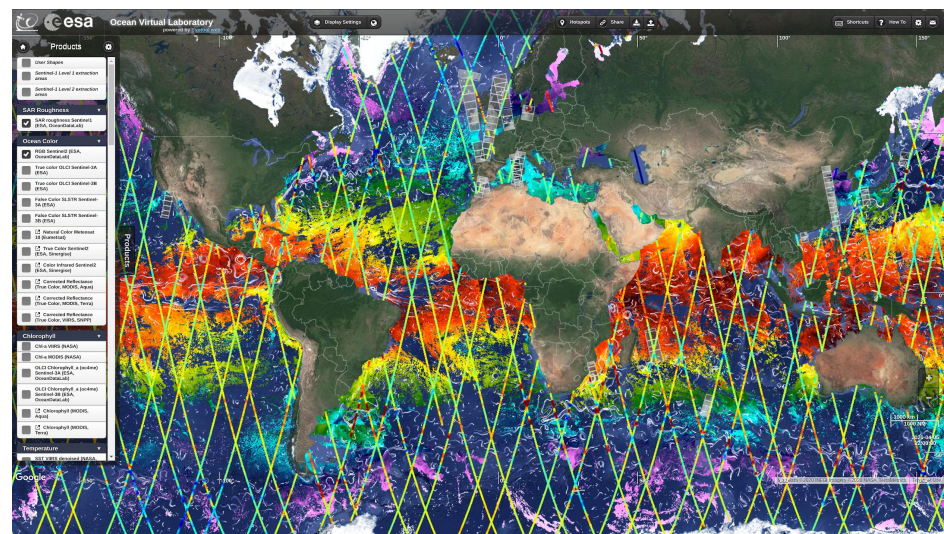
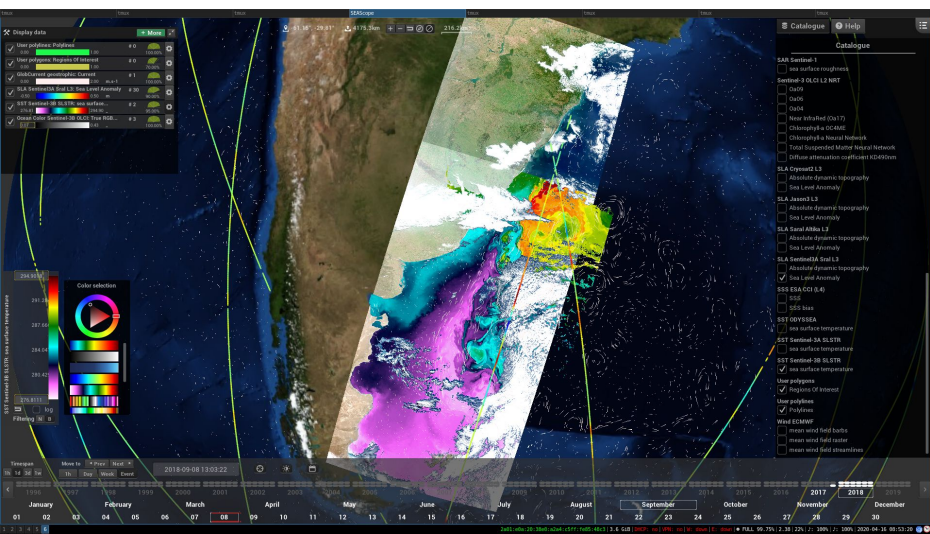


# SEAScope tutorial

## OceanDataLab team

### Brest, 2022/06/14



# SEAScope stand alone tool

## Install the viewer

You can retrieve the archive from the usb key or <https://seascope.oceandatalab.com>

### 1 - Linux

Copy the archive `seascope_20220613.tar.gz` in your workspace.

Uncompress the archive: a directory named `seascope` is created

### 2 - macOS

Open the disk image `SEAScope-20220613.dmg`

Drag SEAScope to the Applications folder and the “Import to SEAScope” droplet to your Desktop.

### 3 - Windows

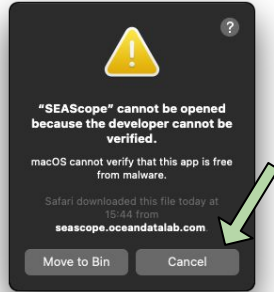
Copy the archive `SEAScope_win64_20220613.zip` in your workspace.

Uncompress the archive: a directory named `seascope` is created

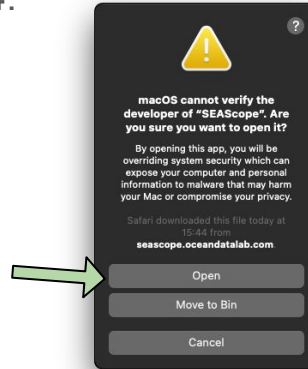
# SEAScope stand alone tool

## Install the viewer - Unblocking SEAScope on macOS

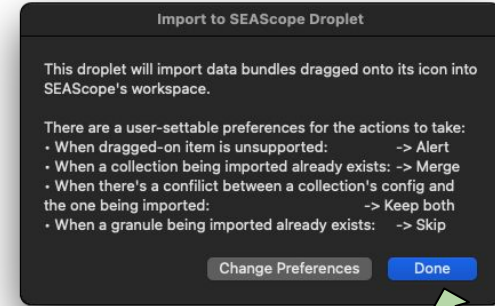
1. Open SEAScope
- 2.



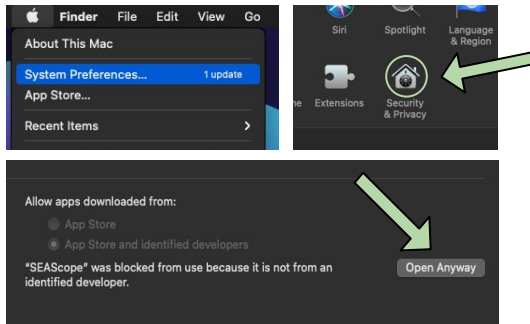
- 4.



5. Repeat steps 1 to 4 but for the "Import to SEAScope" droplet



- 3.



6. Quit SEAScope and you're done

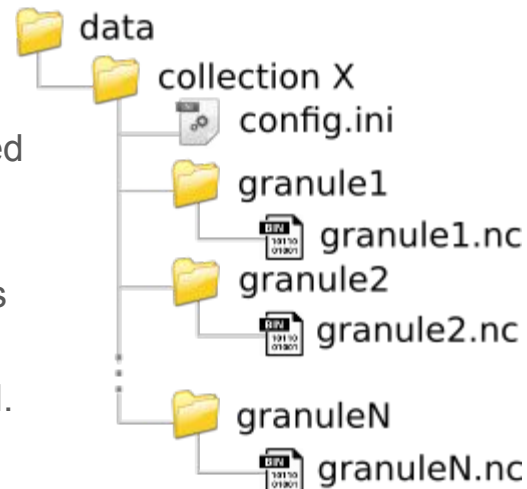
# SEAScope stand alone tool

## How SEAScope works

The first time SEAScope is started, the application creates a configuration file named `config.ini` that contains paths for the colormaps, data, plugins,... directories.

The `data` directory will have one subdirectory for each collection:  
it contains one or several granules, as well as a configuration file (also named `config.ini`) that defines how SEAScope should render these granules.

At startup SEAScope will also create an index for all the compatible granules found in the `data` directory (if it exists):  
this index will contain the full path for each file that SEAScope is able to load.



If you decide to move the `seascope` directory somewhere else, make sure to delete the `seascope/config.ini` and `seascope/index.fb` files because they will still contain references to the old location. SEAScope will recreate them for you the next time you start the application.

# SEAScope stand alone tool

## Open SEAScope viewer

### 1 - Linux

In a shell:

```
> cd [workspace]/seascope  
> ./seascope
```

### 2 - macOS

Open SEAScope like you do any other application

### 3 - Windows

In the file explorer:

- open the [workspace]/seascope directory
- double-click on `launch_seascope.bat`

# SEAScope stand alone tool

## Add data to SEAScope

The `data` directory on the USB key contains samples for several collections.

### 1 - Linux

Copy the content of the `data` directory from the USB key into `[workspace]/seascope/data`

### 2 - macOS

Drag-n-drop the content of the `data` directory from the USB key onto the “Import to SEAScope” droplet

Alternatively you can copy the content into `~/SEAScope-workspace/data`

### 3 - Windows

Copy the content of the `data` directory from the USB key into `[workspace]/seascope/data`

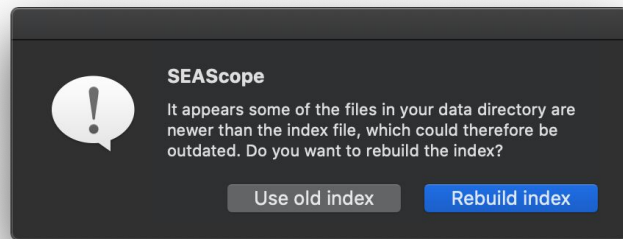
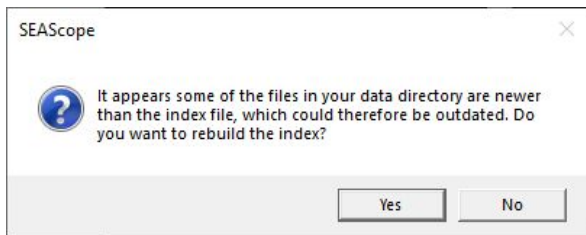
# SEAScope stand alone tool

## Add data to SEAScope

At startup SEAScope builds/updates an index that lists all the granules available in the data directory.

If SEAScope detects a change in the `data` directory, it will ask you whether or not the index should be updated. When prompted, agree to rebuild the index.

```
[User input required]
It appears some of the files in your data directory are newer than the index file, which
could therefore be outdated. Do you want to rebuild the index?
Your answer [y/n]:
```



Alternatively, you can delete the `[workspace]/seascope/index.fb` file (or `~/SEAScope-workspace/index.fb` on macOS) when SEAScope is not running: the file will be regenerated automatically next time you start the application.



# SEAScope stand alone tool

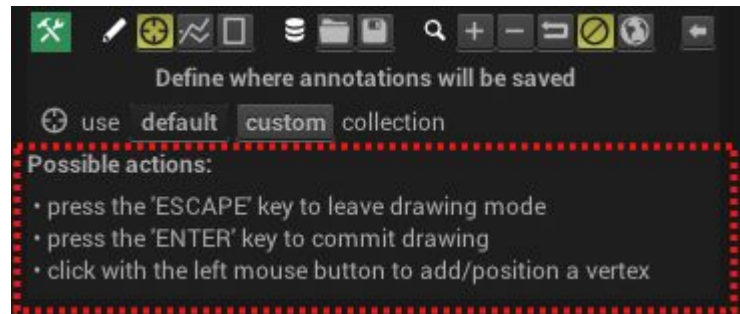
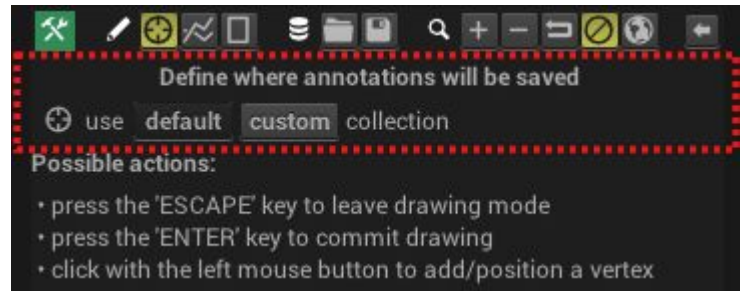
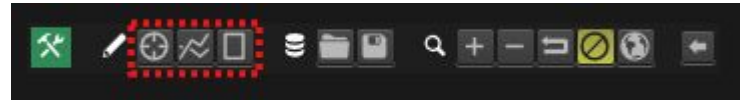
## Shapes: Draw / export / import

Select one of the drawing tools:

- point (Shift + D)
- polyline (Shift + L)
- polygon (Shift + P)

By default the shapes you draw will be associated with a collection that SEAScope creates automatically, but you can select a custom collection if you want (not demonstrated here)

SEAScope will provide some guidance regarding the actions that you can perform:





# SEAScope stand alone tool

## Shapes: Draw / export / import

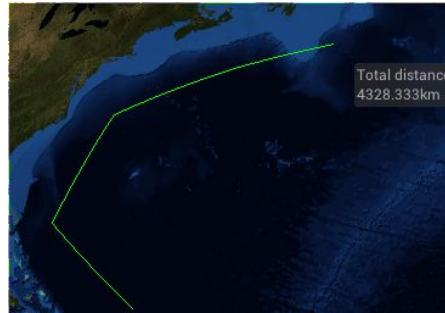
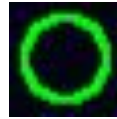
Note that the shapes you draw will be considered as drafts and remain unstyled until you commit them by pressing the Enter key

SEAScope will display the total length of the polyline while you are drawing it.

The same applies to polygons (area and perimeter).

After committing a shape, its measurements can be displayed in a contextual menu by selecting it on the globe.

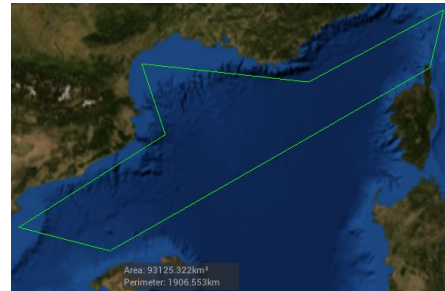
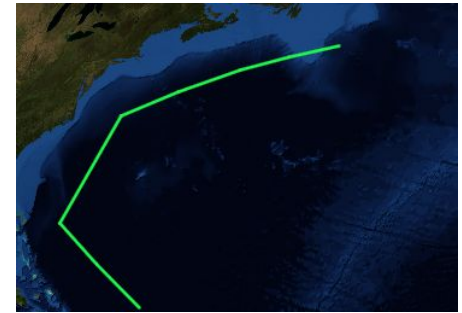
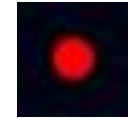
Draft  
(while drawing)



Commit  
(press Enter)



Styled shape

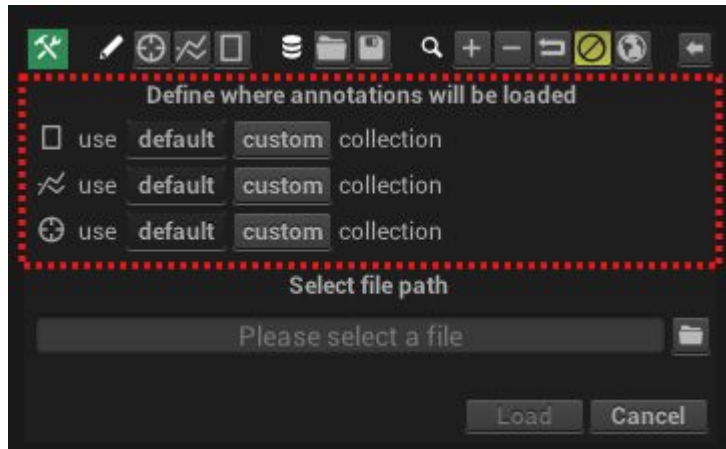


# SEAScope stand alone tool

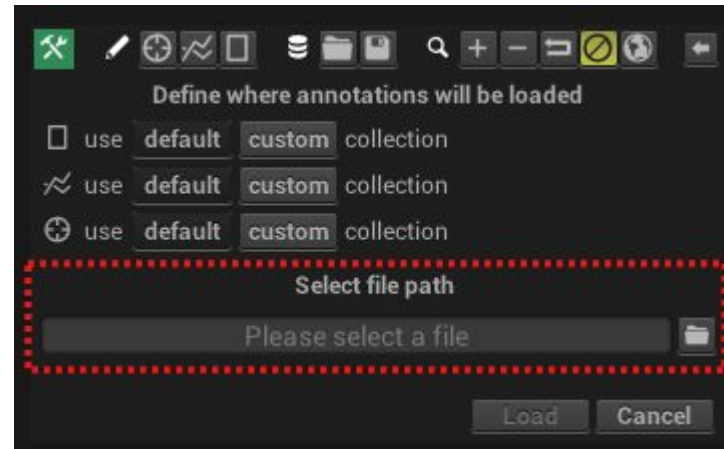
## Shapes: Draw / export / import



1. SEAScope lets you import (folder icon) and export (floppy disk icon) shapes in a Syntool-compatible format



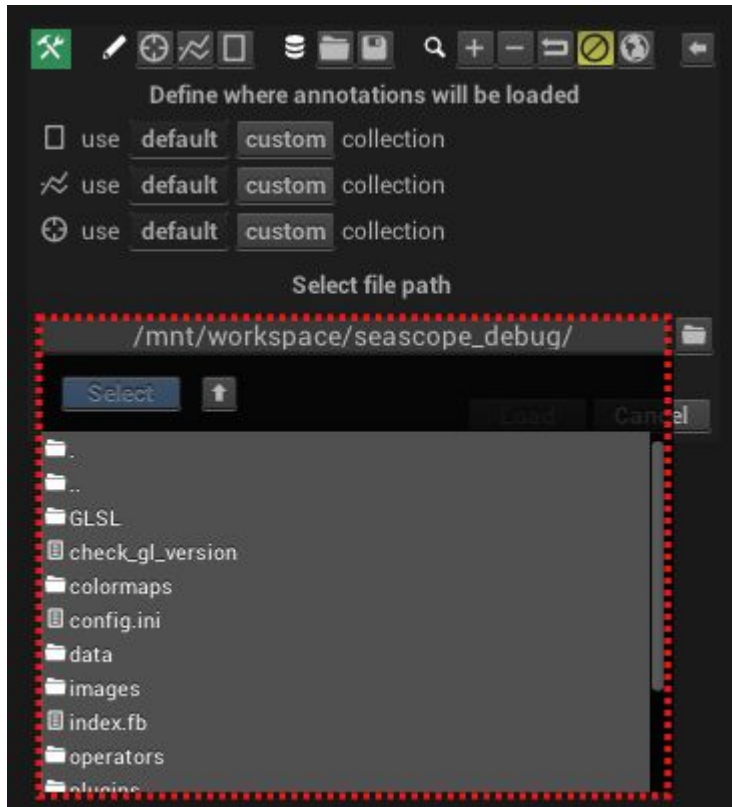
2. It is possible to define which collection will store the imported shapes (resp. which collections to export)



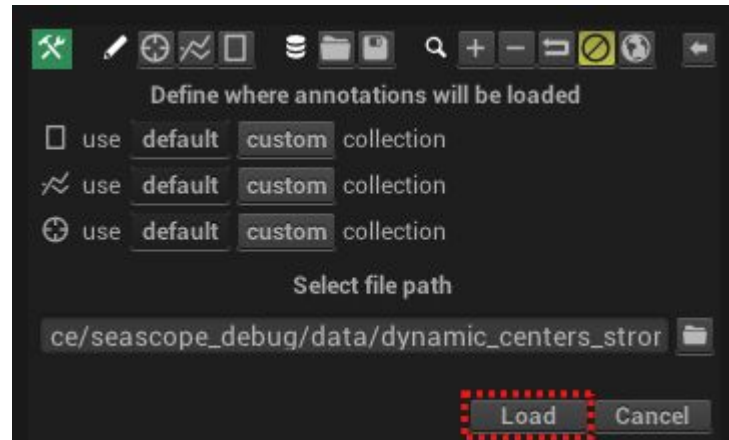
3. You can type the path of the file to import from (resp. to export to) or click the folder icon to browse the storage available on your computer

# SEAScope stand alone tool

## Shapes: Draw / export / import



4. You can select a file by double clicking on it in the dropdown list, or by clicking once on the file in the list and once on the “Select” button



5. Finally, click on the Load (resp. Save) Button: the import/export menu will disappear once the operation is complete

# SEAScope stand alone tool

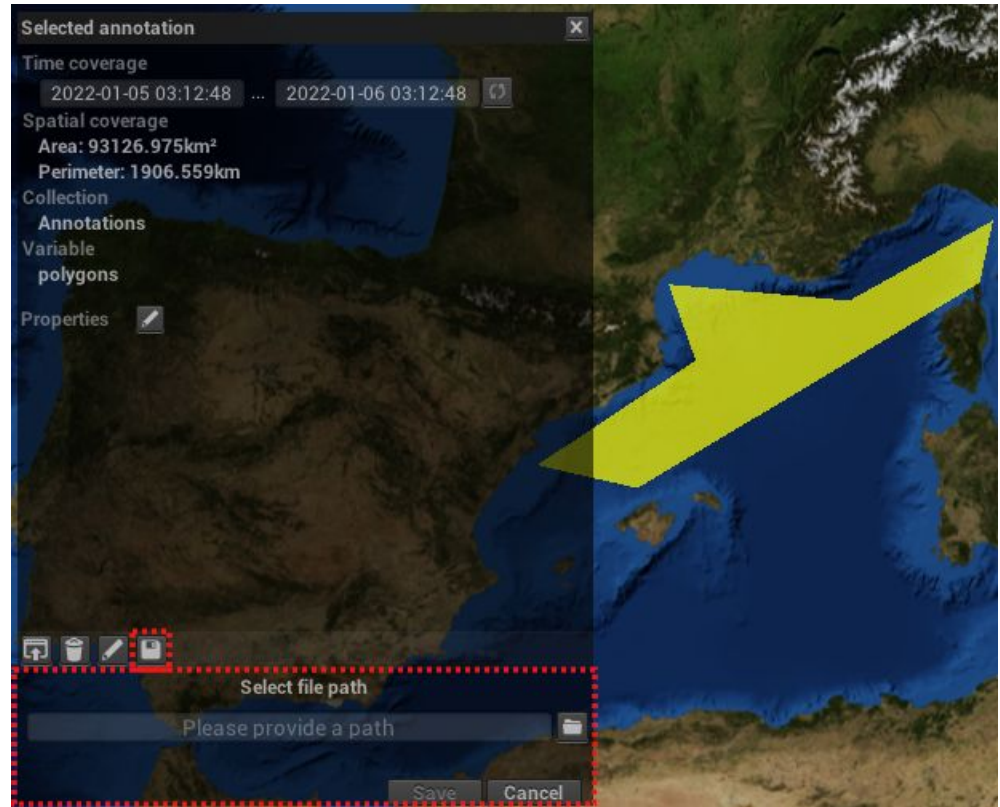
## Shapes: Draw / export / import

Note that SEAScope will only export shapes that belong to the collections you selected in the import/export menu **and** that are currently displayed on the globe.

It is also possible to export shapes individually using the export button (floppy disk icon) located at the bottom of the contextual menu that appears when you select the shape. ⇒

SEAScope embeds an editor to attach properties to the shapes (not demonstrated here).

All these properties are included in the export file, so you can use shapes to make annotations and share them with other SEAScope users.



# SEAScope stand alone tool

## Two-ways interaction with Jupyter Python notebooks

### 0 - Prerequisites

#### *Option A: Using conda (required on Windows)*

```
> conda create --name seascope  
> conda activate seascope  
> conda install pip netCDF4 scipy
```

#### *Option B: Using Python virtual environments*

Some Linux distributions do not include the Python module for creating virtual environments, to install it you may have to use your package manager, for example:

```
> python -mvenv -h # if you get an error saying "No module named venv", then you need to install it  
> sudo apt install python3-virtualenv
```

Once the virtualenv module is installed, create and activate a new environment using the following commands:

```
> python -mvenv seascope  
> source seascope/bin/activate
```

# SEAScope stand alone tool

## Two-ways interaction with Jupyter Python notebooks

### 1 - Install SEAScope Python package

With your new environment still active, go to the root directory of the USB key and install the python package with:

```
> cd [path to usb key]
> pip install -r requirements.txt
```

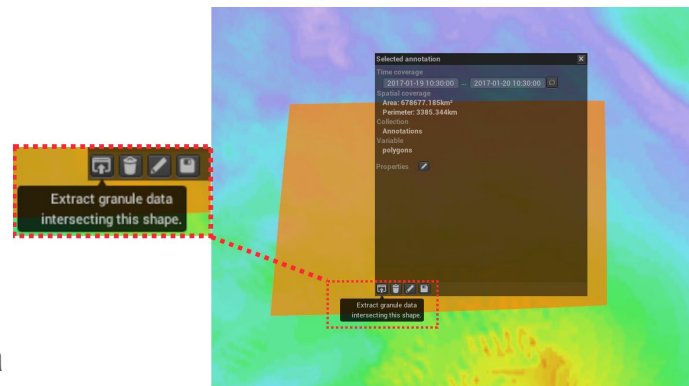
### 2 - Open JupyterLab environment

```
> jupyter lab
```

Select the desired notebook and double click to open it, we will exercise with ekman.ipynb notebook to compute wind-induced current using ECMWF wind data

### 3 - Extract

Draw a polygon and click on the bottom-left button to extract data



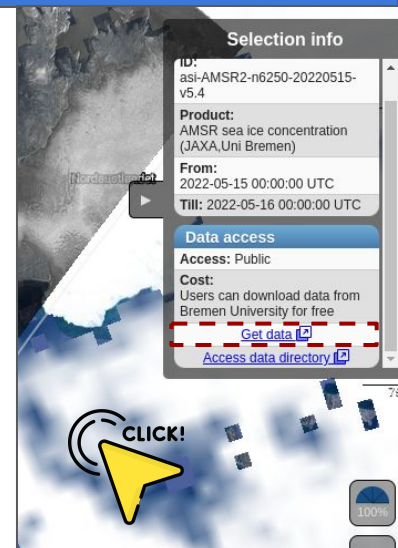
# SEAScope stand alone tool

## Convert data into SEAScope

### 3 - Practice converting AMSR-2 sea ice concentration data

- Go to OVL web portal: <https://odl.bzh/k1Pbfm3U>, click on AMSR-2 sea ice concentration data displayed on the map to open the Selection info panel and click on “Get data”
- or get data from the Bremen University website: [https://seaiice.uni-bremen.de/data/amr2/asi\\_daygrid\\_swath/n6250/netcdf/2022/asi-AMSR2-n6250-20220515-v5.4.nc](https://seaiice.uni-bremen.de/data/amr2/asi_daygrid_swath/n6250/netcdf/2022/asi-AMSR2-n6250-20220515-v5.4.nc)
- To convert this file to IDF, run in a shell or conda:

```
> idf-converter [path to usb key]/configuration/bremen_amr_l3_sic/bremen_amr_l3_sic.txt@ \  
    -i path = [downloads]/asi-AMSR2-n6250-20220515-v5.4.nc \  
    -o path = [workspace]/seascope/data
```



**NB:** macOS users should replace “[workspace]/seascope/data” with “~/SEAScope-workspace/data”



## Contacting us

### About the OVL online portal (based on Syntool)

Website: <https://ovl.oceandatalab.com>

By email: [syntool@oceandatalab.com](mailto:syntool@oceandatalab.com)

Forum: <https://forum.oceandatalab.com/syntool>

### About SEAScope

Website: <https://seascope.oceandatalab.com>

By email: [seascope@oceandatalab.com](mailto:seascope@oceandatalab.com)

Forum: <https://forum.oceandatalab.com/seascope>

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Twitter: [@oceandatalab](https://twitter.com/oceandatalab)

Linkedin: [OceanDataLab](https://www.linkedin.com/company/OceanDataLab)



## Two-ways interaction with Jupyter Python notebooks

### 4 - Run the Python notebook

Go back to your ekman.ipynb notebook and run the cell to see how to:

- Get data from SEAScope
- Perform some analysis (here compute the wind-induced current using the Ekman equation)
- Make some plots
- Export your results to SEAScope and configure the rendering (colormaps, representation, min-max)

Tips: to run cells in a Jupyter notebook you can either click on the play button, or press Shift+Enter on each selected cell.

### 5 - Look at the results in SEAScope

Go back to SEAScope to look at your results, a collection with the exported dataset(s) has been created. Here it is labeled “User - Ekman Current” and three variables are available: “Zonal Ekman Current”, “Meridional Ekman Current” and “Norm of Ekman Current”

# SEAScope stand alone tool

## Convert data into SEAScope

### 1- Install the converter (python code)

Get the idf\_converter python 3 package from the USB key

In conda or in a shell:

```
> pip install idf_converter-0.1.306.tar.gz
```

### 2- Convert your data using a configuration file

Conversion options can be passed directly on the command line or using configuration files.

Sample configuration files can be found on the USB key, in the `configuration` directory.

```
> idf-converter [path to the config file].txt@ -i path = [path to your input file] -o path = [path to your output directory]
```

# SEAScope stand alone tool

## Convert data into SEAScope

- The `data` directory now contains a subdirectory for the `bremen_amsr_l3_sic` collection.  

```
seascope/data/bremen_amsr_l3_sic
├── asi-AMSR2-n6250-20220515-v5.4
│   └── asi-AMSR2-n6250-20220515-v5.4_idf_00.nc
```
- You just added a new collection containing one granule in the `data` directory, but SEAScope does not know how to display these data yet: we need to provide a configuration file where the application will find the rendering settings for all the granules that belong to the `bremen_amsr_l3_sic` collection.

A sample configuration file is available for this collection on the USB key, copy `[path to usb key]/configuration/bremen_amsr_l3_sic/config.in` to the `[workspace]/seascope/data/bremen_amsr_l3_sic` directory.

- And now we're all set! (Re)start SEAScope to let the application detect the new data and update the index.

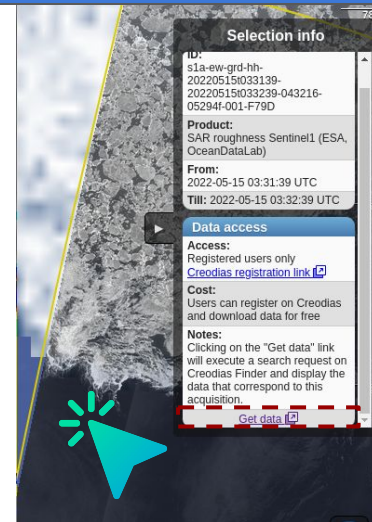
**NB:** macOS users should replace “`[workspace]/seascope/data`” with “`~/SEAScope-workspace/data`”

# SEAScope stand alone tool

## Convert data into SEAScope (Advanced, for training at home)

### 4 - Practice converting Sentinel-1 SAR data

- Go to OVL web portal: <https://odl.bzh/k1Pbfm3U>, click on the dataset you want to download to open the Selection info panel and click on “Get data”
- You will be redirected to Creodias Finder and will have to create an account or log in to retrieve the dataset
- Alternatively you can download this sample from our ftp:  
[https://ftp.odl.bzh/odl/events/lps\\_2022/S1A\\_EW\\_GRDM\\_1SDH\\_20220515T033139\\_20220515T033239\\_043216\\_05294F\\_F79D.zip](https://ftp.odl.bzh/odl/events/lps_2022/S1A_EW_GRDM_1SDH_20220515T033139_20220515T033239_043216_05294F_F79D.zip)
- Unzip the downloaded data
- Run in a shell or conda:



```
> idf-converter [path to usb key]/configuration/sentinel1_l1_roughness_IWEW_GRD/sentinel1_l1_roughness_IWEW_GRD.txt@\  
-i path = [downloads]/S1A_EW_GRDM_1SDH_20220515T033139_20220515T033239_043216_05294F_F79D.SAFE/\  
measurement/s1a-ew-grd-hh-20220515t033139-20220515t033239-043216-05294f-001.tif  
-o path = [workspace]/seascope/data
```

**NB:** macOS users should replace “[workspace]/seascope/data” with “~/SEAScope-workspace/data”

# SEAScope stand alone tool

## Convert data into SEAScope (Advanced, for training at home)

- The `data` directory now contains a subdirectory for the `sentinel1_l1_roughness_IWEW_GRD` collection.  

```
seascope/data/sentinel1_l1_roughness_IWEW_GRD
├── sla-ew-grd-hh-20220515t033139-20220515t033239-043216-05294f-001-F79D
│   ├── sla-ew-grd-hh-20220515t033139-20220515t033239-043216-05294f-001-F79D_idf_00.nc
│   ├── sla-ew-grd-hh-20220515t033139-20220515t033239-043216-05294f-001-F79D_idf_01.nc
│   ├── sla-ew-grd-hh-20220515t033139-20220515t033239-043216-05294f-001-F79D_idf_02.nc
│   ├── sla-ew-grd-hh-20220515t033139-20220515t033239-043216-05294f-001-F79D_idf_03.nc
│   ├── sla-ew-grd-hh-20220515t033139-20220515t033239-043216-05294f-001-F79D_idf_04.nc
│   └── sla-ew-grd-hh-20220515t033139-20220515t033239-043216-05294f-001-F79D_idf_05.nc
```
- You just added a new collection containing one granule in the `data` directory, but SEAScope does not know how to display these data yet: we need to provide a configuration file where the application will find the rendering settings for all the granules that belong to the `sentinel1_l1_roughness_IWEW_GRD` collection.

A sample configuration file is available for this collection on the USB key,

copy `[path to usb key]/configuration/sentinel1_l1_roughness_IWEW_GRD/config.info` to the `[workspace]/seascope/data/sentinel1_l1_roughness_IWEW_GRD` directory.

**NB:** macOS users should replace “`[workspace]/seascope/data`” with “`~/SEAScope-workspace/data`”

# SEAScope stand alone tool

## Convert data into SEAScope (Advanced, for training at home)

- And now we're all set! (Re)start SEAScope to let the application detect the new data and update the index.
- Select the “sea ice concentration” variable under the “AMSR (-E/-2) ARTIST Sea Ice” category
- Select the “sea surface roughness” variable under the “Sentinel-1 SAR Roughness IW/EW GRD” category

- Enjoy :)

