NOOS-Drift
A quick start guide

Sébastien Legrand

V1.0, Septembre 2022

NOOS-Drift in a nutshell

- NOOS-Drift is a transnational multi-models ensemble system to assess and improve drift forecast accuracy in the European Northwest Continental Shelf Seas.

- The NOOS-Drift service aims at providing end-users such as maritime authorities and coastguards stations from the countries bordering the Northwest Shelf not only with drift trajectory forecasts but also with information on the accuracy of the forecast.

- Designed as a one stop shop service, registered users can activate the service on-demand either via a simple web form or a machine-to-machine API. Within 30 minutes after the activation, the users can visualize, analyse and download the results of the multi-model analysis.

NOOS
EuroGOOS North West European Shelf
Operational Oceanographic System

NOOS-Drift,
a secure machine to machine communication system
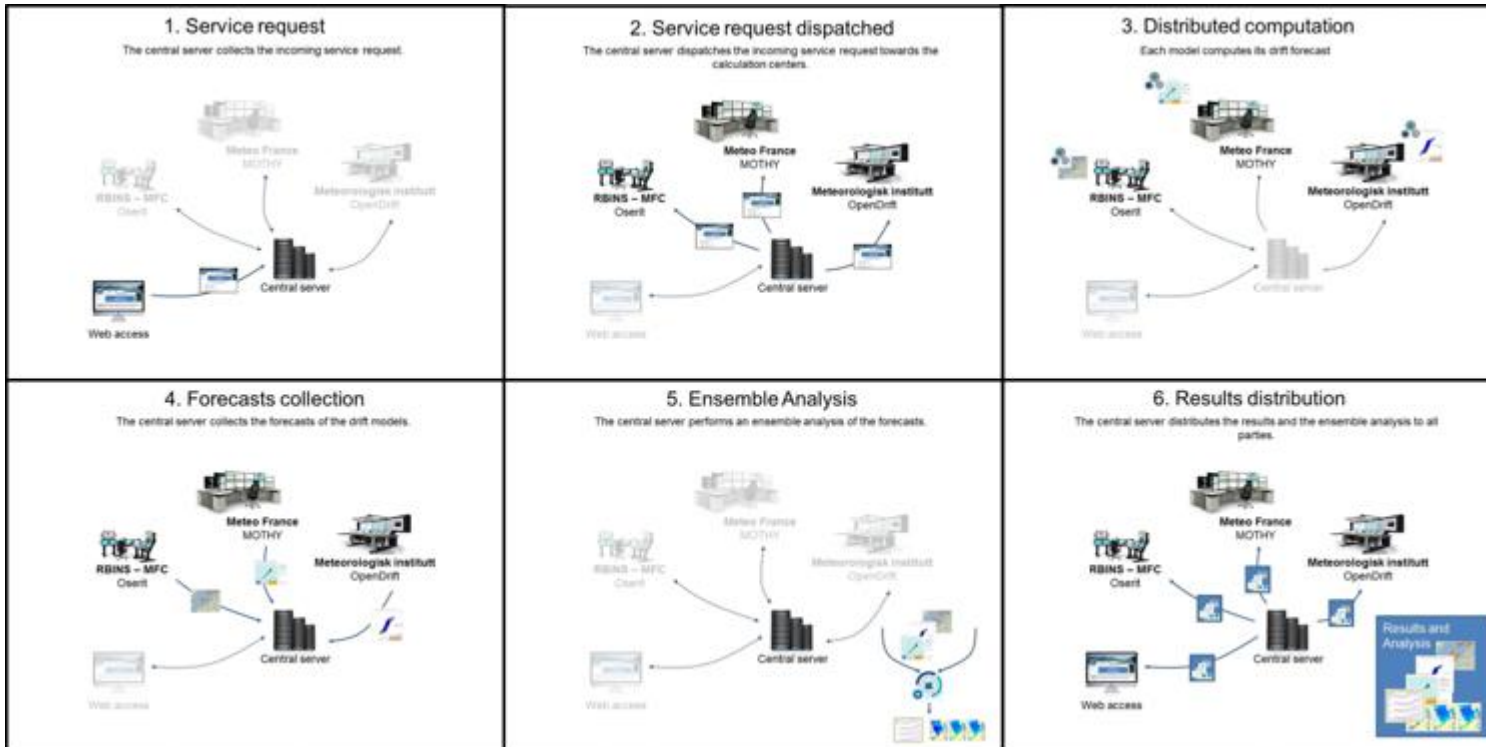
- dispatch drift simulation requests to participating drift model services providers

- Collecting drift   simulation results

- Distributing drift simulation results

NOOS-Drift service specification

- A 24/7 on-demand service accessible to registered users only via a web application and/or a machine-to-machine API

- 3 Drifters categories :
    - Person in water,
    - Objects adrift,
    - 6 generic Oils

- Area : European Northwest continental shelf seas and margin Atlantic Ocean

- Timeliness : Within 15' , all results available for visualization and download

- High level of standardization (netcdf and geoJSON) facilitating integration of NOOS drift results within end-users systems.

NOOS
EuroGOOS North West European Shelf
Operational Oceanographic System

1. How to register and manage your account?

Access to the web-application

- https://odnature.naturalsciences.be/noosdrift/api/home/
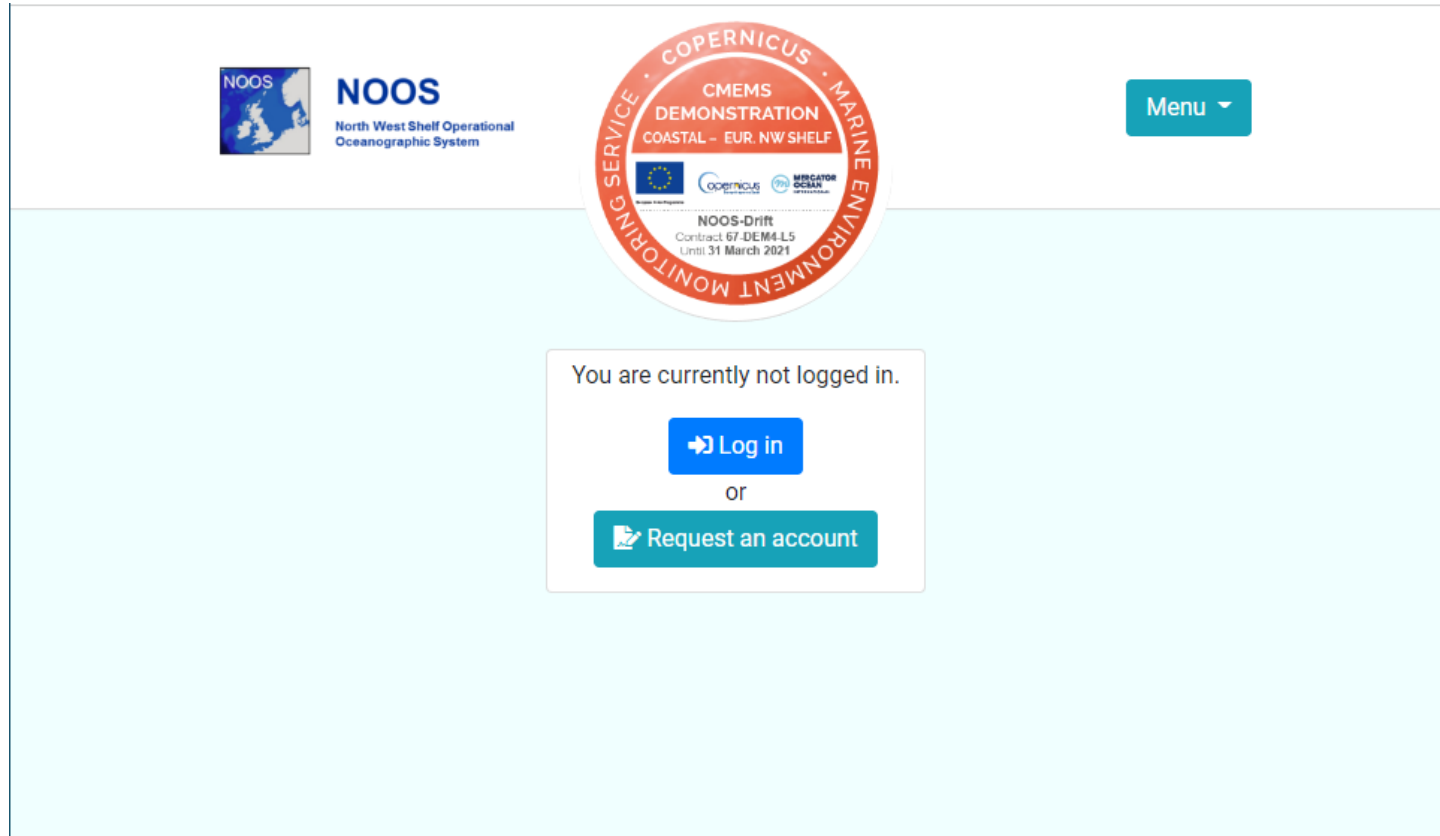
Request an account
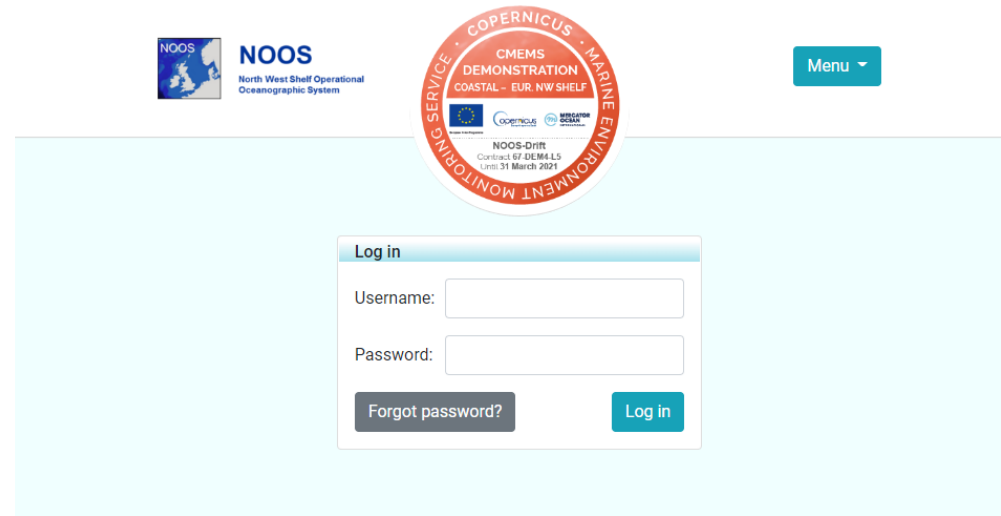
- Just fill in the form here

- Attention read the [condition of use](condition%20of%20use) as the access to the service might be restricted.

- Each account request is reviewed by a NOOS-Drift service administrator. Usually, the access is granted the next business day.

Login
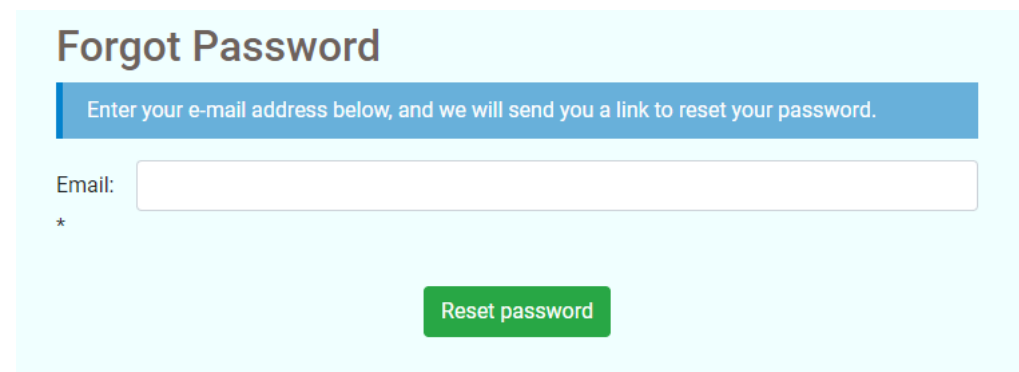
- https://odnature.naturalsciences.be/noosdrift/api/accounts/login/
- Just provides the username and password
- If you've forgotten your password, you will receive an email with a randomly generated password
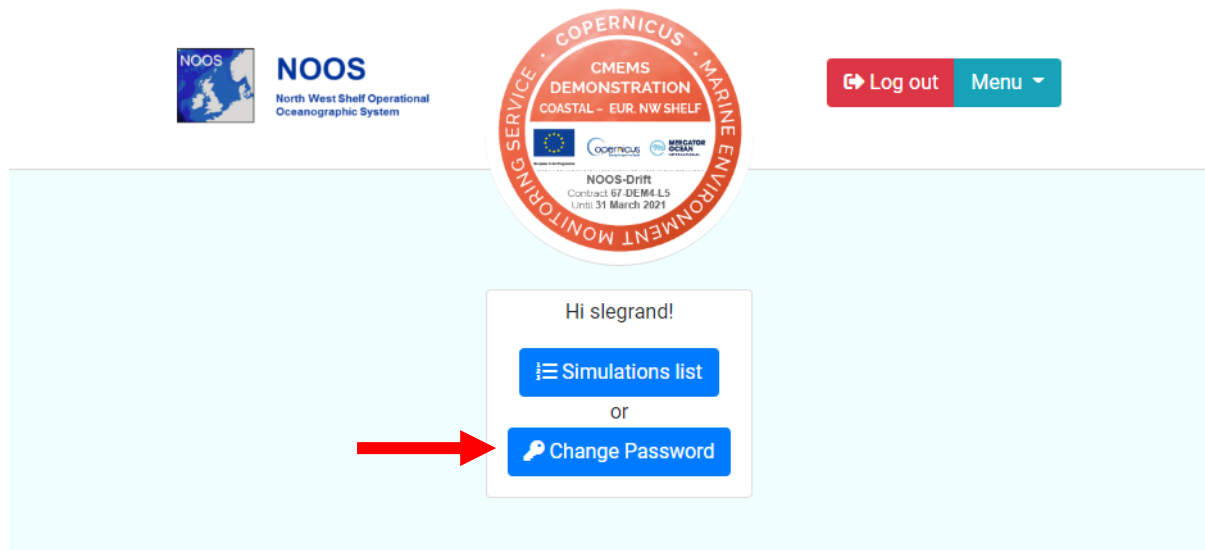
Manage your account

- At each login you have the opportunity to change your password:

2. How to manage simulations?
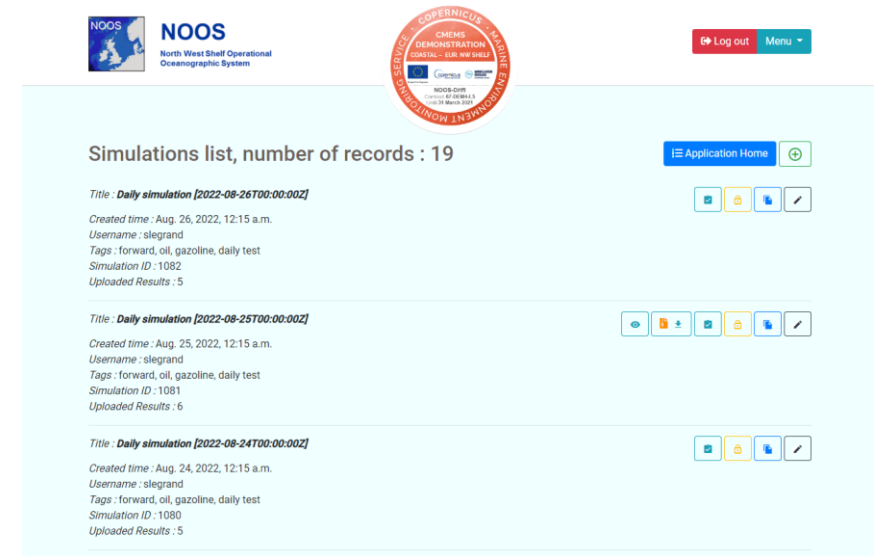
The simulation manager,
the central point of NOOS-Drift web application!

It lists all available simulations and allows
the following actions:

⊕ Request a new simulation

👁 Visualize the results of the current simulation

☑ Visualize the request form of the current simulation

✏ Edit the title, the summary of the tag list associated of the current simulation

📄↓ Download all the available results of the current simulation

🔒 Protect a simulation against automatic deletion after 14 days

📋 Prefill a new simulation request form with the data of the current simulation

3. How to request simulations?

1 form but 2 options:

Give you access to a blank simulation request form

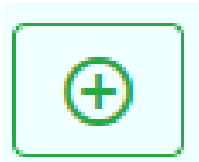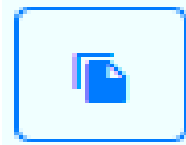Give you access to a simulation request form
pre-filled with info from a previous simulation

NOOS
EuroGOOS North West European Shelf
Operational Oceanographic System

- The form is organised in 4 sections
  1. Describing the simulation
  2. Defining the type of drifter
  3. Describing the initial conditions
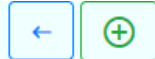 4. Fine-tuning the model set-up (default is a 3D simulations with all)

Section 1 : simulation description

Simultation **type** = to set forward or backward in time

Time only in UTC

Protected = simulation results won't be automatically deleted after 14 days

Simulation description

Title: *   Please provide a title to identify your simulation

Type: *

Summary: *   Please provide a summary to identify your simulation

Tags: *

Start Time: *   YYYY-MM-DDTHH:MM:SSZ

End Time: *   YYYY-MM-DDTHH:MM:SSZ

Protected: ☐

NOOS
EuroGOOS North West European Shelf
Operational Oceanographic System

Section 2 : Selection of the drifter

2 types of drifters are possible:
- oils
- Floating objects

7 generic oils defined

Actual oil characterization may change from one model service provider to another

100+ objects listed in the doplist

But not all objects necessary implemented in all models

For objects, the entry « total mass » is not relevant

Drifter

Drifter Type: *	Oil
Drifter Name: *	diesel oil
Total Mass (kg):	5000

Drifter

Drifter Type: *	Object
Drifter Name: *	Life-raft, no ballast system, no canopy, with drogue
Total Mass (kg):	5000

NOOS
EuroGOOS North West European Shelf
Operational Oceanographic System

Section 3 : Description of the initial conditions

One form but many possible release scenario

Scenario	Geometry	Lat, lon	Radius	Release time
Instantaneous punctual release	Point	1 point	1 value = 0 m	1 release time, i.e. as simulation start time
Instantaneous release of a circular spill	Point	1 point, the center	1 value ≠ 0m	1 release time, i.e. as simulation start time
Instantaneous release of an elongated spill with a constant or variable width	Polyline	2 points (i.e. the ends of the slick) separated by a comma	1 or 2 values separated by a comma, representing the slick width at the slick ends.	1 release time, i.e. as simulation start time
Instantaneous release along a complex trajectory	Polyline	n points, separated by a comma	1 or n values sepatated by a comma, representing the slick width at each polyline vertices	1 release time, i.e. as simulation start time
Continuous release along a complex trajectory	Polyline	n points, separated by a comma	1 or n values sepatated by a comma, representing the slick width at each polyline vertices	Start time and end time of the release. The release start time must be the same as simulation start time. The release end time must be between the start time and the end time of the simulation
...				
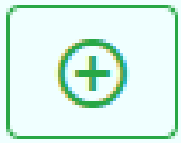
⊕ Section 4 : Fine tuning the model set-ups

By default the more complex possible simulation is requested, but users can always deactivate some processes…

Simulation backward in time are always 2D simulations.

Model set up

2D/3D: *   3D

Beaching: ☑

Buoyancy: ☑

Dissolution: ☑

Evaporation: ☑

Horizontal
spreading: ☑

Natural vertical
dispersion: ☑

Sedimentation: ☑

Once submitted, the form is validated.
If no error, you get the confirmation "demand created" and the simulation appear in the simulation list
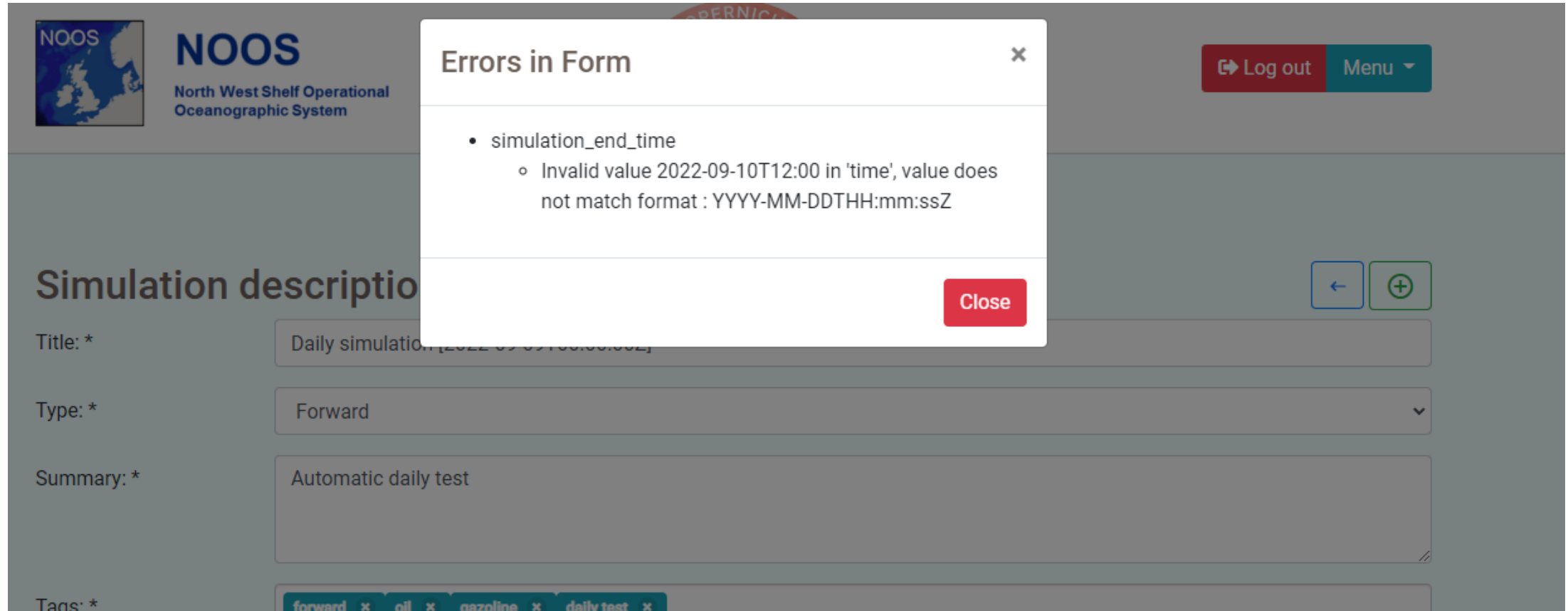
In case the form is not validated, please correct the form as explained in the error messages
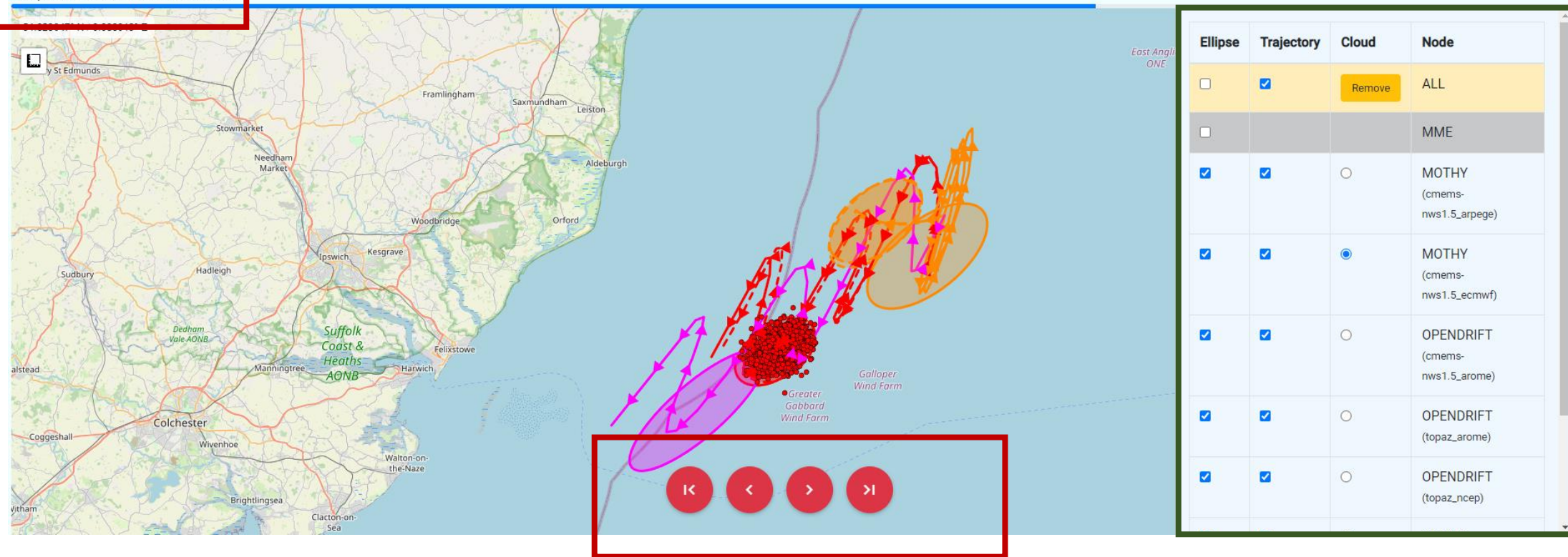
4. How to visualize simulation results?
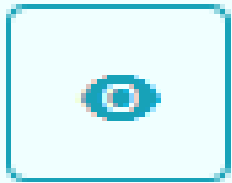
Visualizing simulation results

A first panel to select results to display

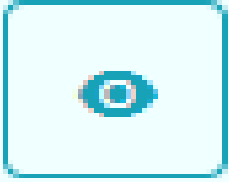Daily simulation [2022-08-31T00:00:00Z]

1 September 2022 01:00 +00:00 UTC

Ellipse	Trajectory	Cloud	Node
☐	☑	Remove	ALL
☐			MME
☑	☑	○	MOTHY (cmems-nws1.5_arpege)
☑	☑	◉	MOTHY (cmems-nws1.5_ecmwf)
☑	☑	○	OPENDRIFT (cmems-nws1.5_arome)
☑	☑	○	OPENDRIFT (topaz_arome)
☑	☑	○	OPENDRIFT (topaz_ncep)

A second panel to easily browse results in time

Visualizing simulation results

- All simulations can be easily compared at once on the same map:
  - ✓ Colour code to easily identity the different models
  - ✓ Trajectories of the centre of mass
  - ✓ Ellipses representing the location and extension of the simulated Lagrangian particles clouds at the given timesteps
  - ✓ Actual representation of the Lagrangian particles cloud (only one simulation at a time)
  - ✓ Easy browsing in time thanks to the red dot panel
  - ✓ Selection of the displayed information via the right-hand side panel
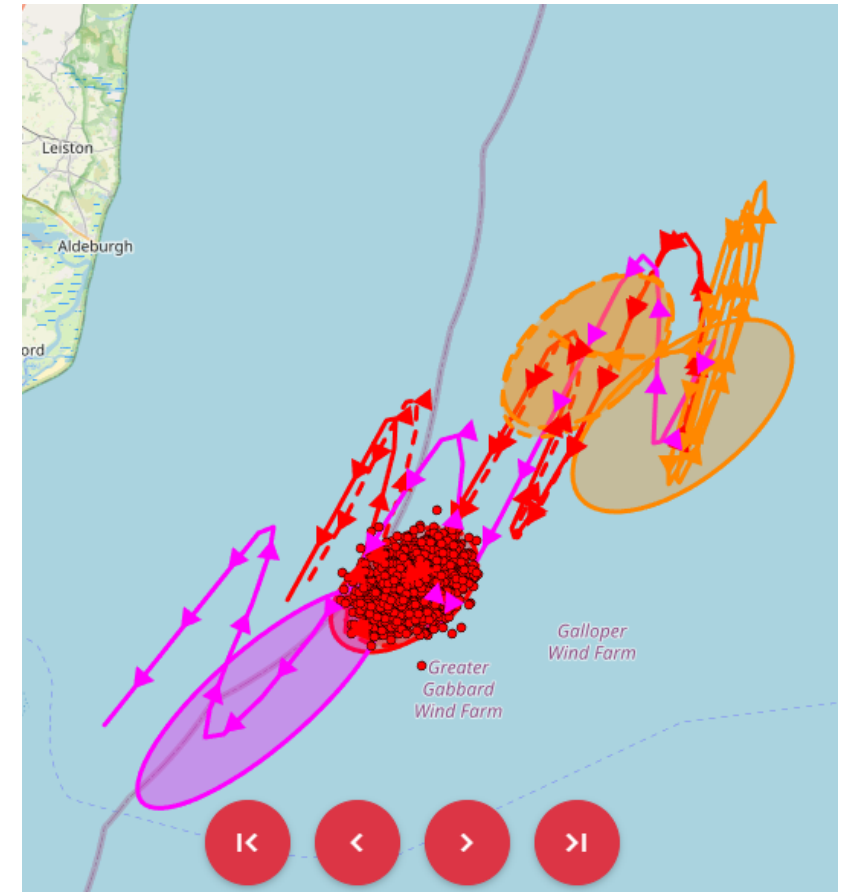
NOOS
EuroGOOS North West European Shelf
Operational Oceanographic System
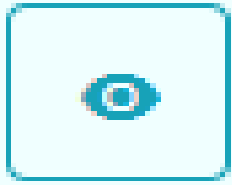
Visualizing MME analysis results

- At each timestep, the MME analysis results, including :

  - ✓Cluster(s) of simulations with similar behaviours (grey circles)

  - ✓An estimate of the simulation uncertainty based on the ensemble spread (green ellipsis)
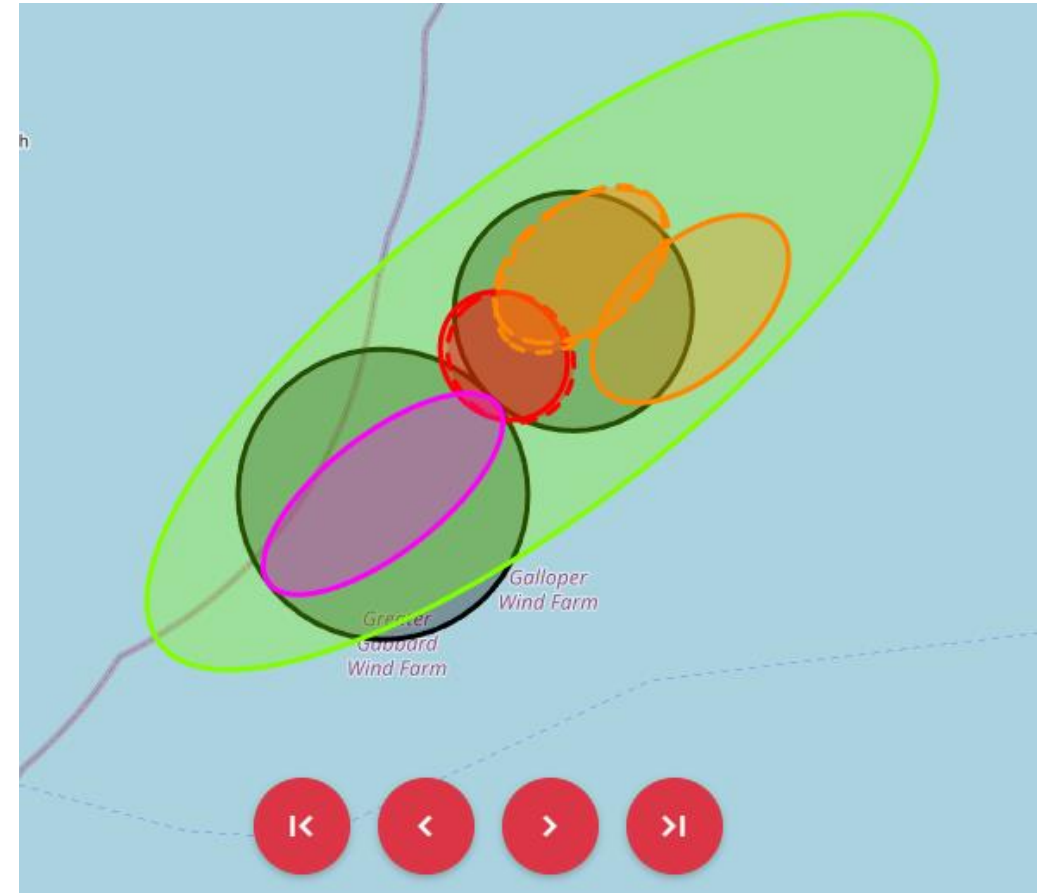
3. How to download results ?
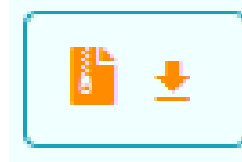
You get a zip archive with

- The netcdf-cf file for the different ensemble members of the drift simulation

📁 mme_output	File folder
📁 parameters	File folder
📄 noosdrift_1105_mothy_cmems-nws1.5_arpege.nc	NC File
📄 noosdrift_1105_mothy_cmems-nws1.5_ecmwf.nc	NC File
📄 noosdrift_1105_opendrift_cmems-nws1.5_arome.nc	NC File
📄 noosdrift_1105_opendrift_topaz_arome.nc	NC File
📄 noosdrift_1105_opendrift_topaz_ncep.nc	NC File
📄 noosdrift_1105_oserit_optos_ukmo.nc	NC File

NOOS

EuroGOOS North West European Shelf
Operational Oceanographic System

You get a zip archive with

- The results of the NOOS-Drift ensemble analysis in geoJSON (trajectory, ellipsis, green ellipsis and grey circles)

📁 mme_output	File folder	
📁 parameters	File folder	
📄 noosdrift_1105_mothy_cmems-nws1.5_arpege.nc	NC File	
📄 noosdrift_1105_mothy_cmems-nws1.5_ecmwf.nc	NC File	
📄 noosdrift_1105_opendrift_cmems-nws1.5_arome.nc	NC File	
📄 noosdrift_1105_opendrift_topaz_arome.nc	NC File	
📄 noosdrift_1105_opendrift_topaz_ncep.nc	NC File	
📄 noosdrift_1105_oserit_optos_ukmo.nc	NC File	

NOOS
EuroGOOS North West European Shelf
Operational Oceanographic System

You get a zip archive with

- The different simulation requests files (in JSON) as exchanged in the NOOS-Drift communication system

📁 mme_output	File folder
📁 parameters	File folder
📄 noosdrift_1105_mothy_cmems-nws1.5_arpege.nc	NC File
📄 noosdrift_1105_mothy_cmems-nws1.5_ecmwf.nc	NC File
📄 noosdrift_1105_opendrift_cmems-nws1.5_arome.nc	NC File
📄 noosdrift_1105_opendrift_topaz_arome.nc	NC File
📄 noosdrift_1105_opendrift_topaz_ncep.nc	NC File
📄 noosdrift_1105_oserit_optos_ukmo.nc	NC File

NOOS
EuroGOOS North West European Shelf
Operational Oceanographic System

Any other questions?

- Please send an email to slegrand@naturalsciences.be