



SeaDataCloud

WP10 – Virtual Research Environment –

Progress of VRE development

WP10 team

sdn-userdesk@seadatanet.org – www.seadatanet.org

Outline

1. SDC VRE – progress summary
2. Demo of individual components
 - Marine-ID and B2Access (Themis, 5 mins)
 - WebODV (Sebastian, 10 mins)
 - DIVAnd and Notebooks (Charles, 10 mins)
 - Biological QC (Simon, 5 mins)
 - Visualisation (Giorgio, 5 mins)
3. VRE deadlines and deliverables

1. VRE – Progress summary



SeaDataClouds VRE needs to:

- Facilitate collaborative and individual research:
- Combine data with subsets from other data resources, such as the ingested collections
- Have a high capacity and performance for big data processing and state-of-the-art web visualisation services

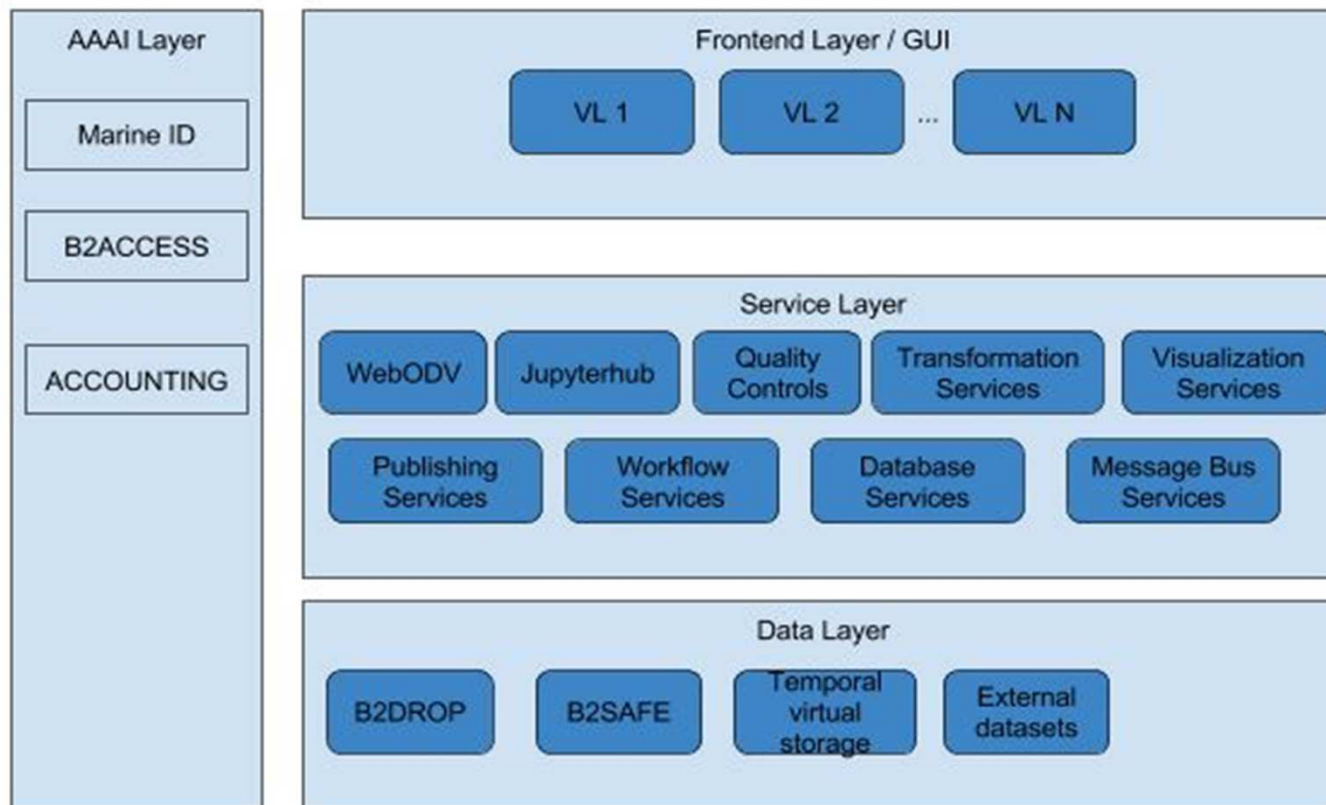


- Respect privacy of users and differences in data policies. Differentiated users, different access to data and data products.
- Be possible to configure virtual work spaces for individuals or groups to work on specific projects, including setting up of dedicated pools of data
- Allow producers to decide whether their outcomes will be shared in the public domain or stay private
- Be based and hosted on EUDAT's infrastructure based on it B2-... service platforms

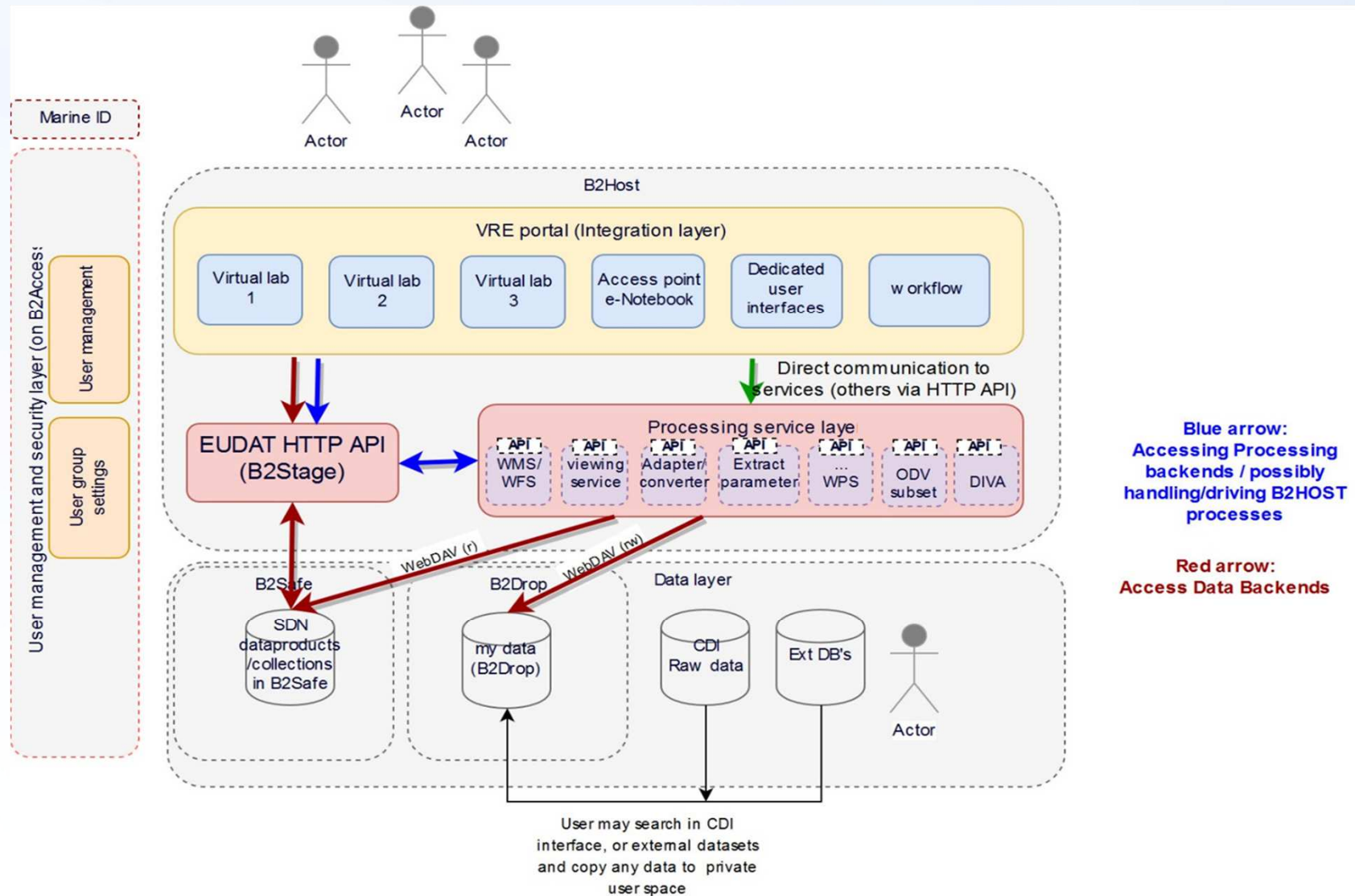
Focus on 5 versatile use cases:

1. **SeaDataNet Temperature and Salinity** water column analysis
2. **EMODNET - Chemistry**, same for bio-geo-chemistry
3. **SeaDataNet Biology Quality Assessment**
4. **EMODNET - HRSM**, DTM processing
5. **Processing and visualising data sets**

SDC VRE Architecture – level 1



SDC VRE Architecture – level 2





Prototype functions targeted of T/S (narrow abstract of total use case!)

log in with single sign on	B2ACCESS + Marine-ID
integration GUI development	Javascript library
apply water column obs quality control with friendly data editor and save result,	webODV
advise data centre of the regional quality control	
be advised of quality control result (email of log of changes/anomalies sorted per DC)	email
configure DIVA interpolation	Jupyter + DIVA library
apply DIVA interpolation, send notification (email) when processing is completed	
visualize interpolation result together with original observations of other observations	
extract and view profiles, time series, hovmuller out of the interpolation result	
publish dataset results (metadata and data), get a DOI	oceanBrowser+sextant-dataCite

2. Progress per component

Some highlights

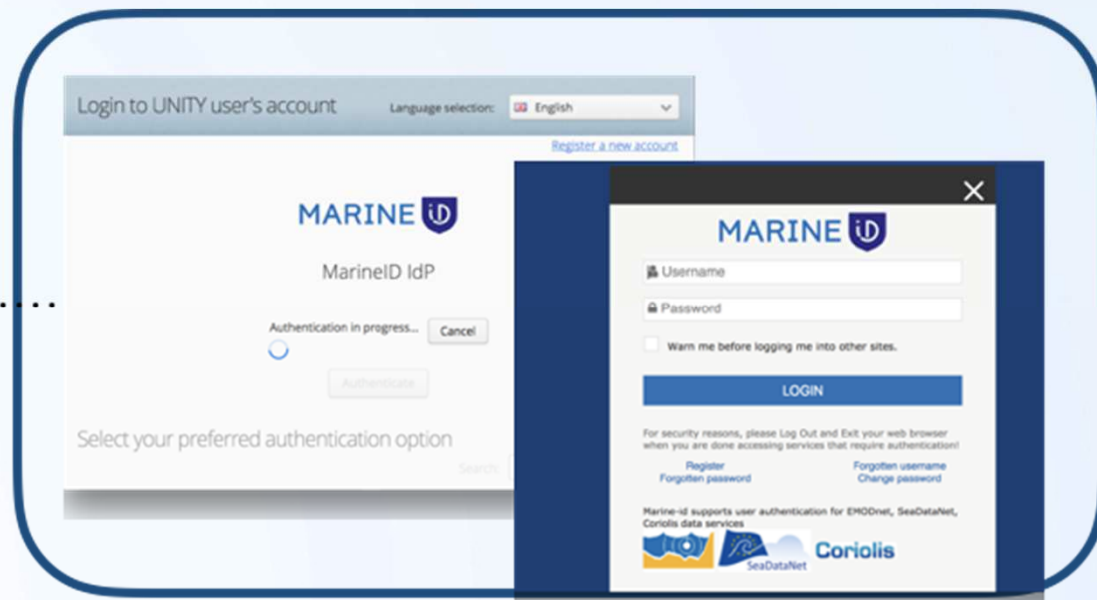
Connecting Marine-ID to B2Access - Themis

Connecting B2ACCESS - Marine-ID

- B2ACCESS is an easy-to-use and secure Authentication and Authorization platform developed by EUDAT. B2ACCESS is versatile and can be integrated with any service.
- Marine-ID is an integrated Registration, Authentication and Accounting infrastructure for marine data users (SeaDataNet, EMODNET, ...).

Connecting B2ACCESS - Marine-ID

Marine-ID has been registered as an Identity Provider in B2ACCESS allowing users to access Services connected to B2ACCESS using their Marine-ID accounts.



Step 1: Demo page

B2ACCESS

B2ACCESS

This service requires the following permissions for your B2ACCESS account:

log in using your identity

read your email address

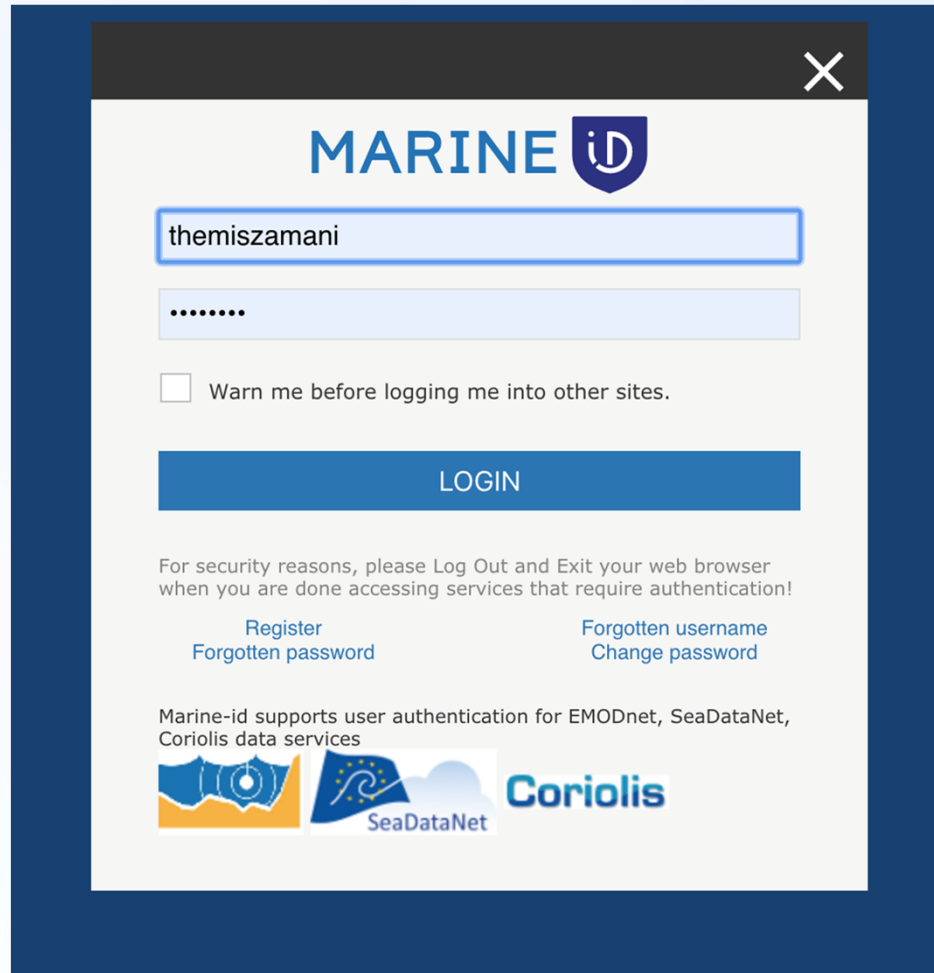
read your basic profile info

access your info while not being logged in

Authorise

Demo: <https://snf-761524.vm.okeanos.grnet.gr/b2access>

Step 2: Insert Credentials



The screenshot shows a login window titled "MARINE iD". It contains a username field with the text "themiszamani", a password field with masked characters ".....", and a checkbox labeled "Warn me before logging me into other sites." Below these is a blue "LOGIN" button. A security warning states: "For security reasons, please Log Out and Exit your web browser when you are done accessing services that require authentication!". There are links for "Register", "Forgotten password", "Forgotten username", and "Change password". At the bottom, it says "Marine-id supports user authentication for EMODnet, SeaDataNet, Coriolis data services" and includes logos for EMODnet, SeaDataNet, and Coriolis.

MARINE iD

themiszamani

.....




☐ Warn me before logging me into other sites.

LOGIN

For security reasons, please Log Out and Exit your web browser when you are done accessing services that require authentication!

[Register](#) [Forgotten username](#)
[Forgotten password](#) [Change password](#)


Marine-id supports user authentication for EMODnet, SeaDataNet, Coriolis data services

Step 3: Marine-ID Consent Form

Our Identity Provider
(replace this placeholder with your organizational logo / label)

You are about to access the service:
unity.eudat-aai.fz-juelich.de

Information to be Provided to Service	
cn	
eduPersonPrincipalName	
givenName	
mail	
sn	
uid	

The information above would be shared with the service if you proceed. Do you agree to release this information to the service every time you access it?

Select an information release consent duration:

☐ Ask me again at next login

- I agree to send my information this time.

☒ Ask me again if information to be provided to this service changes

- I agree that the same information will be sent automatically to this service in the future.

☐ Do not ask me again

- I agree that **all** of my information will be released to **any** service.

This setting can be revoked at any time with the checkbox on the login page.

Step 4: B2ACCESS Consent form

SeaDataCloud OAuth2 Authorization Server

A remote client has requested your authorization

SeaDataCloud Test Client

Address: <https://snf-761524.vm.oceanos.grnet.gr/b2access/refreshToken.php>

Access to the following information was requested:

USER_PROFILE

Provides access to the user's profile information

profile

OpenID Connect user profile scope

openid

Enables the OpenID Connect support

email

OpenID Connect Email Scope

GENERATE_USER_CERTIFICATE

Step 5: Yes you have logged in

B2ACCESS

B2ACCESS

Client ID: sdc-test-client-id

Client Secret: sdc-test-client-pass

Access Token:

WCgDDBo0ofRC2TCgW04WHkgZGaD7veJA25FultPN9rU

Copy

NOTE: New access tokens expire in 10 minutes.

Refresh Token:

QiF15bmc-Lho4BbtPC1217kxb5k9AM26Ev8aEYtXpBY

Copy

NOTE: New refresh tokens expire in 1 year.

To generate access tokens from this refresh token use the following curl command:

curl -X POST -u 'sdc-test-client-id':sdc-test-client-pass' -d 'client_id=sdc-test-client-id'

Copy

To get the user info from the access token, execute the following curl command:

curl -H 'Authorization: Bearer WCgDDBo0ofRC2TCgW04WHkgZGaD7veJA25FultPN9rU'


Copy

Access to SDC web-based services

1. User clicks on the “login” button in the portal of a SeaDataCloud service and he/she is redirected to B2ACCESS.
 - Then B2ACCESS redirects the user automatically to Marine-ID.
2. The user enters his/her credentials.
3. The user is asked to consent the information that Marine-ID is going to release to B2ACCESS.
 - The user is redirected back to B2ACCESS.
4. If the user logs in through B2ACCESS for the first time, he/she needs to register to the platform. Otherwise, the user will be asked to consent the information that B2ACCESS is going to release to the SeaDataCloud service.
5. The user is redirected back to the SeaDataCloud service.

Register only the first time

Cloud OAuth2 Authorization Server

Language selection: 

First time login

Your authentication with remote service was successful, however your account is not known.

[Register](#)

You can register to create a new local account.

[Cancel](#)

Registration form

MARINEiD user registration

The following identities were externally provided:

[userName] themiszamani@marine-id.org

Attributes

Common Name:

Email:

Given name: *


Surname: *

More on WebODV integration - Sebastian

sdv-vre - Chromium



sdv-vre

seadatacloud/vre



PAN-EUROPEAN INFRASTRUCTURE FOR
OCEAN & MARINE DATA MANAGEMENT

Welcome Test
[Change settings](#)



Quality control

[video](#)

Quality Control Services

← previous

1. Select data set

2. QC Editor

3. Save/Export/Exit

next →

Right click on the data windows or map window to open context menus and choose an options. Apply zoom by double left mouse click or **enter** key if **zoom mode** is active. Cancel **zoom mode** by **ESC** key. To assign a quality flag, right click on the value or flag of the respective variable in the "Sample" table at the bottom right of the page. Use the **arrow buttons** below to navigate from sample to sample within one station. Use double-clicking for larger steps.

↓

↑

Depth [m]

0

500

1000

1500

2000

ITS-90 water temperature [degrees C]

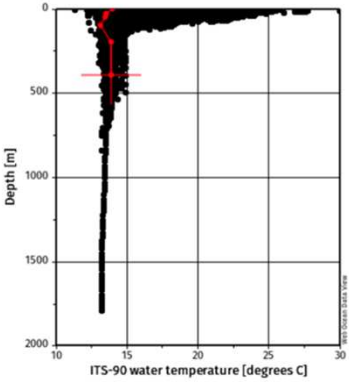
10

15

20

25

30



Depth [m]

0

500

1000

1500

2000

Water body salinity [per mille]

35

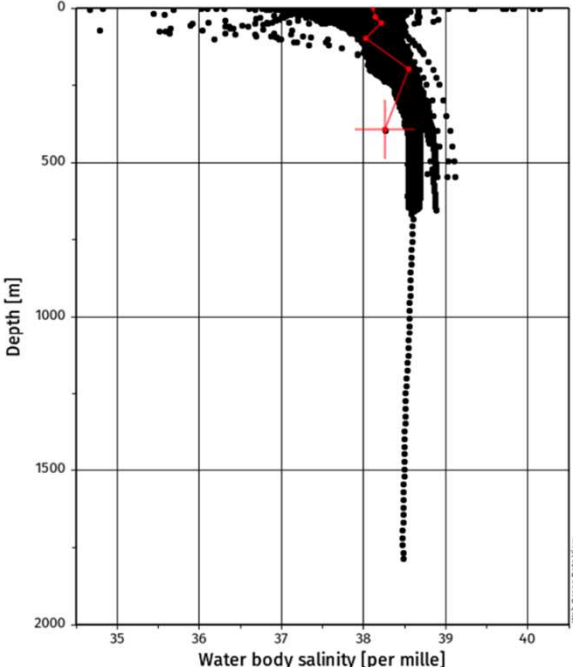
36

37

38

39

40



43°N

42.8°N

42.6°N

9.6°E

9.8°E

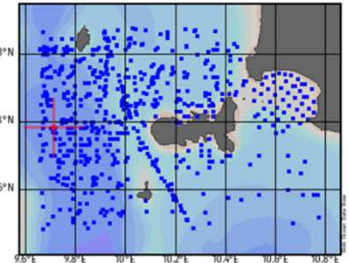
10°E

10.2°E

10.4°E

10.6°E

10.8°E



Status: ▲

Data set: **VRE/SDN_test_EL...**

Mouse:

Station ID: 369 ▲

Accession Num... 369

Cruise EAA2

Station 36950 (B)

Position 9.717°E / 42.783...

Date 25 March 1976

Time 10:05:59

Depth Range [m] [0.00 - 396.45]

LOCAL_CDI_ID 158829

EDMO_CODE 120


Sample: 6/6 ▲

variable	value	flag
1: Depth [...]	396.45	1
2: ITS-90 ...	13.88	4
3: Water ...	38.26	4

sdv-vre - Chromium



sdv-vre

seadatacloud/vre



PAN-EUROPEAN INFRASTRUCTURE FOR
OCEAN & MARINE DATA MANAGEMENT

Welcome Test
[Change settings](#)



Data Extractor

[← previous](#)[1. Select stations](#)[2. Select variables](#)[3. Download](#)[4. Exit](#)[next →](#)

Select cruises from the *Cruises* menu. Click *Zoom in* to define a sub-region, *Apply* to select the sub-region, or *Zoom out* to return to global domain. Use the *Required variables* as a station filter.

Selection status

Stations:

Output variables:

Cruises

cruises

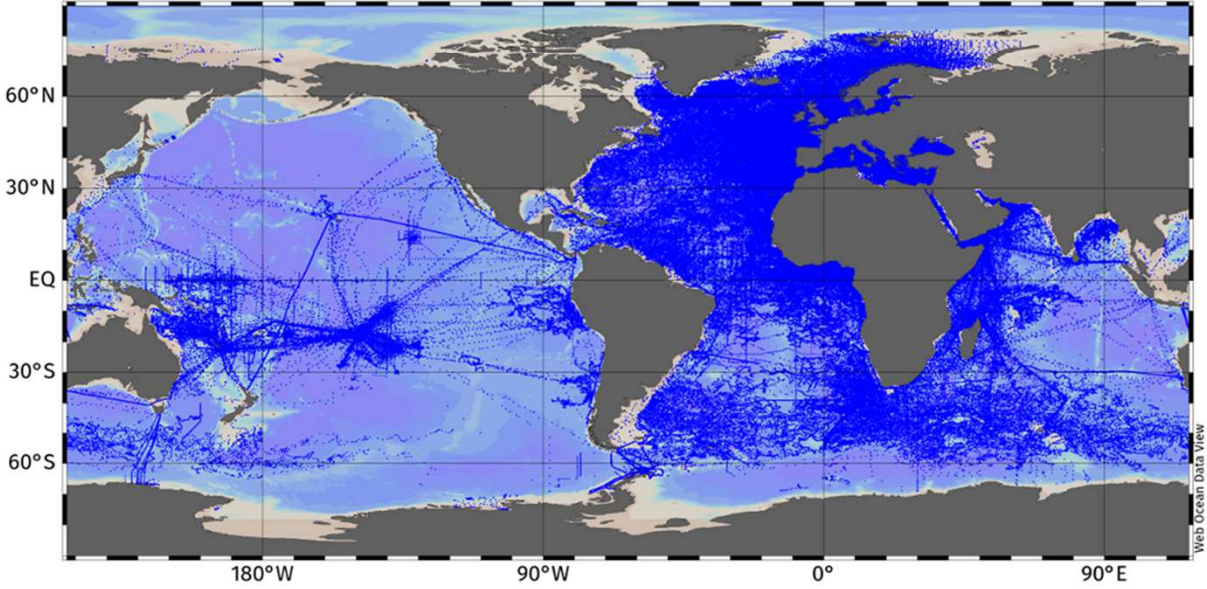
Map domain

Zoom in

Required variables ?

Nothing selected


Reset



sdvc-vre - Chromium



sdvc-vre

seadatacloud/vre



PAN-EUROPEAN INFRASTRUCTURE FOR
OCEAN & MARINE DATA MANAGEMENT

Welcome Test
[Change settings](#)



Data Extractor

← previous

1. Select stations

2. Select variables

3. Download

4. Exit

next →

Select output variables from the *Output variables* treeview.

Selection status

Stations:

Output variables:

Search

Q

Output variables

☒ All

☒ Depth

☒ Temperature

☒ Salinity

Collapse

Reset

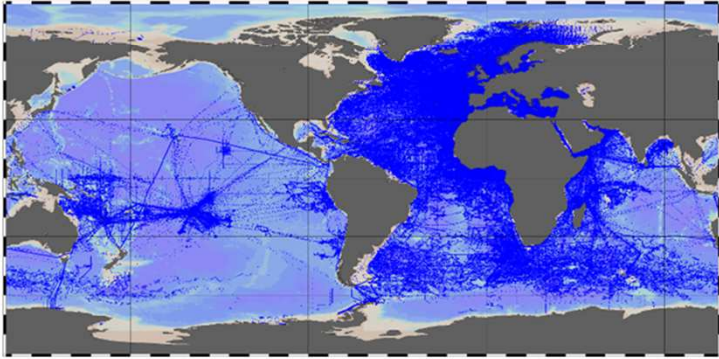
60°N

30°N

EQ

30°S

60°S




180°W90°W0°90°E

sdv-vre - Chromium



sdv-vre

seadatacloud/vre



PAN-EUROPEAN INFRASTRUCTURE FOR
OCEAN & MARINE DATA MANAGEMENT

Welcome Test
[Change settings](#)



Data Extractor

← previous

1. Select stations

2. Select variables

3. Download

4. Exit

next →

Download data in different formats. You will receive a .zip file containing the data in the format of your choice.

Selection status

Stations:
Output variables:

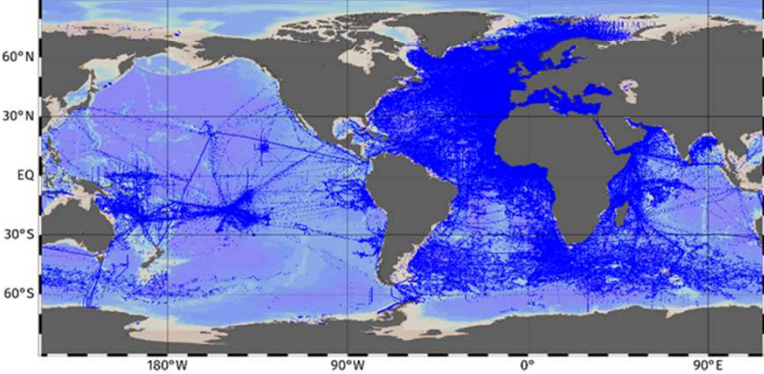
Download

Spreadsheet

ODV Collection

netCDF

WHP Exchange



ODV-online

SDN_2015-09_TS_MedSea_QC_done_v2.odv

Window 1 STATION

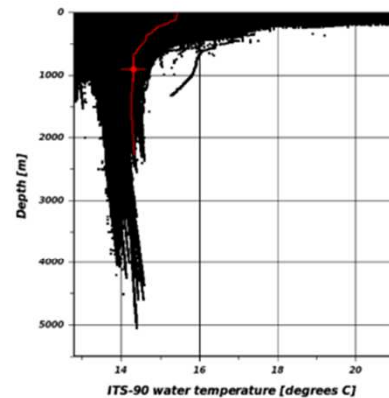
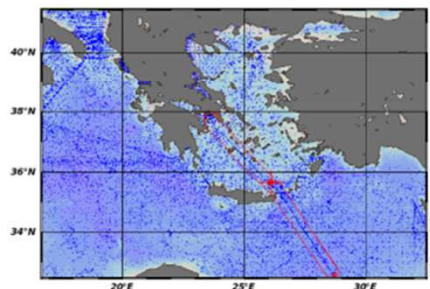
Press ENTER to add the data of the current station to the plot.

ITS-90 water temperature [degrees C] >>>

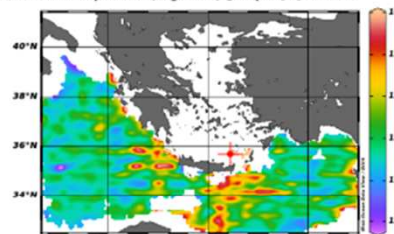
Window 2 STATION

Press ENTER to add the data of the current station to the plot.

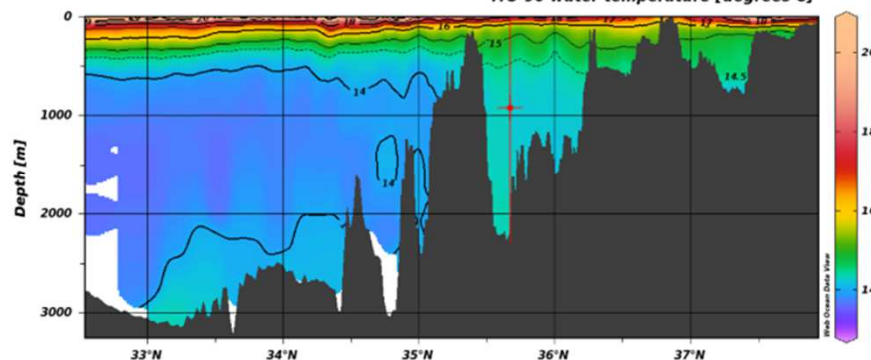
Water body salinity [per mille] >>>



ITS-90 water temperature [degrees C] @ Depth [m]=2000.0



ITS-90 water temperature [degrees C]



Station ID: 134757

Depth Range [m]	[2.0 - 2285.5]
Bot. Depth [m]	2316
LOCAL_CDI_ID	GN36200503701000_FS109_265
EDMO_code	269
Instrument Info	
Reference	
Data set name	GN36200503701c.med(FS109)
Discipline	Administration and dimensions;C

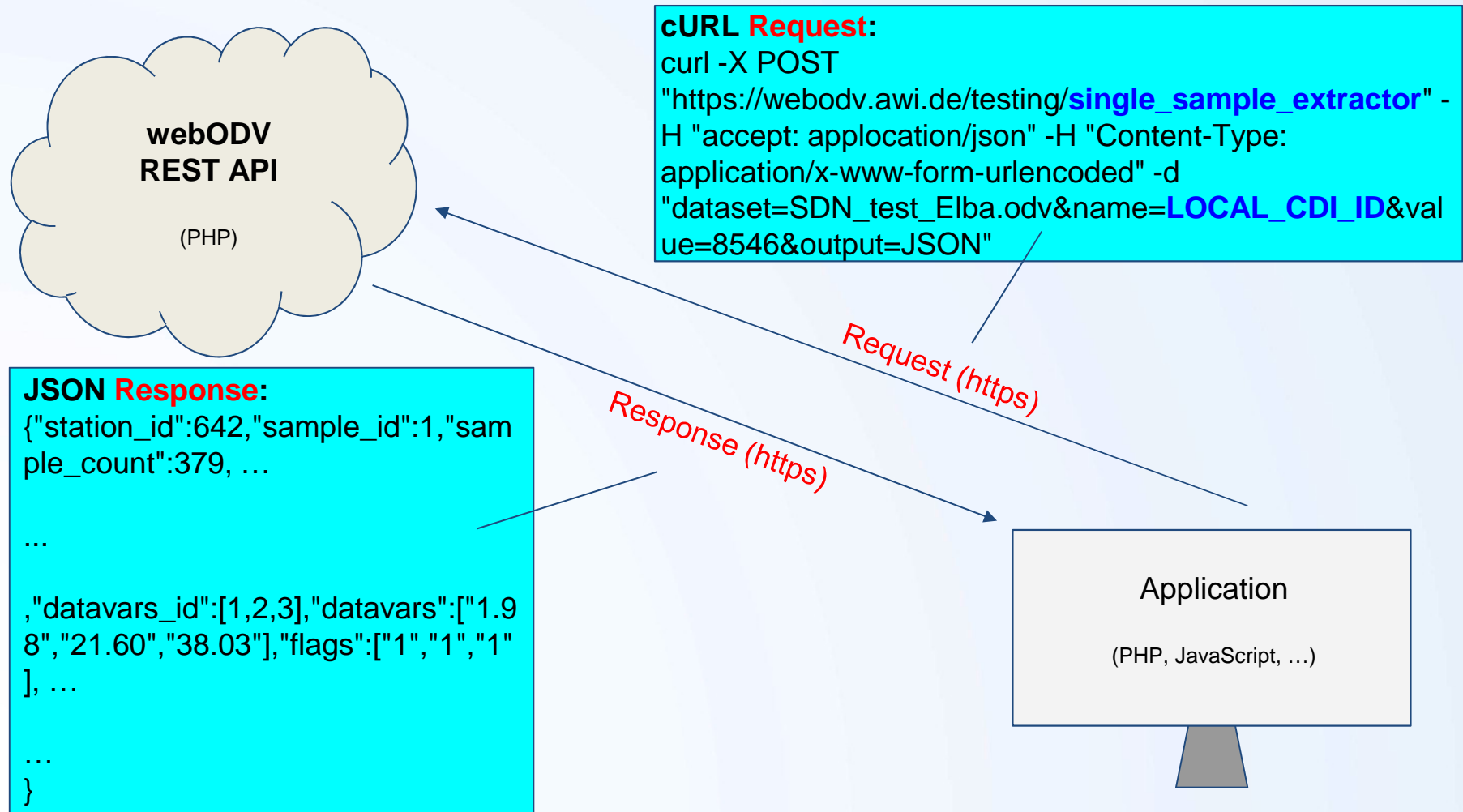
Sample: 923 / 2314

1: Depth [m]	915.2	1
2: ITS-90 water temperature [degrees]	14.33	1
3: Water body salinity [per mille]	38.961	1
drvd: Section Latitude	35.68	1

Isosurface Values

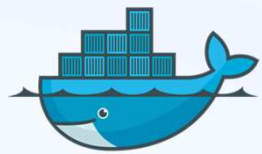
Longitude	26.119
Latitude	35.677
Time [yr]	2005.185
Day of Year	68
Depth [m] @ Depth [m]=first	2.0
ITS-90 water temperature [degrees C] @ Depth [m]=first	15.43
Water body salinity [per mille] @ Depth [m]=first	38.961

REST API -- for developers (us) and advanced users





**File selector
Service (API)**



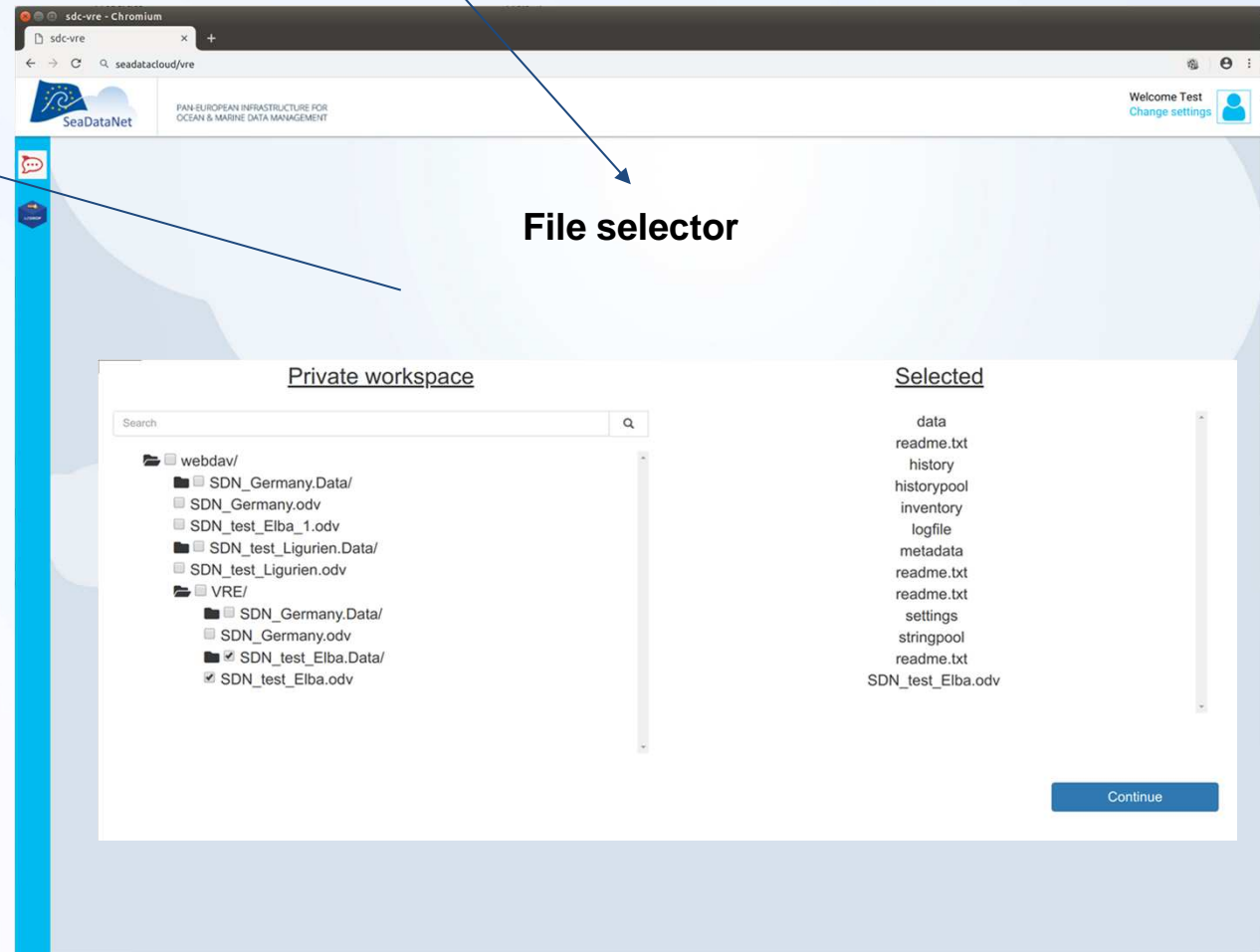
docker

WebDAV



Client

File selector



More on DIVA integration - Alexander, Charles

DIVAnd in Jupyter notebooks

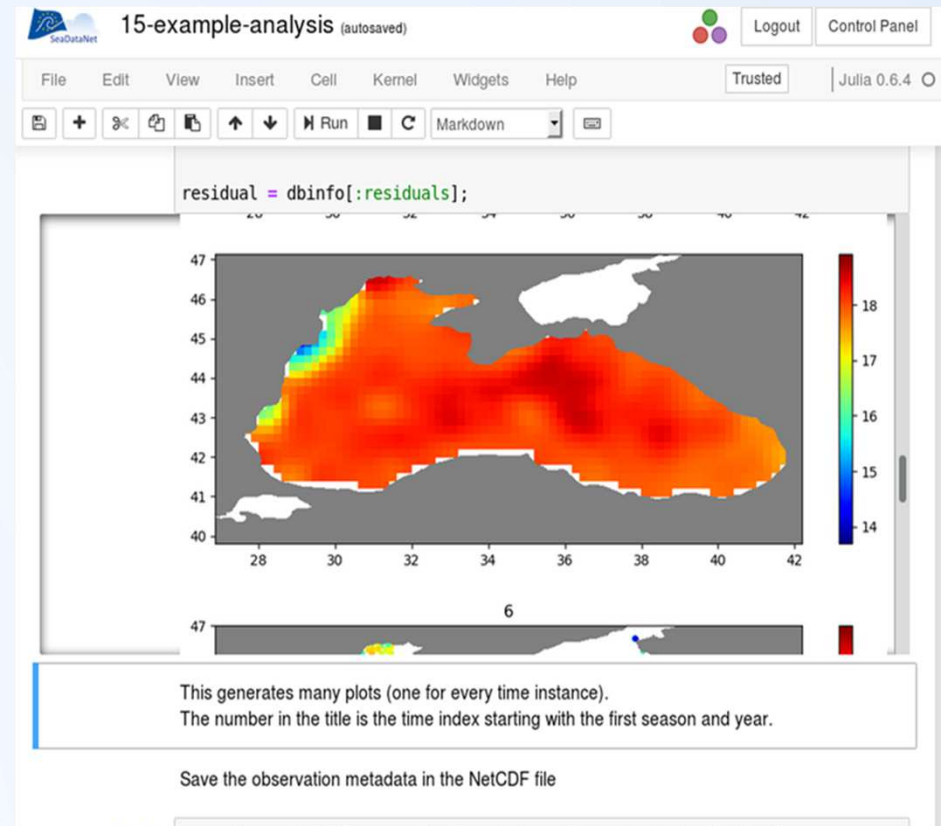
- Jupyter notebooks are integrated web environment
 - Computing
 - Visualization
 - Documentation of code
- DIVAnd extension of DIVA in more than 2 dimensions
- DIVAnd distributed as a Julia package installed into Docker containers

DIVAnd in Jupyter notebooks

- Loading bathymetry (GEBCO, EMODnet)
- Data formats (ODV spreadsheets, netCDF, mat files etc.)
- Support for databases like:
 - World Ocean Database
 - CMEMS INSTAC
- Check for duplicates
- Automated quality checks
- Parameter optimisation
- Error field computation
- Plot results and data
- Generate XML for catalog

[Full example notebook](#)

sdn-userdesk@seadatanet.org – www.seadatanet.org





Integrations with SeaDataCloud services

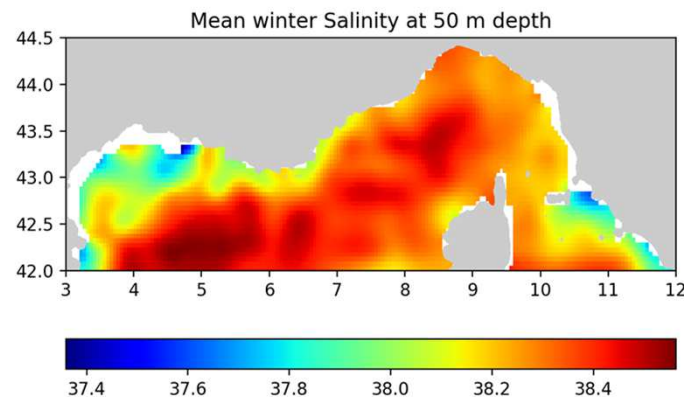
- Querying the vocabulary service
- Querying the EDMO database
- XML files for Sextant
- Extracting data from the ODV REST API
- Embed additional metadata for a given observation based on EDMO code and local CDI id from jupyter notebook

REST API of DIVAnd

- User provides the URL of the data set (netCDF format)
- Provide analysis parameters and metadata
- Download the final analysis

DIVAnd REST API

observations	<input type="text" value="https://b2drop.eudat.eu/s/UsF3RyL"/>
varname	<input type="text" value="Salinity"/>
bbox	<input type="text" value="3,42,12,44.5"/>
depth	<input type="text" value="0,20,50"/>
len	<input type="text" value="100000,100000"/>
epsilon2	<input type="text" value="0.05"/>
resolution	<input type="text" value="0.05,0.05"/>



Deployment-Pipeline

- Pipeline of the Docker images for the
 - Jupyter notebook
 - REST API

Source code
repository



Code
testing



Travis CI

Distribution of
Docker
images



→
*on every commit to
the master branch**

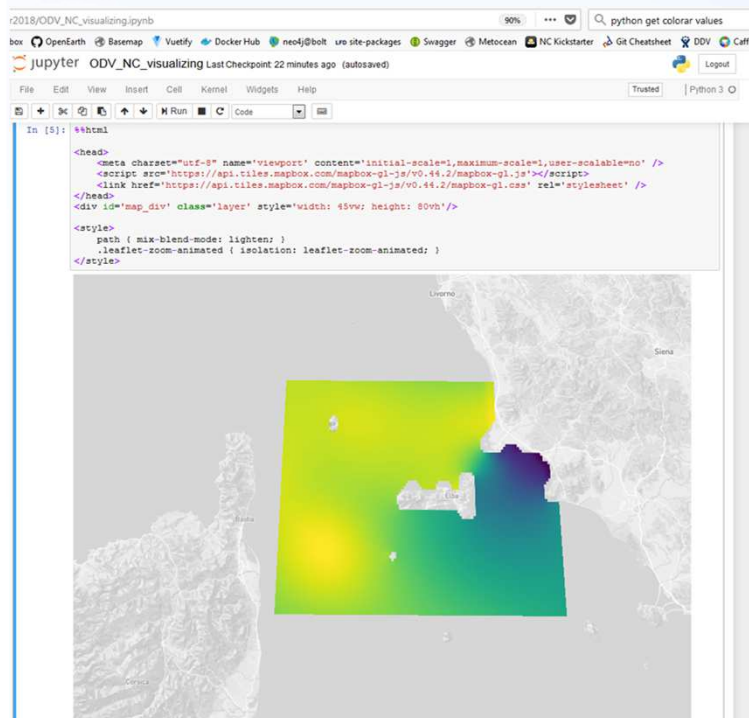
→
*If all tests
succeed*

**Only fully implemented features are merged into the master branch*

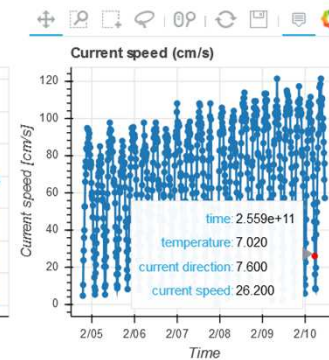
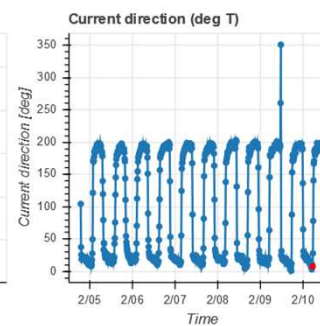
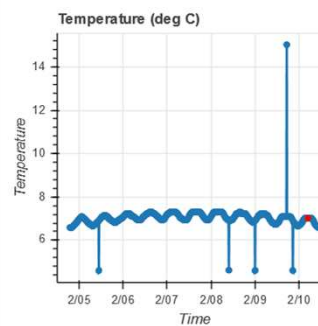
Biological QC – Simon

Additional visualisation – Giorgio

- Containers, Notebooks, Package, Visualization
- Dockerfile <https://github.com/openearth/sdc-visualization>
- Data type. NetCDF / tarfile from **B2DROP**
- Logging, **import** sdc_visualization

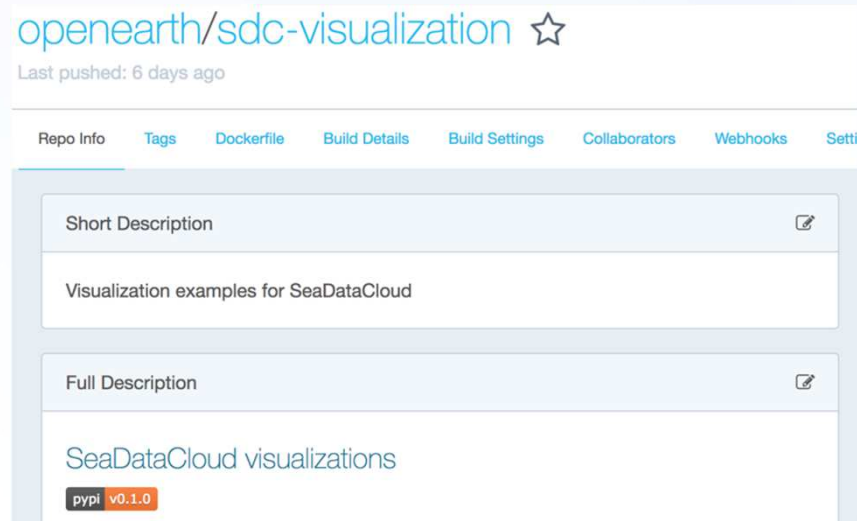


BokehJS successfully loaded.



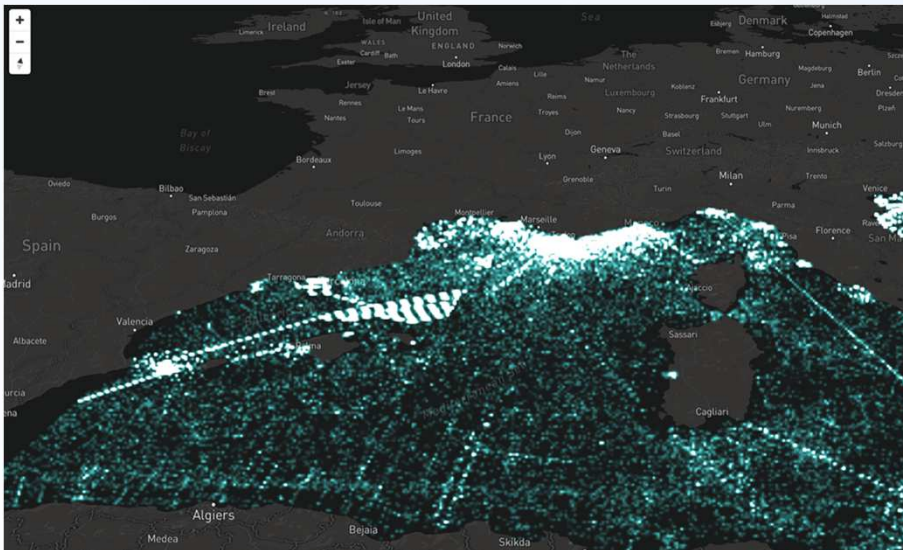
Docker image updates

```
Executing the command: jupyter notebook --NotebookApp.token=sdcc
2018-09-11 07:38:22 [INFO] [NotebookApp] Writing notebook server cookie secret to /home/jovyan/.local/share/jupyter/runtime/notebook_cookie_secret
2018-09-11 07:38:23 [WARNING] [NotebookApp] WARNING: The notebook server is listening on all IP addresses and not using encryption. This is not recommended.
2018-09-11 07:38:23 [INFO] [NotebookApp] JupyterLab beta preview extension loaded from /opt/conda/lib/python3.6/site-packages/jupyterlab
2018-09-11 07:38:23 [INFO] [NotebookApp] JupyterLab application directory is /opt/conda/share/jupyter/lab
2018-09-11 07:38:23 [INFO] [NotebookApp] Serving notebooks from local directory: /home/jovyan
2018-09-11 07:38:23 [INFO] [NotebookApp] 0 active kernels
2018-09-11 07:38:23 [INFO] [NotebookApp] The Jupyter Notebook is running at: http://4c88afe60d00:8888/?token=... http://4c88afe60d00:8888/?token=...
2018-09-11 07:38:23 [INFO] [NotebookApp] Use Control-C to stop this server and shut down all kernels (Ctrl-C)
```

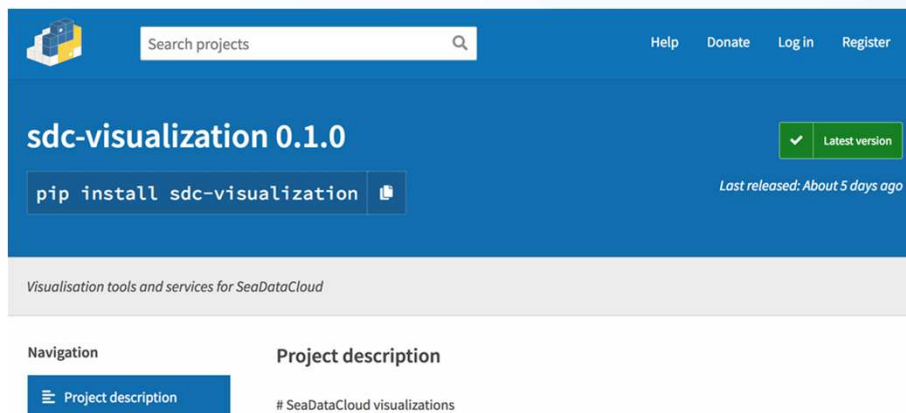


- Custom logging format (both for notebooks and python code)
- Updates published to hub.docker.com/openearth/sdc-visualization
- Closer follows docker guidelines
- Some help needed with limiting restrictions needed (`--privileged --cap-add SYS_ADMIN --device`)

Mapbox application



- Interactive API
- Code is available @ hub.docker.com/openarth/sdc-visualization
- Reads NetCDF and subset based on time
- Some help needed with limiting restrictions (--privileged --cap-add SYS_ADMIN --device)



Search projects

Help Donate Log in Register

sdc-visualization 0.1.0 ✓ Latest version

`pip install sdc-visualization` Last released: About 5 days ago

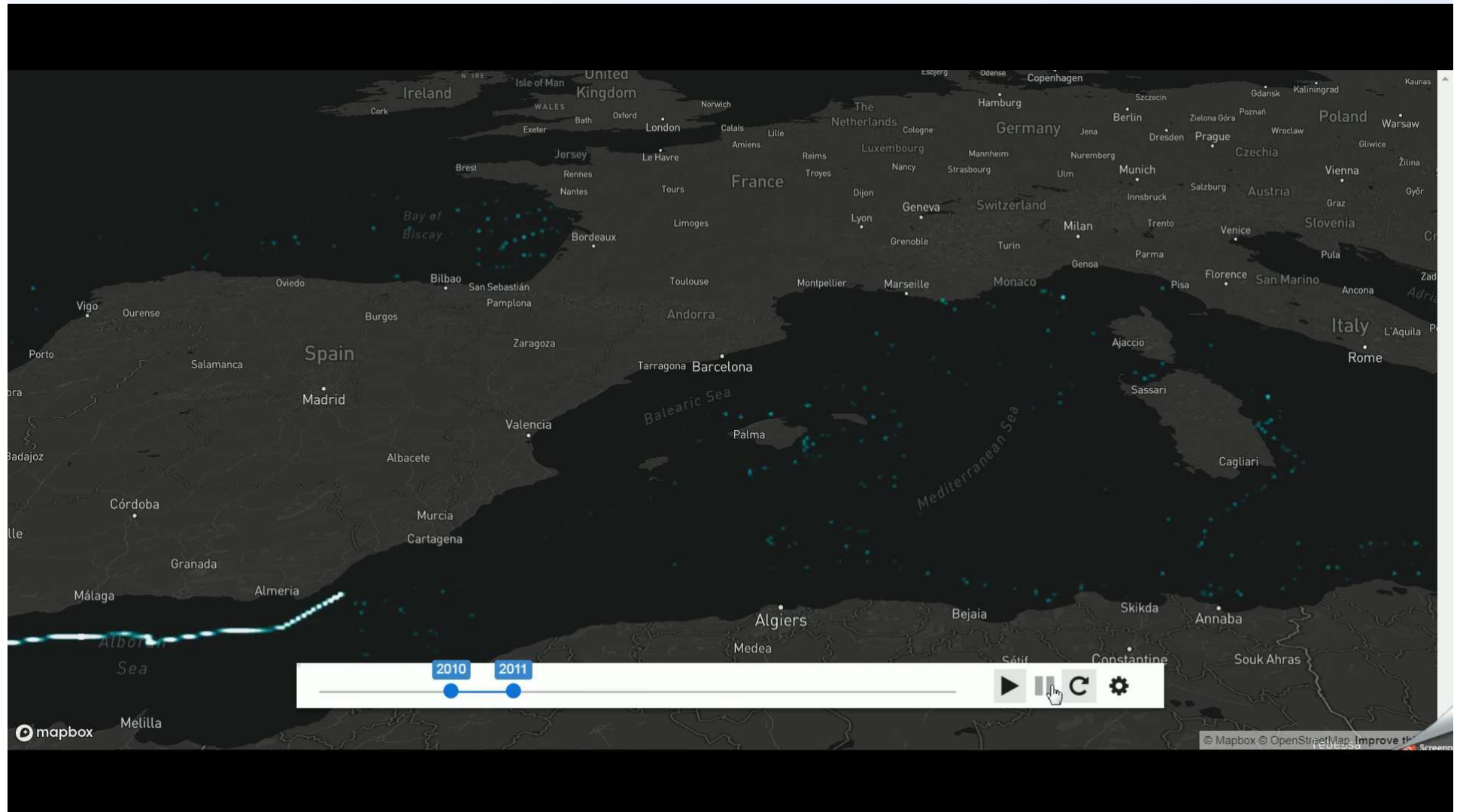
Visualisation tools and services for SeaDataCloud

Navigation


Project description


SeaDataCloud visualizations

Movie example



Integration layer mockups (UI) - Peter





☐ Prévenez-moi avant d'accéder à d'autres services.




[SE CONNECTER](#)

Pour des raisons de sécurité, veuillez vous déconnecter et fermer votre navigateur lorsque vous avez fini d'accéder aux services authentifiés.

[Register](#)
[Forgotten password](#)

[Forgotten username](#)
[Change password](#)

Marine-id supports user authentication for EMODnet, SeaDataNet, Coriolis data services





T & S Lab

Bio Lab

WEBODYV



Lorem ipsum dolor
sit amet, consetetur
adipiscing elised
do eiusmod.

JUPYTER



Ut enim ad minim
veniam, quis nos-
trud exercitation.

OCEANBROWSER



Duis aute irure
dolor in reprehenderit
in voluptate
velit esse cillum.

SEXTANT




Excepteur sint oc-
caecat cupidatat
non proident, sunt
in culpa qui officia.

DIVA




Sed ut perspiciatis
unde omnis iste
natus error sit.




SeaDataNet


PAN-EUROPEAN INFRASTRUCTURE FOR
OCEAN & MARINE DATA MANAGEMENT

Welcome Scott
[Change settings](#)





MESSAGING




FILE SYSTEM

lab

Bio Lab


WEBODV

Lorem ipsum dolor sit amet, consectetur adipiscing elit do eiusmod.



JUPYTER

Ut enim ad minim veniam, quis nostrud exercitation.




OCEANBROWSER

Duis aute irure dolor in reprehenderit in voluptate velit esse cillum.

SEXTANT

Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia.



DIVA

Sed ut perspiciatis unde omnis iste natus error sit.

Private workspace



T & S Lab

Bio Lab

WEBODYV



Lorem ipsum dolor
sit amet, consetetur
adipiscing elised
do eiusmod.

JUPYTER



Ut enim ad minim
veniam, quis nos-
trud exercitation.

OCEANBROWSER



Duis aute irure
dolor in repreh-
derit in voluptate
velit esse cillum.

SEXTANT



Excepteur sint oc-
caecat cupidatat
non proident, sunt
in culpa qui officia.

DIVA



Sed ut perspiciatis
unde omnis iste
natus error sit.

3. VRE deadlines and deliverables

Where are we now?

- Development kick-off At Deltares
- Virtual code sprint in June 2018
- Physical workshops in Sopot and Helsinki
- Currently in third development cycle of 4 months (Nov 2018 - Feb 2019)
- Two weekly telco's / trello boards with actions
- Currently in integration phase:
 - Many concepts already tested
 - Basic functions working in the cloud
 - Now development of dashboard for first user group

Project month	Component	remark
PM12	VRE specification document	This document
PM15	Start actual developments VRE	Kickoff to be decided
PM18	D10.3: Specification of sub-setting application and development plan	Led by IFREMER
PM18	D10.5: Specification of Ocean Data View online and development plan	Led by AWI
PM18	D10.7: Specification of DIVA online and development plan	Led by ULiege
PM18	D10.9: Specification of Biology Data QC online and development plan	Led by VLIZ
PM18	D10.13: Specification of visualisation services and development plan	Led by Deltares
PM18	D10.19: Specification of MySeaDataCloud and development plan	Led by EUDAT
PM24	D10.10: Phase 1 of Biology Data QC online operational	Led by VLIZ
PM24	D10.17: Specification of SOS viewing services and development plan	Led by 52N
PM26	D10.15: Specification of Oceanotron services and development plan	Led by IFREMER
<i>PM30</i>	<i>D10.2 First version Virtual Research Environment (VRE) in the cloud operational</i>	<i>For internal users, related to selected use cases</i>
<i>PM30</i>	<i>D10.4: Sub-setting application operational in VRE</i>	<i>Led by IFREMER</i>
<i>PM30</i>	<i>D10.6: Ocean Data View online operational in VRE</i>	<i>Led by AWI</i>
<i>PM30</i>	<i>D10.8: DIVA online operational in VRE</i>	<i>Led by ULiege</i>
<i>PM30</i>	<i>D10.14: Visualisation services operational in VRE</i>	<i>Led by Deltares</i>
PM30	D10.20: MySeaDataCloud operational	Led by EUDAT
PM31	D10.18: SOS viewing services for data streams operational	Led by 52N
PM36	D10.11: Phase 2 of Biology Data QC online operational	Led by VLIZ
PM40	D10.16: Upgraded Oceanotron services operational for SeaDataNet WP11 data products	Led by IFREMER
PM42	D10.12: Phase 3 of Biology Data QC online operational	Led by VLIZ
<i>PM42</i>	<i>VRE operational for internal (and some public?) users</i>	<i>New: No official deliverable</i>

Questions, or suggestions?