

The background of the slide is a composite image. On the left, a satellite is shown in orbit above a blue Earth. Below it, a satellite component with a gold-colored thermal blanket is visible. On the right, a complex visualization of fluid flow is shown, featuring streamlines and vortices in shades of blue, green, and yellow. The text "Visualisation and Analysis Tools" is centered in white.

# Visualisation and Analysis Tools

L. Gaultier, F. Collard and the ODL team

11/10/2022

To ease browsing and intercomparing data, Visualisation and Analysis tools have been made available within the WOC project:

- SEAScope Stand alone application
- Dedicated WOC Syntool Web portals

Both tools enable you to easily open, visualize, compare and blend data that are collocated in time and space.

Using vectorfields representation and images, it is possible to compare data in term of structures rather than pointwise data.

Support for a wide variety of data, WOC data, Sentinel 1-2-3-6, as well as in-situ observations and model outputs

# Visualisation tools: general overview

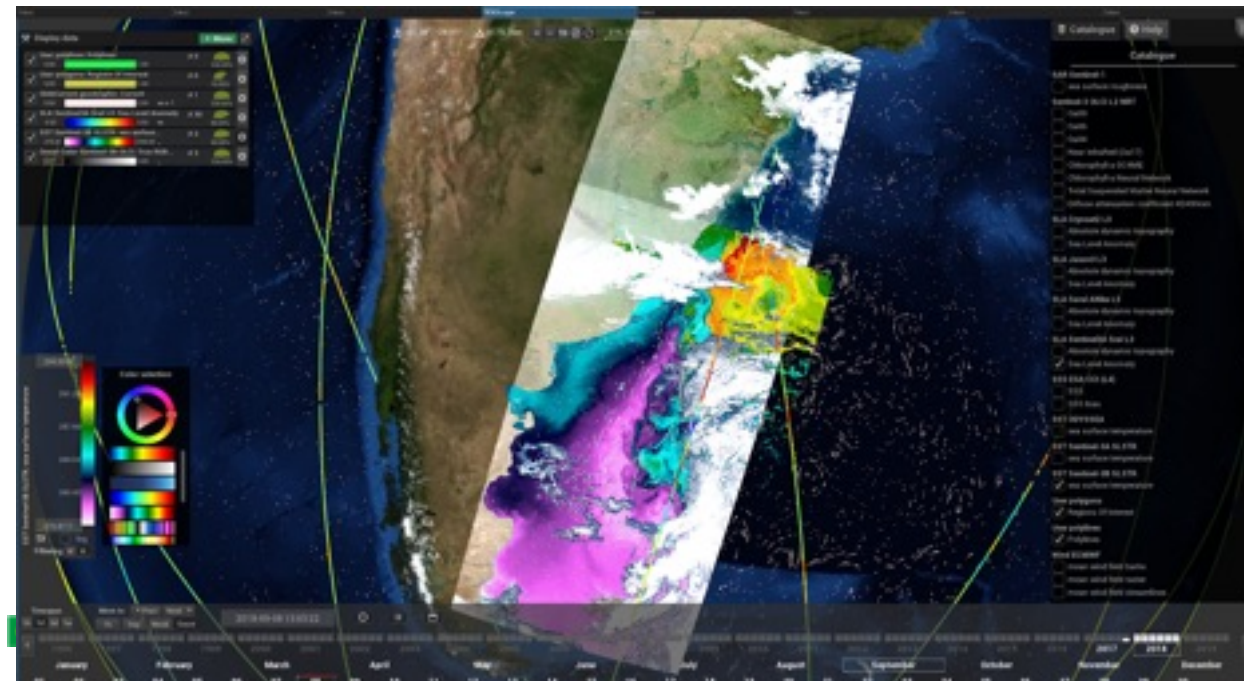
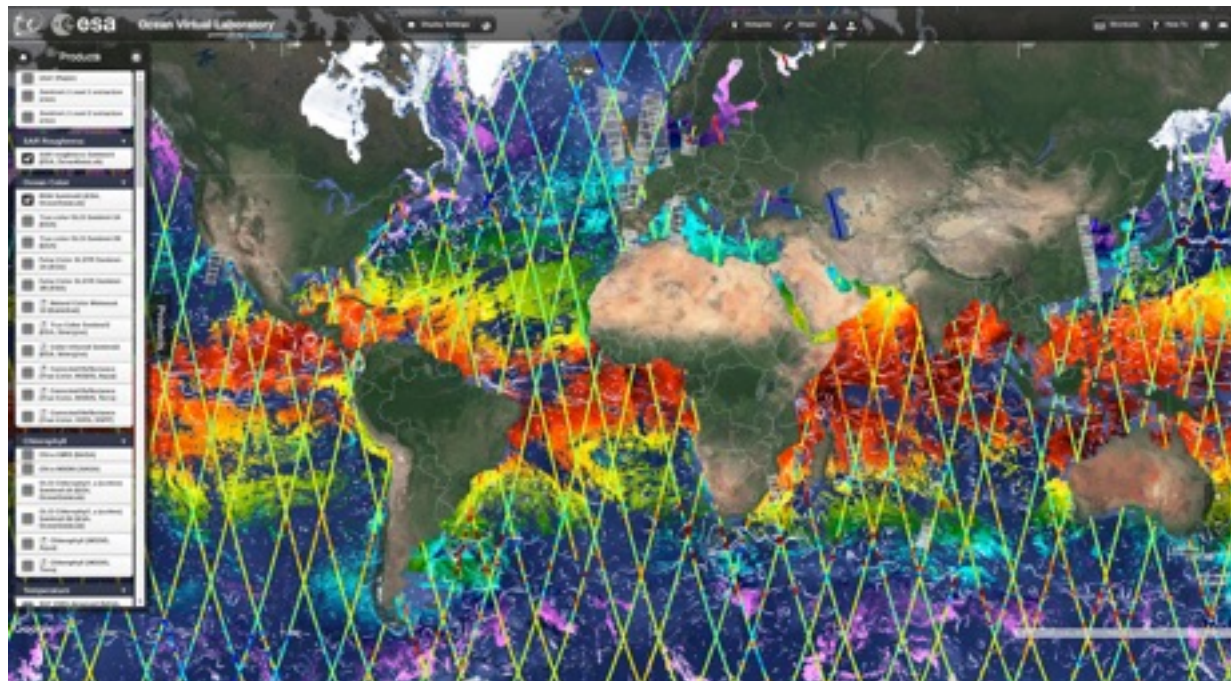
## Syntool Web Portals

- Data are projected and tiled (preprocessed)
- Drawing capabilities for synoptic chart
- Portals available on any browser:  
<https://woc.oceandatalab.com>,  
<https://ovl.oceandatalab.com>

more than 200 products available, NRT processing

## SEAScope Stand alone application

- Works on Linux, macOS and Windows
- 3D earth, no data projection , dynamical rendering
- Two-ways interaction with Python
- Available on <https://seascope.oceandatalab.com>



# WOC Specific development

## Syntool Web Portals

All products from WOC catalogue have been included in the WOC portals

Other relevant products made available

Short link with interesting test cases are being populated

## SEAScope Stand alone application

All netCDF regular grid 2D products are compatible with SEAScope

IDF SEAScope format data are available at request for other

Jupyter python notebooks to perform analyses are available at requests



The screenshot displays a grid of product cards. Each card includes a title, a small thumbnail image, and key metadata:

- WOC ERA\* Hourly Global Stress Equivalent Wind and Wind Stress**: Project(s): WOC; Parameters(s): Ocean Winds; Temporal resolution: 1 hour(s); Spatial resolution: 0.125 degree.
- WOC Estimation of Stokes Drift Components from WaveWatch3 Model over Global Ocea...**: Project(s): WOC; Parameters(s): Sea State, Ocean currents; Temporal resolution: 3 hour(s); Spatial resolution: 0.5 degree.
- WOC Fronts Derived from Remote Sensing Microwave SST L4 over Agulhas Region**: Project(s): WOC; Platform(s): GCOM-W1, Coriolis, TRMM; Instrument(s): AMSR-2, WindSat, TMI; Parameters(s): Ocean currents; Temporal resolution: 1 day(s); Spatial resolution: 0.25 deg.
- WOC Fronts Derived from Remote Sensing Microwave SST L4 over North Atlantic R...**: Project(s): WOC; Platform(s): GCOM-W1, Coriolis, TRMM.
- WOC Fronts Derived from Remote Sensing SST Observations by SEVIRI over Agulhas R...**: Project(s): WOC; Platform(s): MSG-2, MSG-3, MSG-4.
- WOC Fronts Derived from Remote Sensing SST Observations by SEVIRI over Western E...**: Project(s): WOC; Platform(s): MSG-2, MSG-3, MSG-4.

<https://worldoceancirculation.org/Products>

- Platform
- Instrument
- Processing level
- Spatial Resolution
- Area
- GCMD parameter

jupyter SWELL\_refrac Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

In [ ]: `import matplotlib
matplotlib inline
import matplotlib.pyplot as plt
import numpy
import os
import datetime
import pickle`

### Load and select data from SEAScope

Select the surface velocity from GlobCurrent you want to play with (current norm raster)  
 Draw a polygon on SEAScope  
 Click on the extract button on the polygon window

In [ ]: `# Load data directly from viewer memory
from SEAScope.lib import get_extracted_data
extractions = get_extracted_data()`

In [ ]: `# Save a local copy
with open('data.pickle', 'wb') as f:
 pickle.dump(extractions, f)`

In [ ]: `# Load the local copy
with open('data.pickle', 'rb') as f:
 extractions = pickle.load(f)`

In [ ]: `#from SEAScope.lib import load_py
#data_path = ''
#extractions = load_py(data_path)
## Print a list of path of extracted granules
print('\n'.join(extractions.keys()))`

Print selected granules

In [ ]: `for k, data in enumerate(extractions.keys()):
 print('{} - {}'.format(k, os.path.basename(data)))
 print('\n'.join(['\t{}'.format(x) for x in extractions[data]
 print(extractions[data]['meta']['start'])`


### Play with the data

Compute trajectory of fictive swell ray at initial position  $(x_0, y_0)$  using the dispersion relation in presence of surface current :

$$\omega_r = \omega + \vec{k} \cdot \vec{u}$$

$$\vec{u} = \vec{u}_s$$

Load in space 15927.5km 788.5km



Timeline: 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019

2018-12-04 11:59:59

January February March April May June July August September October November December

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31



One general portal that contains all WOC products and other relevant upper ocean observations and model:

<https://woc.oceandatalab.com>

Three thematic portals with a focus on the studied region and the corresponding products:

1. <https://woc-safe-navigation.oceandatalab.com>
2. <https://woc-sustainable-fisheries.oceandatalab.com>
3. <https://woc-clean-ocean.oceandatalab.com>

- Theme 1, safe navigation:

Comparison WOC SAR Doppler and WOC BFN: <https://odl.bzh/x7fY49FO>

- Theme 2, sustainable fisheries:

Comparison with SST SLSTR and Microwave: <https://odl.bzh/U8JJO8P>  
[https://odl.bzh/6I5A\\_Bzd](https://odl.bzh/6I5A_Bzd)

- Theme 3, clean ocean:

Triggering of a large inertial oscillation: <https://odl.bzh/OYIgbTUQ>

# Demo today 17h-19h

Visualization tools are available on laptops and can be demonstrated on the big screen

Come at the demo area to have a tour or play with the tools

Today 17h - 19h CET

Tutorials available on our youtube channel:

<https://www.youtube.com/channel/UCayVzsP1tMGofMxmxHarM9w>

Send us your feedback at [contact@oceandatalab.com](mailto:contact@oceandatalab.com)

ESA UNCLASSIFIED - For ESA Official Use Only

