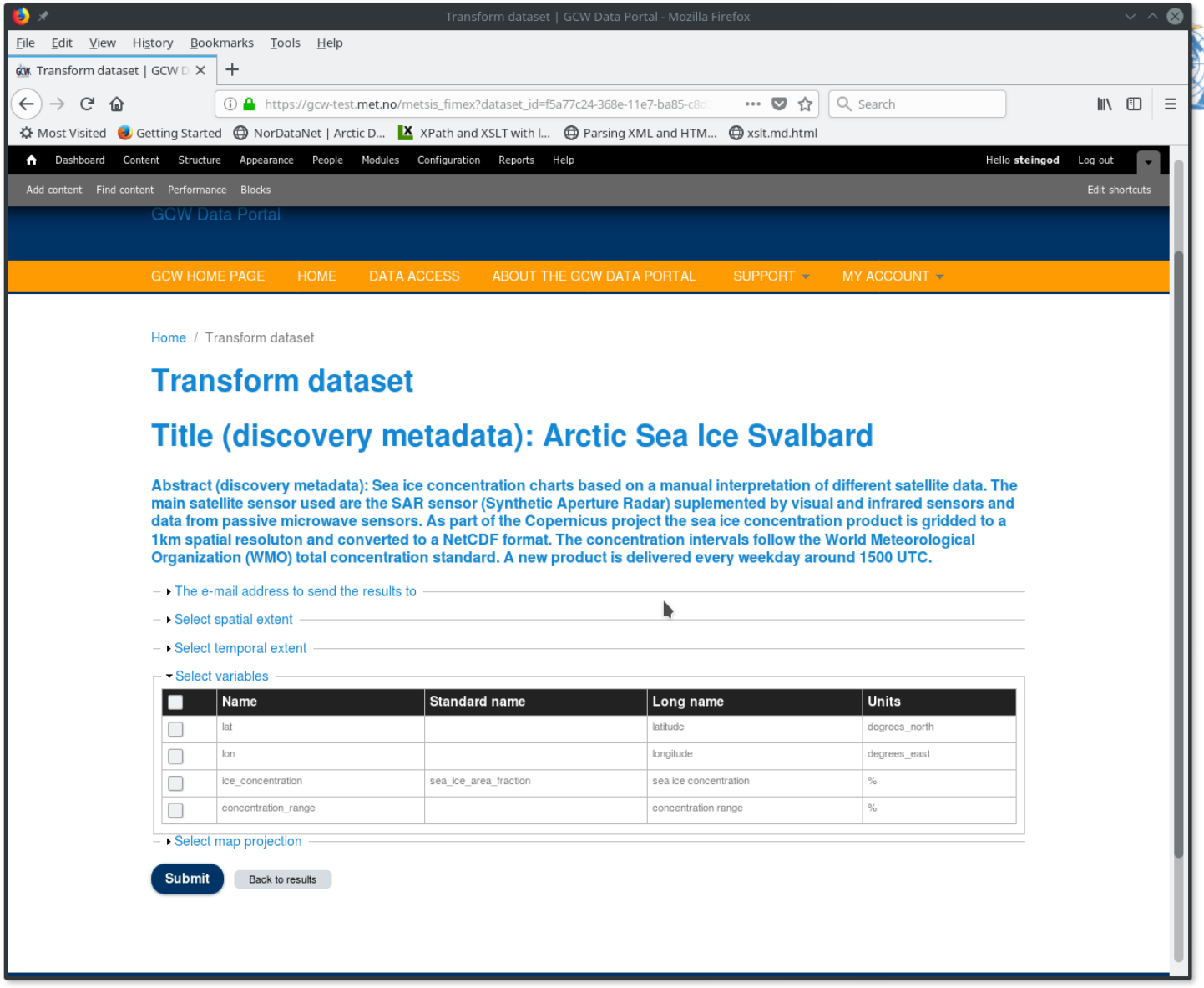
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Select spatial extent
Select temporal extent
Select variables
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ice_concentration sea_ice_area_fraction sea ice concentration %
concentration_range concentration range %
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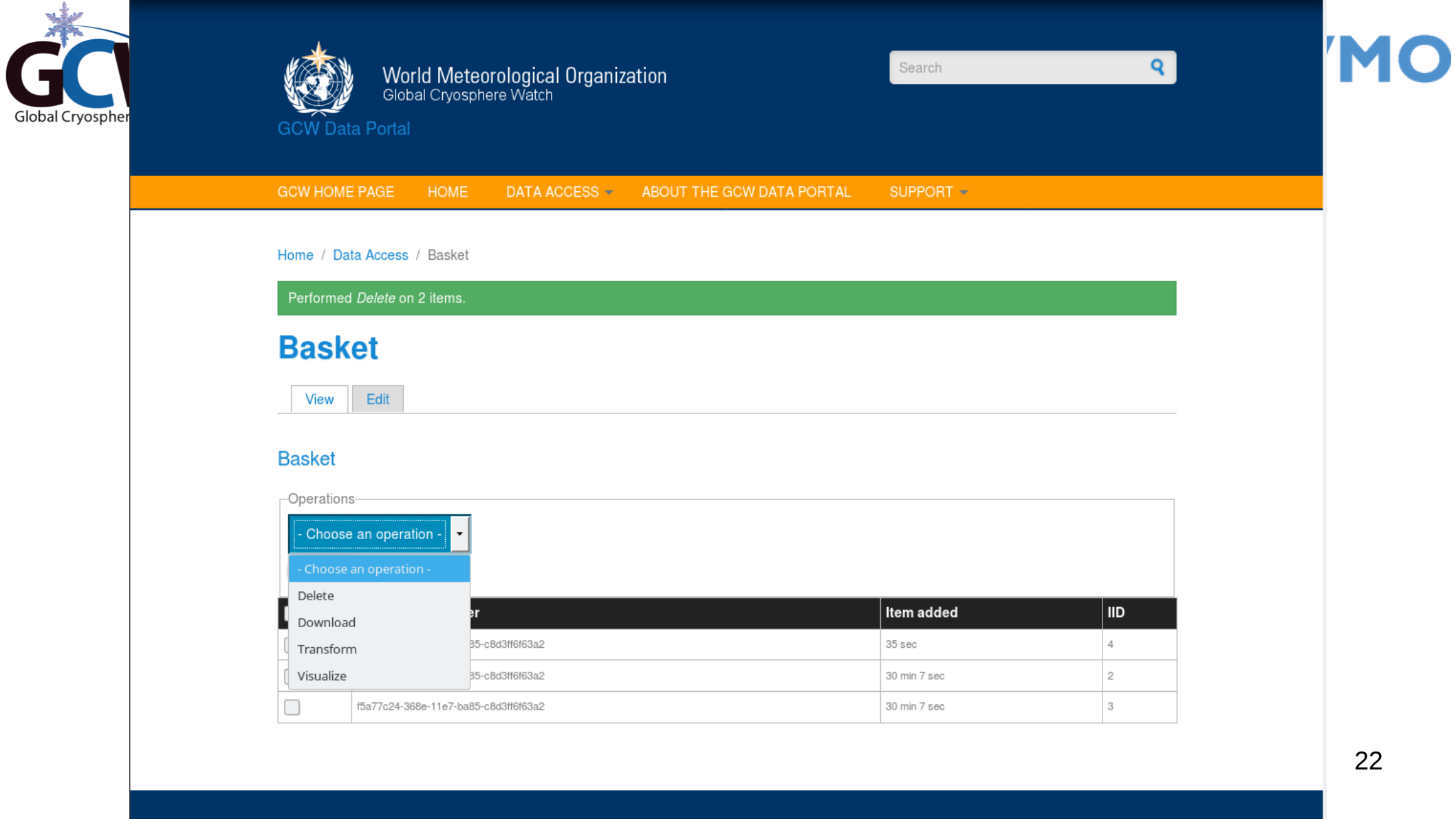
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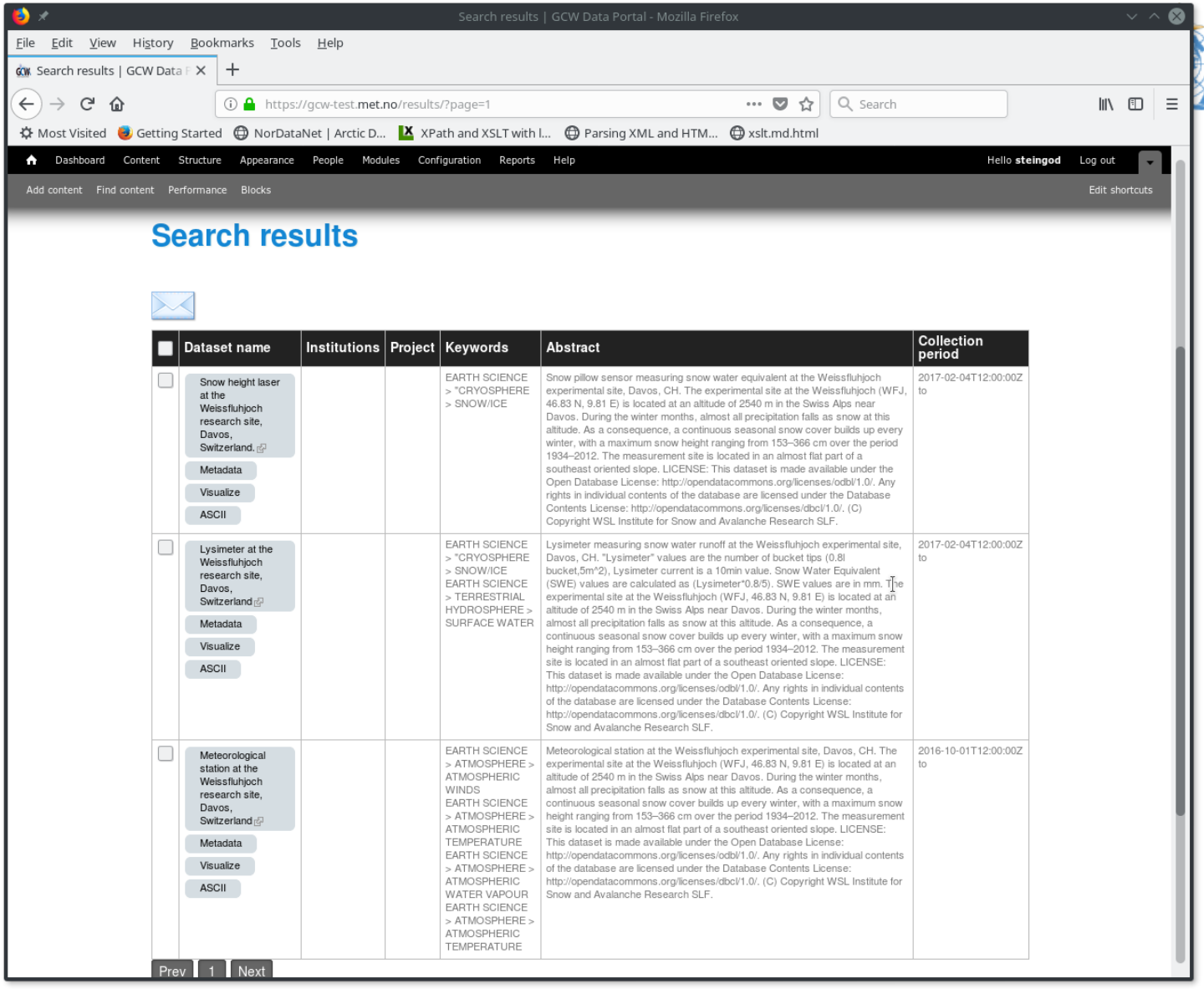
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Project
Keywords
Abstract
Collection period
Snow height laser at the Weissfluhjoch research site, Davos, Switzerland.
Metadata
Visualize
ASCII
EARTH SCIENCE > "CRYOSPHERE > SNOW/ICE
Snow pillow sensor measuring snow water equivalent at the Weissfluhjoch experimental site, Davos, CH. The experimental site at the Weissfluhjoch (WFJ, 46.83 N, 9.81 E) is located at an altitude of 2540 m in the Swiss Alps near Davos. During the winter months, almost all precipitation falls as snow at this altitude. As a consequence, a continuous seasonal snow cover builds up every winter, with a maximum snow height ranging from 153–366 cm over the period 1934–2012. The measurement site is located in an almost flat part of a southeast oriented slope. LICENSE: This dataset is made available under the Open Database License: http://opendatacommons.org/licenses/odbl/1.0/. Any rights in individual contents of the database are licensed under the Database Contents License: http://opendatacommons.org/licenses/dbcl/1.0/. (C) Copyright WSL Institute for Snow and Avalanche Research SLF.
2017-02-04T12:00:00Z to
Lysimeter at the Weissfluhjoch research site, Davos, Switzerland
Metadata
Visualize
ASCII
EARTH SCIENCE > "CRYOSPHERE > SNOW/ICE
EARTH SCIENCE > TERRESTRIAL HYDROSPHERE > SURFACE WATER
Lysimeter measuring snow water runoff at the Weissfluhjoch experimental site, Davos, CH. "Lysimeter" values are the number of bucket tips (0.8l bucket,5m^2), Lysimeter current is a 10min value. Snow Water Equivalent (SWE) values are calculated as (Lysimeter*0.8/5). SWE values are in mm. The experimental site at the Weissfluhjoch (WFJ, 46.83 N, 9.81 E) is located at an altitude of 2540 m in the Swiss Alps near Davos. During the winter months, almost all precipitation falls as snow at this altitude. As a consequence, a continuous seasonal snow cover builds up every winter, with a maximum snow height ranging from 153–366 cm over the period 1934–2012. The measurement site is located in an almost flat part of a southeast oriented slope. LICENSE: This dataset is made available under the Open Database License: http://opendatacommons.org/licenses/odbl/1.0/. Any rights in individual contents of the database are licensed under the Database Contents License: http://opendatacommons.org/licenses/dbcl/1.0/. (C) Copyright WSL Institute for Snow and Avalanche Research SLF.
2017-02-04T12:00:00Z to
Meteorological station at the Weissfluhjoch research site, Davos, Switzerland
Metadata
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Meteorological station at the Weissfluhjoch experimental site, Davos, CH. The experimental site at the Weissfluhjoch (WFJ, 46.83 N, 9.81 E) is located at an altitude of 2540 m in the Swiss Alps near Davos. During the winter months, almost all precipitation falls as snow at this altitude. As a consequence, a continuous seasonal snow cover builds up every winter, with a maximum snow height ranging from 153–366 cm over the period 1934–2012. The measurement site is located in an almost flat part of a southeast oriented slope. LICENSE: This dataset is made available under the Open Database License: http://opendatacommons.org/licenses/odbl/1.0/. Any rights in individual contents of the database are licensed under the Database Contents License: http://opendatacommons.org/licenses/dbcl/1.0/. (C) Copyright WSL Institute for Snow and Avalanche Research SLF.
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WMO

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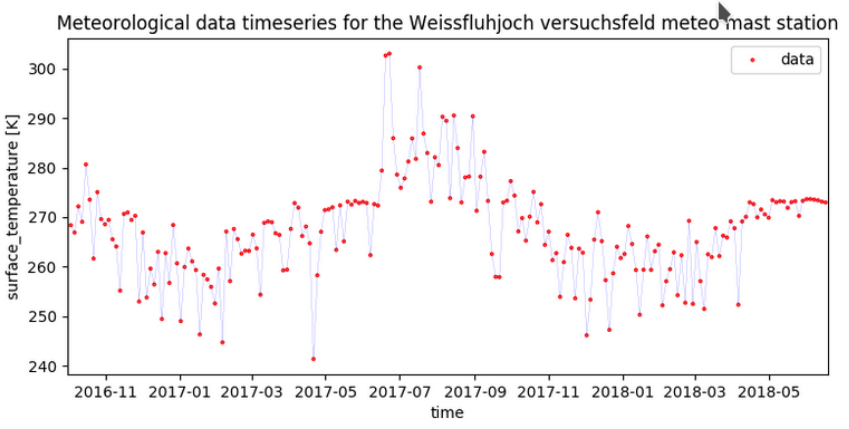


X-axis variable

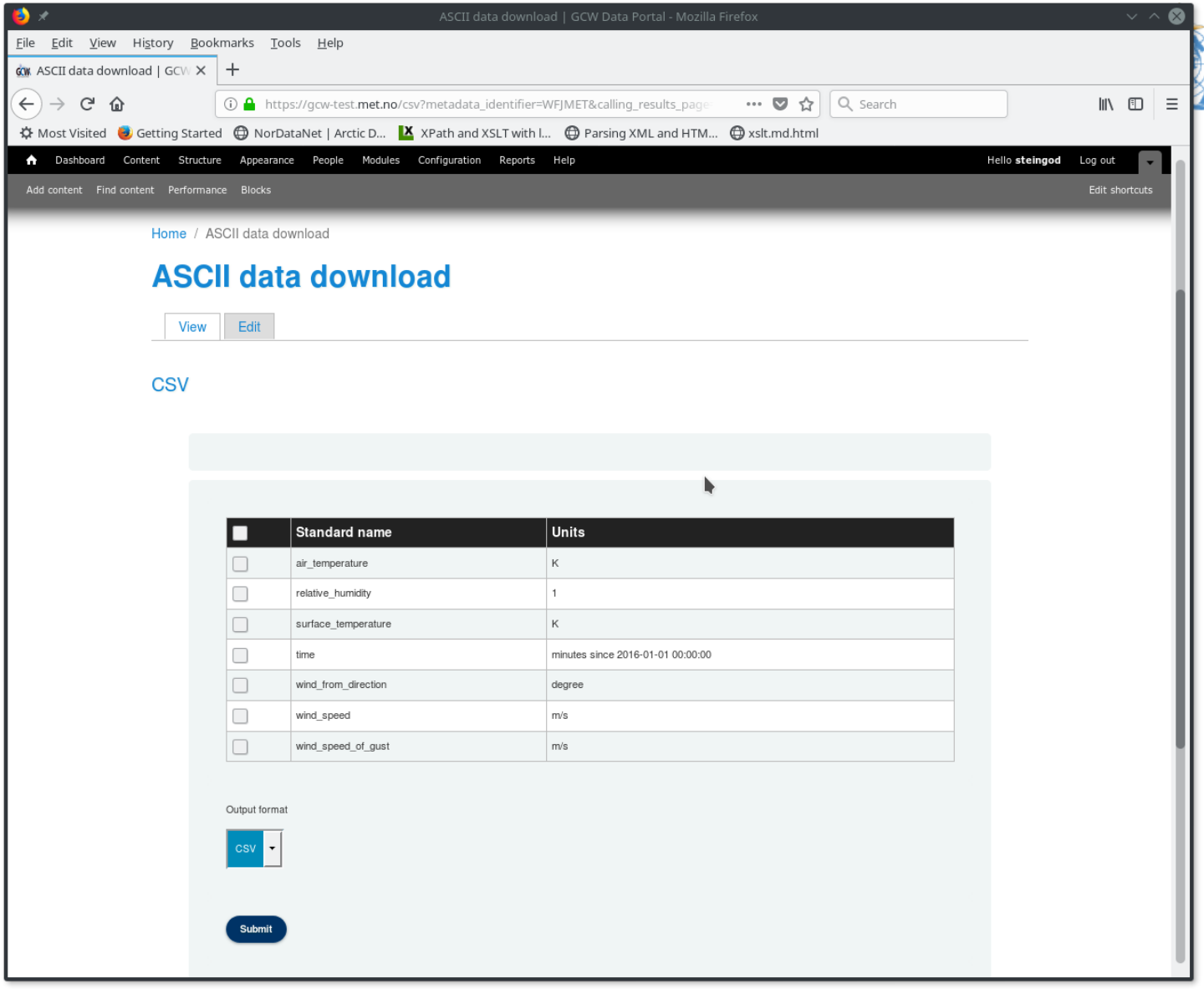
time

Plot every Nth data point

150

Y-axis variable

Output file format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surface_temperature
K
time
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wind_from_direction
degree
wind_speed
m/s
wind_speed_of_gust
m/s
Output format
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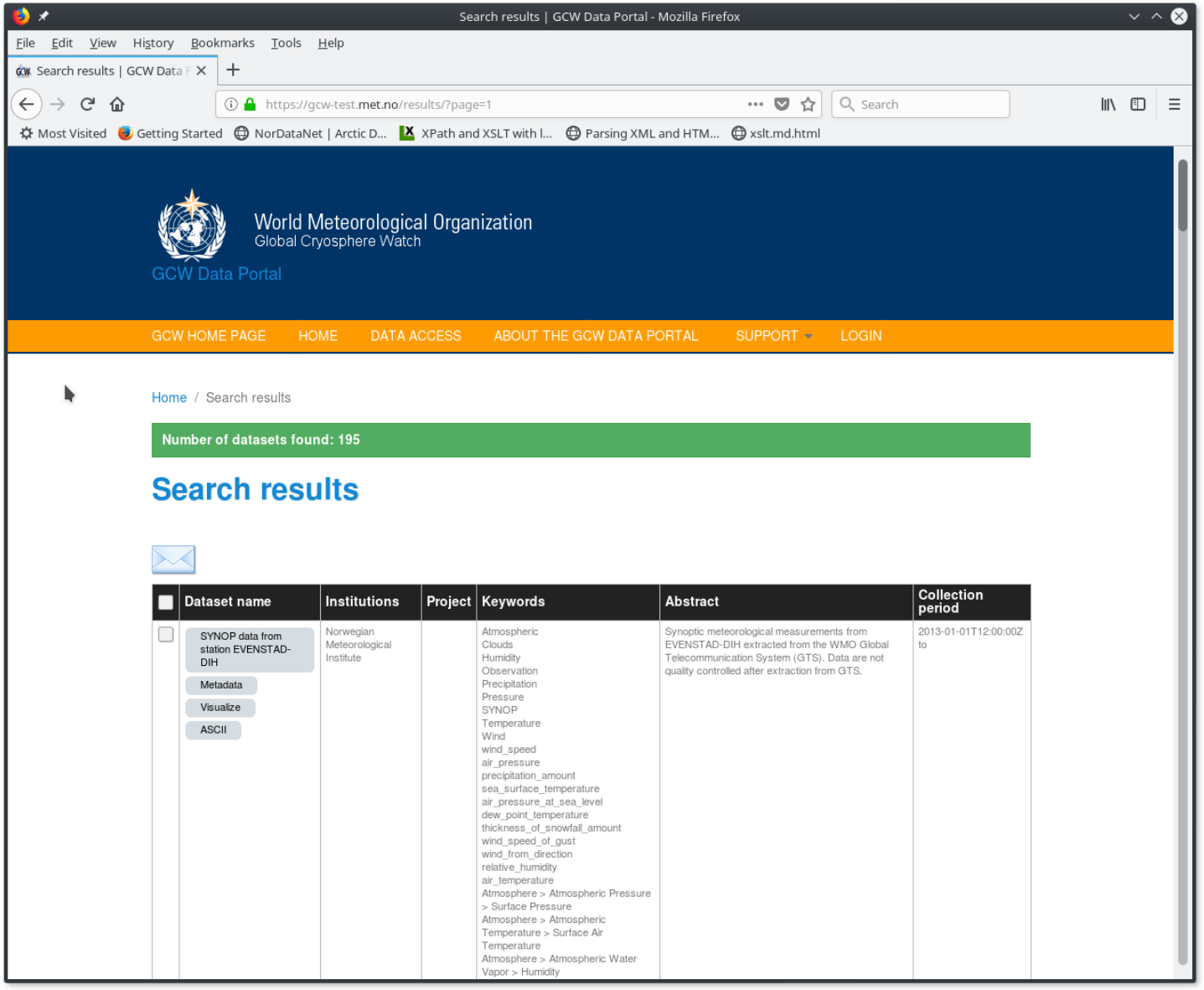
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precipitation_amount
sea_surface_temperature
air_pressure_at_sea_level
dew_point_temperature
thickness_of_snowfall_amount
wind_speed_of_gust
wind_from_direction
relative_humidity
air_temperature
Atmosphere > Atmospheric Pressure > Surface Pressure
Atmosphere > Atmospheric Temperature > Surface Air Temperature
Atmosphere > Atmospheric Water Vapor > Humidity
Synoptic meteorological measurements from EVENSTAD-DIH extracted from the WMO Global Telecommunication System (GTS). Data are not quality controlled after extraction from GTS.
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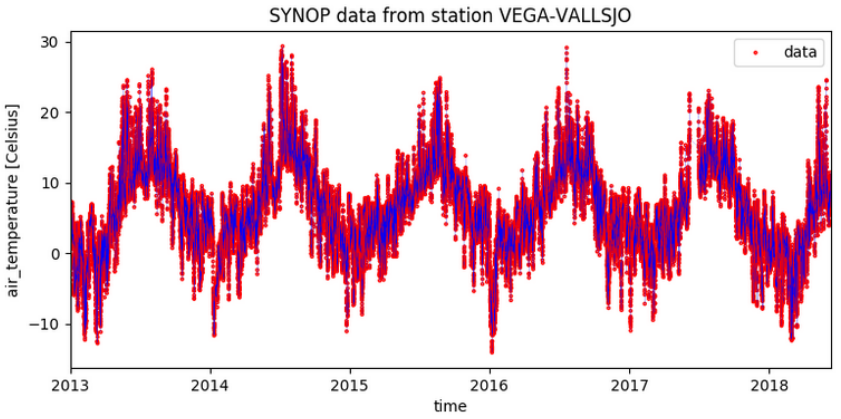

X-axis variable

time

Plot every Nth data point

1

Y-axis variable

air_temperature

Output file format

PNG

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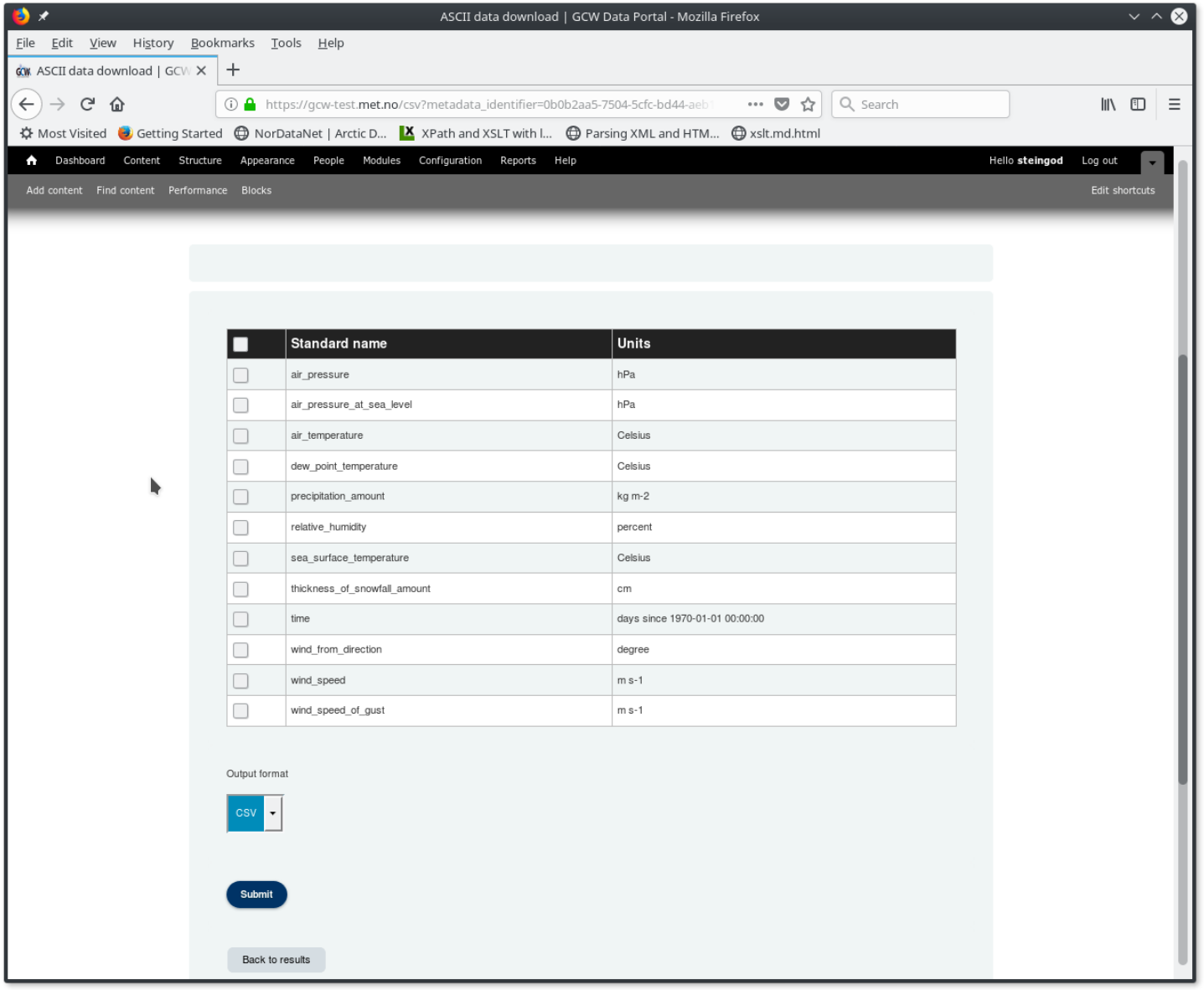
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