Annotated Atlas

Abdelkader Mezghani
Hans Christian Nenseth
Bard Saadatnejad

WeADL 2023 Workshop

The workshop is organized under the umbrella of WeaMyL, project funded by the EEA and Norway Grants under the RO-NO-2019-0133.
Contract: No 26/2020

Web-Application

- What is the Annotated Atlas?
- Who is it intended for?
- Components of the Annotated Atlas
- Deployment of the Annotated Atlas
- How it is linked to other WeaMyL components?

What is the Annotated Atlas?

It is a web browser based tool for searching through and analysing weather warnings issued as Common Alerting Protocol (CAP) documents.

Who is it intended for?

Research meteorologists

- Easy access to source observation datasets
- Identify good training data for machine learning

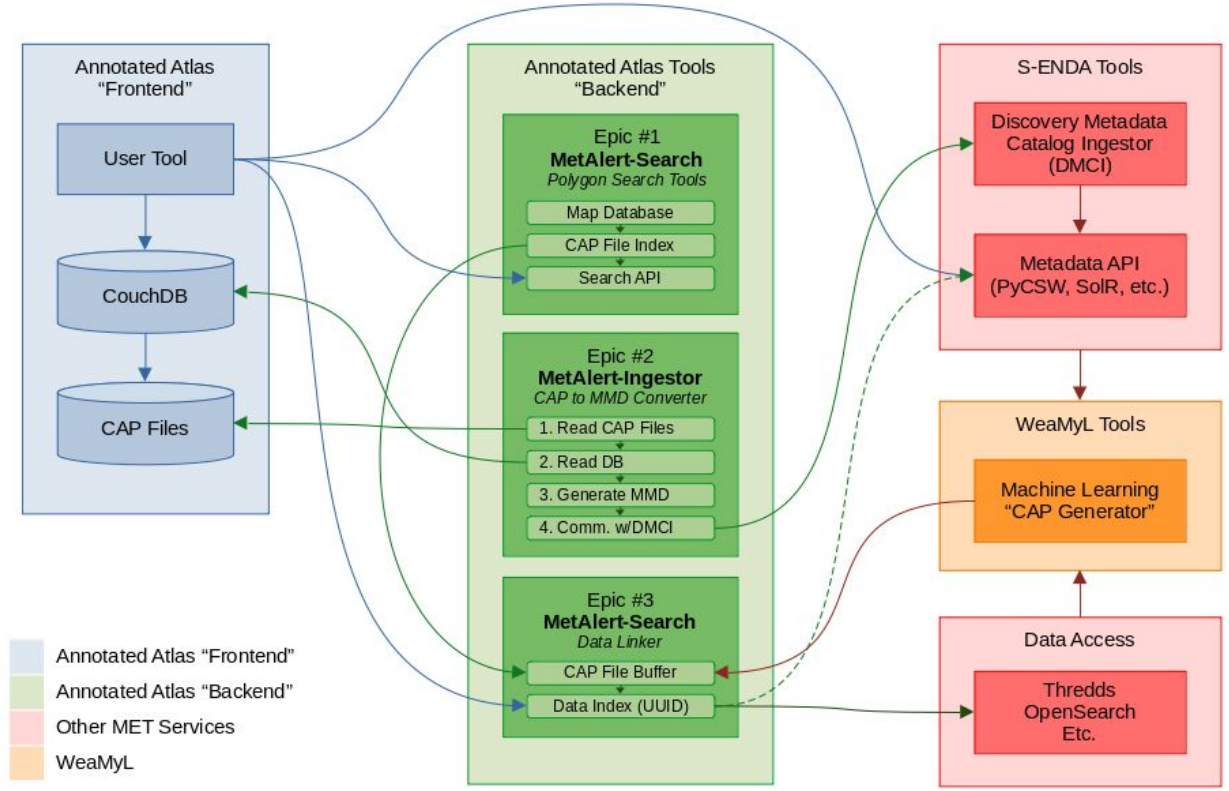
Operational meteorologists,

- Analyse the weather warnings proposal
- Review earlier warnings
- Give the earlier warnings hit rate grades

Flowchart of the main components of the Annotated Atlas

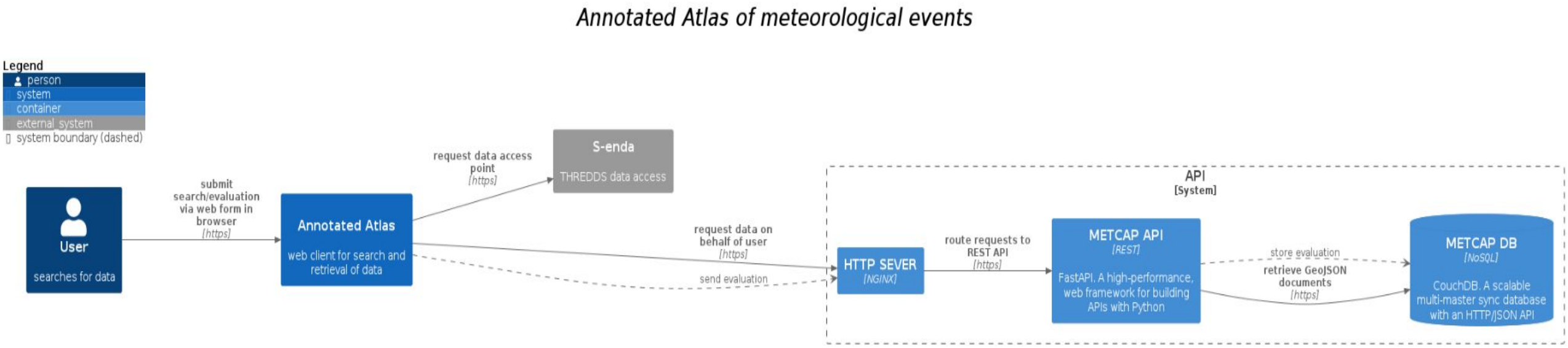
Components of the Annotated Atlas

- Front-end
  - User tools
  - CouchDB
  - CAP Files
- Back-end
  - MEtAlert Search
  - MEtAlert Ingestor



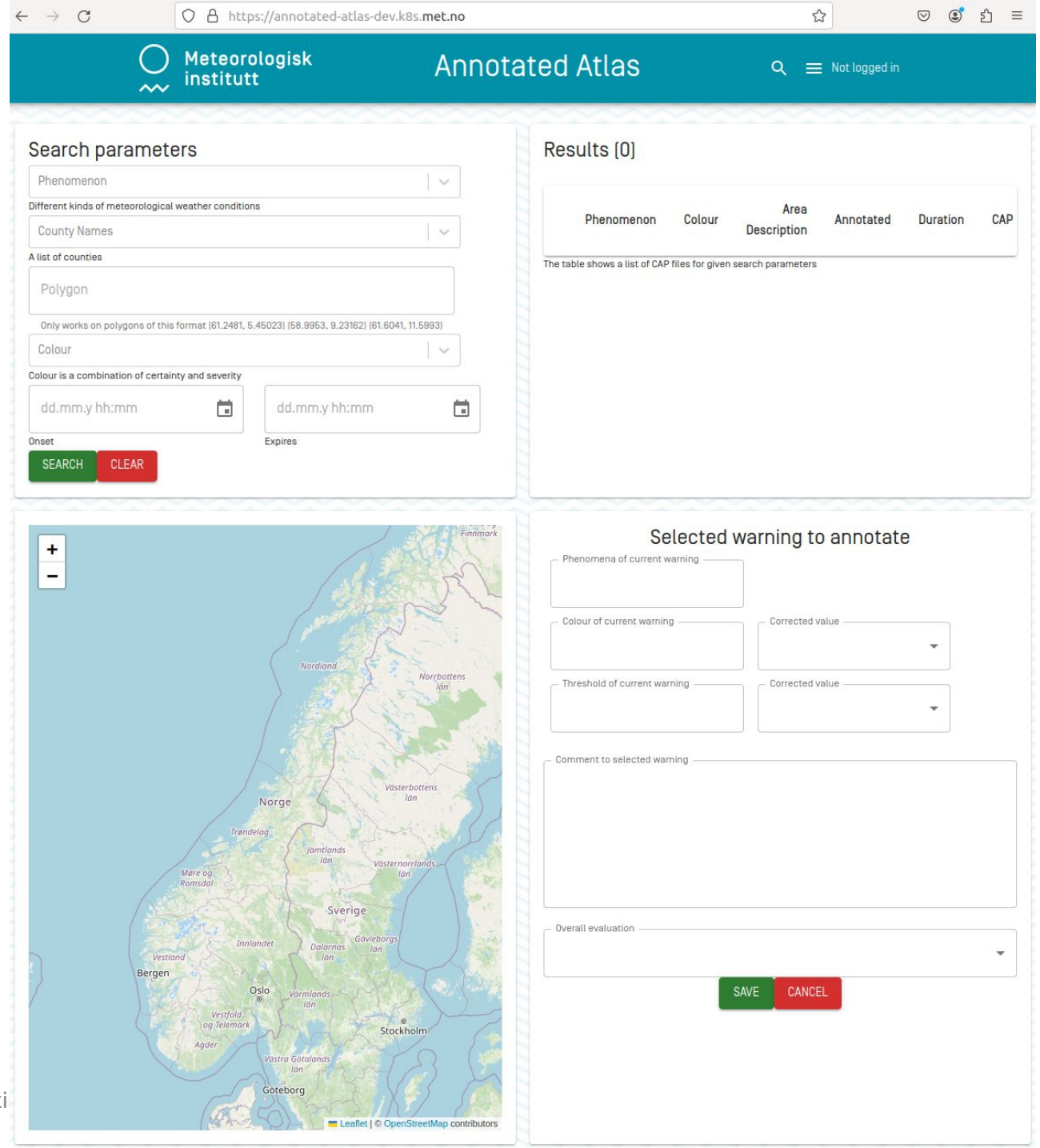
Flowchart of the main components of the Annotated Atlas

“Follow the data”



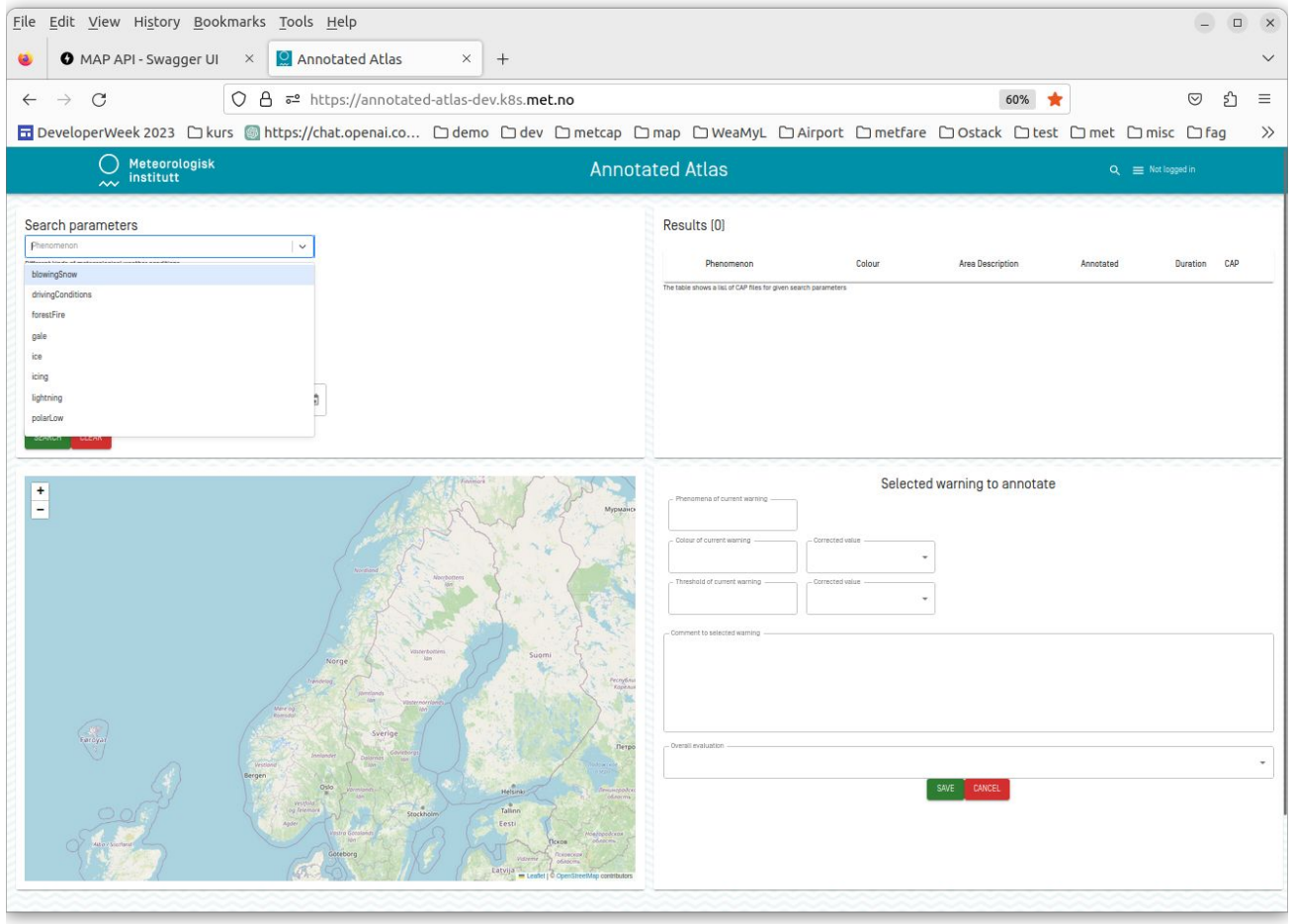
Browser interface

. specify your search



Browser interface

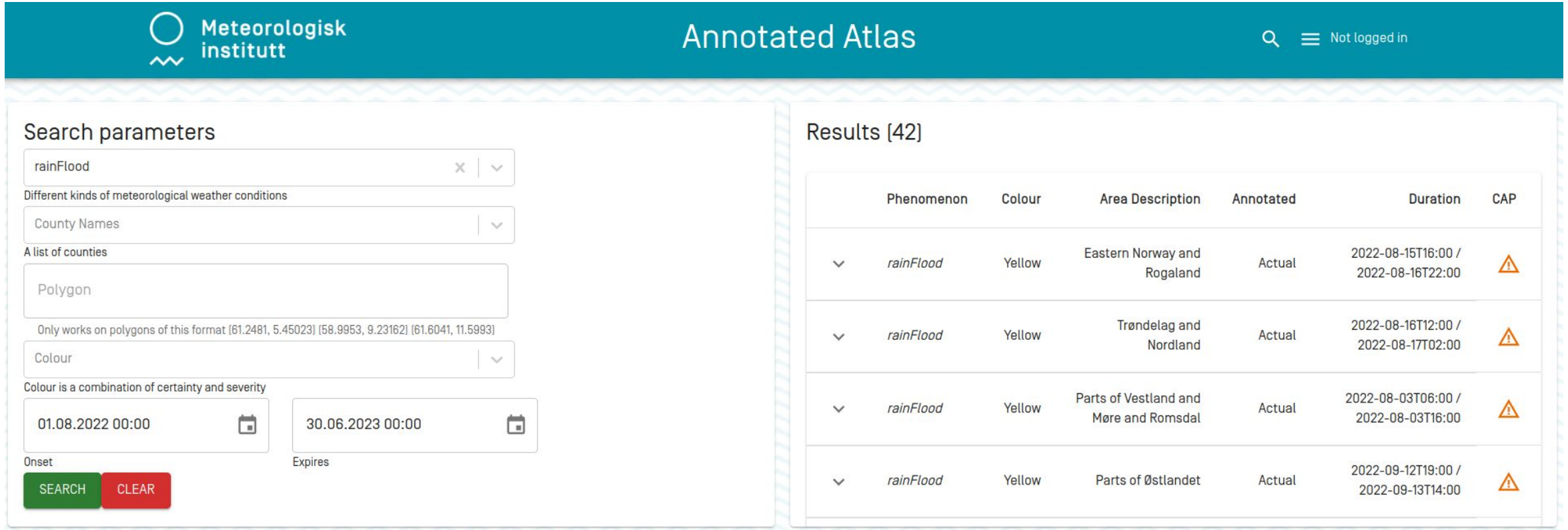
. dynamically updated dropdowns



Browser interface

. number of results

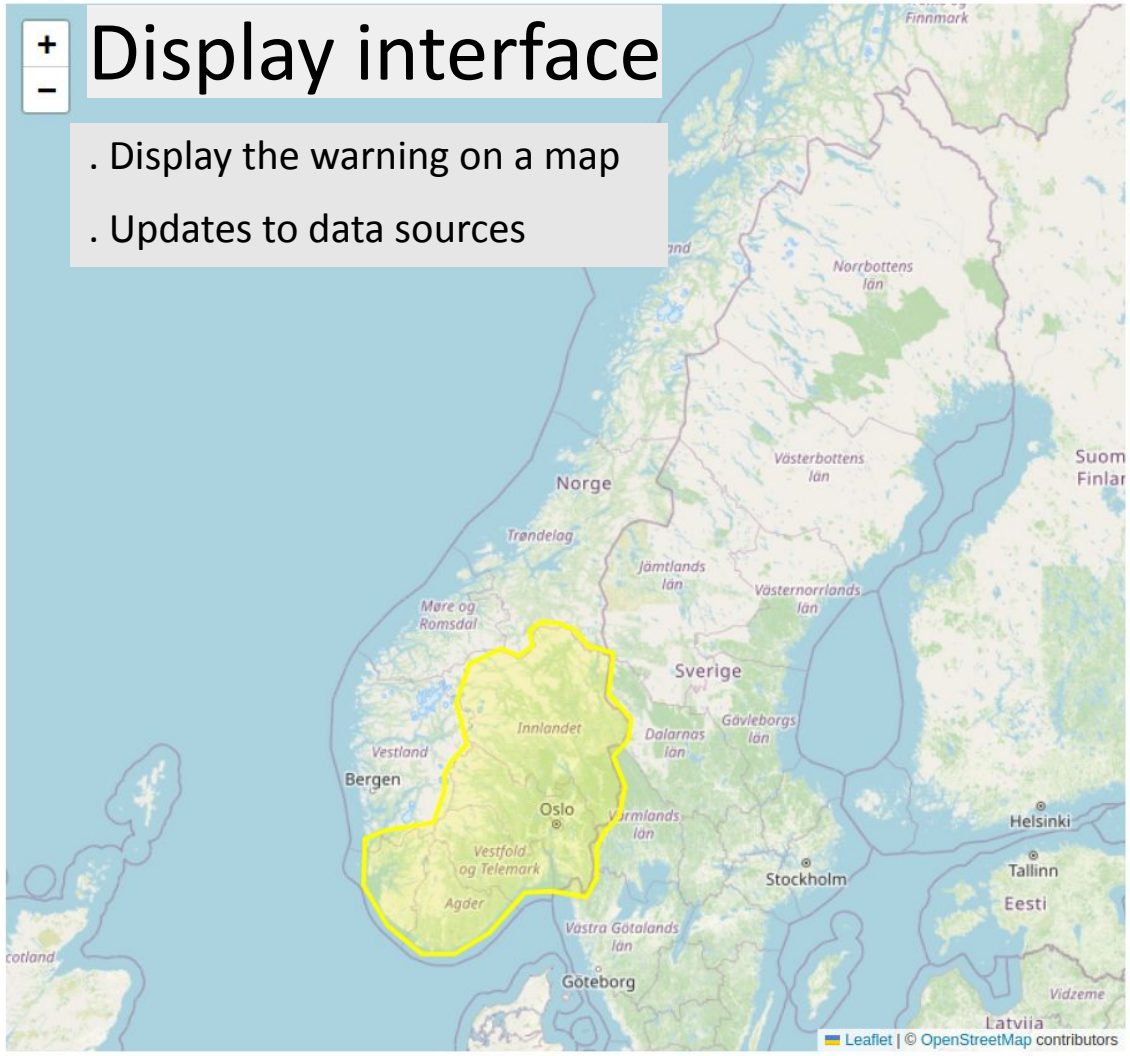
. links to data sources



Display interface

. Display the warning on a map

. Updates to data sources



Selected warning to annotate

Phenomena of current warning: Rain flood

Colour of current warning: yellow

Corrected value:

Threshold of current warning: no value given

Corrected value:

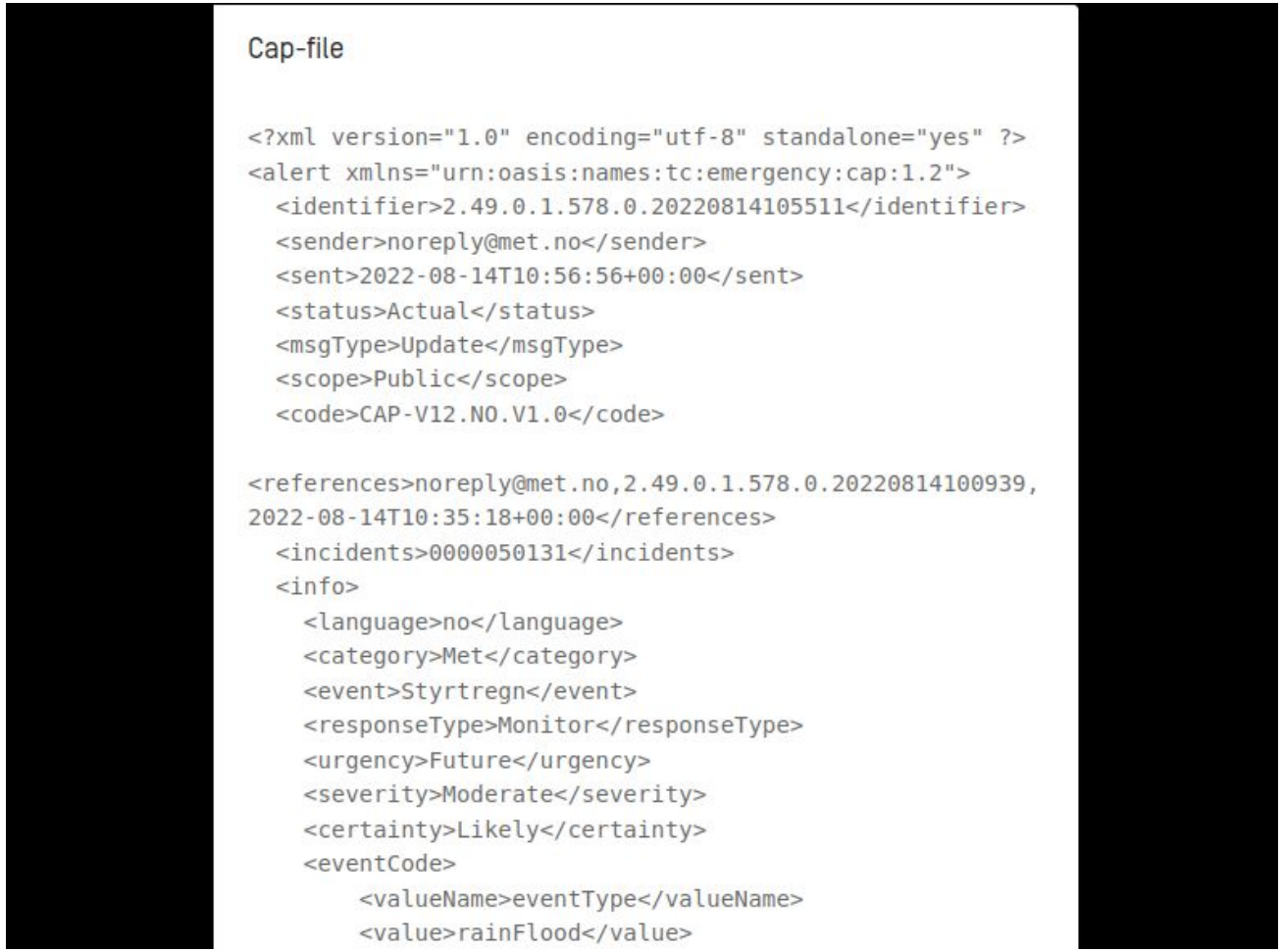
Comment to selected warning:

Overall evaluation:

SAVE CANCEL

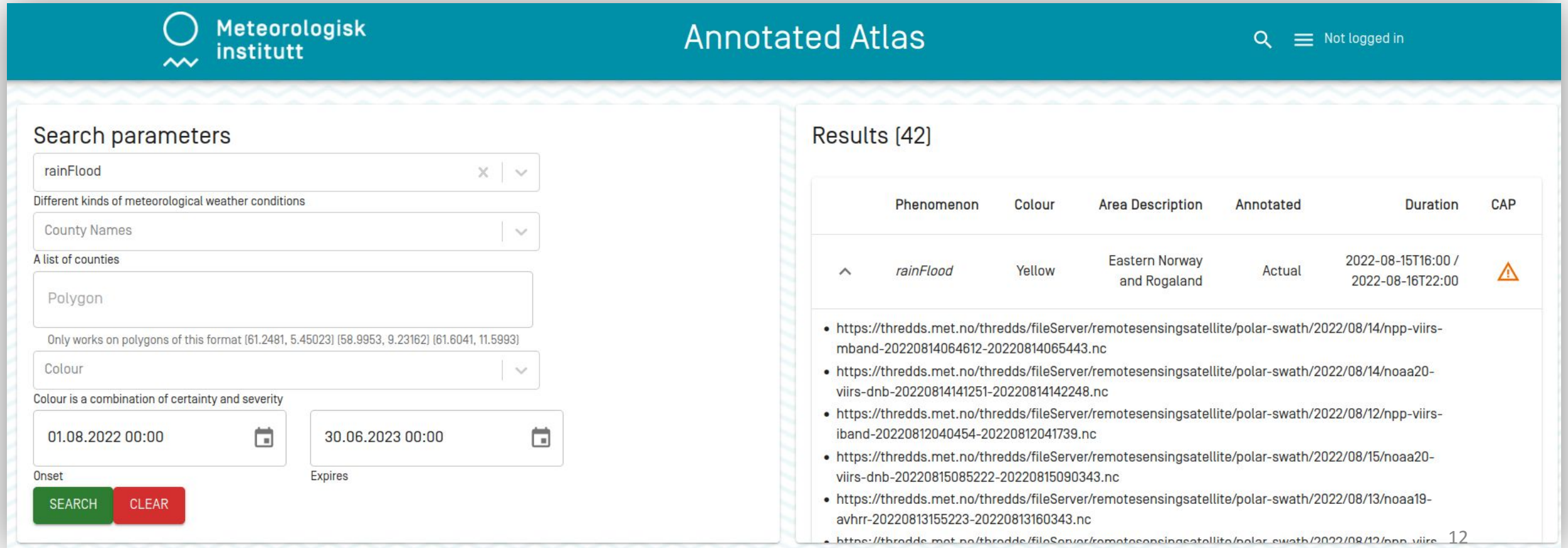
Browser interface

. view the original CAP document



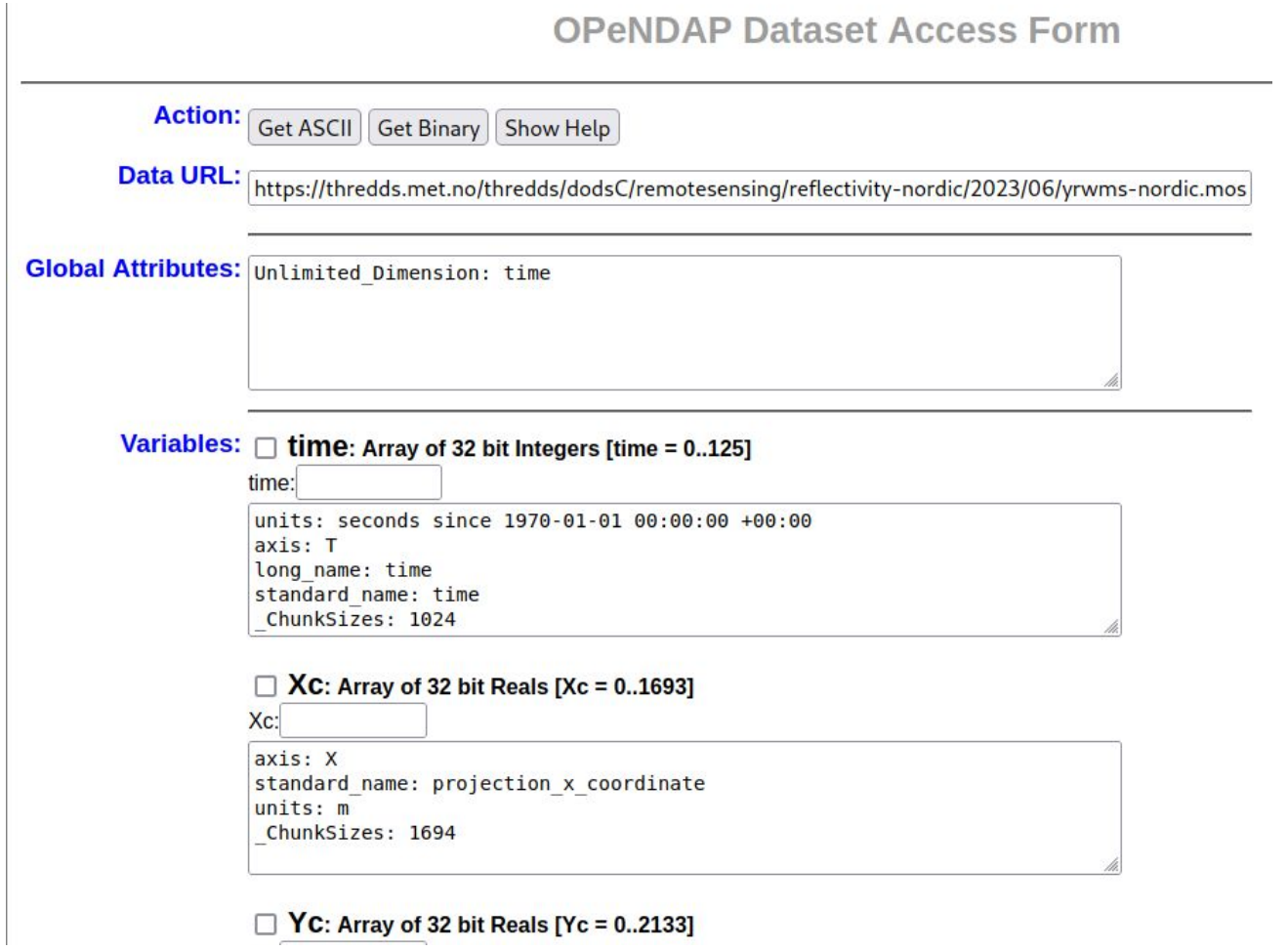
Browser interface

. **Submit a request for THREDDS *data access*** (Findability, Accessibility, Interoperability, Reusability: FAIR)



THREDDS

OPeNDAP



THREDDS

WCS Capabilities

https://thredds.met.no/thredds/wcs/remotesensing/reflectivity-nordic/2023/06/yrwms-n 120%

L file does not appear to have any style information associated with it. The document tree is shown below.


```
_Capabilities version="1.0.0">
vice>
ees>NONE</fees>
ccessConstraints>NONE</accessConstraints>
rvice>
pability>
equest>
GetCapabilities>
-<DCPType>
 -<HTTP>
  -<Get>
   <OnlineResource xlink:href="https://thredds.met.no/thredds/wcs/remotesensing/reflectivity-nor
   /2023/06/yrwms-nordic.mos.pcappi-0-dbz.noclass-clfilter-novpr-clcorr-block.nordiclcc-1000.202306
  </Get>
 </HTTP>
</DCPType>
</GetCapabilities>
DescribeCoverage>
-<DCPType>
 -<HTTP>
  -<Get>
   <OnlineResource xlink:href="https://thredds.met.no/thredds/wcs/remotesensing/reflectivity-nor
   /2023/06/yrwms-nordic.mos.pcappi-0-dbz.noclass-clfilter-novpr-clcorr-block.nordiclcc-1000.202306
  </Get>
 </HTTP>
</DCPType>
```

THREDDS

WMS Capabilities

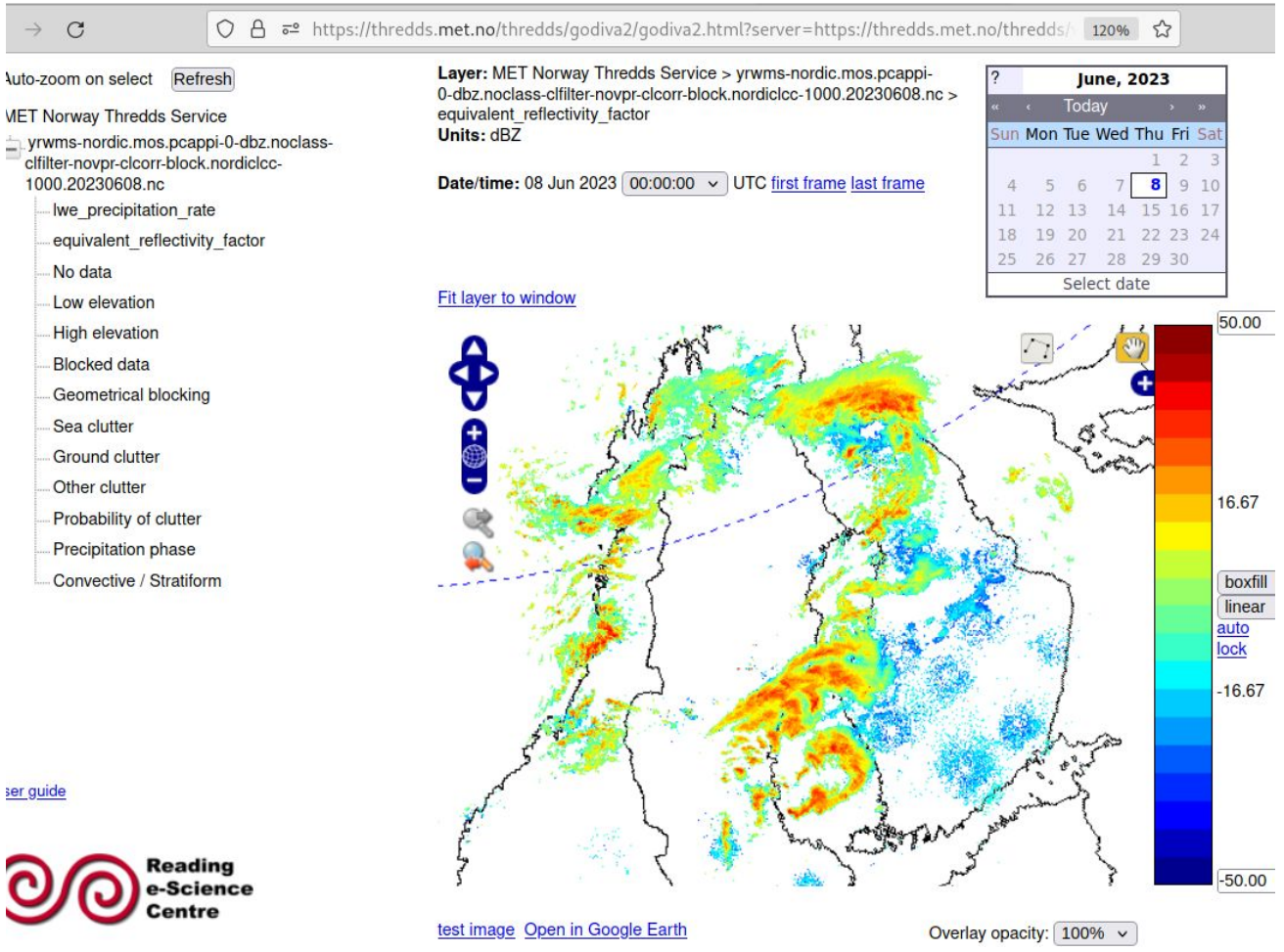
https://thredds.met.no/thredds/wms/remotesensing/reflectivity-nordic/2023/06/yrwms- 120%

XML file does not appear to have any style information associated with it. The document tree is shown belo

```
MS_Capabilities version="1.3.0" updateSequence="2023-06-08T10:52:30.563Z"
chemaLocation="http://www.opengis.net/wms http://schemas.opengis.net/wms/1.3.0/capabilities_1_3_0.
ervice>
<Name>WMS</Name>
<Title>MET Norway Thredds Service</Title>
<Abstract>Scientific Data</Abstract>
<KeywordList>
  <Keyword>meteorology</Keyword>
  <Keyword>atmosphere</Keyword>
  <Keyword>climate</Keyword>
  <Keyword>ocean</Keyword>
  <Keyword>earth science</Keyword>
  <Keyword>humanGeographicViewer</Keyword>
</KeywordList>
<OnlineResource xlink:type="simple" xlink:href="http://met.no/"/>
<ContactInformation>
-<ContactPersonPrimary>
    <ContactPerson>Servicedesk</ContactPerson>
    <ContactOrganization>MET Norway</ContactOrganization>
  </ContactPersonPrimary>
  <ContactVoiceTelephone>+47 22 96 31 00</ContactVoiceTelephone>
  <ContactElectronicMailAddress>thredds@met.no</ContactElectronicMailAddress>
</ContactInformation>
<Fees>
  Credit should be given to The Norwegian Meteorological Institute as the source of data
</Fees>
```

THREDDS

Godiva



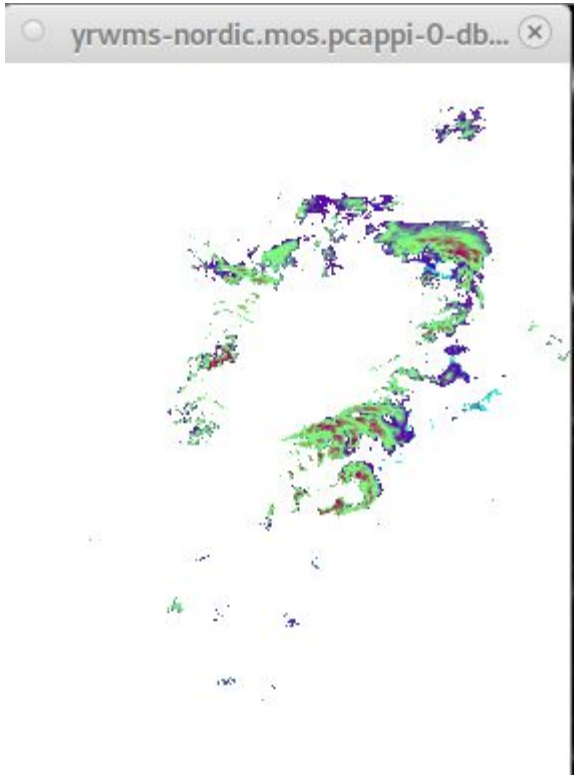
Examine NetCDF

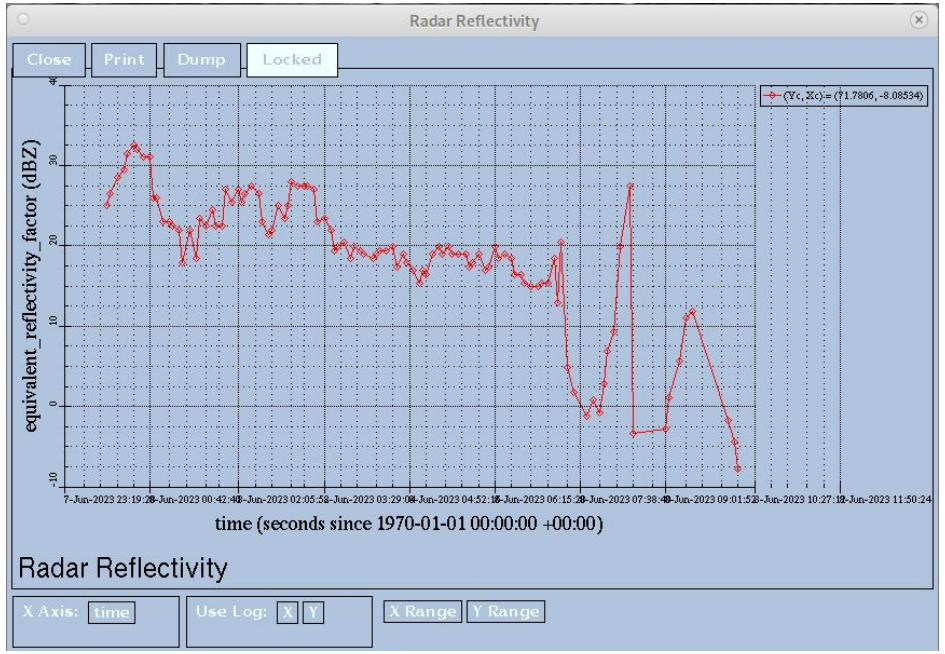
ncdump

```
efs +R=6.371e+06" ;
        int mosaic_info ;
                mosaic_info:nodes = "norsg,noand,nober,nobml,nohas,nohgb,nohur,nohfj,
smn,nosta,fianj,fikan,fikes,fikor,fikuo,filuo,finur,fipet,fiuta,fivih,fivim,sebaa,seh
,selek,selul,seosu,seovi,sevar,sevil" ;
                mosaic_info:missing_nodes = "seang,sease" ;
        float lwe_precipitation_rate(time, Yc, Xc) ;
                lwe_precipitation_rate:standard_name = "lwe_precipitation_rate" ;
                lwe_precipitation_rate:long_name = "Radar Precipitation Rate" ;
                lwe_precipitation_rate:units = "mm/h" ;
                lwe_precipitation_rate:_FillValue = 9.96921e+36f ;
                lwe_precipitation_rate:coordinates = "lon lat" ;
                lwe_precipitation_rate:grid_mapping = "projection_lambert" ;
        float equivalent_reflectivity_factor(time, Yc, Xc) ;
                equivalent_reflectivity_factor:standard_name = "equivalent_reflectivi
                equivalent_reflectivity_factor:long_name = "Radar Reflectivity" ;
                equivalent_reflectivity_factor:units = "dBZ" ;
                equivalent_reflectivity_factor:_FillValue = 9.96921e+36f ;
                equivalent_reflectivity_factor:coordinates = "lon lat" ;
                equivalent_reflectivity_factor:grid_mapping = "projection_lambert" ;
        byte is_nodata(time, Yc, Xc) ;
                is_nodata:long_name = "No data" ;
                is_nodata:units = "flag: 1=on, 0=off" ;
                is_nodata:coordinates = "lon lat" ;
                is_nodata:grid_mapping = "projection_lambert" ;
        byte is_lowele(time, Yc, Xc) ;
                is_lowele:long_name = "Low elevation" ;
                is_lowele:units = "flag: 1=on, 0=off" ;
```

Examine NetCDF

Ncview

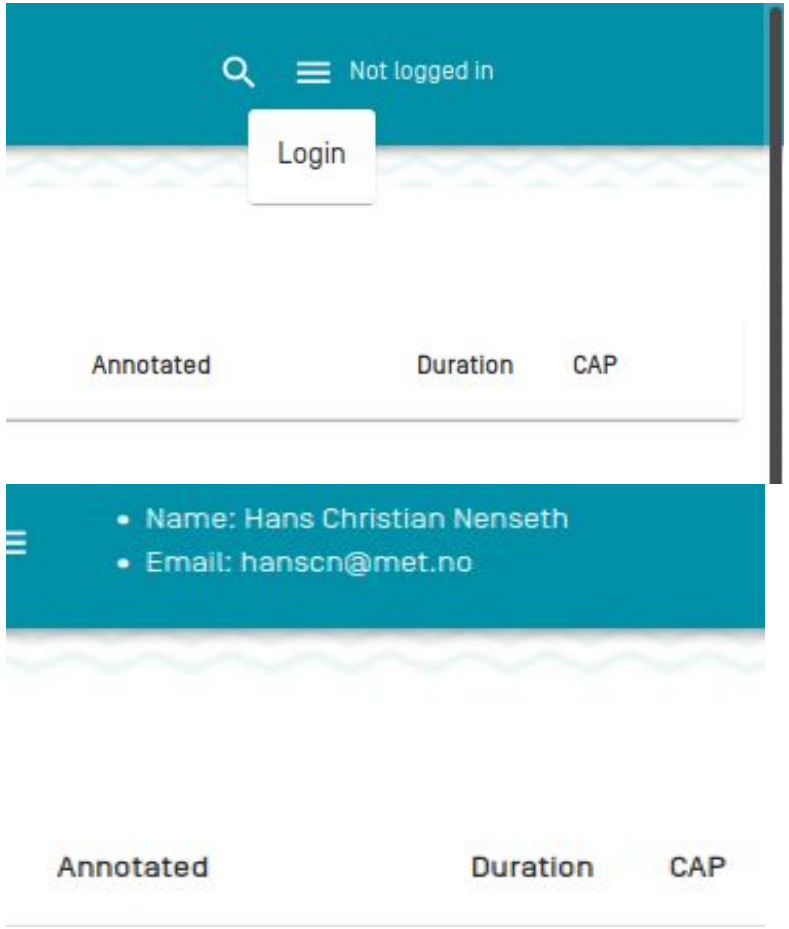


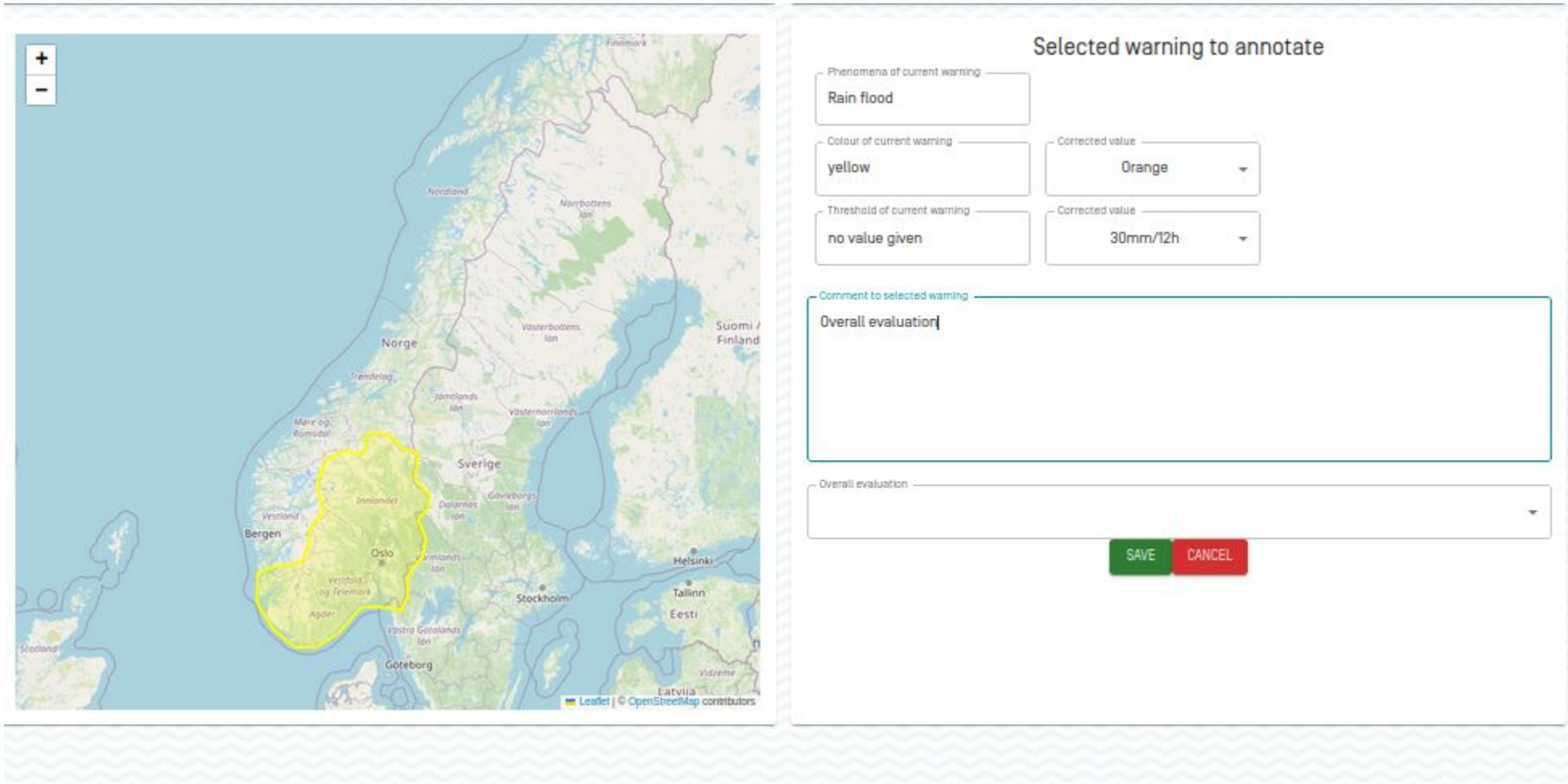


Other tools for analysis include Panoply, Integrated Data Viewer and HDFView.

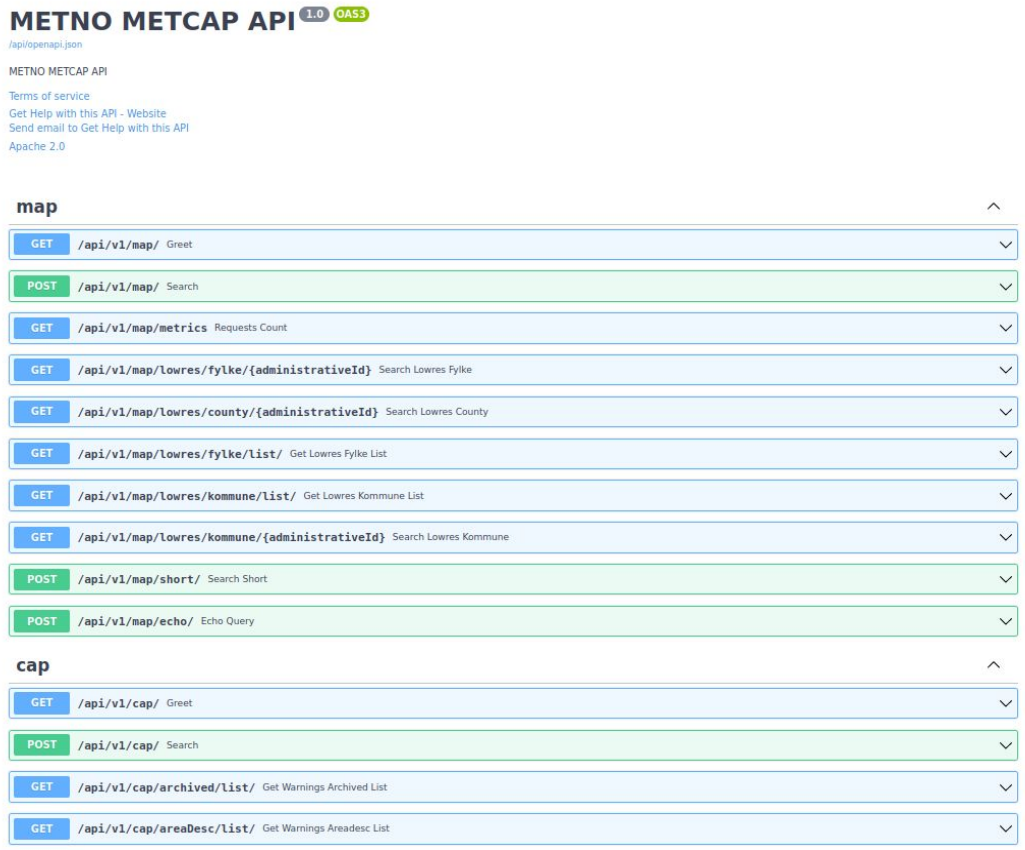
Browser interface

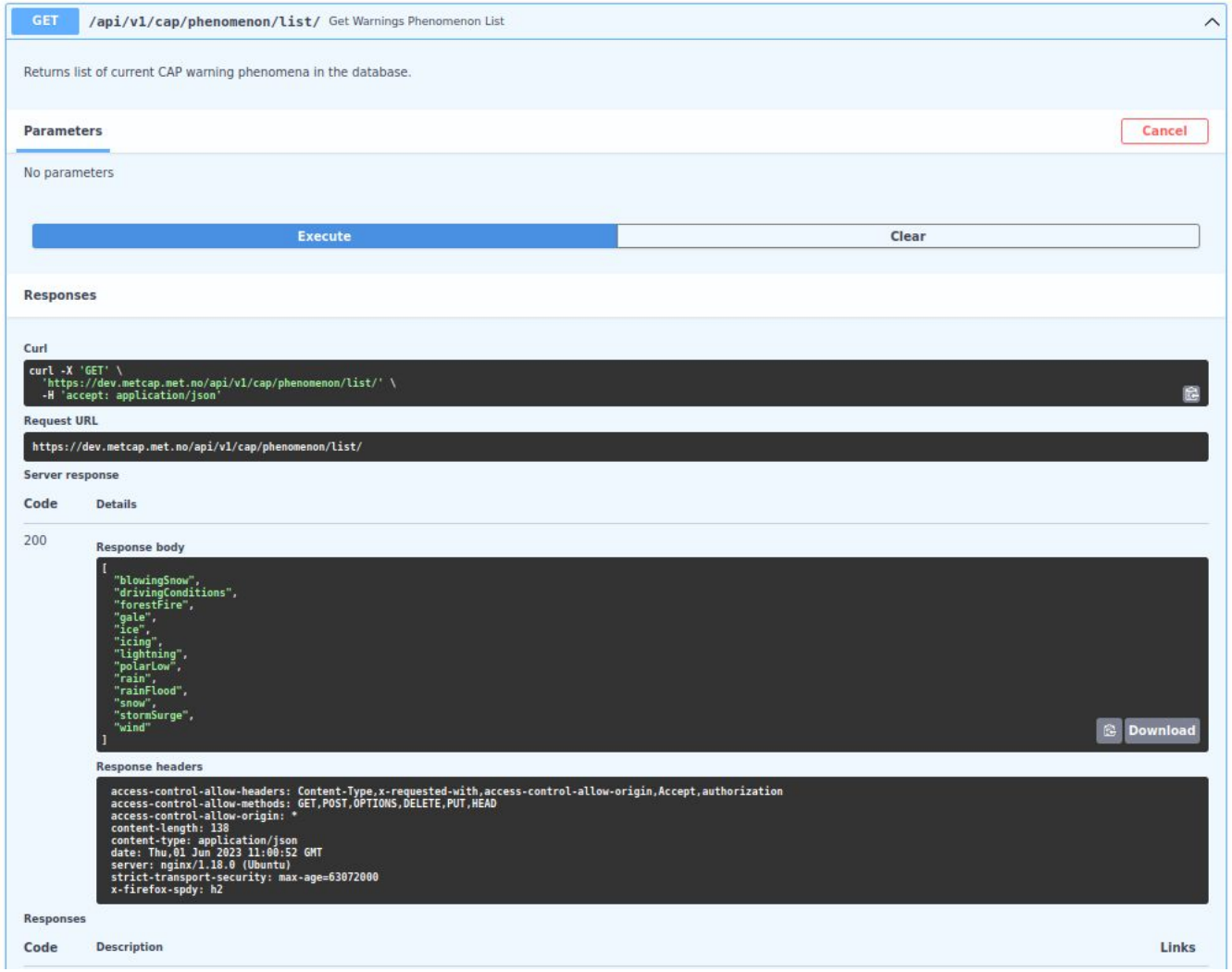
login to “annotate” CAP

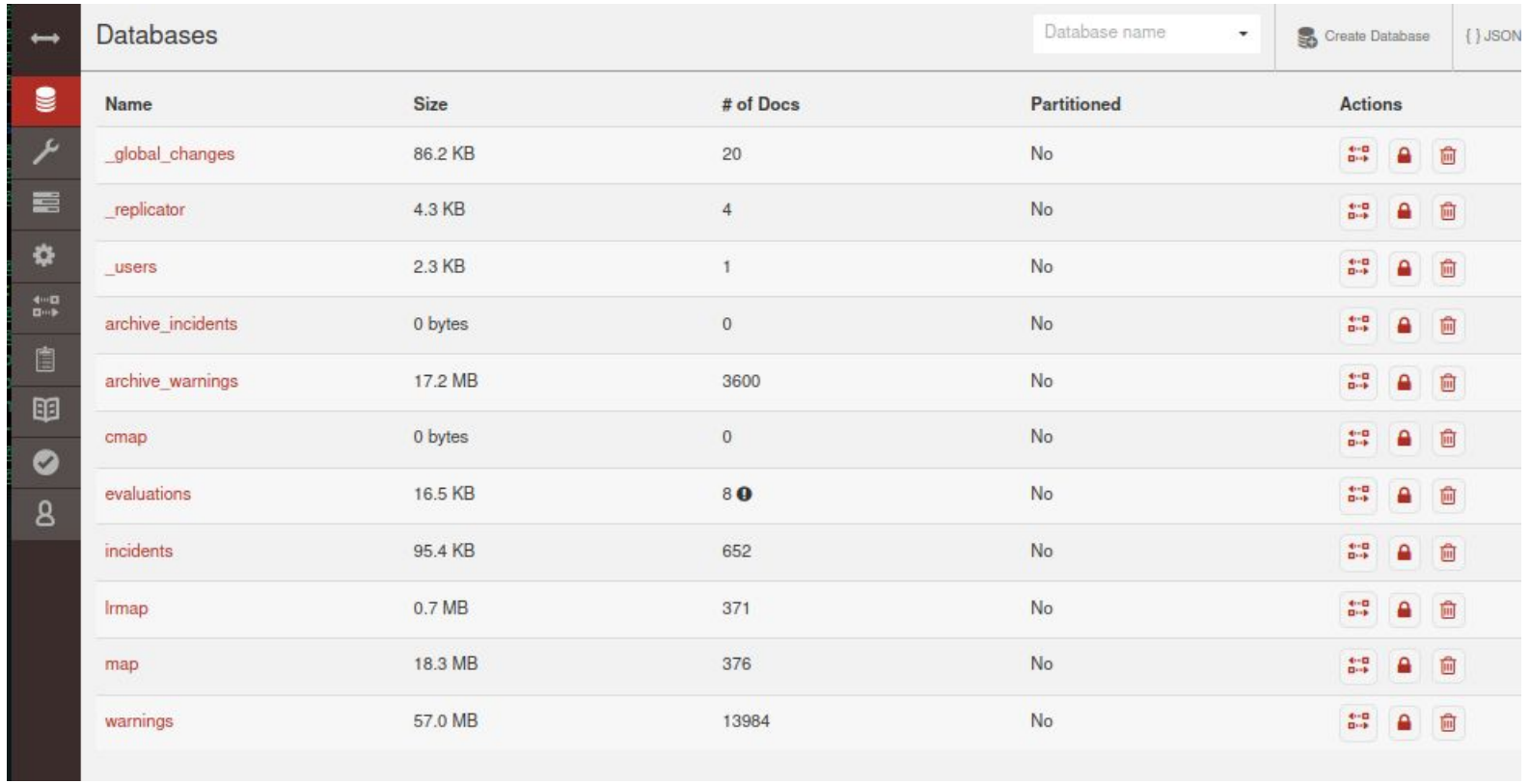



Selected warning to annotate
Phenomena of current warning
Rain flood
Colour of current warning
yellow
Corrected value
Orange
Threshold of current warning
no value given
Corrected value
30mm/12h
Comment to selected warning
Overall evaluation
Overall evaluation
SAVE
CANCEL
Norge
Sverige
Suomi / Finland
Bergen
Oslo
Stockholm
Helsinki
Tallinn
Eesti
Göteborg
Latvija
Leaflet | © OpenStreetMap contributors

Under the hood: webserver, API and DB



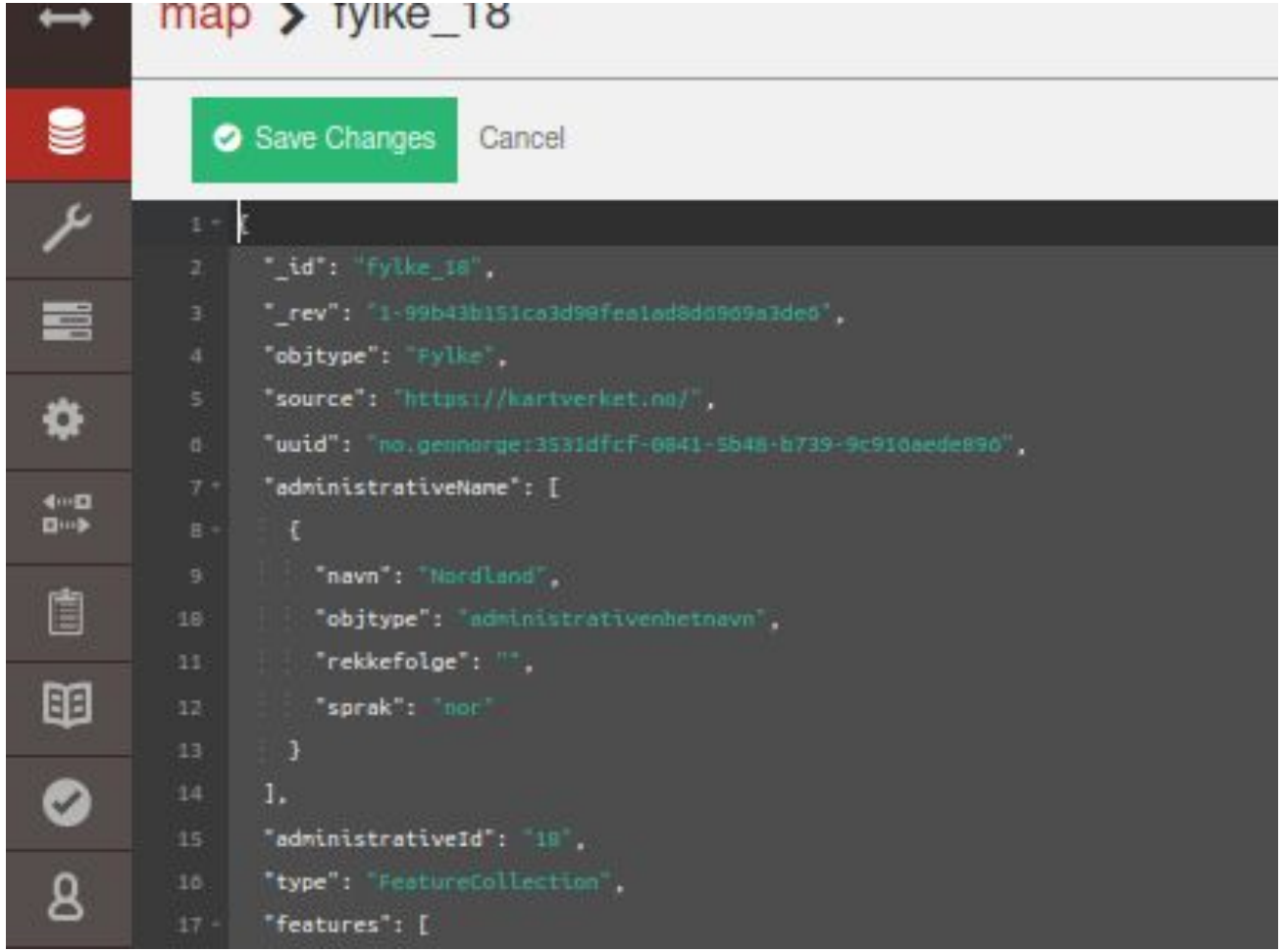

GET
/api/v1/cap/phenomenon/list/
Get Warnings Phenomenon List
Returns list of current CAP warning phenomena in the database.
Parameters
Cancel
No parameters
Execute
Clear
Responses
Curl
curl -X 'GET' \
'https://dev.metcap.met.no/api/v1/cap/phenomenon/list/' \
-H 'accept: application/json'
Request URL
https://dev.metcap.met.no/api/v1/cap/phenomenon/list/
Server response
Code
Details
200
Response body
[
"blowingSnow",
"drivingConditions",
"forestFire",
"gale",
"ice",
"icing",
"lightning",
"polarLow",
"rain",
"rainFlood",
"snow",
"stormSurge",
"wind"
]
Download
Response headers
access-control-allow-headers: Content-Type,x-requested-with,access-control-allow-origin,Accept,authorization
access-control-allow-methods: GET,POST,OPTIONS,DELETE,PUT,HEAD
access-control-allow-origin: *
content-length: 138
content-type: application/json
date: Thu,01 Jun 2023 11:00:52 GMT
server: nginx/1.18.0 (Ubuntu)
strict-transport-security: max-age=63072000
x-firefox-spdy: h2
Responses
Code
Description
Links

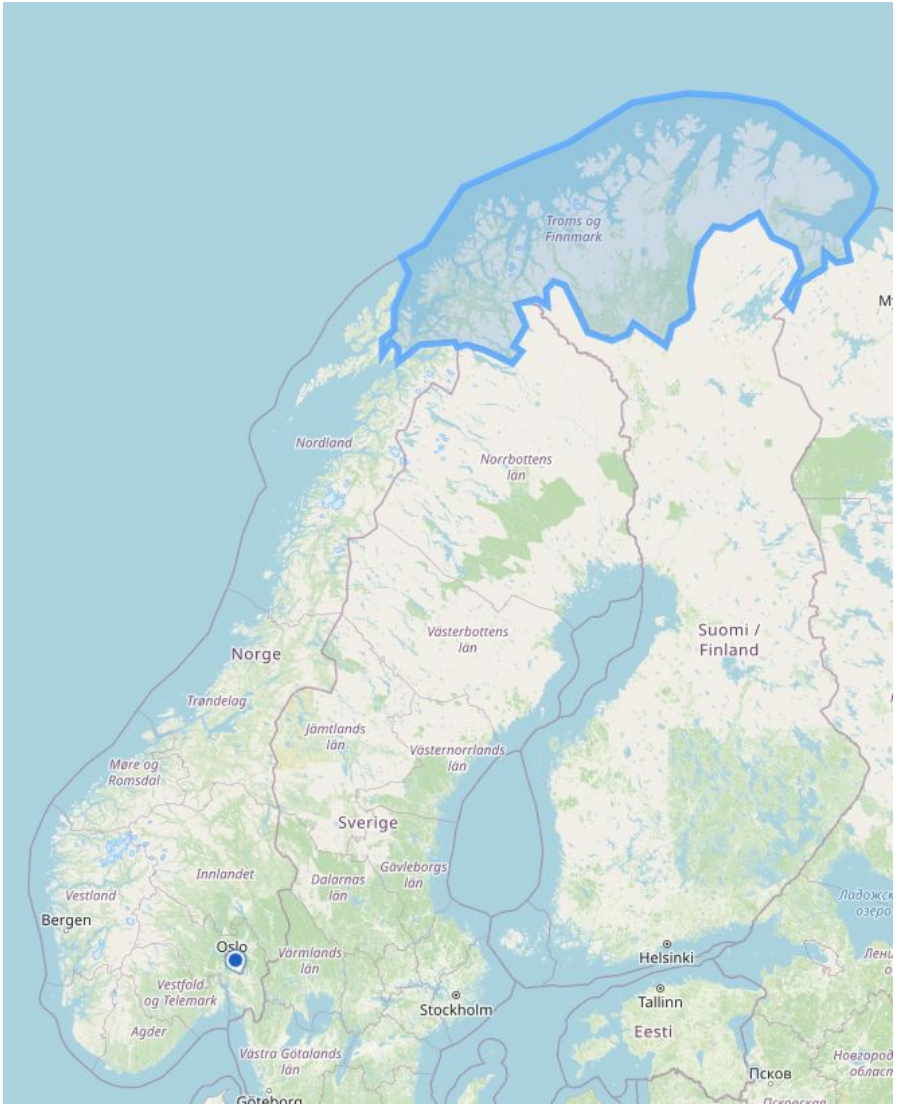


Name	Size	# of Docs	Partitioned	Actions
_global_changes	86.2 KB	20	No	
_replicator	4.3 KB	4	No	
_users	2.3 KB	1	No	
archive_incidents	0 bytes	0	No	
archive_warnings	17.2 MB	3600	No	
cmap	0 bytes	0	No	
evaluations	16.5 KB	8	No	
incidents	95.4 KB	652	No	
lrmap	0.7 MB	371	No	
map	18.3 MB	376	No	
warnings	57.0 MB	13984	No	

CouchDB

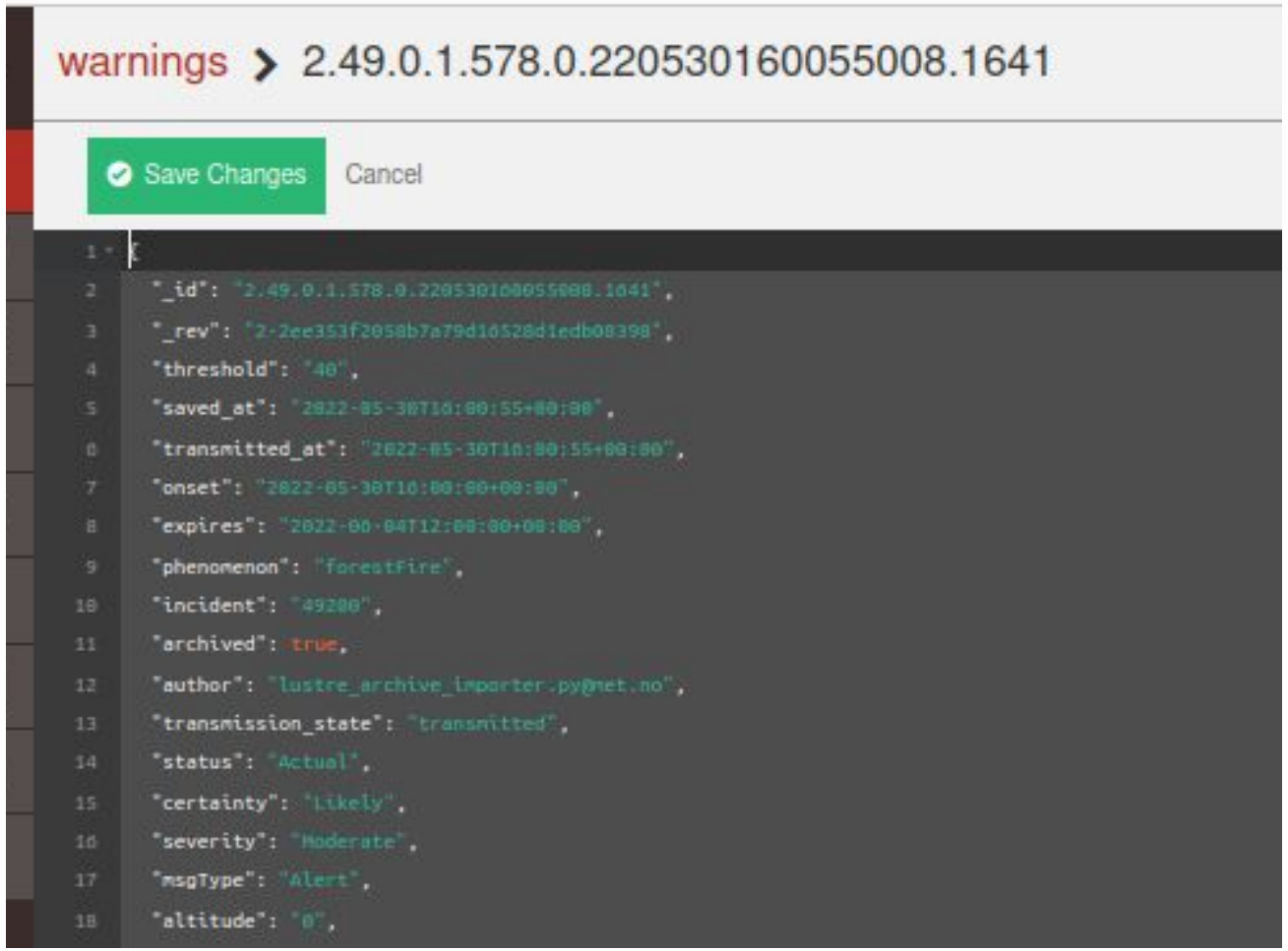
MAP as GeoJSON

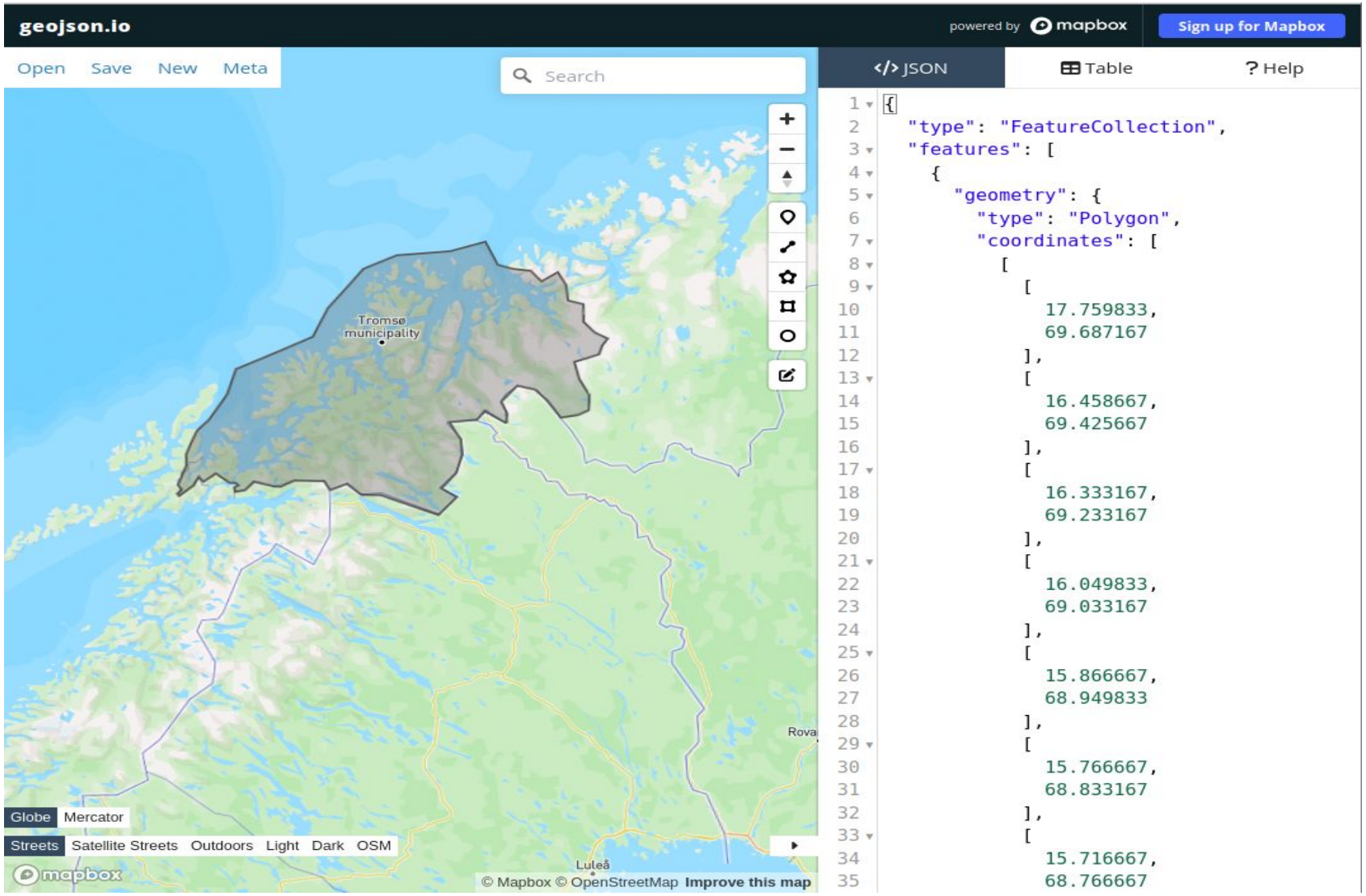



Troms og Finnmark
Nordland
Norrbottens län
Västerbottens län
Norge
Suomi / Finland
Trøndelag
Jämtlands län
Västernorrlands län
Møre og Romsdal
Sverige
Innlandet
Dalarnas län
Gävleborgs län
Vestland
Bergen
Oslo
Värmlands län
Helsinki
Vestfold og Telemark
Stockholm
Tallinn
Agder
Eesti
Västra Götalands län
Псков

CouchDB

CAP as GeoJSON




geojson.io
powered by mapbox
Sign up for Mapbox
Open
Save
New
Meta
Search
JSON
Table
Help
Tromsø municipality
Globe
Mercator
Streets
Satellite Streets
Outdoors
Light
Dark
OSM
© Mapbox © OpenStreetMap Improve this map
{
"type": "FeatureCollection",
"features": [
{
"geometry": {
"type": "Polygon",
"coordinates": [
[
[
17.759833,
69.687167
],
[
16.458667,
69.425667
],
[
16.333167,
69.233167
],
[
16.049833,
69.033167
],
[
15.866667,
68.949833
],
[
15.766667,
68.833167
],
[
15.716667,
68.766667

Deployment

- Open source and available on GitHub: Annotated Atlas and METCAP API
- Docker/Docker compose container based