D5.3 - MANIFESTS DSS - User guides

COP tool

HNS database

Web application for HNS models

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COPtool

User Manual

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Project Acronym	MANIFESTS
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Content

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1. Background

In the event of a maritime accident involving HNS, maritime authorities must take numerous decisions to organize the best response strategy, i.e., one that minimizes risks to human health (including incident response teams, crew members and coastal communities), to the marine environment, for maritime safety and for socio-economic activities and facilities. While many key decisions and considerations are prescribed in national or regional contingency plans, operational response activities will generally need ongoing adjustment or review to reflect the most recent information available as the contamination event evolves. In such a rapidly changing situation, an efficient exchange of information between competent decision-making authorities and response teams on the ground can greatly facilitate both decision-making processes and organizational processes.

The purpose of work package 5 of the Manifests project (Manifests decision support system) is to develop an efficient information system that helps (1) decision makers understand the situation at stake and its likely evolution in the coming hours and days; (2) identify the population, ecosystems and socio-economic assets at risk and (3) share useful information with response teams deployed at sea, in the air or on the coast.

Building on the experience gained and development carried out during the previous HNS-MS and MARINER projects, the MANIFESTS decision support system (DSS) will integrate several services, including the DSS Common Operational Picture (COPtool).

This COPtool refers to a system designed so that during a contingency, the exchange of information that occurs between the maritime authorities and the different response teams (sea, coast, air) is carried out in the most efficient way possible, ensuring that all actors involved in the crisis committee and response teams can access the same data. These can be standard reports (such as the Standard Pollution Observation Report of the Bonn Agreement), images, videos and any other georeferenced data collected by response teams, as well as satellite observations, model simulation results, exclusion areas, location of response media, requests for new response actions shared by the crisis.

The COPtool documentation is composed by:

- ‹ Installation guides.
- ‹ User Manual (this document).

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‹ DSS Implementation report.

2. Description of the COPtool

The COPtool consists of a web platform hosted on a server (Windows or Linux), which once published in a domain will be accessible to users through a web browser from a desktop computer or mobile device (responsive UI).

The platform allows you to perform the following tasks:

‹ Manage the system users, defining the responsibilities/functions of each one of them.
‹ Manage the information that must be available in the system permanently (basic or reference information). This information is characterized by being generated prior to a contingency. It must be routinely collected to ensure that the most up-to-date data is used. Examples of this information are: Base layers, topography, types of background, toponymy, administrative boundaries, marine charts, information on socioeconomic and environmental resources, ocean-meteorological data for both prediction and observation, etc.
‹ Insert information that is generated during the contingency, either information provided by the response teams (POLREP reports, SCAT, photos, videos, comments, etc.) such as collection of ocean-meteorological data obtained in situ, position of the buoys, simulations, dispersion of the toxic cloud, etc.
‹ Management/dissemination of information during a contingency, creating a strategic map that facilitates decision-making and giving different permissions to display the information depending on the user.

3. Access to the tool

The Web platform is available on http://coptool.plancamgal.gal/. If it's your first time accessing it, you must contact the administrator who will provide you with the credentials to gain access to the platform.
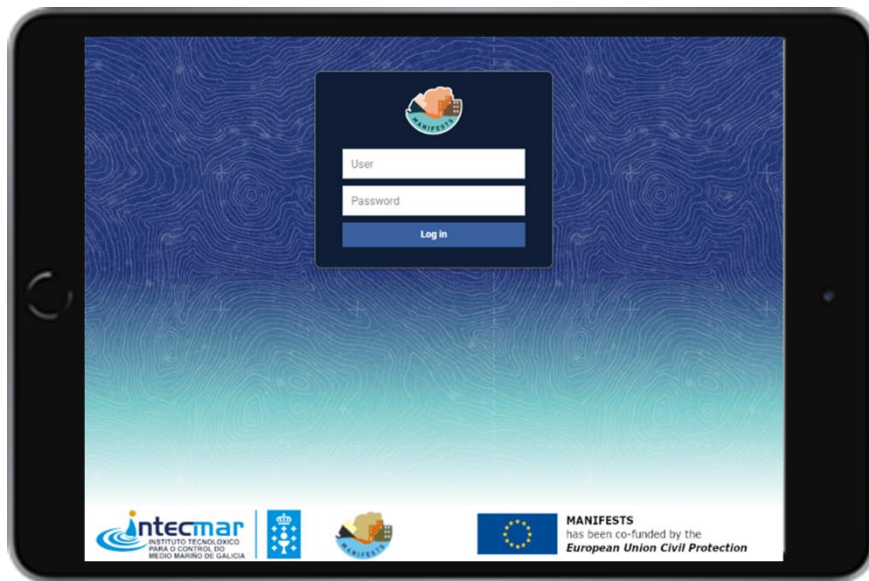
After identification, the user will be able to access those modules that have been assigned to him. The initial screen allows to:

‹ Access to the modules for which you have credentials (menu on the left)

‹ Display in the main panel the latest data (based on your credentials) that has been recorded in the system. This data is grouped in different windows depending on the module it belongs to.

‹ Look up a window with the information that has been marked as favorite by the user. At first this window will appear empty, getting filled as the user marks their favorites.

‹ Change the language or log out (icon in the upper right margin)

3.1. Navigation

In general terms, the application consists of different detail forms in which you will cover the required information. Navigation is done using the following common elements on all screens of the application:

‹ **+ button**: allows the creation of new elements (forms)

‹ **Search field:** With controls and forms to search for items by different criteria.

‹ **Menu:** allows you to access the detail form or delete the record

‹ **Next:** Allows you to advance to continue filling out the detailed form

‹ **Summary bar:** Located at the top, allows access to the different details that make up each form

‹ **Delete:** Deletes the record from the database

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‹ **Edit:** Allows you to edit the forms.

‹ **Menu:** Access to the different modules integrated in the application.

3.2. Users

There are two types of users:

‹ **Administrator**: Super user, has access to all modules, as well as the management of users and layers of information of the system.

‹ **User**: Only with access to the modules (one or more) assigned by the administrator.

3.3. Modules

To facilitate its use, the application has been organized into different modules that allow the functions detailed below to be performed:

Module	Functions
User Management	Creation/editing of user accounts.
Layer management	Management of the layers of information available in the system.
COP Management	Management of the information to be distributed during the contingency.
POLREP	Insertion of POLREP reports in the system.
SCAT	Insertion of SCAT reports in the system.
Reports	Insertion of information derived from different inspections (photos, videos, comments, etc.)
COP Viewers	Access to the COP viewers to consult the COP of the contingency

Note: The user management and layer management modules are restricted to the administrator user, being the only one allowed to make changes.

The other users will be able to access one or several modules depending on the permissions granted by the administrator at the time of registration in the system.

The goal of this manual is to aid all users who use the system. To do this, it has been organized based on the modules that compose it. It is advisable to access only those sections that are of interest through the following tables.

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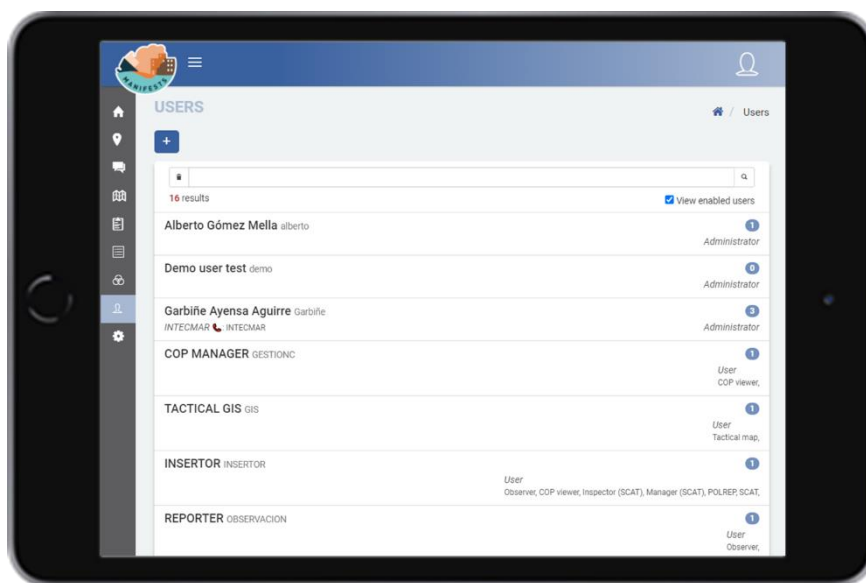| POLREP	SCAT	REPORTS
COP MANAGER	MANAGEMENT	COP VIEWER

4. Management module

This module is restricted to users with an Administrator profile. Through it it is possible to manage both the users of the system and the layers of information that will be available to POPs managers.

4.1. User Management

By clicking on the user's menu, in the left sidebar you can access the users menu.

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From this screen you can delete/edit existing users or, through the + button, access the form for the creation of a new user.

This form presents the following fields:

‹ Login and password: These will be the data that the user must know to access the system.

‹ Name, surname, and electronic contact code.

‹ Profile: where it is decided if the person who is being registered will be an administrator or user.

‹ Level: That will determine the level of confidentiality of the user (only applies to those users who have viewer permission)

‹ Comments: Free text field that allows you to add everything that is considered of interest.
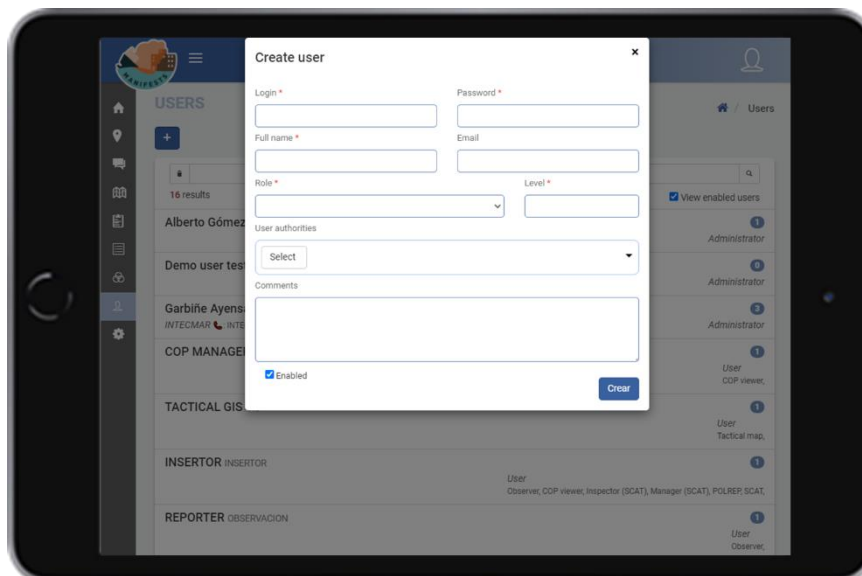
4.1.1. User permissions

Once the user is registered on the platform, the administrator can assign different permissions. To do this, you must access the specific user form and open the edition.

Using the permissions field, you can assign or remove permissions to a user by changing their tool type (giving them access to more or fewer modules). The following table shows the available options.

Permission	Module	Functions
POPs Manager	POPs Management	Management of the information to be distributed during the contingency.

POLREP Reports	POLREP	Insertion of POLREP reports in the system.
Manager POLREP COSTA	POLREP COSTA	Opening of a POLREP Costa in the system
POLREP COSTA Team	POLREP COSTA	Insertion of information in the POLREP coast assigned by the manager of POLREP costa.
Observer	Reports	Insertion of information derived from different inspections (photos, videos, comments, etc.)
Strategy map	Tactical GIS	Development of strategic maps that allow obtaining a photograph of the contingency
COP Viewers	COP Viewers	View (based on your level) the information available in the viewers

4.2. Geographic Information Management

In the context **of Spatial Data Infrastructures (SDIs),** the Maps Web Service (WMS) is the most widely used service among organizations that provide geographic information over the Internet. This is due to its ease of implementation and the existence of several software solutions.

The **Web Map Service (WMS**) is defined by the Open Geospatial Consortium (OGC) in order to produce maps, from spatially referenced data, dynamically from geographic information. That is why the COP tool is based on this service to distribute geographic information in the system.

To make the query of the layers in the viewer more functional, they are organized hierarchically into groups and panels.

The groups are formed by layers that have a common theme, for example, being layers with information about the environmental resources of the area. The panels, the highest level of the hierarchy, are made up of different groups of layers that have a common entity, for example, the resource panel, formed by the environmental resources group and the fishery resources group.

In this way a layer should always belong to a group and a group should always belong to a panel.

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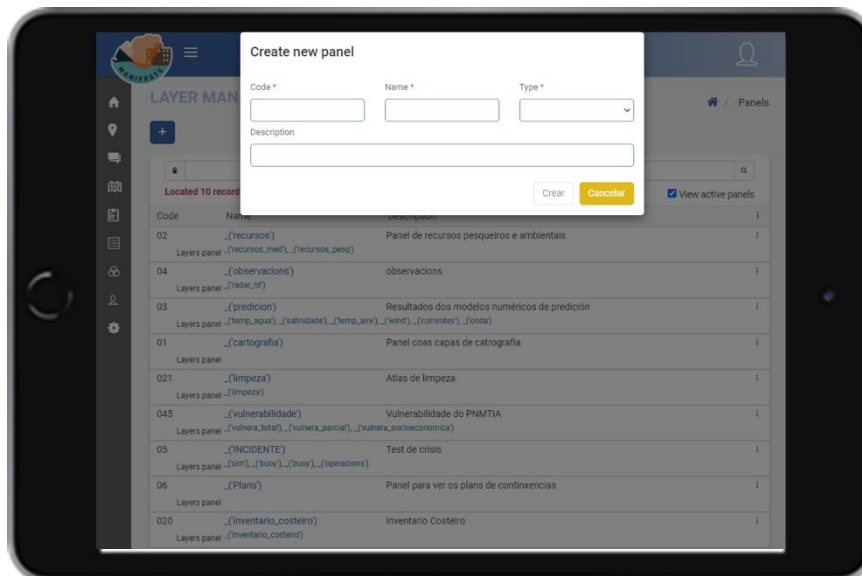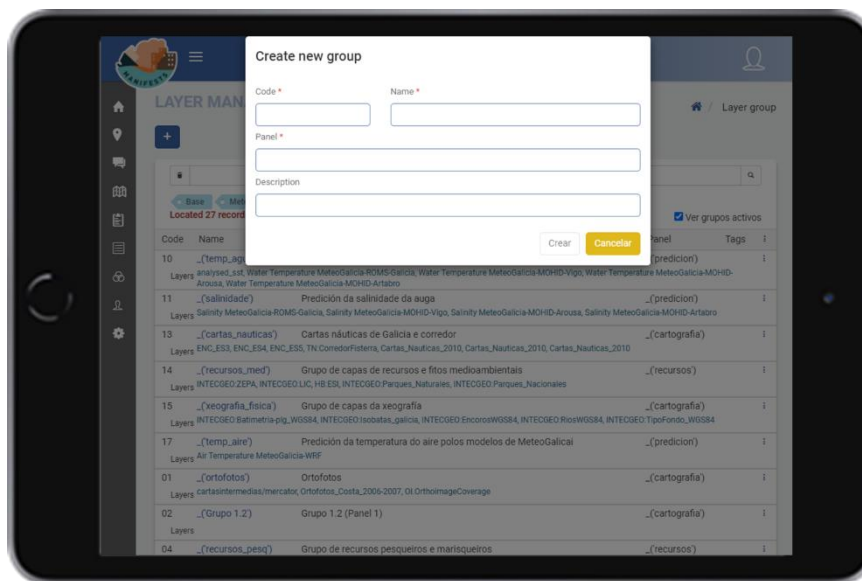
4.2.1. New panel

By clicking on the panel menu, in the left sidebar you can access the panel menu from where you can manage/edit the panels.

The + button gives access to the form to add a new panel to the system. This form contains the following fields:

Code: A numeric field used to sort the panels within the viewer's layer tree. The lower the panel code, the higher the panel will look in the tree.

Name: This will be the name that will be visible in the viewer.

Type: With two options, simple or model.

4.2.2. New group

By clicking on the group menu, in the left sidebar you can access the panel menu from where you can manage/edit the panels.

The + button gives access to the form to add a new panel to the system. This form contains the following fields:

Code: Numeric field used to sort groups within panels. The lower the group code, the higher it will look.

Name: This will be the name that will be visible in the viewer.

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Panel: Panel to which the group is assigned.

4.2.3. New layer

The + button gives access to the form to add a new layer in the system. This form contains the following fields:

Name, Title, **Projection Description**, **URL, class** fields that serve to identify and explain the layer and are extracted from the WMS_Capabilities of the layer.

Level: A field that defines the sensitivity level of the layer.

Layer type: which varies depending on the type of the layer.

Group: Layers must be assigned to a group. In case you do not want to add the layer to any of the existing layers, you must create the group before the layer.

Once the layer is created, you must access its form to cover the boundary coordinate fields in edit mode. These values are queried in the layer WMS_Capabilities.

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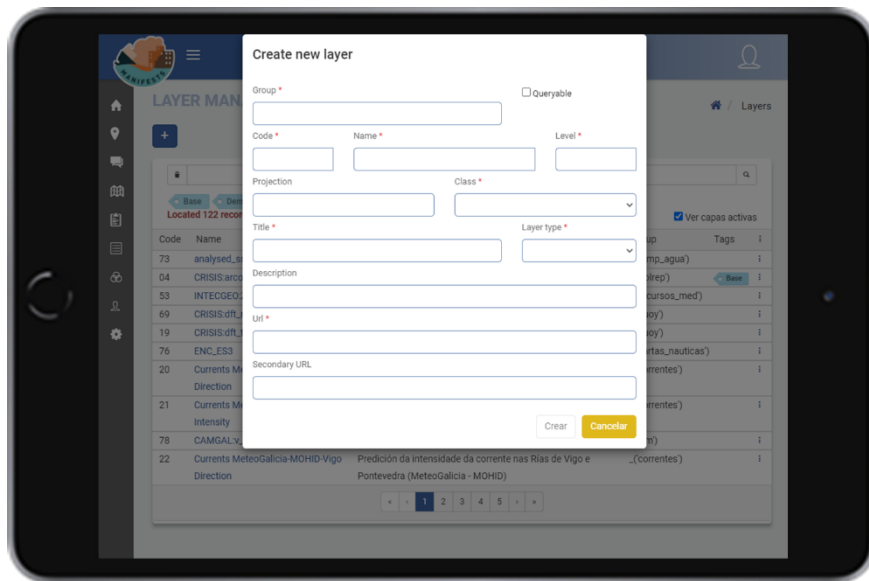
5. COP Management Module

This module is designed to manage in an agile way the information that will be distributed during a contingency. Both the geographic information, which will be displayed through the COP viewer is specific to each contingency, and that information that is provided by the different response teams that are facing the contingency (POLREP reports, POLREP coast, photos, videos, comments, etc.).

Since you must provide the information available in the application, the COP manager has access to the POLREP, SCAT, and reporting modules. This access enables you to consult the information available in them but does not allow you to edit it.

The menu on the left will give you access to each one of the modules. It is advisable, therefore, that the person in charge of the management of the COP also knows the rest of the modules of the application, for which it is recommended to consult this manual in all its sections.

5.1.   COP management menu

Clicking on COP management opens the management window, which allows:

‹   To access the consultation / edition of all those COPs that the user has created in advance (a search engine facilitates the operation in case the number of COPs is high).

‹   To create a new one by clicking on the '+' button

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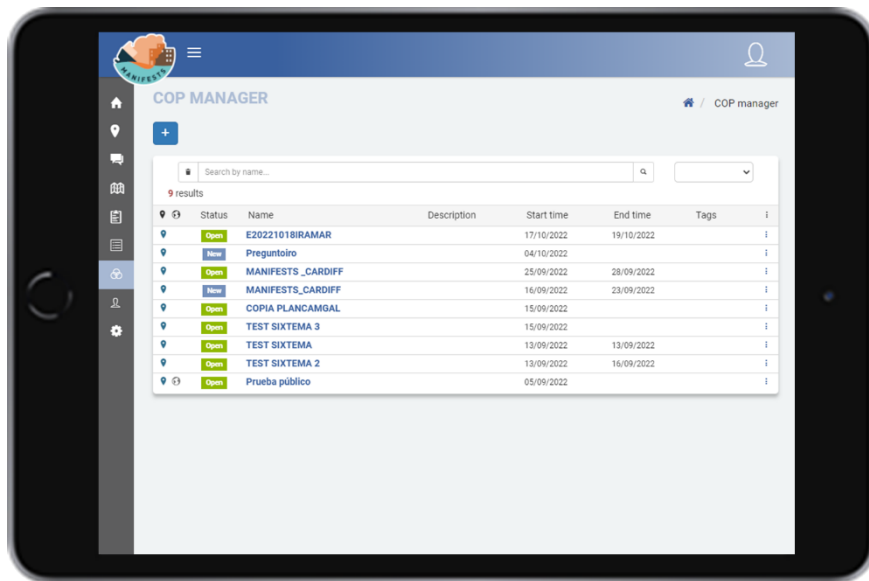
5.2.   New COP.

Once you click on the '**+**' button, you will navigate through different screens that allow you to cover the necessary sections to configure a COP.

Detail of the contingency.

The first thing to cover is the information regarding the name of the contingency, its start date, and a brief description of it. This field description is optional, it is recommended that in case of being left blank by the urgency of the crisis, it should be covered once the emergency has passed.
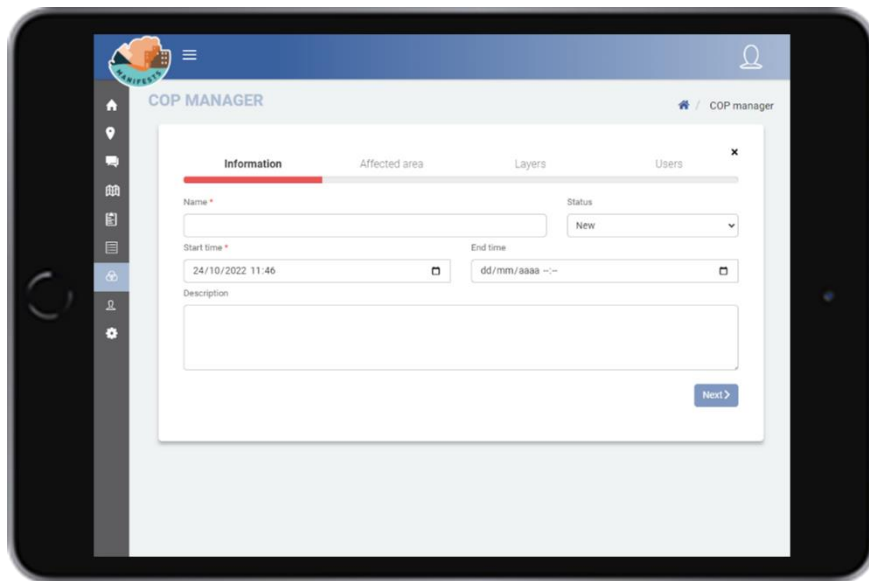
The COPs have the following statuses:

New COP created recently, is not visible to users. So that the manager can configure the COP privately once finished or published.

Open: In this state the COP will be visible to users with credentials. The information will be updated as soon as it becomes available.

Completed: The COP has been terminated. Users with credentials will be able to access the information but knowing that the situation is not active so that no updates will be made.

Archiving: The COP **can** be archived, ceasing to be visible to users, remaining available only to system administrators.

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Note: This form does not require you to modify the status field, its function will be explained later. The end date will be covered once it is known, since the time to start the contingency has no end date.

Affected area.

This section allows, with the aid of a map, to define the geographical area in which the COP will focus. With the mouse you can move the map, and clicking marks the four corners of the polygon that defines the area in which the map will be centered.
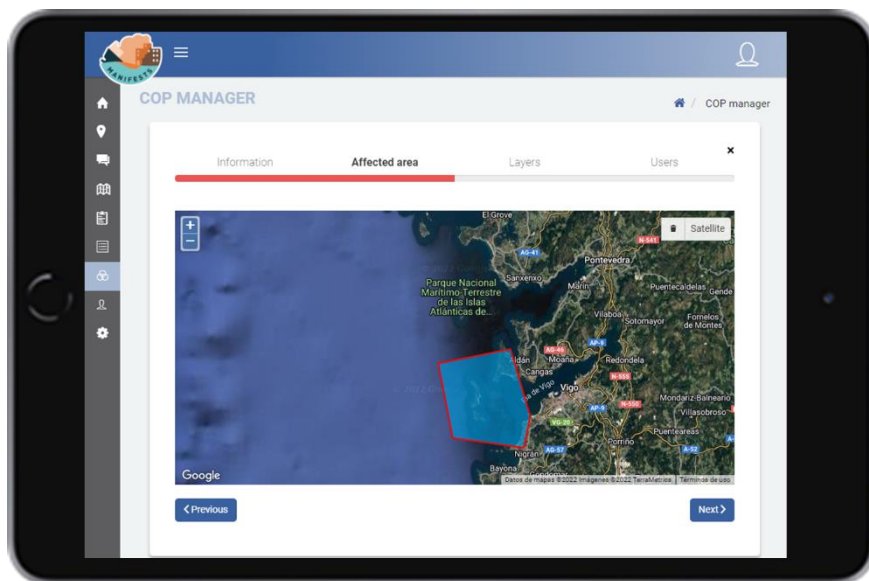
Layers

Through this screen, those layers that will be included in the COP are selected from a list previously configured by the administrator.

In Annex X you can consult the total layers available in the COP manager of the camgal plan, as well as a recommendation of the layers to be selected.
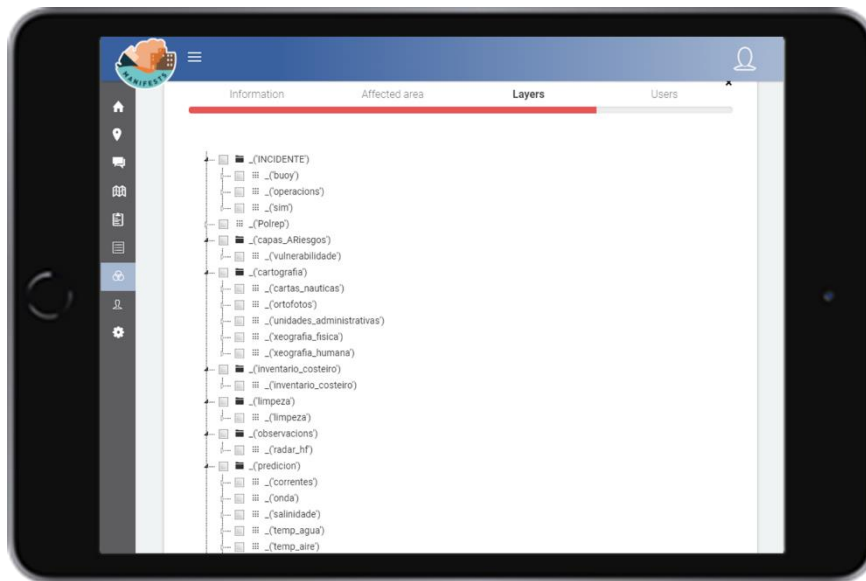
Once all the layers have been selected, the next button allows you to continue.

Users

This screen allows you to select, from a list configured by the administrator, those users who are given access to the specific COP viewer of the contingency.

Once all users have been selected, the next button allows you to continue.

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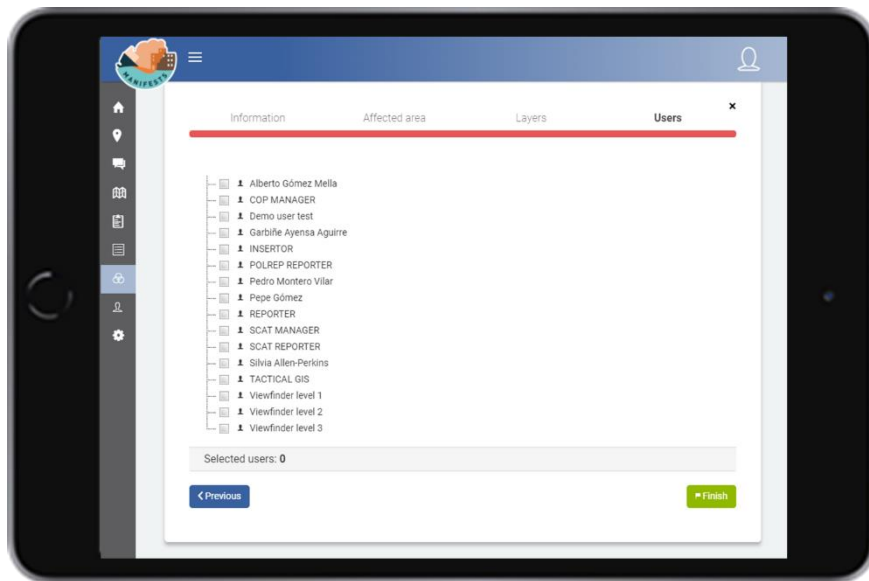
Confidentiality rules

Since the information contained in the layers can be sensitive and you want to restrict only to certain users, each layer is associated with a level of confidentiality (established by the administrator). This can be low in those layers available open without any restriction, **intermediate** or high in those layers with restricted access depending on the user's credential.

Thus, users with display permission also have associated in their credential a level that determines which are the layers that will be displayed automatically.

User credential	Layers to display
Low (1)	All low level
Intermediate (2)	All low and intermediate level
High (3)	All layers that have been selected for contingency (high, medium, low)

The assignment of the layers to each user is done automatically following the table above.

5.3.   Information Management

Once the COP is created you can access its management screen.

Said screen contains the following features:

Copy COP/close/publish buttons: These buttons, available at the top of the screen, allow you to do the following:

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‹ **Close** the COP and save all the changes you have made.

‹ **Publish** the COP and save all the changes you have made, with its publication the COP status changes from new to open automatically.

‹ **Copy**, allowing you to use a COP as a basis to create a new one modifying only what is necessary.

Top panel: Where you can consult/edit or delete what has been done so far.

Bottom panel: Where you can see the information available in the system to this COP in particular. This panel also allows you to make changes to both users and layers.

Clicking on the '**layers**' button opens the tree of the selected layers. The **'edit'** button allows you to add new layers or delete any that were chosen in the previous step.

The '**users**' button gives access to a table that summarizes the users who have been selected, what their level of confidentiality is and to what number of layers, of those selected for the contingency, they have access.

The COP manager is free to change the layers assigned to each user and can allow a low-level user to view a high-level layer. This change will only apply to the COP in progress, therefore it does not affect the credentials that the administrator has granted to the user when registering it in the system. To do this, clicking on the user's name opens the layer tree and allows the COP manager to make the modifications that are deemed appropriate.

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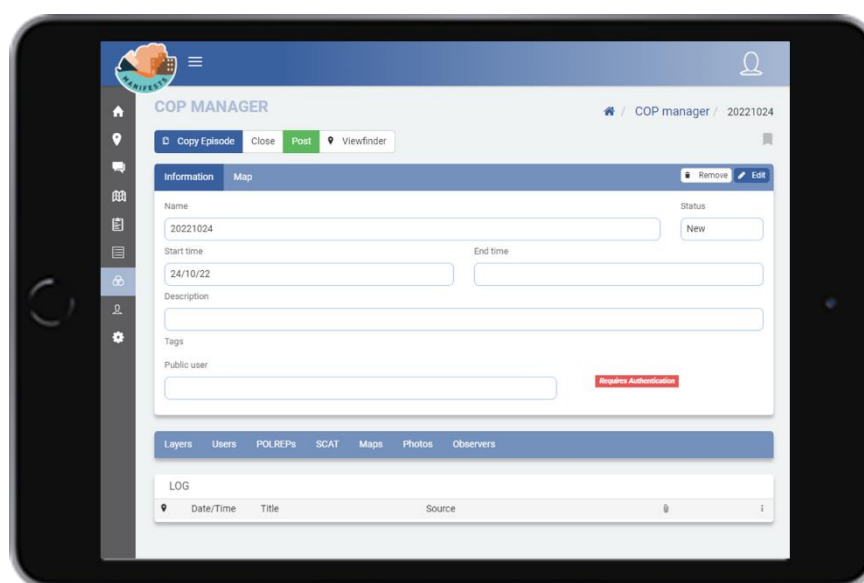
The **'POLREP', 'SCAT'** buttons open the possibility of linking these reports to the COP. In this way these reports are linked to the contingency. The **'link'** button displays a table that makes it easy to find the reports that have been recorded in the application by the agents responsible for the inspection.

In the case of the '**map**' button, what is linked is not a report, but a strategic map that synthesizes the geographic information generated during the contingency.

The '**photos**' button allows you to link photographs to the COP by clicking on the '**+**' button.

In the square on the left, you can select a photograph from those available on the computer. The comment field allows a text to add everything that the user considers of interest. The associated location screen allows you to geolocate the photo by adding the latitude/longitude position of said photograph. To fill in this information, the application allows three possible ways:

1) M Typing manually the coordinates in the fields intended for this purpose.
2) Use the '**location**' button, which automatically inserts the position the user is in.
3) Use the '**paint**' button. This button opens a map where you can insert a point that determines the position in which you want to geolocate the photograph.

Reporters: Those observers who want to be linked to the contingency are managed through this section.

During a contingency, the agent involved may have to make numerous reports to deliver information about the evolution of the situation to the Operational Coordination Center (CECOP). To speed up this exchange of information the user can link all the reports of an agent to a specific contingency. If this is the case, all communications reported by this agent will be automatically visible to all members present at the POPRC.

Clicking on the '**link User**' button opens the linking window where the following fields must be covered:

‹   Name of the agent to be linked (field with the help of autocomplete).
‹   Linking start date
‹   Linking end date.

Log

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The Log table, (available at the bottom of the screen), is completed automatically after the different agents are linked to the contingency. It displays the date and time, the sender of the message, the message itself and the attached files.
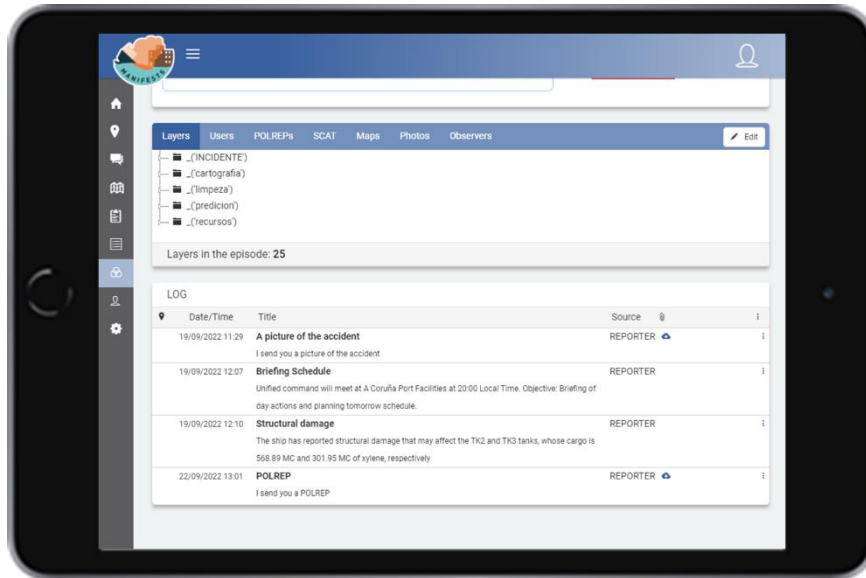
Once the linking is finished, you can use the '**publish**' or '**close**' buttons (previously explained) to exit, saving any changes made so far.

6. COP viewer

The COP viewer is a development that consumes geographic information from map servers. The COP viewer has a public component that allows its consultation by citizens. However, in most cases the maps that are displayed through the COP have restricted access giving different permissions to display the information depending on the user.

6.1. Viewer menu

By clicking on the VISOR module in the menu on the left you can access the Viewers screen, from here, the user can consult the viewers that have been assigned to him.

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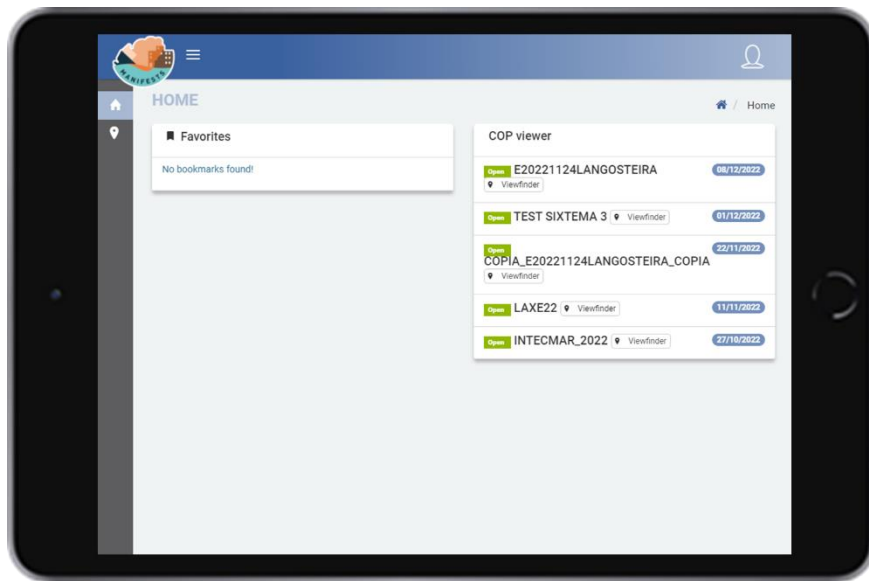
The viewer is structured in the following sections:

‹ Headboard.

‹ Title and user bar (visually active for private users).

‹ Viewfinder.

‹ Cartography management panel.

‹ Secondary layer management panel.

‹ Temporary animation panel.

‹ Prefooter.

‹ Footer.

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Cop viewer: panel structure. 1. Header. 2.Title and user bar. 3. Geoviewer. 4. Cartography management panel. 5. Secondary layer management panel. 6. Temporary animation panel. 7. Prefooter. 8. Footer.

6.2.   General viewer capabilities

The GIS viewer of the COPtool is a tool developed for use in a web environment, without the need to deploy or install software on the computer equipment of the functional users of the tool.

In addition, a tool with *responsive* design has been developed that allows consultation from different computer devices (computer, tablet, mobile), regardless of the screen size on which it is consulted.

Considering these premises, the main functionalities of the viewer are described below.

6.2.1. Cartography Management Panel

The viewer has a panel for managing cartography located on the left side of the screen. This panel has an associated button that allows its deployment and compression, according to the needs of the user.

This panel displays the various geographic information layers accessible from the viewer. These layers are grouped by thematic blocks that unfold and contract when you click on them.
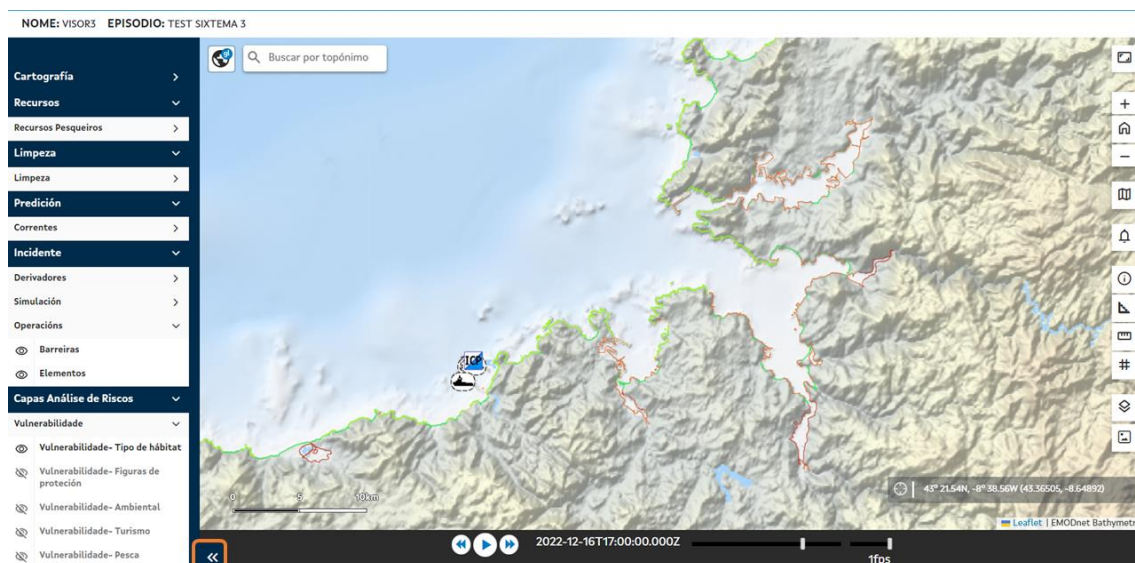
Users can turn **the display of layers on** or **off** by tapping the **eye-shaped icon** to the left of the layer name.

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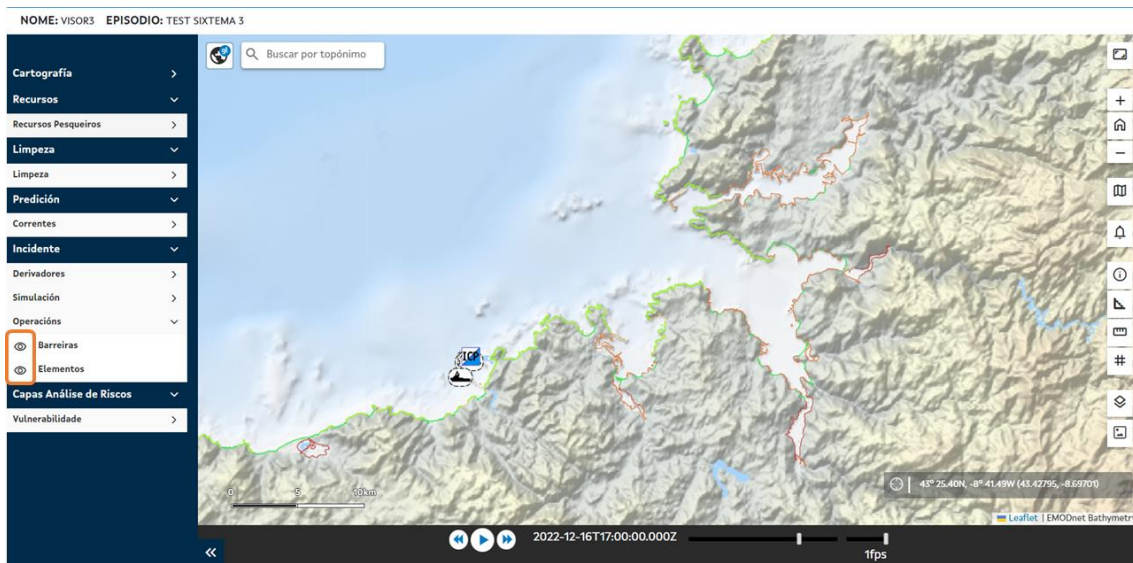
Cartography management panel. Visually turn information layers on or off.

6.2.1. Secondary Information layer management dashboard

Visually active layers are automatically added to **the secondary information layer management dashboard**. In this secondary panel, in addition, the layers resulting from toponymic searches are recorded, as well as the results of the measurement of areas / surfaces and distances, as will be described in future sections.
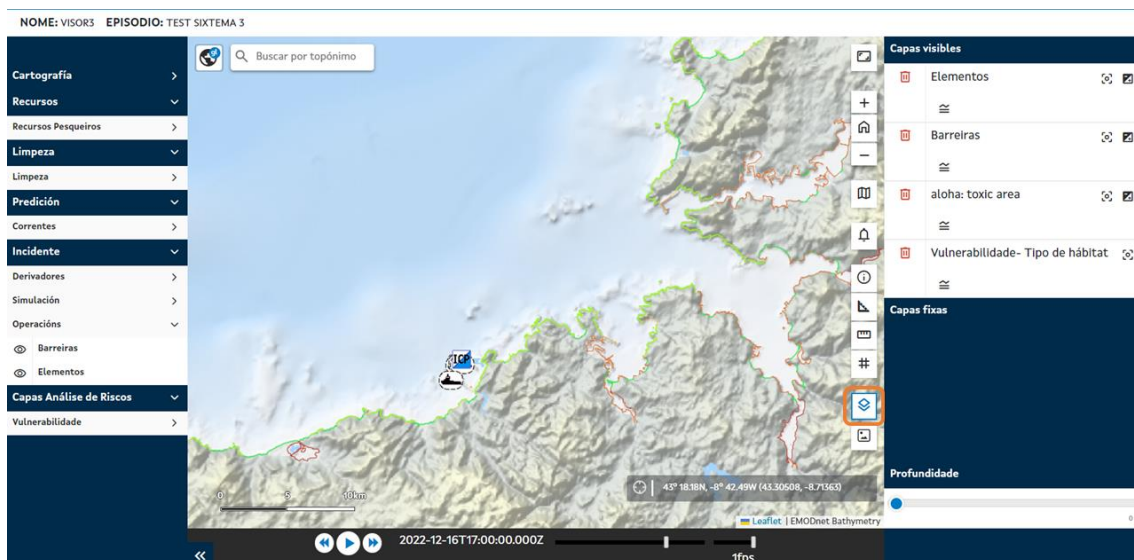
Secondary mapping management panel and secondary panel access button

This panel has several functionalities for the management of the layers:

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- ‹ **Visual deactivation of layers** by clicking on the red trash can icon located to the left of the layer name.
- ‹ **Visual ordering of layers.** Users can reorder the display of layers on the map by tapping the layer name and scrolling it up or down. This functionality is useful only when you have more than one layer in the secondary panel.
- ‹ **Display the maximum extent of the layer**.
- ‹ Definition of the **transparency or opacity** with which the layer is displayed.
- ‹ Query the **layer legend** (if available), opening a modal window above the viewfinder.
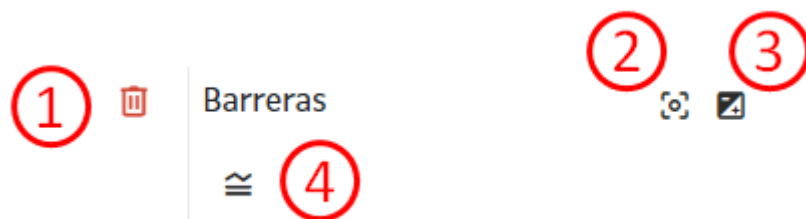
Capabilities associated with a layer in the secondary panel. 1. Visual deactivation. 2. Maximum layer extension. 3. Transparency/opacity selector 4. Display of the legend.

6.2.2. Navigation features

The COPtool viewer is equipped with the following functionalities:

Language selector

Users can **select the viewer's query language**. However, it will be the web browser itself that initially defines the default language based on its own configuration.

The available language selection options are:

- ‹ Galician (GL).
- ‹ Spanish (EN).
- ‹ Portuguese (PT).

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‹ English (EN).

Language selector: Galician (gl), Spanish (es), Portuguese (pt), English (en)

Consultation of toponymic information

The viewer offers the possibility to **search and geolocate place names**. To do this, the user must enter

a text with the keyword in the toponymic search section and accept (press the "Enter / Enter" key).

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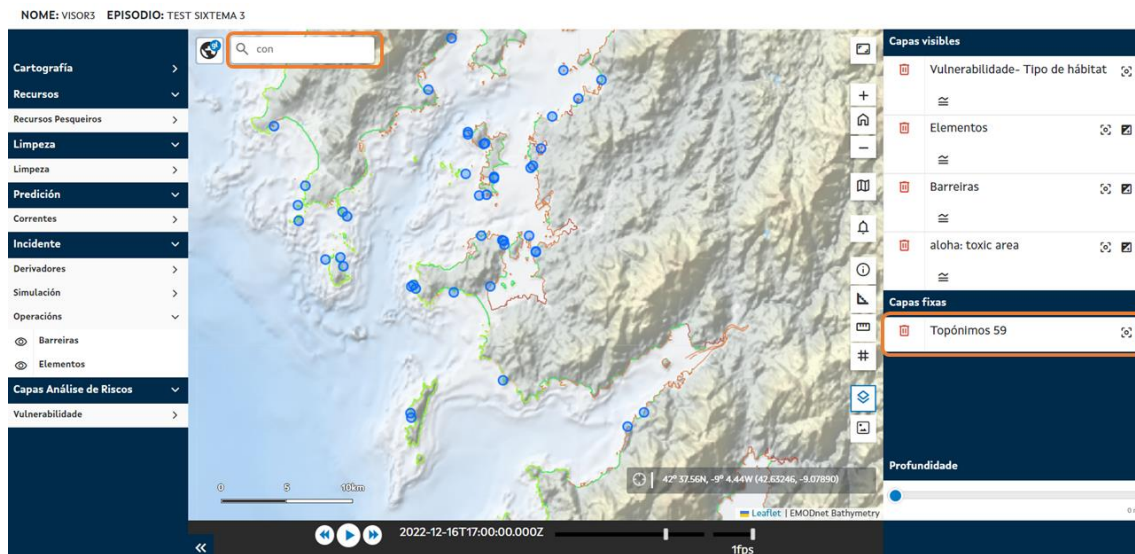
Search by place name and display of the search results layer in the secondary panel.

The toponymic search results **will be recorded in the secondary results management panel**, described above: next to the name of the layer ("Place names") the **number of** results obtained in the search is displayed (59 results in the search shown in the previous image).

Full Screen Mode

Users can choose the display mode on the upper right rectangular icon:

‹ Navigation in **full-screen mode**.

‹ Navigation in **browser window**.
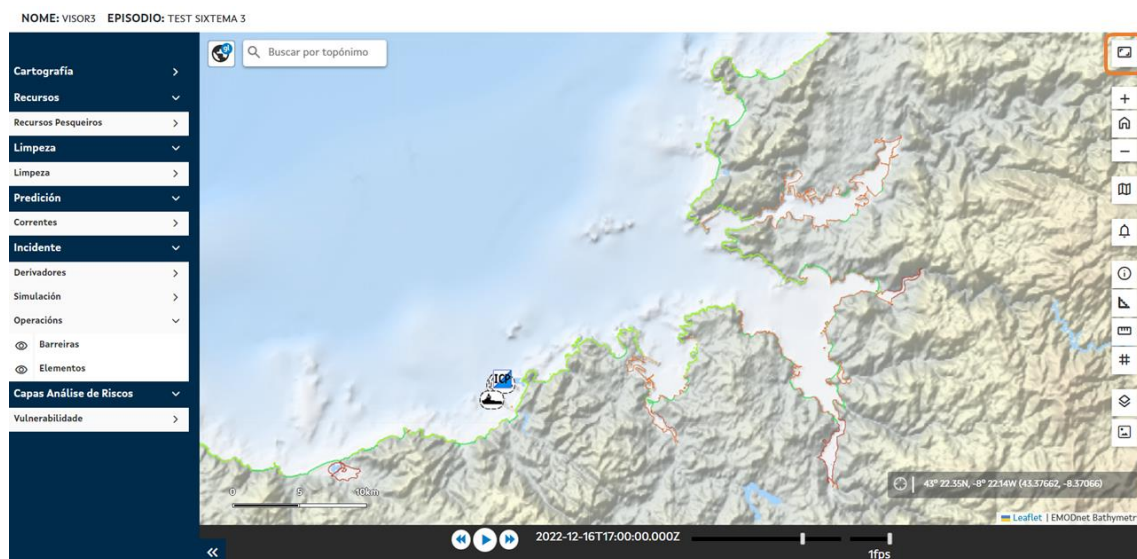
Navigation selection button in full-screen mode.

Zoom +/-

To zoom in or out in the viewfinder, users can press the **Zoom+** and **Zoom-** keys.
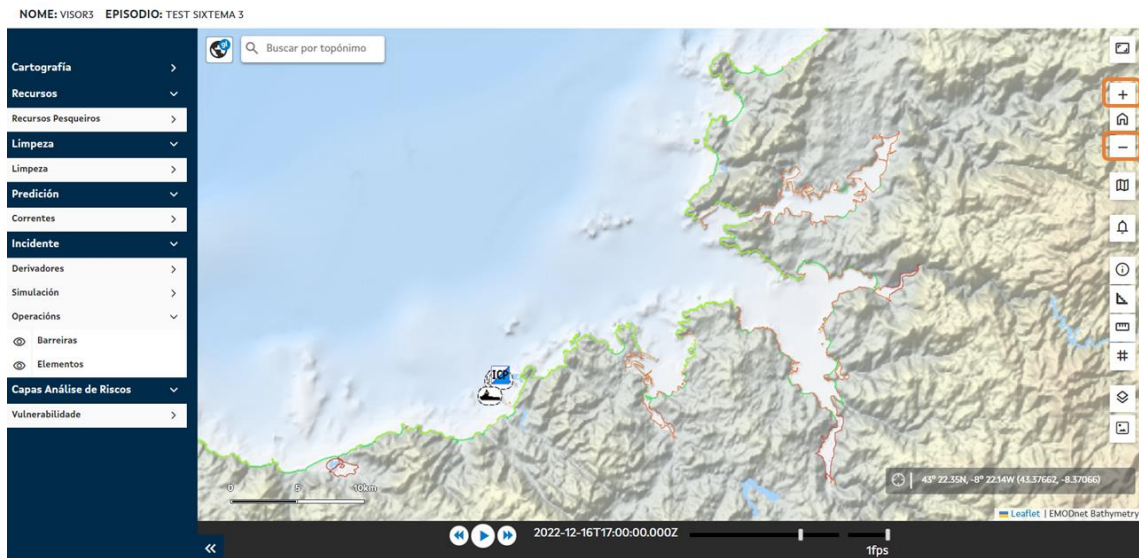
Zoom+ and Zoom- keys.

General zoom (full extension)

In the same block of buttons as those described in the previous functionality, users can **zoom to the predefined maximum extension** of the viewer by clicking on the "home" icon.
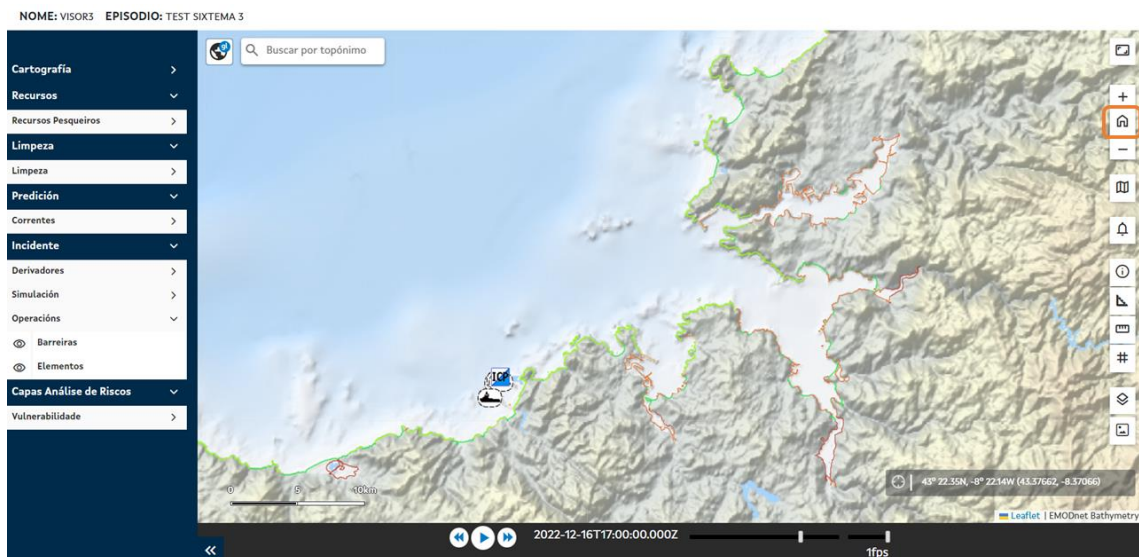
General zoom button.

Pan tool (displacement)

Users can **move** around the map if they do not have activated functionalities that are described below (information consultation, measurements ...). To do this, simply click on the map and move.

Basemap Management

The viewer offers users the possibility to consult different basemaps that give spatial context to the information displayed in the viewer:

- ‹ Map of **bathymetry**.

- ‹ **IGN-BASE** (official cartography service developed by the National Geographic Institute).

- ‹ **OpenStreetMap** (collaborative project that aims to create a freely accessible global cartography based on the information provided by different administrations and, mainly, by collaborating users).

- ‹ **Spanish National Plan of Aerial Orthophotography (PNOA)** (cooperative project of the General Administration of the State and the Autonomous Communities that aims to obtain digital aerial orthophotographs of the Spanish territory).

- ‹ Satellite image of the world **Sentinel-2** (Earth observation mission developed by the European Space Agency within the Copernicus program to develop observations of planet Earth).

Basemaps selector

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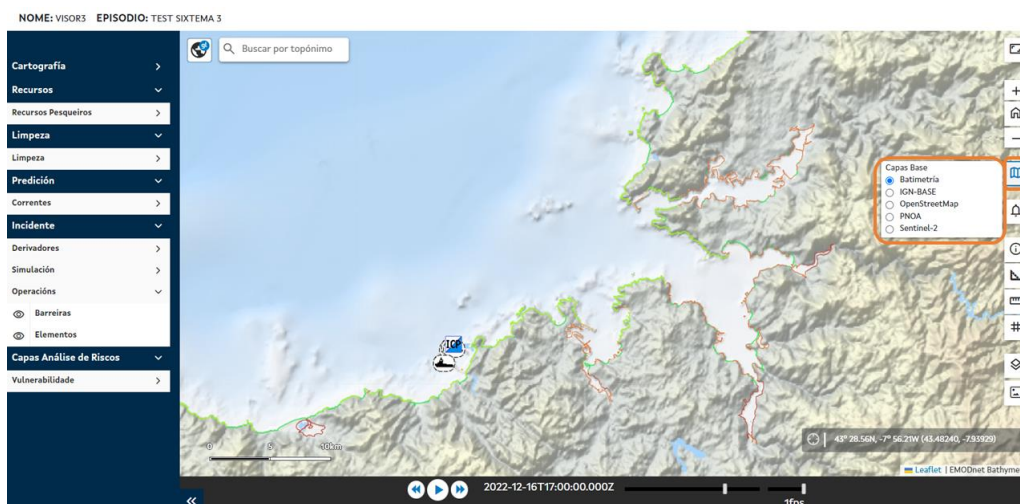
Item information query tools

The query tool allows you to obtain information about the elements displayed on the map. Users can **activate and deactivate the information query mode** in the "i" icon, being an indispensable condition that the layer to be consulted must be visually active.

Clicking on the geographic element opens a **window** with information about the entity. If you click on a point on the map where multiple layers overlap, the **information will be displayed for multiple layers**. In the window, the user simply selects the layer and element of the layer for which they want to query the information.
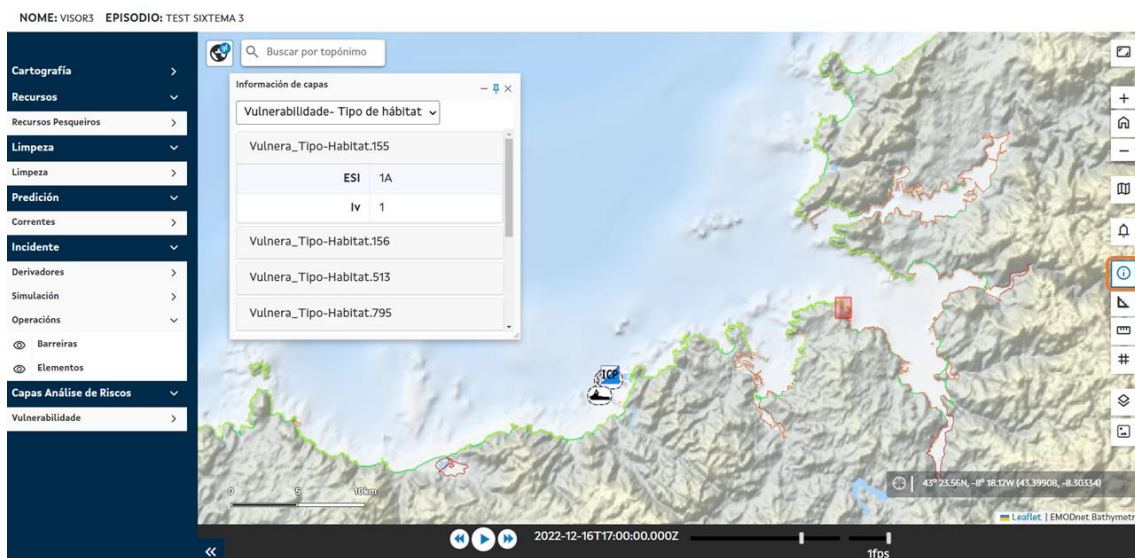
Enable or disable query mode, and window display with item information.

In addition to alphanumeric information, descriptive images of the element can also be displayed in the information window. These images can be displayed in larger size in a new browser tab.

Users can **change the position of the Layer Information window** by clicking on the "pin" icon:

- ‹ If it is **blue**, it indicates that the window cannot scroll.
- ‹ If **it is grayed** out, it indicates that the user can click on the title bar of the window and move/scroll it.

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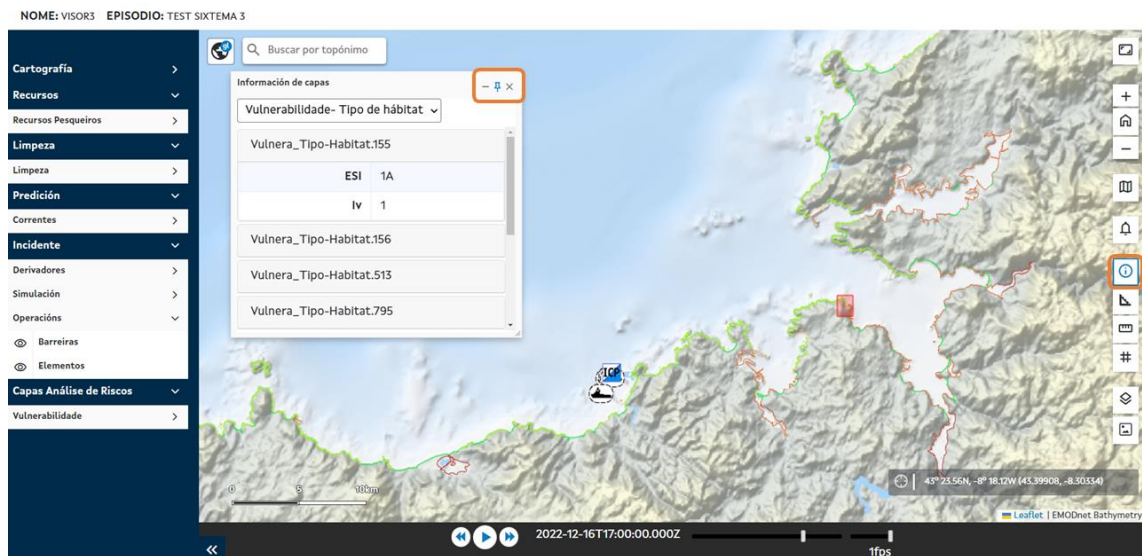
Scroll button in the item information query window.

The **size of the viewer windows can be modified** (enlarged, made smaller) by clicking and dragging from the lower right corner of the window.
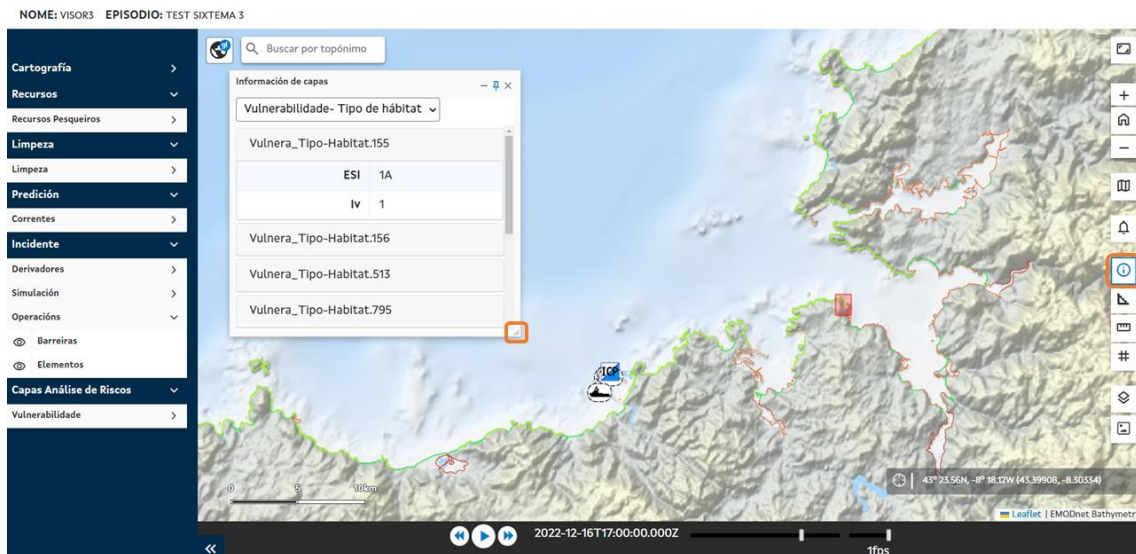
Modify the size button of the item information window.

Measurement tools

The viewfinder has tools for **measuring**:

‹ **Distances** (m/km).

‹ **Surfaces** or **areas** (m² / km²).

The user only must press the desired tool and draw the figure that allows measuring distances

or surfaces. To finish the distance or surface to be measured, only the main mouse button must be pressed twice or the right mouse button once; In the case of using a tablet or a mobile phone, the measurement is completed by double-clicking on the screen.

Surface measurement tool.
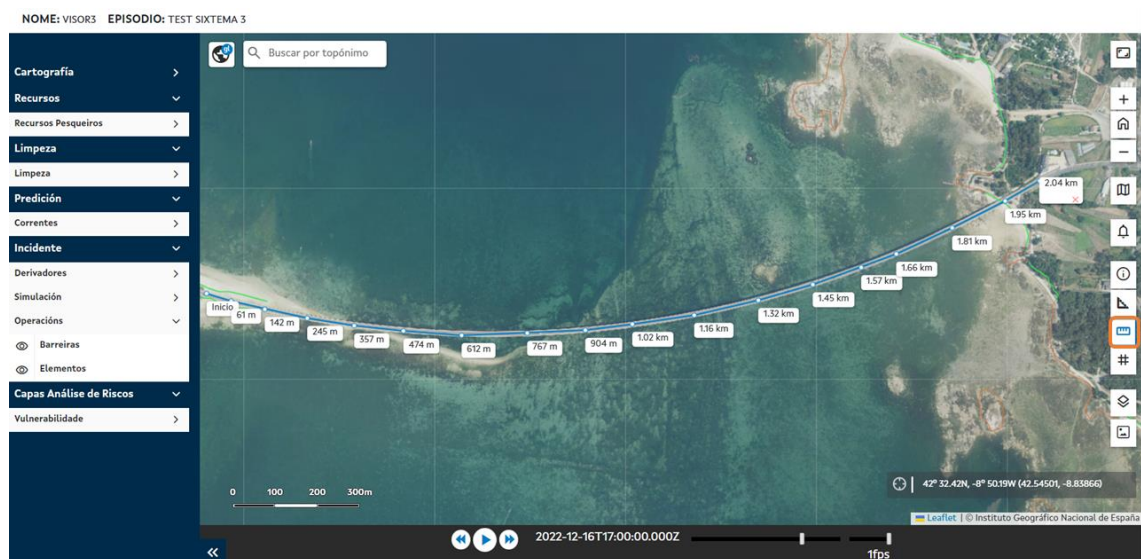
Distance measurement tool.

Each of the measurements made **is added to the secondary panel of management of layers of information**, being able to eliminate the geometry or zoom to the total extension of this from this panel.

Inclusion of measurements in the secondary information management panel.

In the case of distance measurement, the measurement shows:

‹ The starting point.

‹ The partial distances (at each vertex of the measurement line).

‹ The total distance of the measurement.
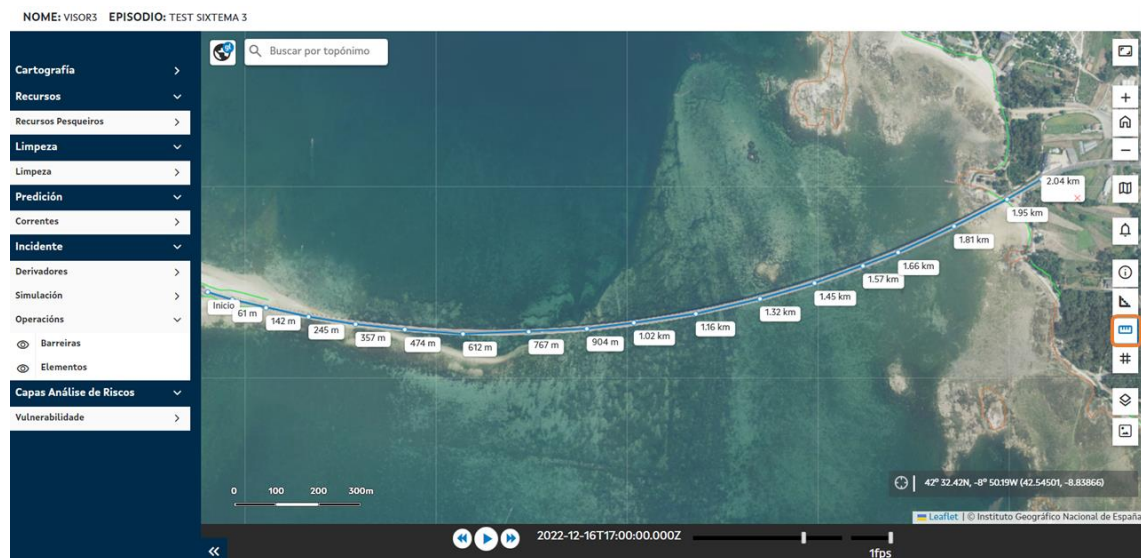
From left to right: starting point, distances at intermediate points, and total distance (with the corresponding distance measurement removal button).

In the case of surface/area measurement, the geometry shows the total surface value, as shown in the following image.

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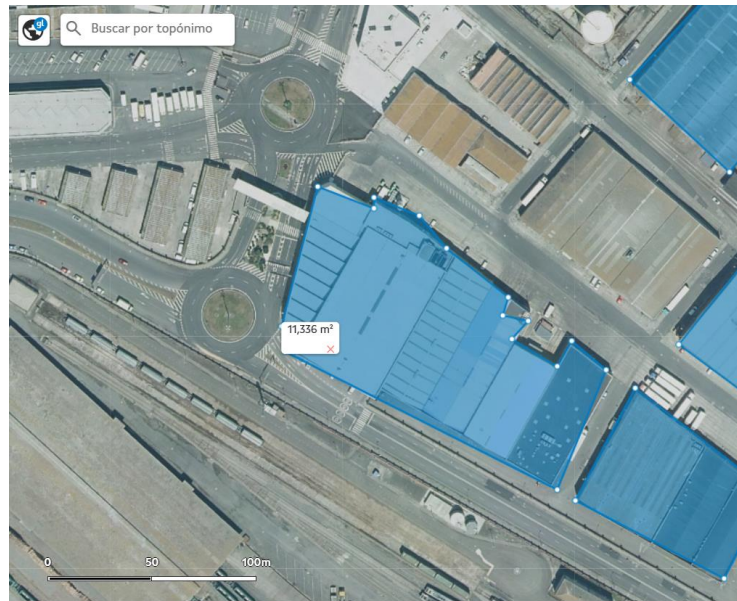
Total surface area value and delete button of the measured surface.

To **discard or delete a measurement**, there are two options:

- ‹   Click on the red cross shown next to the unit of measurement.
- ‹   Click the trash can icon associated with the geometry name in the secondary information management panel.

Grid

Users have the possibility to **activate a grid** (parallels and meridians) with variable scale depending on the zoom applied to the viewfinder. It is turned on and off on the "#" icon.
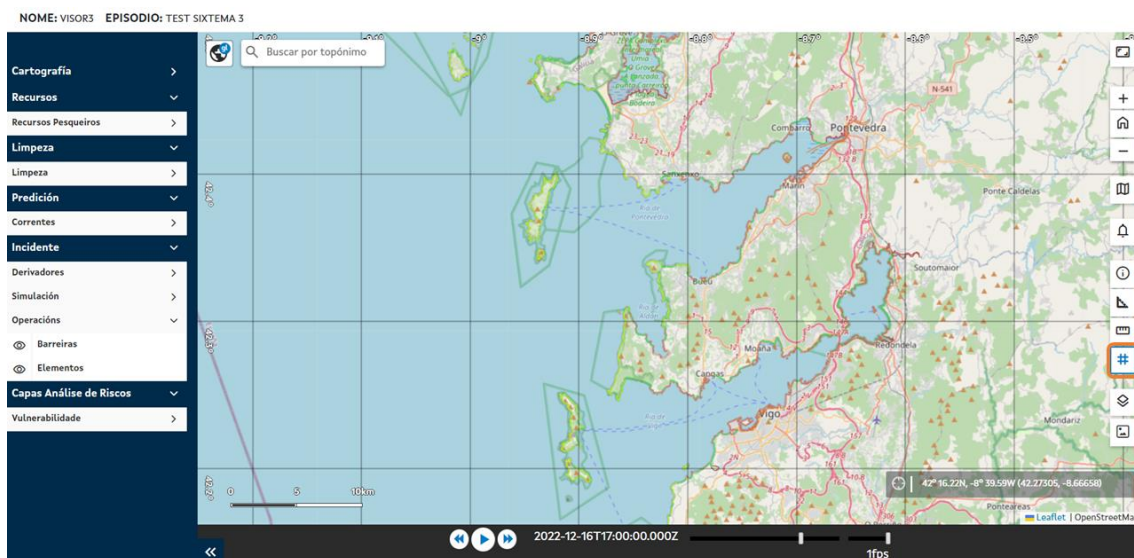
Geogrid on/off button

Graphical scale and coordinate display

At the bottom left of the COP viewer there is a **graphic scale** that is updated depending on the zoom level.

Graphic scale.

Similarly, there is a **coordinate viewer** (lower right of the screen) that shows the positioning of the mouse pointer when moving through the map in geographical coordinates (latitude-longitude). In mobile applications this functionality is not available.
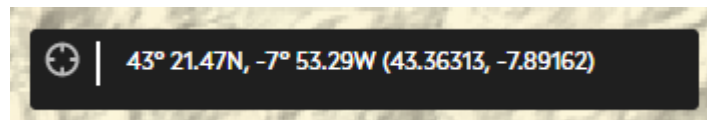
Printing the map in image format

The viewer has the functionality of **printing the map in image format**. Users must select the tool indicated in the following image, enter the name of the image, and click on the "Export" button.

The result is the export of **a file containing an image of the viewer view at the time of export.**
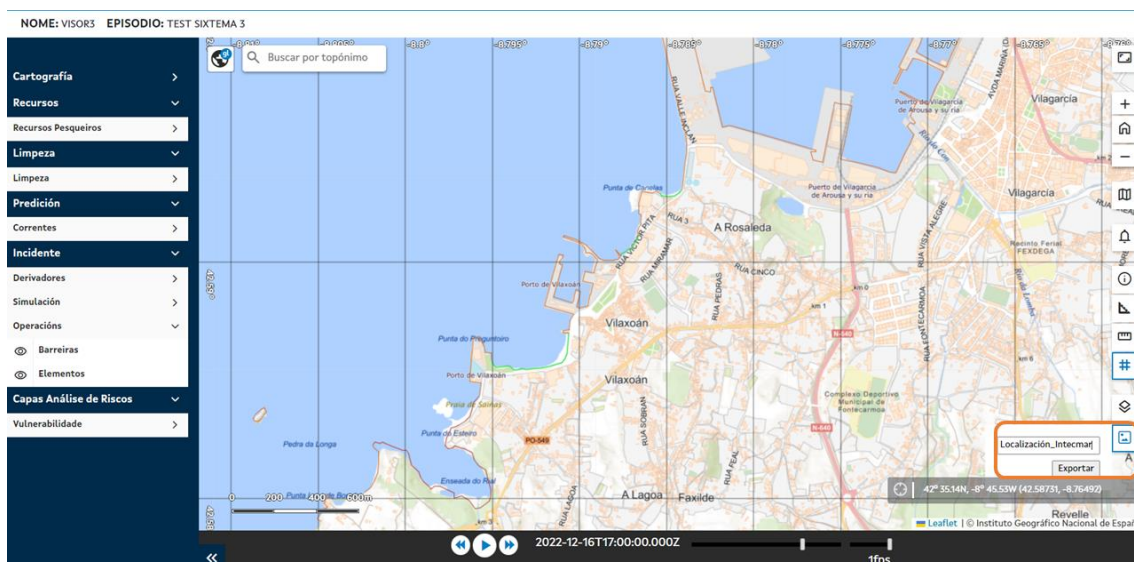
Printing the map in image format

Temporal geographic data viewer

Users can query layers of geographic information in a **72-hour time interval** with a **data time range of 1 hour.**
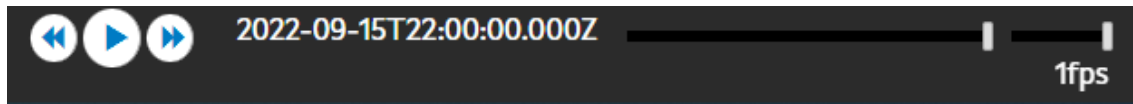
Functional module of temporary animation.

This functionality is available at the bottom of the viewer once layers that have temporary information are visually activated.

The time interval is controlled with **the play buttons**:

- ‹ Recoil.
- ‹ *Play*.
- ‹ Progress.
- ‹ Time bar.

To the right of these 3 buttons is the **date and time in which the data displayed on the screen is being displayed**. The scroll bar manages temporary progress; while the bar located further to the right allows you to manage the playback speed of the data (by default set to 1 *frame* per second).
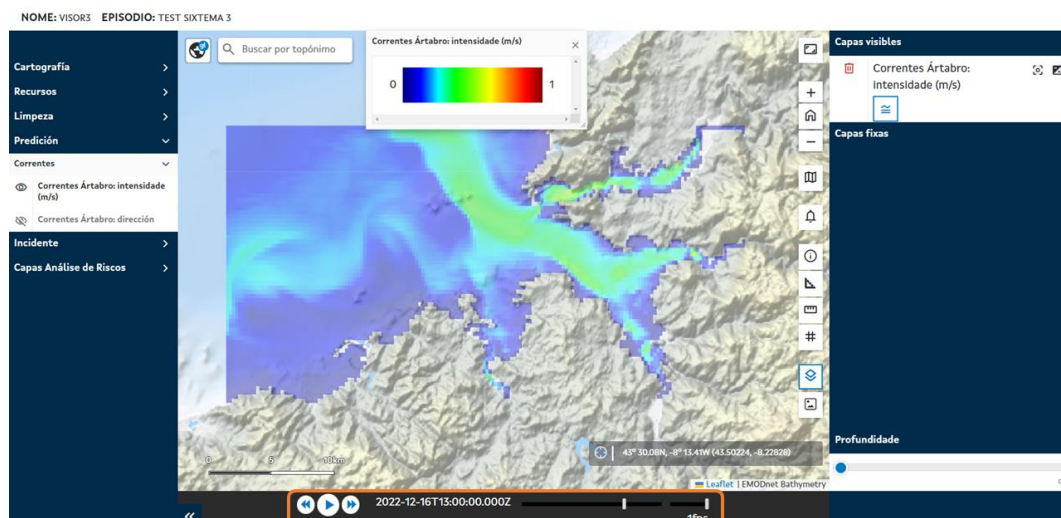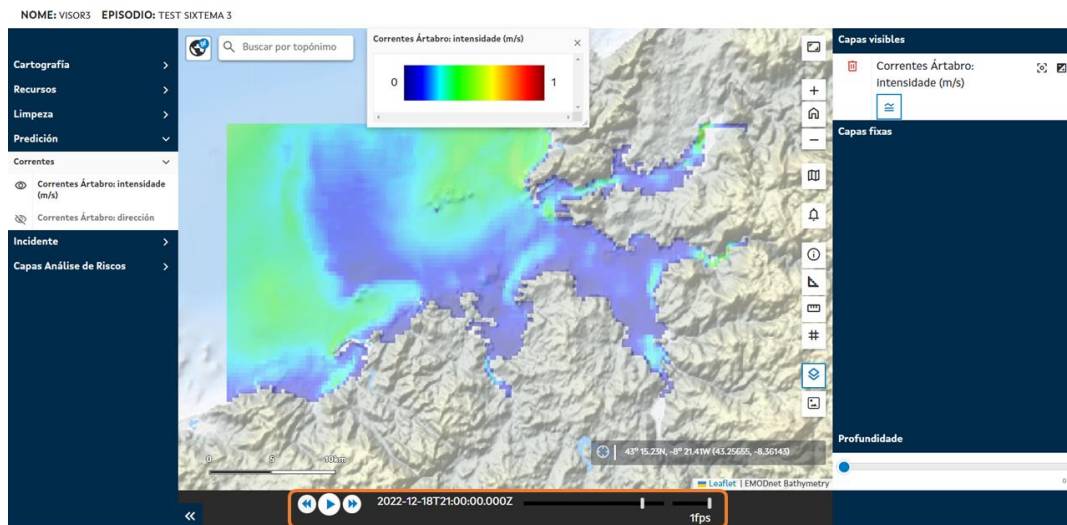
Display two frames of an animation at two different points in time.

Query information according to depth

For those geographic information layers that enable this (for example, marine current information layers), the COP viewer offers the possibility to consult information from these layers not only at the surface level, but also in **depth**.

To do this, the user only must **regulate the depth level in the bar** located at the bottom of the secondary panel.

The following levels of depth are offered to be consulted:

‹ **0 meters**

‹ **0.5 meters**

‹ **1 meter**

‹ **2 meters**

‹ **5 meters**

‹ **10 meters**

‹ **20 meters**

‹ **40 meters**

‹ **75 meters**

‹ **125 meters**

‹ **250 meters**

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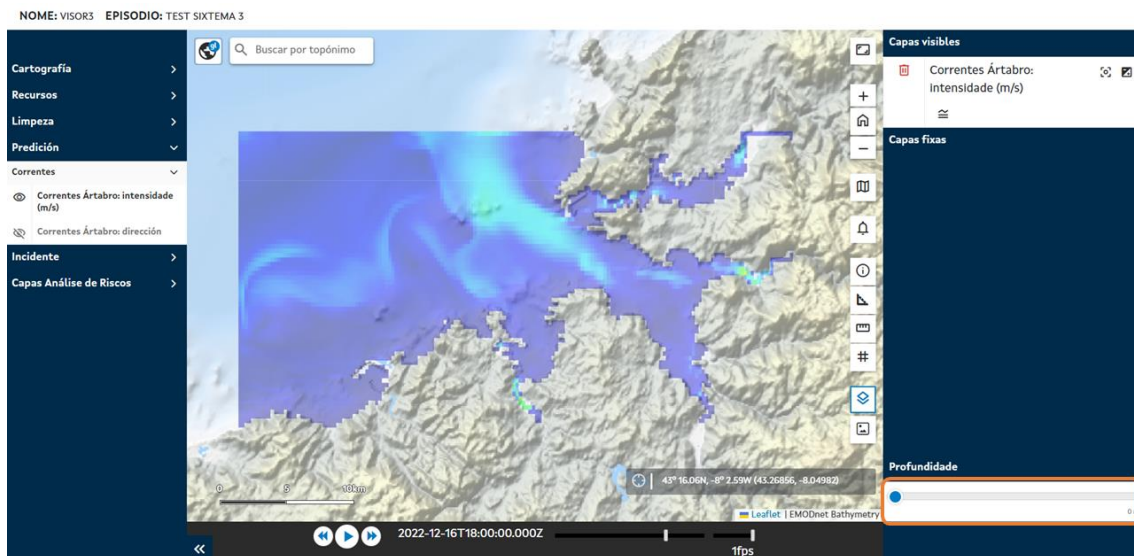
In-depth information query: surface.
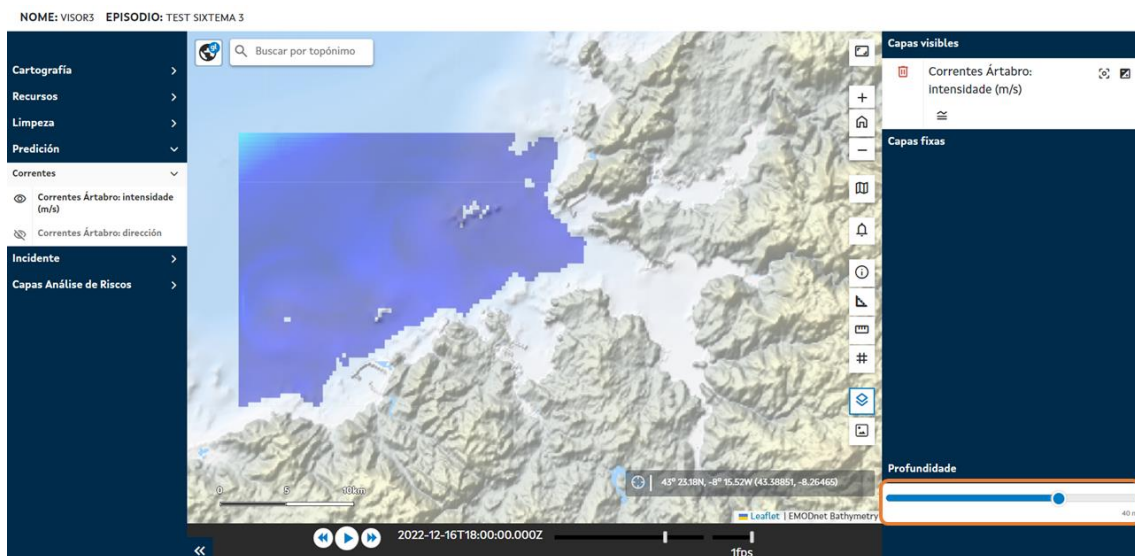
In-Depth information consultation: 40 meters.

Log

The tool has a **communications module, or** logbook. By opening the window of this functionality, users can see in real time the communications generated because of contingencies.

All communication is associated with a **label** that classifies the criticality and typology of the communication.

- ‹ **Alarm**
- ‹ **News**
- ‹ **General**

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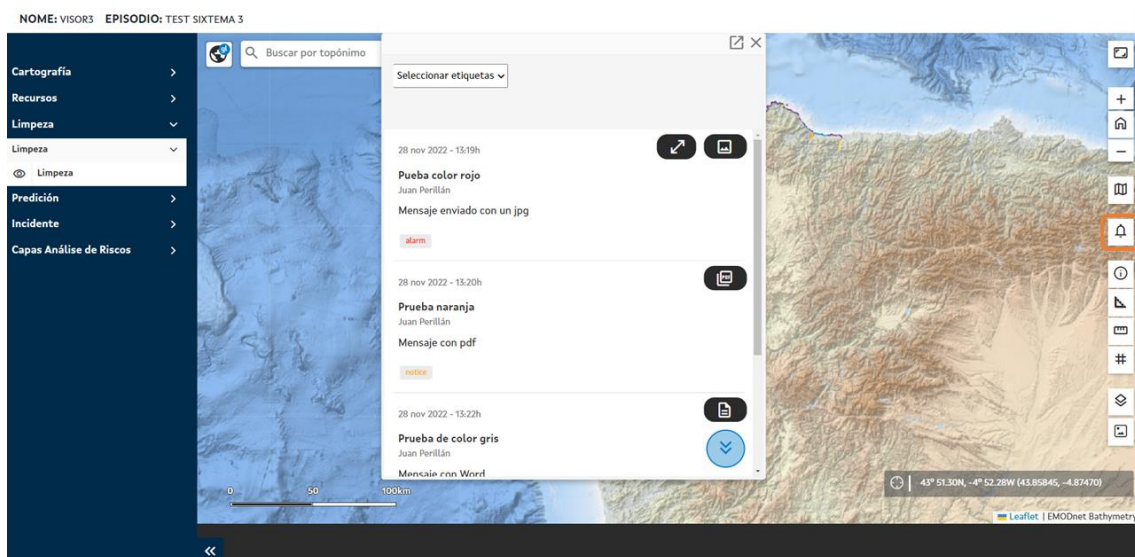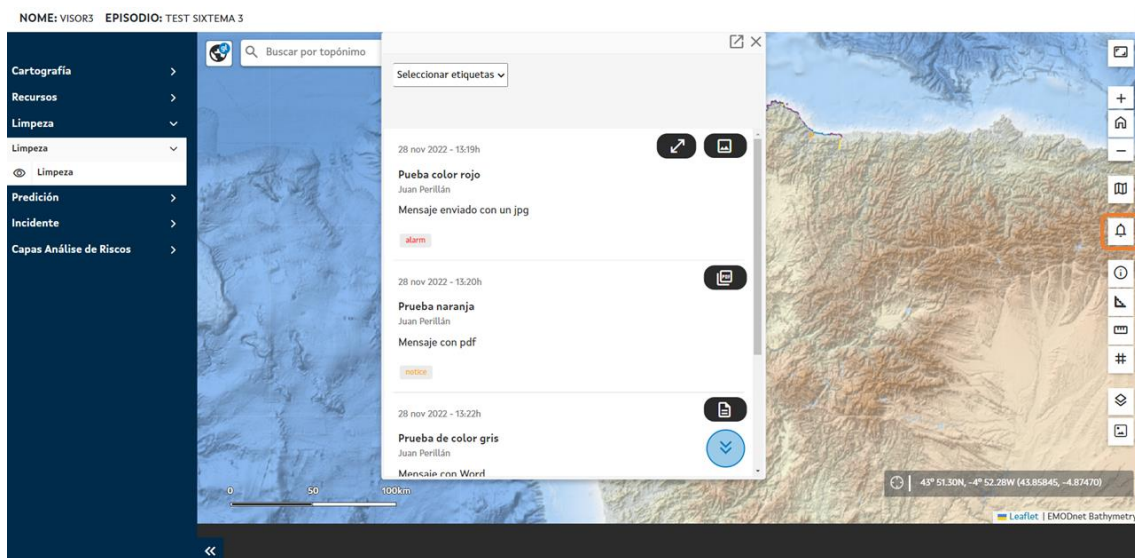
Communications in turn can be filtered based on the tags. Similarly, filters can be disabled by clicking on the label to the right of the drop-down.
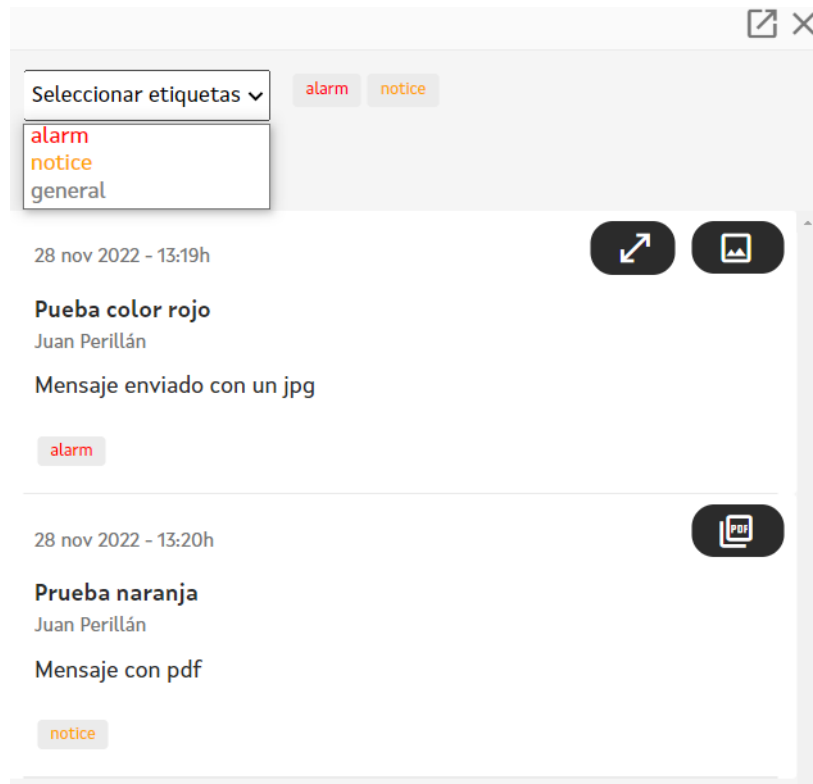
The log also has a button that allows the user to go to the most recent messages. Likewise, this button will show a red dot when there are new communications, and the user is in non-recent communications.
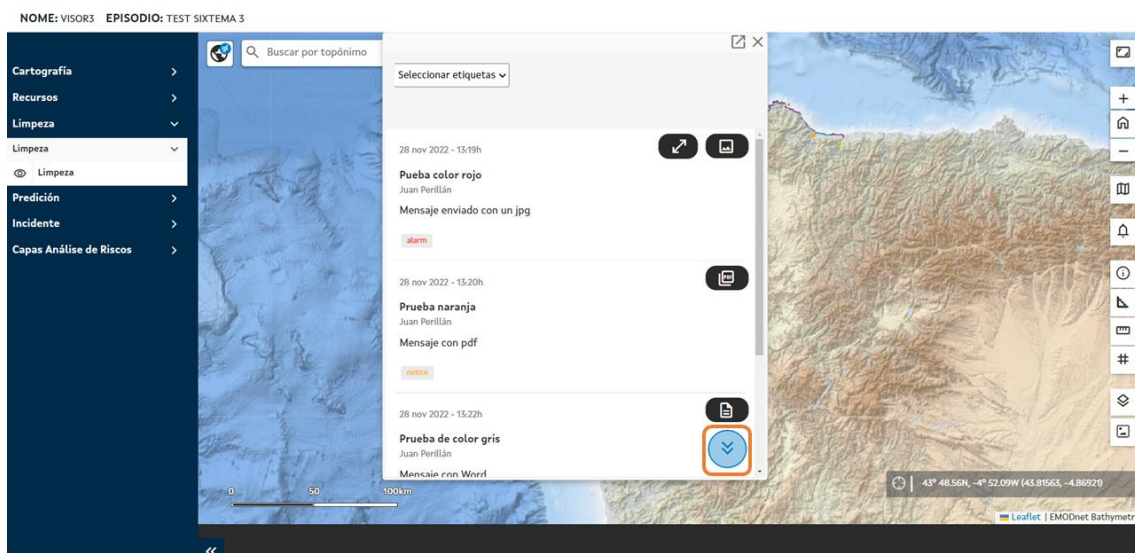
Functionality to go to the most recent messages.

Messages can bring **associated files or documents** that can be downloaded:

The log also has a button that allows the user to go to the most recent messages. Likewise, this button will show a red dot when there are new communications, and the user is in non-recent communications.
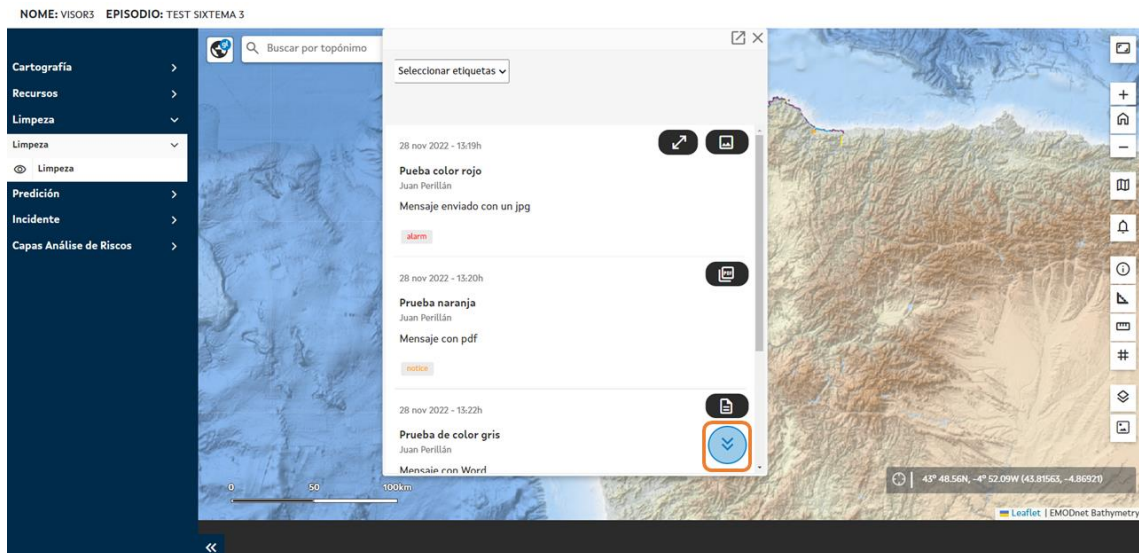
Functionality to go to the most recent messages.

Messages can bring **associated files or documents** that can be downloaded:

ELEMENT	SYMBOL
.PDF	
Text document	
Worksheet	
Imagery	

Images can be **previewed** in larger size within the log itself.

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28 nov 2022 - 13:19h

Pueba color rojo
Juan Perillán

Mensaje enviado con un jpg

alarm

Image preview button in the log.

Finally, to facilitate the visualization of the log and geoviewer tool at the same time, the log can be **consulted in a new browser tab** by clicking on the button located in the title bar of the log.
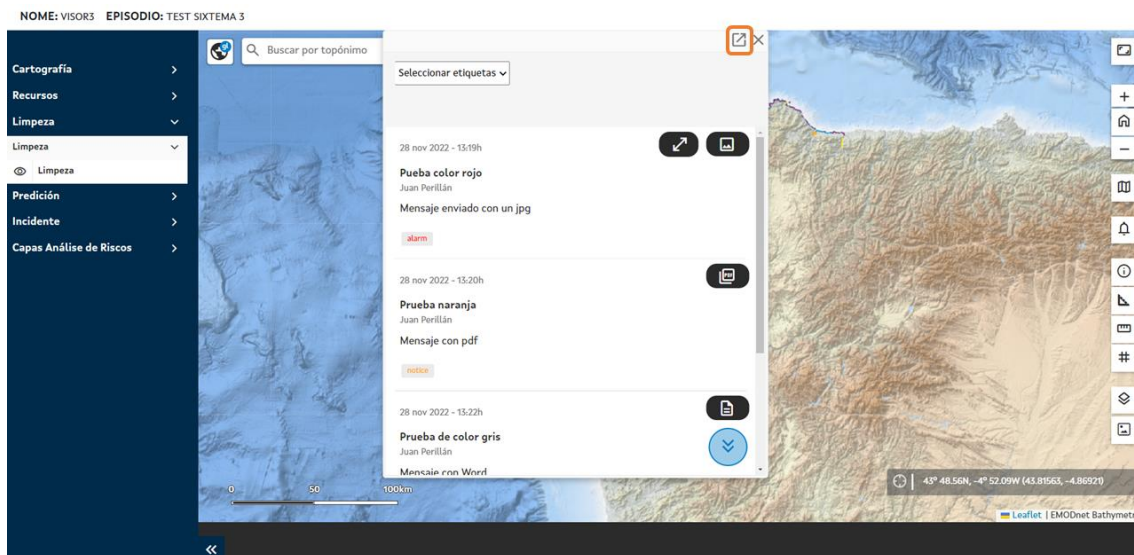
Open button of the log in a new browser tab.

7. POLREP Module

The initial warning about an event of accidental marine pollution must collect as much information as possible to complete the data of the POLREP Galicia model that appears in Chapter IV ANNEX POLREP of the Camgal Plan. This document, if possible, must be completed by the observer of the event and must be sent urgently to the Operations room of the Galician Coastguard Service and other competent bodies that proceed.

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This module makes it possible to access a standardized POLREP model through a mobile device, facilitating the observer to get the information to the Operations Room in an efficient and agile way.

7.1.   POLREP menu

By clicking on the POLREP module, (in the menu on the left), you access the POLREP screen, from here, the user can make a new POLREP, as well as consult, edit or delete previously made POLREPs. In case of being the first time that the user accesses the platform there will be no associated POLREP so at this point you can only create a new POLREP, through the '**create new POLREP**' button.
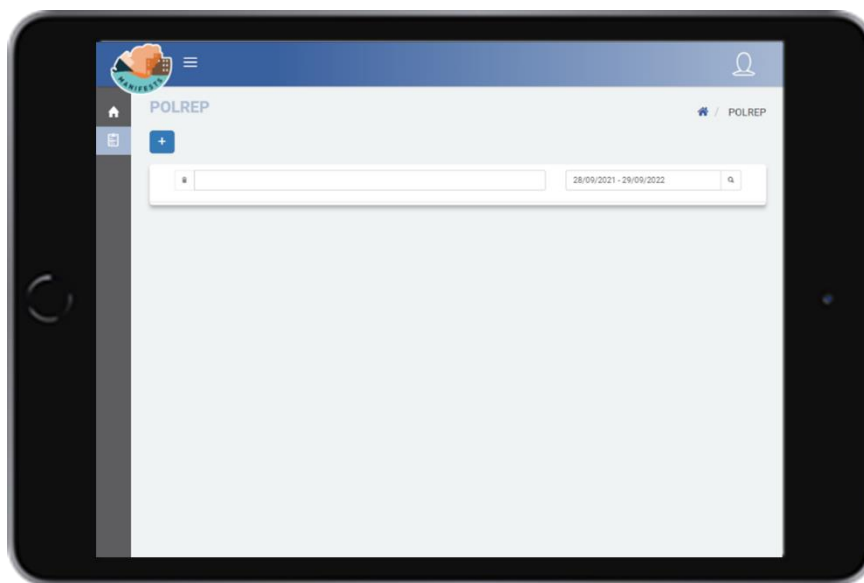
7.2.   New POLREP
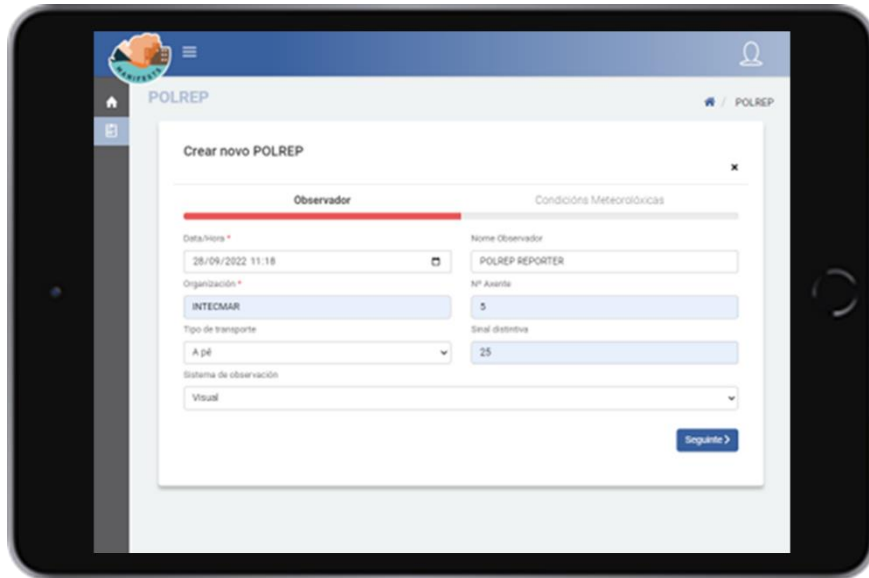
The user can start a new POLREP by clicking on the '**+**' button, filling in all the information related to said POLREP. This information will be saved automatically and can be edited if necessary. After completion, a POLREP report is generated, it will be registered on the platform and available for printing.

Observer data

This first form collects the data relating to the observer who is carrying out the inspection. The date/time field and the observer's name field are covered automatically considering both the date/time in which the form is being filled out and the user data used to access the platform. In both cases, the user may edit them if he deems it necessary.

The rest of the fields must be covered by the user. Although the ideal is that all fields of the form are covered, only the **Organization** field is mandatory, that is, without covering this information you

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cannot continue. This field, like all those that are mandatory throughout the application, is marked with *.

Once covered, you must click on the '**next**' button to continue filling in the information, in this case, that related to weather conditions.

Meteorological conditions

This form is the one related to the meteorological conditions at the time of the observation, where data on the wind conditions, the state of the sea, the visibility in the area, etc. are stored. To facilitate its completion, most of the fields have drop-downs with the possible options for each parameter. It should be noted that, although it is advisable to cover the form in its entirety, any field is mandatory, so that, in case the observer does not have any of these data, he can continue to cover the rest of the information related to the POLREP.

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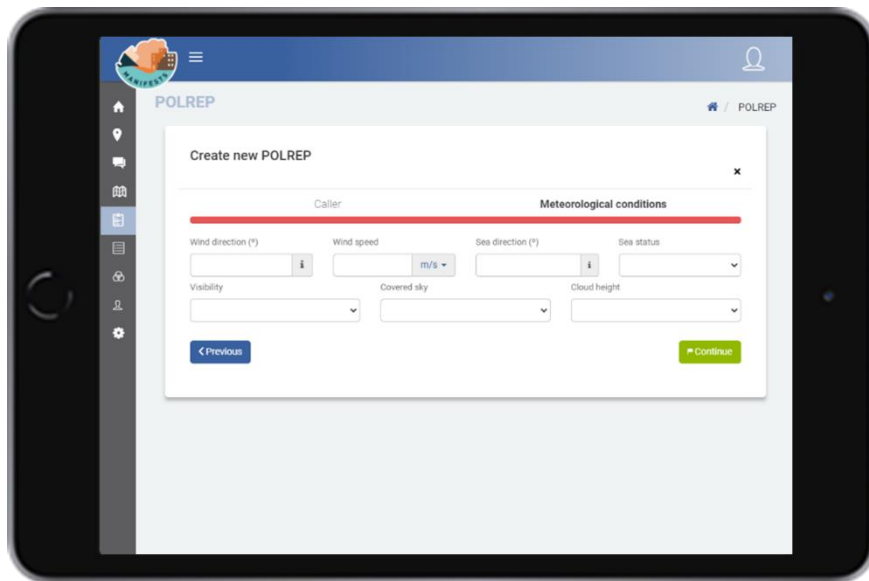
Pollution information

Once the first two forms have been completed, the user has access to the section on pollution information, which consists of four steps.

1. Information relating to spills.
2. Information on possible sources of pollution.
3. Photos of the pollution.
4. Comments that the user may consider of interest.

Information relating to spills.

The user will cover the information from each one of the spills that must be reported, related to its characteristics, location, and appearance. To do this, you can navigate through the different forms of this screen, either using the '**next**' button (lower left margin) or by clicking on the '**progress**' bar, at the top of the form.

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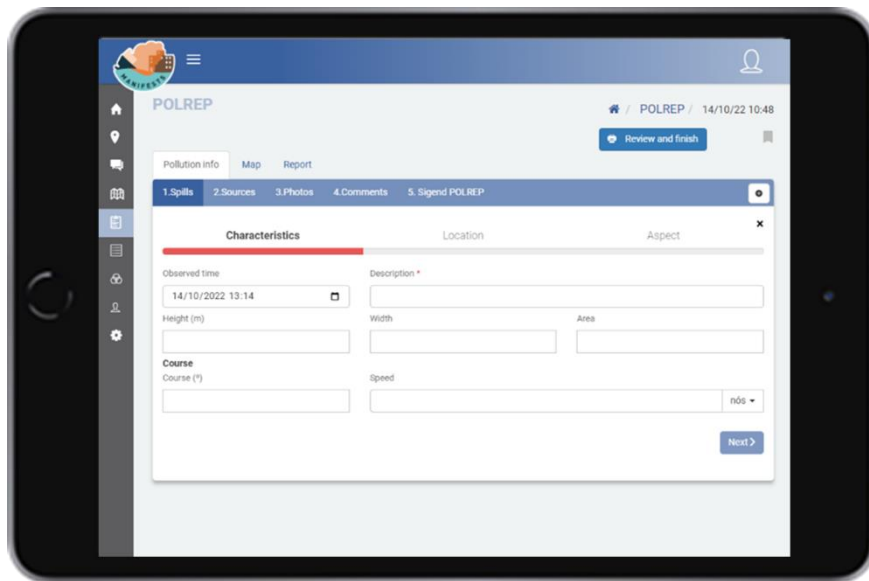
The characteristics form collects information regarding the size and direction of the spill. The description field of the spill is mandatory, without making a brief description of it you can't continue.
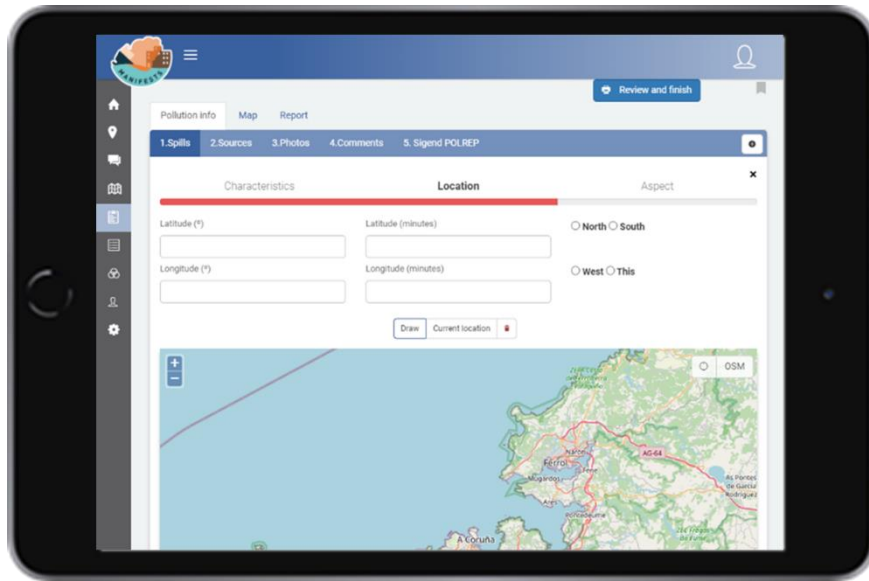
You cannot continue without making a brief description of it as it is mandatory to fill the description field.*

The location form collects the latitude/longitude position of the spill. To fill in this information, the application allows three possible ways:
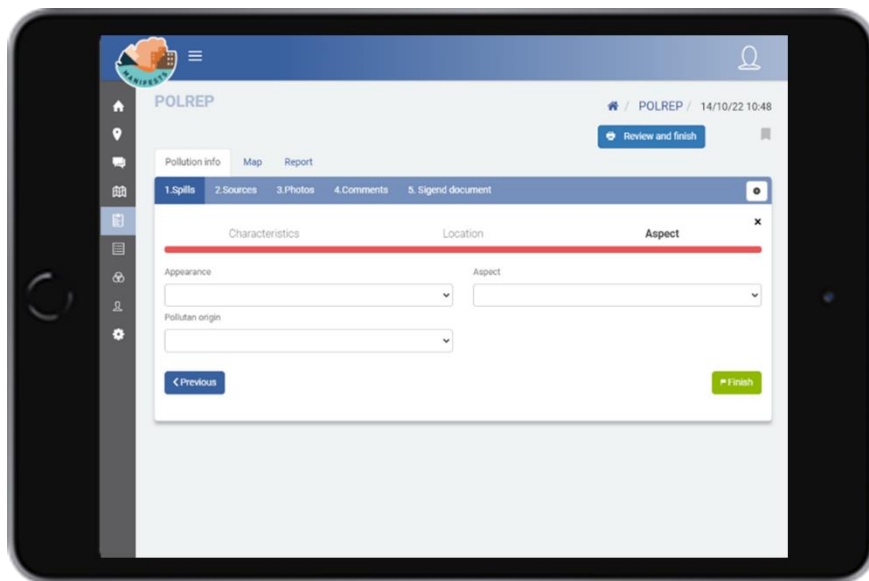
1) manually type the coordinates in the fields intended for this purpose.
2) Use the '**location**' button, which automatically inserts the position the user is in.
3) Use the '**draw**' button. This button opens a map where you can insert a point that determines the position of the spill.

It is recommended to use the '**current location**' button whenever the observer's location is very close to that of the spot. The first way can be used in case the observer has a GPS.

The map (way 3) is useful in those situations where the observer is very far from the spill (for example, in observations made from the coast) and does not have a GPS to help him geolocate. In this case the map will be useful to locate the spill, even if it is in an approximate way.

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The aspect form collects information about the characteristics, appearance, and nature of the contamination. All fields have dropdowns with possible options.

After completing this last form, all the information related to the spill is considered covered. At this point you can continue adding new spill, using the '**+**' button located on the right side of the screen.

In this case, the information related to characteristics, location, and appearance of the second spill would be covered again, repeating the steps described so far.

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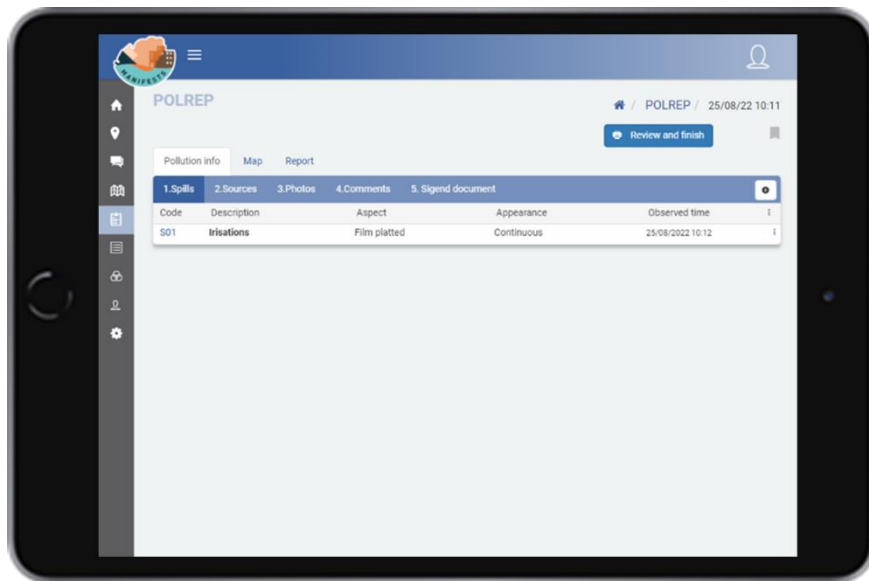
This screen also allows you to consult or edit the information that we have reported of the spills, for this it's necessary to double click on the registration of the spill. Once the information of all the spill is covered, you can continue to cover information related to the source's photos and comments.

The application allows free navigation between the different sections by clicking on them. In this way the user may not follow the suggested order, since sometimes information is not available regarding all the sections. For example, you may not want to insert information related to the source.

Source information

The form of the polluting source collects information regarding its origin, the type of source and the cause, and allows to write a description of it. It also allows to provide data on the geographical location of the source, for this you have a screen with the same options described in the spill location form.

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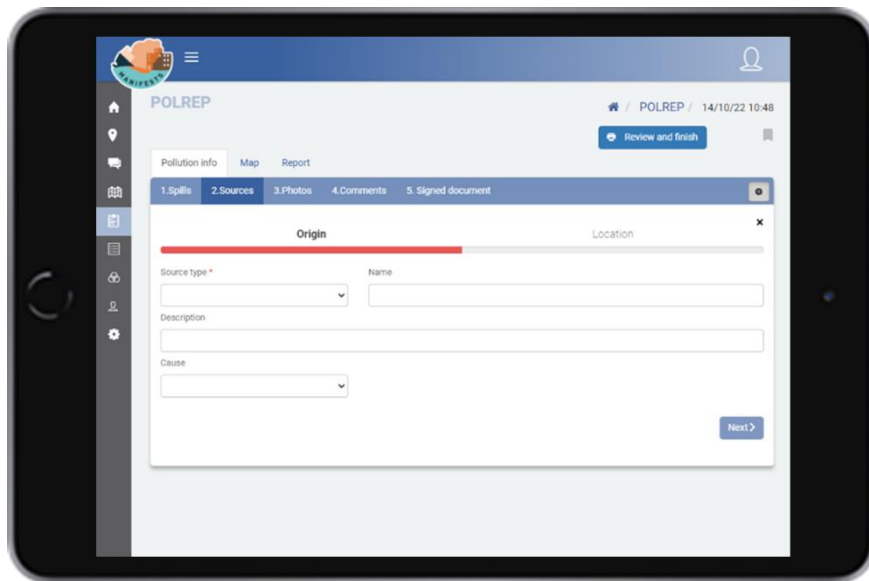
Photos

On this screen you can add one or more photos accompanied by a comment. These photos can be geolocated using the location screen (already described above).
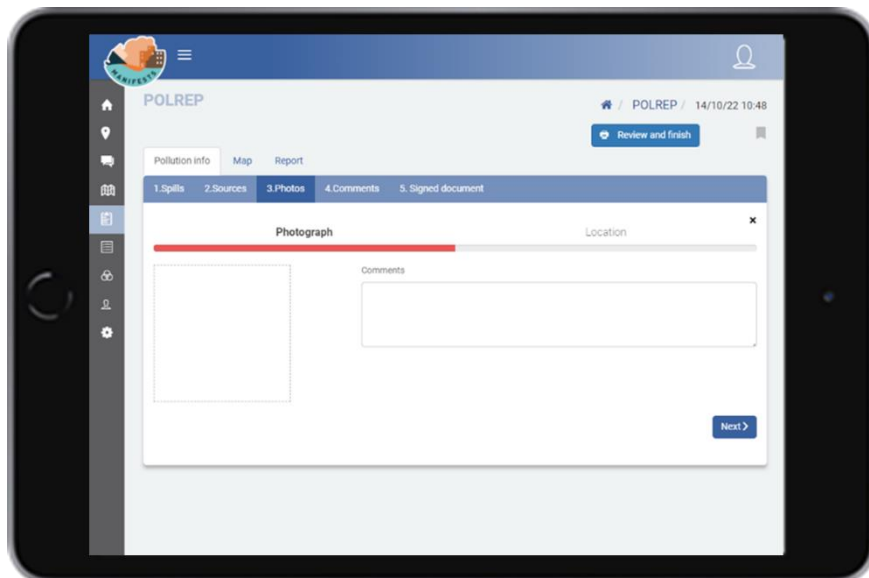
Comments

The user may add one or more comments of everything he considers of interest. Comments can also be geolocated using the location screen.

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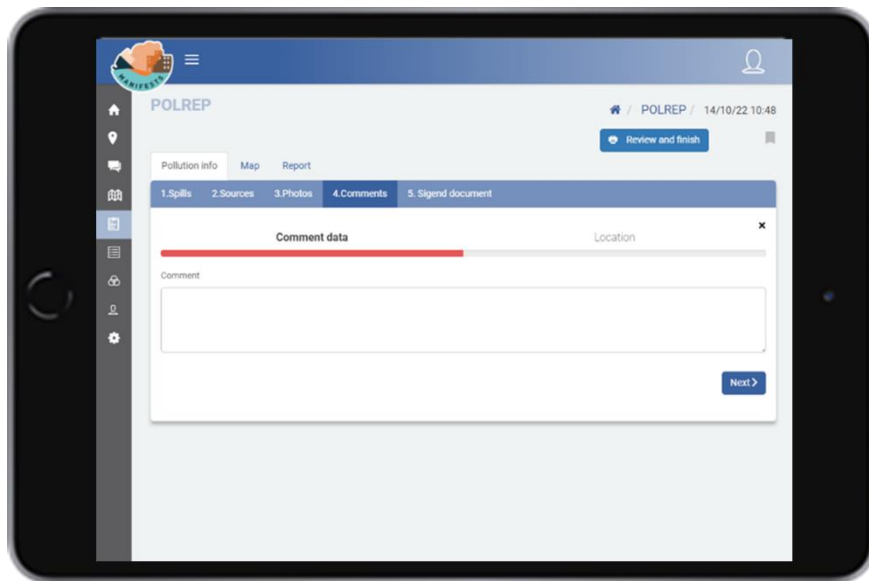
Review and finalize.

Once all the information related to the contamination is covered, the review and end buttons available at the top of the screen allow us to review our POLREP report and finalize it.

Although it is advisable to provide data related to the four sections of the pollution information, this is not always possible. Therefore, this button can be used at any time during the process, generating a POLREP report that will cover only the fields for which information is available.
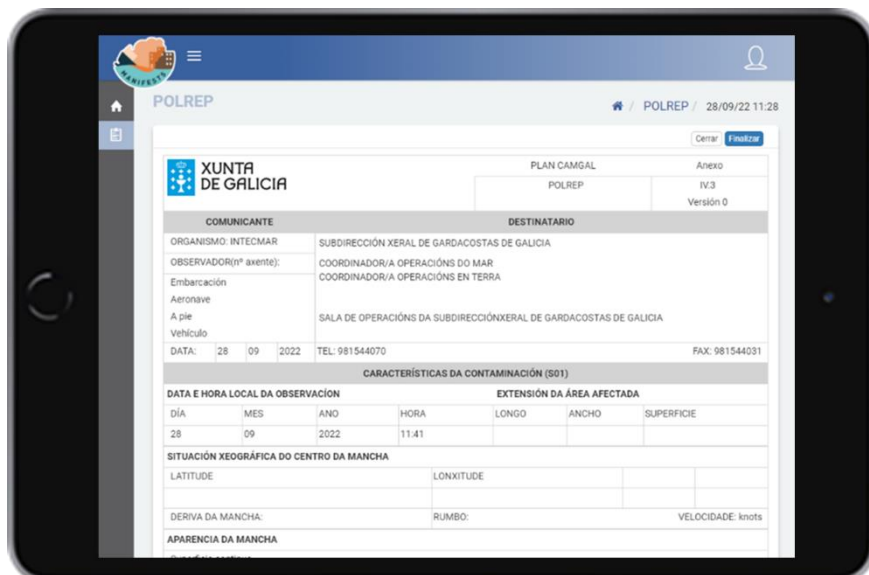
Since most of the information in the POLREP can be geolocated, the application also allows to review the position of all the elements that have been geolocated (using the 'map' button).

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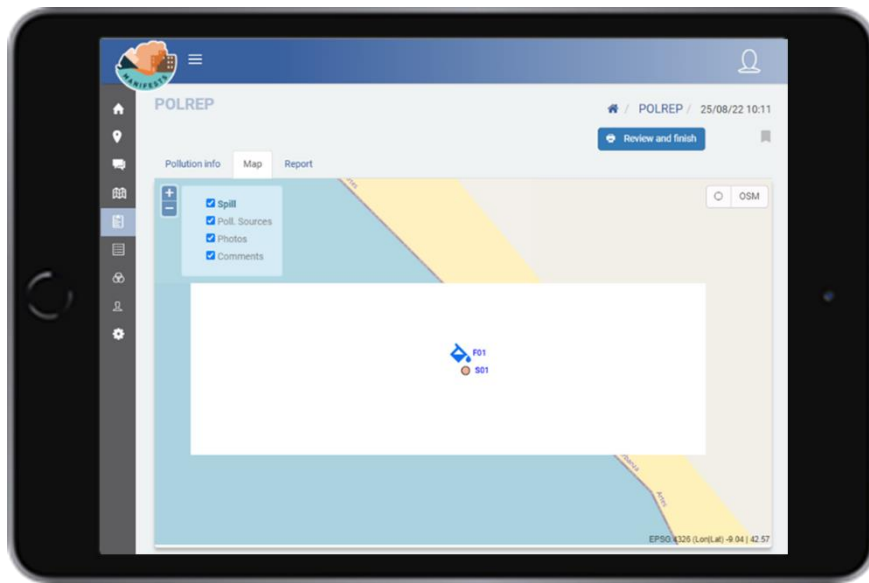
Print a POLREP

Once a POLREP has been created using the application, it becomes registered in the database and can be consulted by those to whom the system administrator has given permission.

In case of needing a physical copy of the POLREP, it's possible to print one by opening the form with the 'review' option on your browser or download a PDF version of it.

8. SCAT Module

In Spain, the initial information on the pollution event on the coast conforms to the SCAT model, as provided for in article 6 of Order AAA/702/2014 approving the State Plan for the Protection of the Ribera del Mar against Pollution (Plan Ribera). This information is of crucial importance for decision-making and serves as the basis for different operational phases of the response ("Field Manual for Evaluation of the Coast Contaminated by Hydrocarbons", of the Ministry for the Ecological Transition. https://publicacionesoficiales.boe.es NIPO:638-19-003-8).

This module makes it possible to access a standard model of SCAT through a mobile device, thus facilitating the observer to send the information to the competent body.

A SCAT is composed of eight sections, the first three have the purpose of collecting basic information of the place and will be covered, in general, by the sampling coordinator. In this way, the members of the inspection team will only cover the remaining five sections, relating to the details of the contamination.

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8.1.   SCAT Menu

By clicking on the SCAT module (menu on the left) you access the SCAT screen, from here, the sampling coordinator can open a new SCAT, as well as consult, edit or delete the SCAT that you have previously made. In case of being the first time that the user accesses the platform there will be no associated SCAT so at this point only a new SCAT can be covered, through the '+' button.
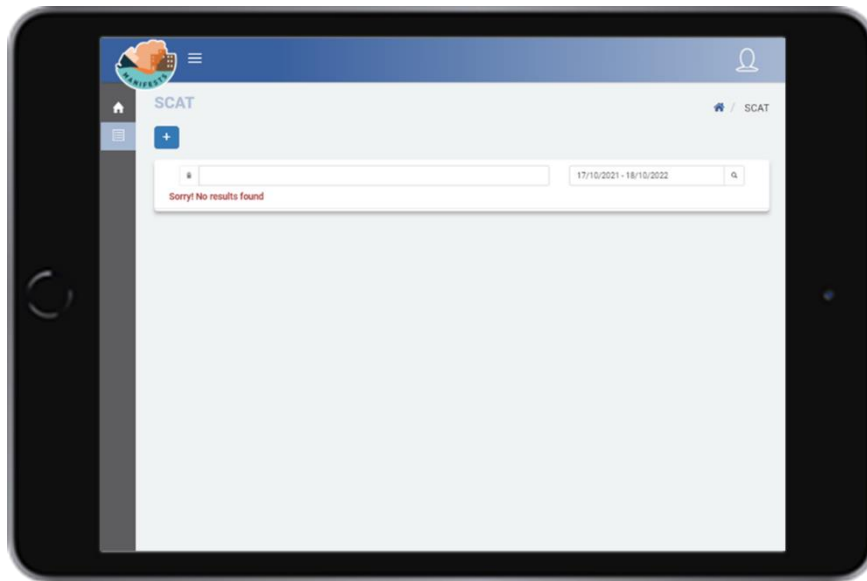
8.2.   New SCAT

By clicking on the '+' button, the user can start a new SCAT, filling in all the related information. Said information will be saved automatically and can be edited if necessary. After completion, a SCAT report is generated and will be registered on the platform at the disposal of the corresponding inspection team, which will cover the sections related to the details of contamination.

Information

This first form collects general incident information, the incident fields (name you want to assign to it) and date of the report, are mandatory. Both marked with '*'. The application covers the date field automatically, and in case you want to modify this data it is possible to do so.

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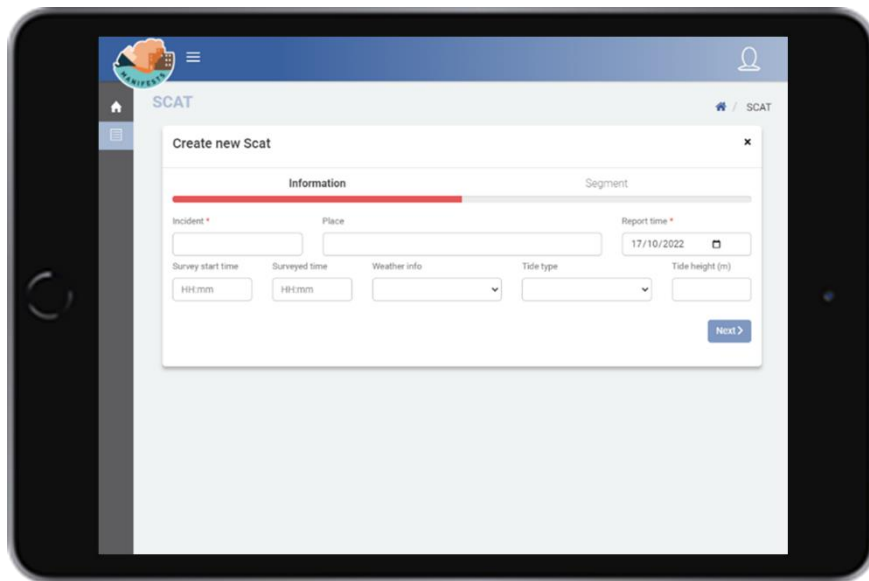
Once covered, the '**next**' button allows us to continue.

Segment

This form contains the information related to the segment to be inspected. In this case the segment ID and the name of the place are mandatory fields that must be established by the management team during the design of the inspection.

The start and end position of the segment can be set in two ways, covering the corresponding latitude and longitude data or by clicking on the '**Draw'** button that enables the map to draw the segment. This option covers the coordinate fields automatically.

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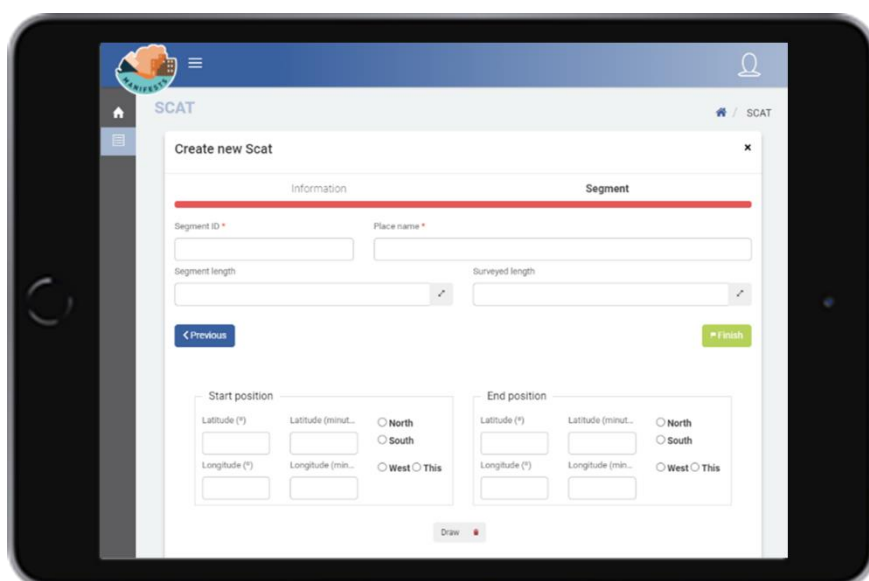
Once the form is completed, the '**finish**' button allows us to save the information and continue.

Inspection equipment

The inspection team can be composed of inspectors who are already registered in the system (inspection permit) or external personnel. In both cases this form records the name and contact details of each of them in case of needing further clarification.

To fill out the form you must click on '**2. Inspection equipment',** then over the **'Edit'** button that opens the form in edit mode.
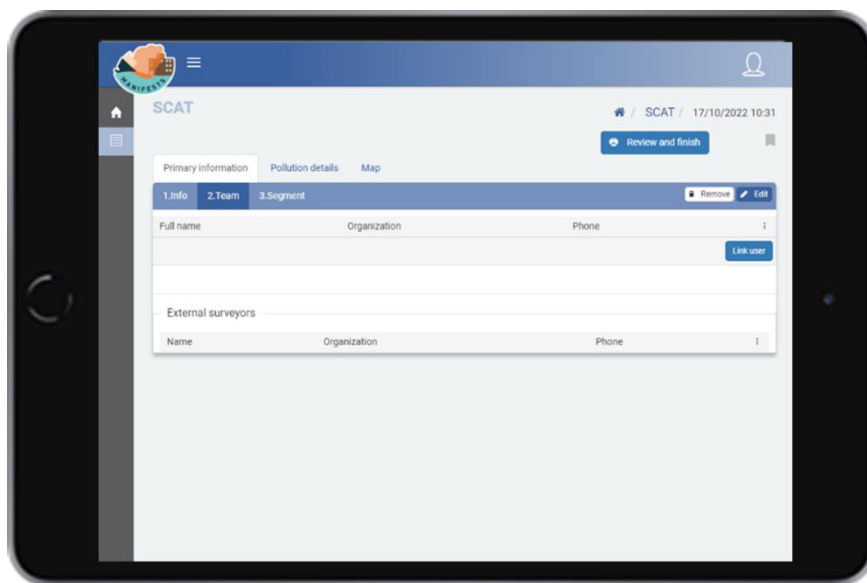
The '**Link User'** button allows the linking of those inspectors who are registered in the system. Once the inspector data is completed, the '**save'** button records the log.

The '**External Personnel'** table allows to include in the inspection equipment those inspectors who are not registered in the system (for example, because they do not belong to the agency that is using the application) but will participate in the inspection.

Once these three sections are covered, the SCAT is available to the members of the inspection team, who will cover the details of the contamination.

The '**Review and Finish'** button allows you to view the SCAT report in tab format for review. In case everything is correct the '**finish'** button closes the SCAT, going to the initial screen. Otherwise, the

'**close**' button takes you back to the detail form of the SCAT in progress to edit everything that is considered necessary.

8.3.   SCAT Contamination Details

Once the POLREP costa has been opened by the sampling coordinator, the members of the inspection team will access the application through their credentials, finding in their profile those SCAT that have been assigned to them and proceeding to their completion.
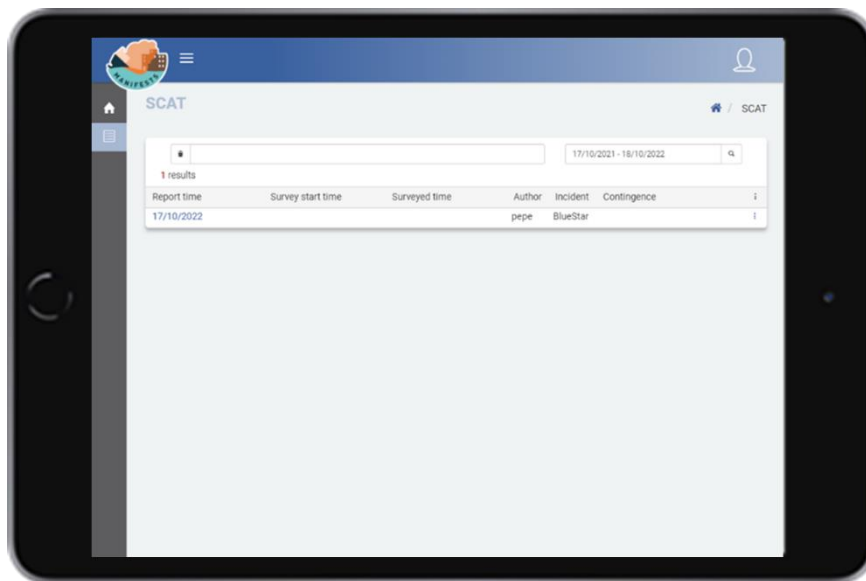
To cover the information, click on '**Pollution Details'**. This detail is composed of the following five forms.

Types of coast.

The '**edit**' button opens the edit of the form where you must identify the nature of the types of coastline within the segment, paying special attention to contaminated areas.

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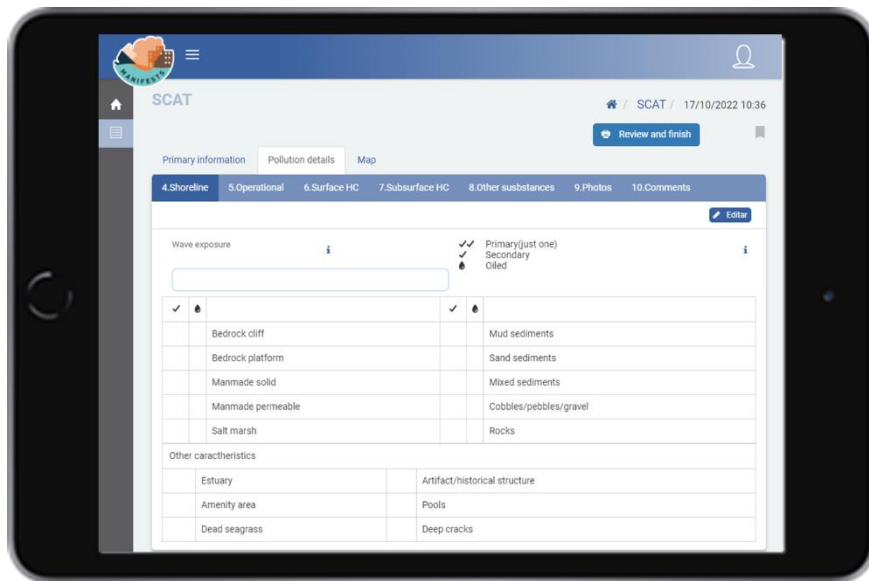
This is a selection form, so that the first type of coast to be marked will be taken as primary by marking with the double sign ✓✓. This type of coast corresponds to the clearly predominant coast, located in the upper intertidal zone. In general, there can only be one type of main coast within a segment, but there can be several secondary ones. For this, the following types of coastline that are selected will be marked with a single sign✓.

In case you want to indicate that there is pollution in that type of coast, select the icon ⬤ ,being free of the 'x' and indicating the presence of contamination.

In the section other characteristics, you can select those aspects of the coast that may have an influence on the behavior of the hydrocarbon, on the anthropogenic use of the coast, wildlife or vegetation.

After the form is completed, the '**OK'** button saves the changes and closes the editing mode of the form.

Operational characteristics

The edit button opens the edition of the form, in this case of selection, where the user will cover by ✓ those options related to access, uses and conservation of the contaminated remains in the segment.

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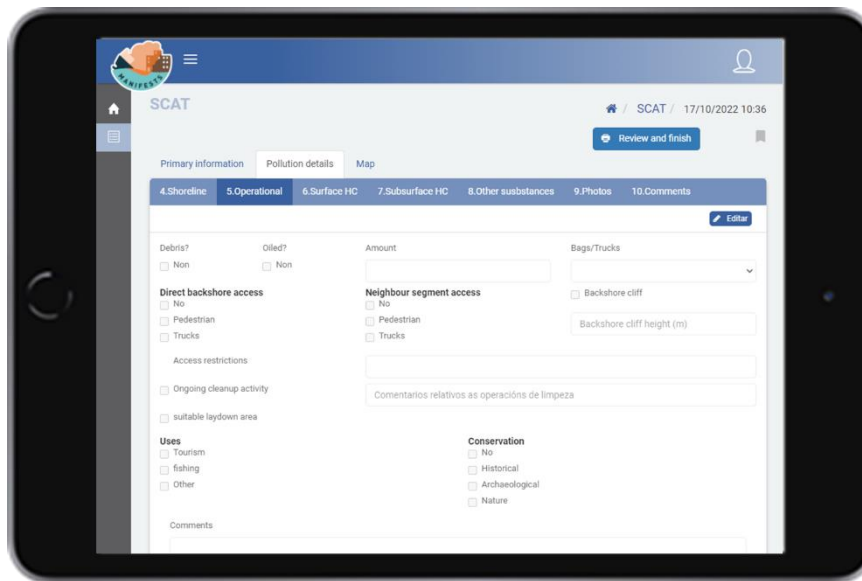
The notes field allows you to insert a text with the information that the inspector deems appropriate to facilitate emergency managers to make decisions when intervening in the area.

After the form is completed, the '**OK'** button saves the changes and closes editing mode of the form.

Surface hydrocarbon

If after the inspection, no surface contamination is observed it is not necessary to cover this section, in specific case the '+' button gives access to the form relating to the presence of surface hydrocarbon.
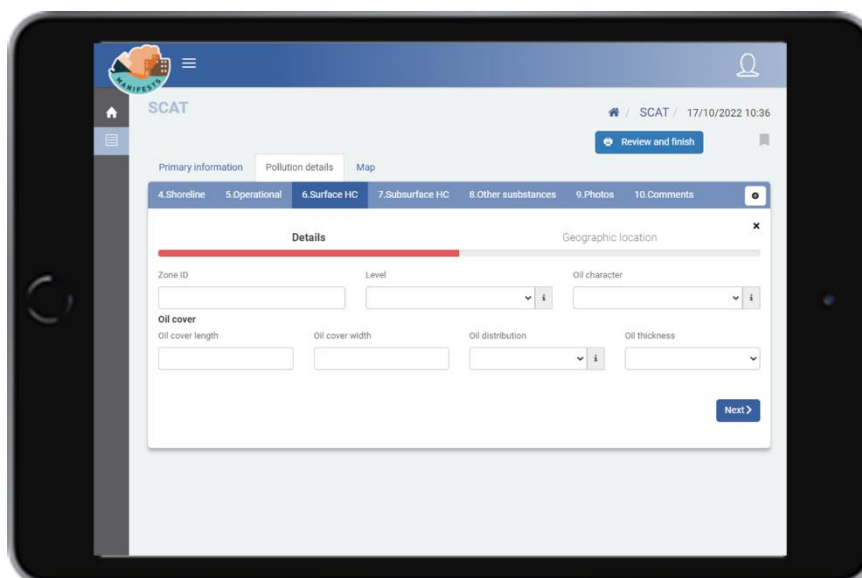
By using the drop-down buttons you can cover the information related to the area (ID), the position of the tide, the appearance of the hydrocarbon, distribution of the contamination and thickness of it.

Regarding the coverage of the hydrocarbon, data can be provided regarding the length and width of the contaminated area.

Once this information is covered, the '**next**' button gives way to a geographical location screen where the latitude/longitude position of the spot is collected. To fill in this information, the application allows three possible ways:

1) Typing manually the coordinates in the fields intended for this purpose.
2) Using the '**location**' button, which automatically inserts the position the user is in.
3) Using the '**paint**' button. This button opens a map where you can insert a point that determines the position of the hydrocarbon.

It is recommended to use the '**current location**' button whenever the location of the observer is very close to that of the hydrocarbon. Track 1 can be used in case the observer has a GPS with which he has positioned the hydrocarbon.
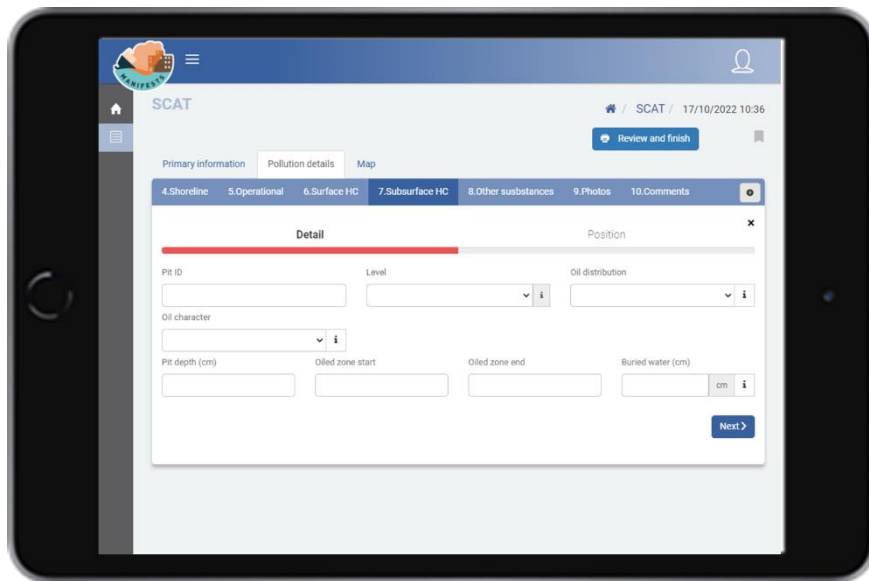
The map (track 3) is useful in those situations where the observer is very far from the hydrocarbon (for example, in observations made from the ground) and does not have a GPS to help him geolocate. In this case the map will be useful to locate the spill, even if it is in an approximate way.

The '**+**' button allows you to add all the necessary records in the form. Once the surface hydrocarbon sampling is completed, you can continue with the following form.

Hydrocarbon under surface

To determine the presence of hydrocarbon under the surface it is necessary to carry out small sampling, pitting, or digging of trenches on the coast. These actions should only be carried out if there is a suspicion that the hydrocarbon may have been buried.

If this pitting is not carried out, this section can be left uncovered, otherwise the + button gives access to the form.

This form covers the information related to the ID of the pit, the tidal position, the distribution of pollution, the appearance of the hydrocarbon, the depth of the pit (with the beginning and end of the area that presents hydrocarbon) and the level of the sea water. The ⓘ icon opens aids related to each field.

As in the previous form there is the possibility of geolocating the position of the pollution through the geographical location screen.

The '**+**' button allows you to add all the necessary records in the form. Once the subsurface hydrocarbon sampling is completed, you can continue with the following form.

Other substances

If there are no other polluting substances it is not necessary to fill out this form, otherwise the '**+**' button allows access to the form.

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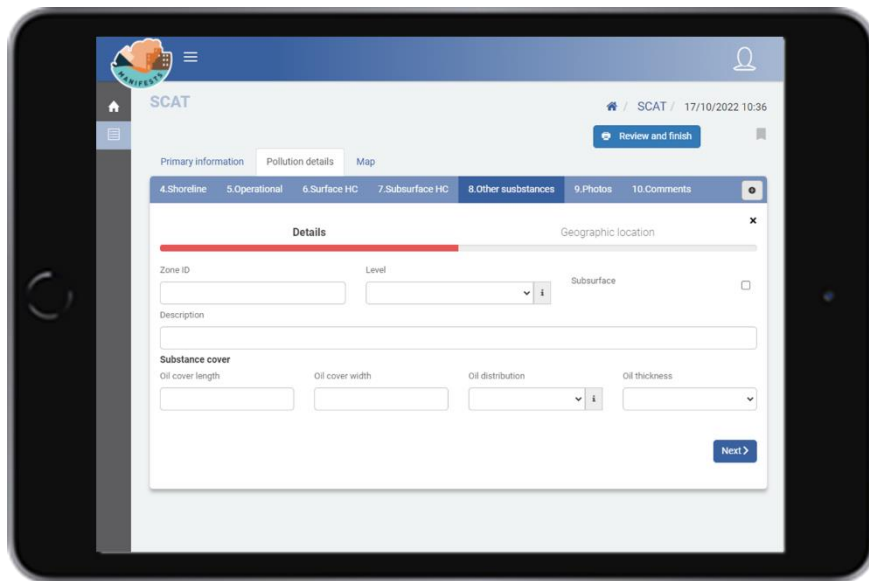
This form identifies the contaminated area with an ID and defines for each zone the position in relation to the tidal zone, coverage of the substance, its thickness, and a description of the substance.

As in the previous form, there is the possibility of geolocating the position of the pollution through the geographical location screen.

The '**+**' button allows you to add all the necessary records in the form. Once that form is finished, you can continue.

Photos

In case you want to complete the SCAT with photos, the '**+**' button allows you to add one or more photos accompanied by a comment. These photos can be geolocated using the location screen already described above.
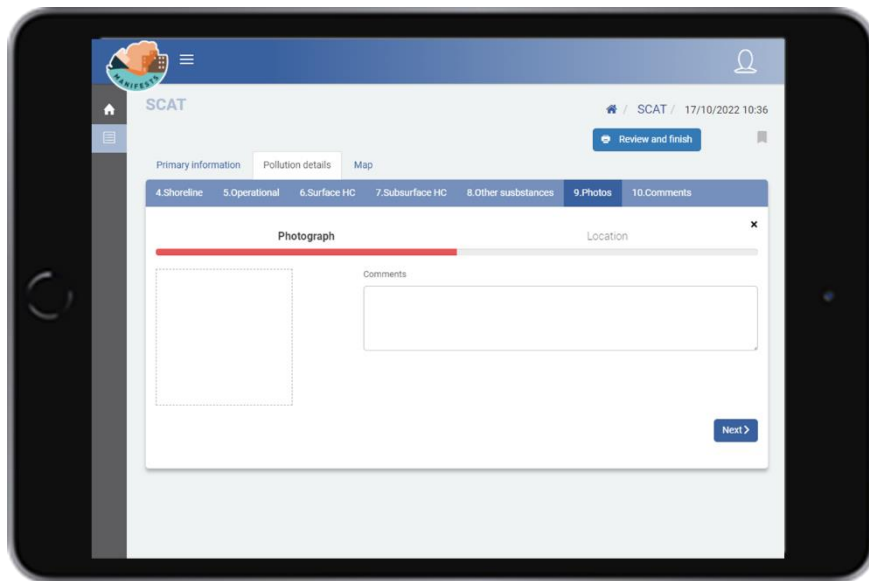
Feedback

The user may add one or more comments of everything he considers of interest. Comments can also be geolocated using the location screen.
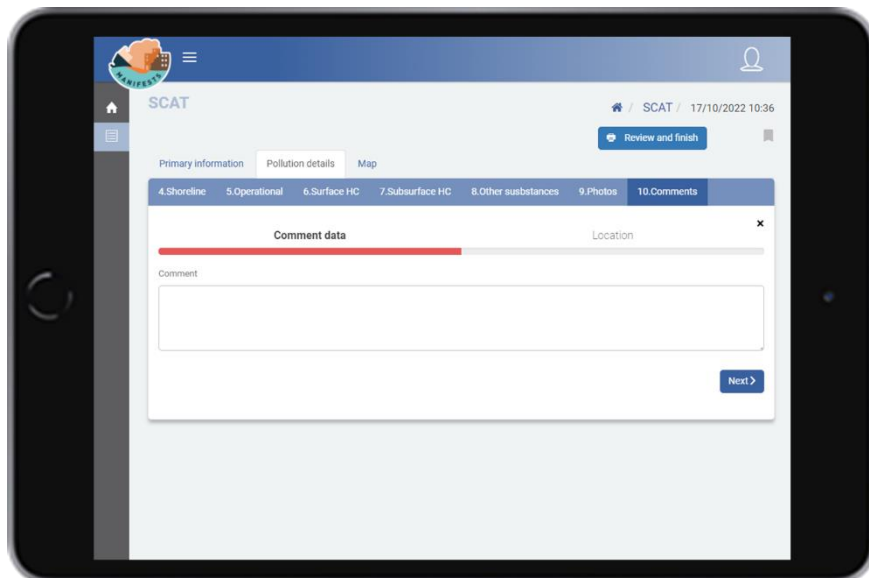
Review and finalize.
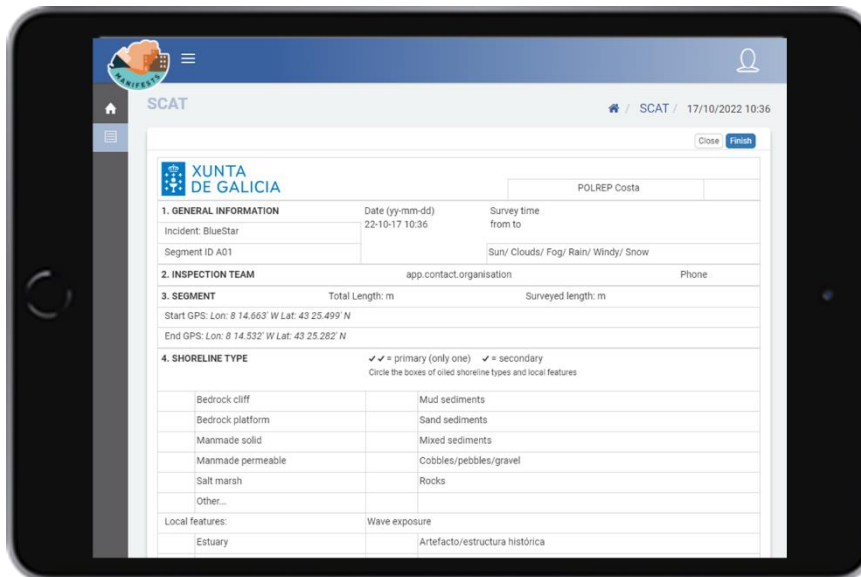
Once all the information related to the contamination has been covered, the '**review and finish**' button available at the top of the screen allows us to review our SCAT report and finalize it.

This button can be used at any time during the process, generating a SCAT report that will cover only the forms in which information has been filled.

Print a SCAT

Once a SCAT has been created using the application, it becomes registered in the database and can be consulted by those to whom the system administrator has given permission.

Sometimes it may be necessary to send the SCAT via email or a printed copy of it's needed. To do this, you can open the form with the 'review' option and use the 'print' option of the browser in which the web application has been opened. In this way you can print the SCAT on paper on those devices connected to a printer or in PDF on those that do not have a printer.

Since most of the information in the SCAT can be geolocated, the application also allows, through the map button, to review the position of all the elements that have been geolocated.
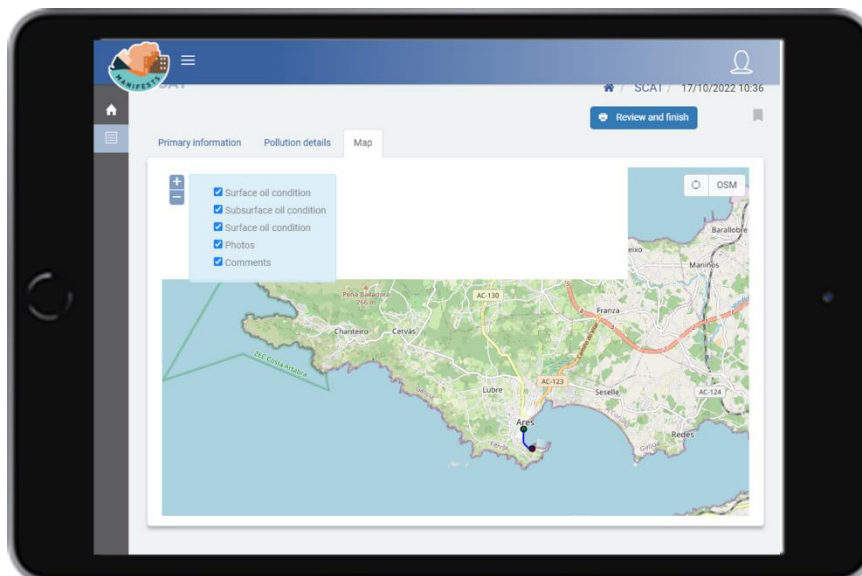
9. Reports Module

During a contingency, response teams take many photos, videos and make a series of reports with decision-making managers. This module was designed with the idea of centralizing all these communications and giving a common entry point to all the files that can be generated during the crisis (photos, videos, pdf) ensuring that managers have them in a fast and efficient way.

9.1. Reports Menu

By clicking on the report's module, in the menu on the left, you can access the reports screen, from here, the agent who works in the response operation can open a new report, as well as consult, edit or delete the existing reports. In case of being the first time that the user accesses the platform there will be no previous reports so at this point you can only start a new one through the '+' button.

9.2. New report

Once the report is opened, the user accesses the form where the following fields are covered:

Title: it is an optional field, covered only in case the communicator finds it of interest.

Message: Text field where the communicator covers everything that he wishes to transfer to the contingency managers.

File selection: Button that allows you to attach all kinds of files (photos, videos, pdf, etc.) that the communicator wants to send to the managers.

Tags: Where the communicator can tag the communication between the three available options. This tag gives the contingency manager the ability to filter the information received based on the chosen tag.

Contingency: Non-editable field, marked in gray. To be covered by the contingency manager.

During a contingency, the agent involved may have to make numerous communications to report on the evolution of the situation to the Operational Coordination Center (CECOP). To speed up this exchange of information, the COP manager, whose mission is to manage the information to be distributed during the contingency, can link (a task that is carried out through the COP management module) all the communications of an agent to a specific contingency. If this is the case, all communications reported by this agent will be automatically visible to all members present at the CECOP.

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In this situation, the contingency field will appear covered, to inform the agent that it has been linked to a contingency.
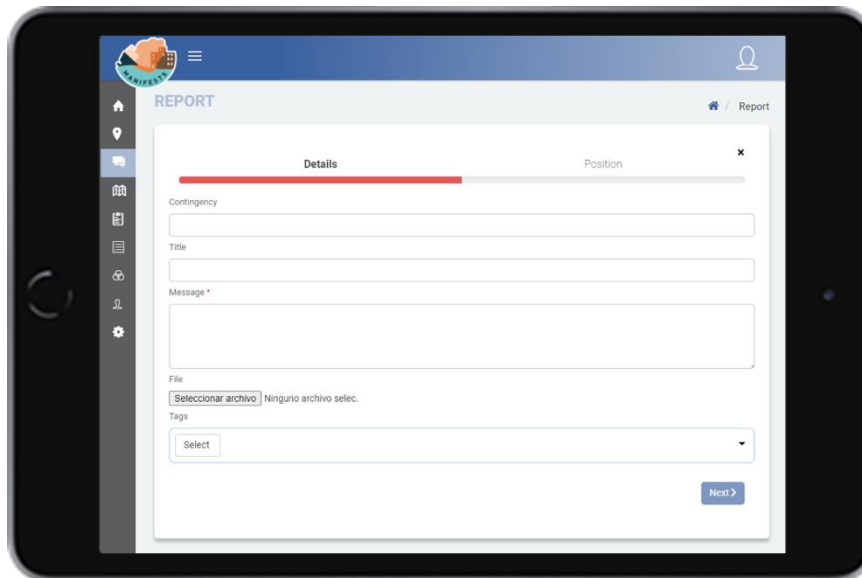
Optionally, the reports may be associated with a geographical location. To do this, each communication is associated with a location screen, which collects the latitude/longitude position of the communication. To fill in this information, the application allows three possible ways:

1) Typing manually the coordinates in the fields intended for this purpose.
2) Using the '**location**' button, which automatically inserts the position the user is in.
3) Using the '**paint**' button. This button opens a map where you can insert a point that determines the position.

It is advised that whenever the location of the agent is very close to the point you want to geolocate, use the '**current location**' button. 'Way 1' can be used in case the agent has a GPS with which he has located the position. 'Way 3' is useful in situations where the agent is far from the desired position (for example, in observations made from the ground) and does not have a GPS to help it geolocate. In this case the map will be useful to locate the position, even if it is in an approximate way.

It should be noted that the location is only indicated for those cases in which it's important that the information you want to move is geolocated. For example, reporting the appearance of a new spill.

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HNS database user guide

Ludovic Lepers, Samuël Orsi, Sébastien Legrand

Project Acronym	MANIFESTS
Project Full Title	**MAN**aging risks and **I**mpacts **F**rom **E**vaporating and gaseous **S**ubstances **T**o population **S**afety
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Project Website	https://www.manifests-project.eu/

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Status (Final/Draft/Revised)	Final
Work Package	5
Task Number	5.2
Responsible Institute	RBINS
Author/s	Ludovic Lepers, Samuël Orsi, Sébastien Legrand
Recommended Citation	Lepers L., Orsi S., Legrand S. (2023) HNS database user guide, MANIFESTS project, deliverable D5.3
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V1.0	26/04/2023		

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1. Table of content

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2. Introduction

This guide aims to help users use the HNS (Hazardous and Noxious Substances) database built during the MANIFESTS project. It contains more than 600 chemicals with up to more than 100+ parameters by chemical. The chemicals are from the MIDSIS-TROCS database (from REMPEC) and from the HNS-MS database (From CEDRE). It can be used easily by a user looking to retrieve data for a chemical or can be accessed from an API.

3. Accessing the database

The database is located at https://manifests-project.eu/hns-database/. It can also be accessed through the MANIFESTS https://manifests-project.eu/, then clicking on Tools/HNS Database as illustrated in Figure 1 and in Figure 2.
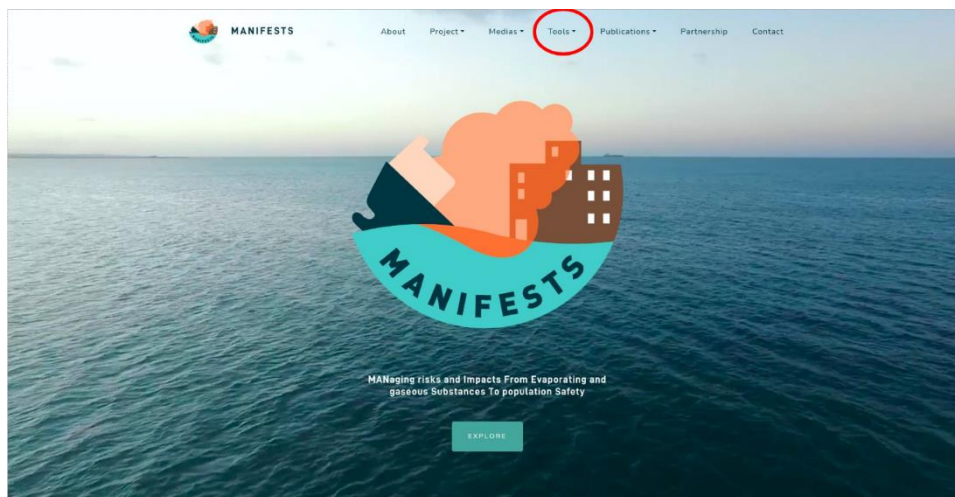
Figure 1: MANIFESTS website homepage
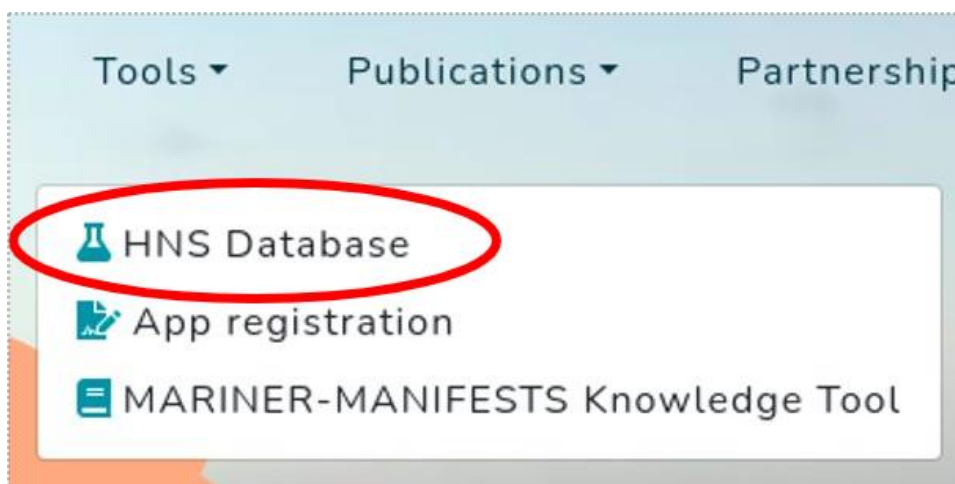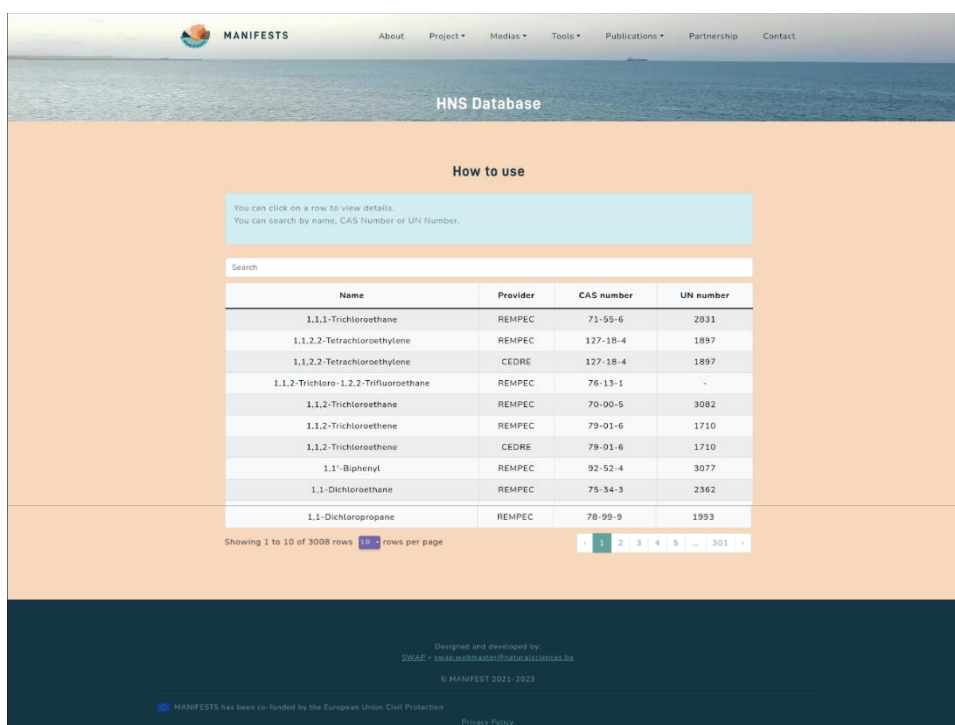
Figure 2: Tools listing

This tool is free to use by anyone, there no needs for credentials to access it.

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4. Searching tools

Once on the database main page (Figure 3), the user can click on any HNS to access detailed information on it. A search can be done on the name, CAS number or UN number. To do that, simply type it on the "Search" field. The provider is the provider of the chemical information inside the database.

Figure 3: HNS database overview

The user can access a specific page by clicking on it on the bottom right and shows more than 10 rows of chemicals by choosing the desired amount on the bottom left purple drop-down menu. The HNS are ordered in alphabetical order. There are multiple instances of some chemicals because there are several data providers, and the user can choose from which provider to show the data. Currently, entries come from two of them:

- CEDRE (data collected or direct laboratory measurement done by CEDRE in the framework of several European projects, like the HNS-MS project. These data are initially coming from the original data of the HNS-MS database)
- REMPEC (Data collected in the literature and coming from MIDSIS-TROCS 3.0)

4.1. Example: Acrylonitrile

The user input "acrylonitrile" in the "search" field (Figure 4).

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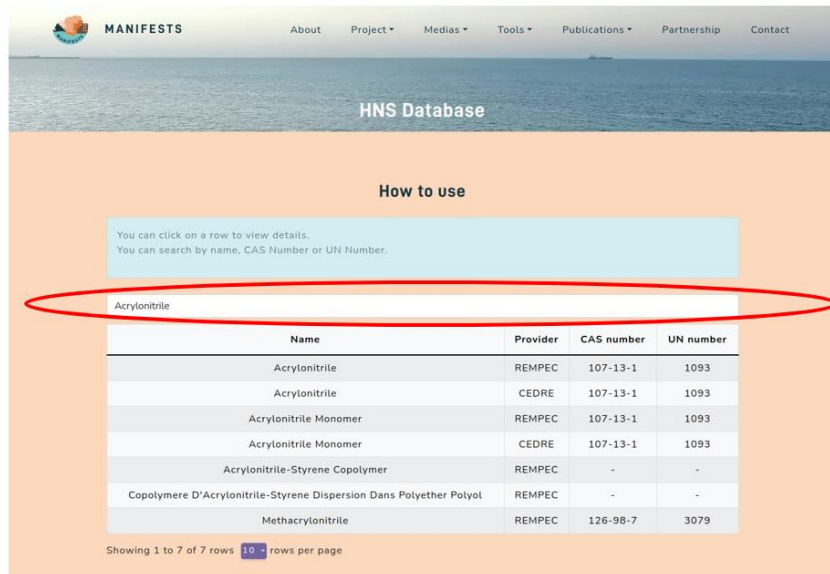
Figure 4: Making a search on the HNS database

And the user selects the HNS row of interest by clicking on it (Figure 5), here for instance the one provided by CEDRE (Acrylonitrile monomer is a synonym of Acrylonitrile and will lead the user to the same page):
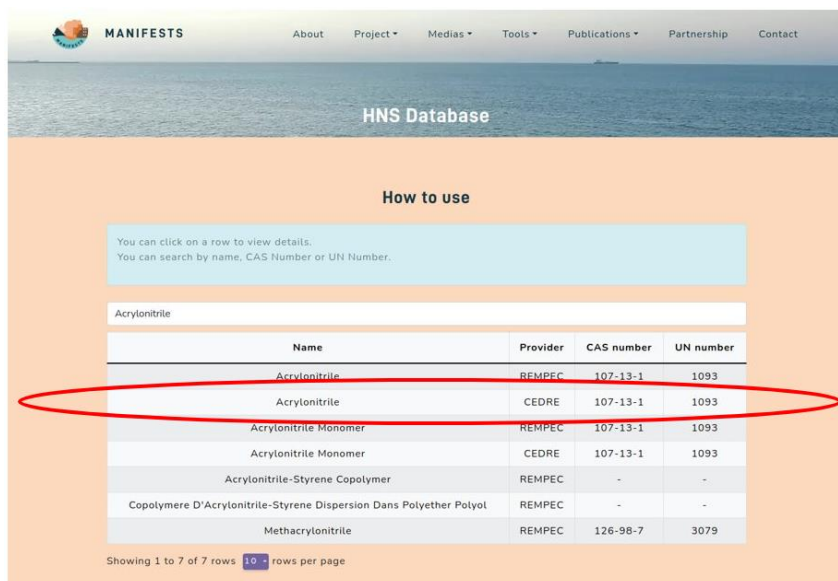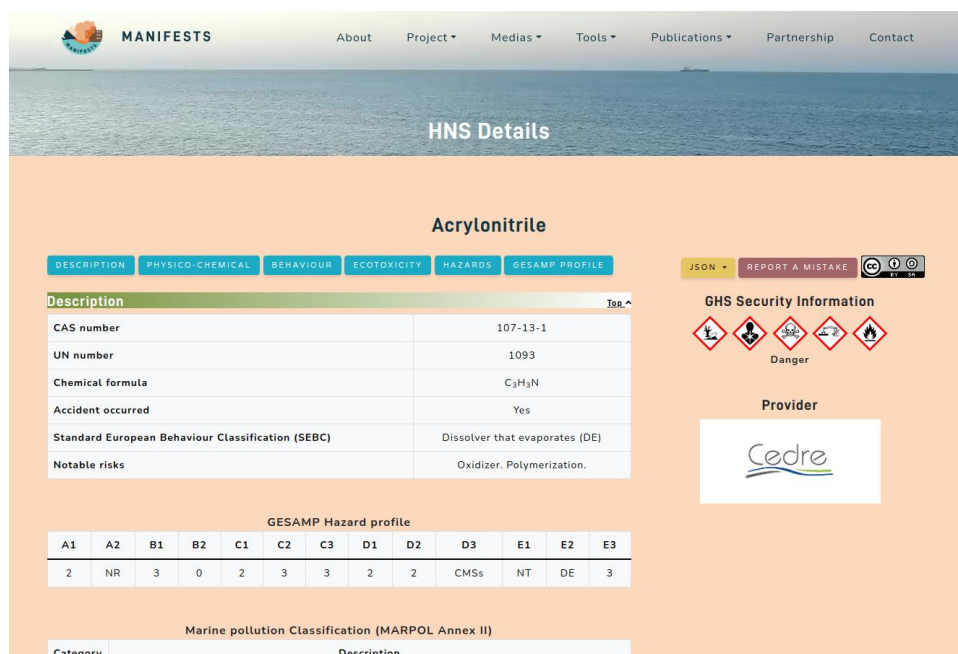
Figure 5: selecting an HNS

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5. Detailed HNS information

Each chemical has its own page with all the detailed information available in the database. There is an example with Acrylonitrile in Figure 6.

Figure 6: overview of the Acrylonitrile

The center of the page contains the data of the HNS in several categories:

- Description (Figure 7)
- Physico-chemical properties (Figure 8)
- Behaviour (Figure 9)
- Ecotoxicity (Figure 10)
- Hazards (Figure 11)
- Gesamp Profile (Figure 12)

These categories are accessible by scrolling down the page or by clicking on the blue buttons on top of the page. The "Top" buttons will bring the page to the top.

On the top right of the page, there are several information:

- JSON: view or download the chemical information of the HNS in a JSON format
- Report a mistake: this will prepare a mail to send if the user finds a mistake in the database
- License: links to the license information and website
- GHS Security information
- Provider: the provider of the data of the HNS, links to the provider website

Here are several examples of field for all the categories (Figure 7 to Figure 12):

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Description

CAS number	107-13-1
UN number	1093
Chemical formula	C_3H_3N
Accident occurred	Yes
Standard European Behaviour Classification (SEBC)	Dissolver that evaporates (DE)
Notable risks	Oxidizer. Polymerization.

GESAMP Hazard profile

A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
2	NR	3	0	2	3	3	2	2	CMSs	NT	DE	3

Marine pollution Classification (MARPOL Annex II)

Category	Description
Y	Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a hazard to either marine resources or human health or cause harm to amenities or other legitimate uses of the sea and therefore justify a limitation on the quality and quantity of the discharge into the marine environment.

Alternate names for this chemical

2-Propenenitrile
Acrylonitrile
Acrylonitrile Monomer
Cyanoethylene
Cyanure De Vinyle
Nitrile Acrylique
Propenoic Acid Nitrile
Vinyl Cyanide

Figure 7: Main description of the HNS

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Physico-chemical properties		Top ^
Chemical formula	C_3H_3N	
Molar mass	53.06 [g/mol]	
Critical molar volume	0.000173 [m³/mol]	
Physical state	Liquid at a temperature of 25 [°C] and at a pressure of 101325 [Pa]	
Melting point	-83 [°C]	
Boiling point	77.4 [°C] at a pressure of 101325 [Pa]	
Critical temperature	540 [°C]	
Density	810 [kg/m³] at a temperature of 20 [°C]	
Surface tension	27.22 [mN/m] at a temperature of 20 [°C]	
	26.63 [mN/m] at a temperature of 25 [°C]	
Kinematic viscosity	0.43 [cSt] at a temperature of 20 [°C]	
	0.42 [cSt] at a temperature of 25 [°C]	
Water solubility	79000 [mg/l] at a temperature of 20 [°C] and at a salinity of 0 [‰]	
Vapour pressure	11500 [Pa] at a temperature of 20 [°C]	
	14470 [Pa] at a temperature of 25 [°C]	
Critical pressure	4660000 [Pa]	
Vapour density	1.9	
Flash point (Pensky-Martens closed cup)	-1 [°C]	
Lower explosive limit (LEL)	3 [% in volume]	
Upper explosive limit (UEL)	17 [% in volume]	
Vaporization enthalpy	616000 [J/kg] at a temperature of 77.4 [°C]	
Combustion enthalpy	31900000 [J/kg]	
Specific heat capacity	2050 [J/(kg·K)] at a temperature of 25 [°C]	
Combustion efficiency	98 [%]	
Mass flow rate of the combustion surface	0.05 [kg/(m²·s)]	
Radiative fraction	26 [%]	
Henry's constant	8.7 [mol/(m³·Pa)]	

Figure 8: Physico-chemical properties of the HNS

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Behaviour at sea	Top ^
Log Kow	-0.92000000
Log Koc	-0.07000000
Hydrolysis (Half-life period)	Not hydrolysable
Aqueous photolysis (Half-life period)	Not photolysable
Biodegradation in estuary environment (Half-life period)	Not biodegradable
Biodegradation in marine environment (Half-life period)	Not biodegradable
Standard European Behaviour Classification (SEBC)	Dissolver that evaporates (DE)
Bioconcentration factor (BCF)	1.00000000

Figure 9: Behaviour of the HNS at sea

Ecotoxicity	Top ^
Lowest median lethal concentration (LC_{50}) on algae	1.63 [mg/l]
Lowest median lethal concentration (LC_{50}) on crustacean	6 [mg/l]
Lowest median lethal concentration (LC_{50}) on fishes	5.16 [mg/l]
Highest no observed effect concentration (NOEC) on algae	0.8 [mg/l]
Highest no observed effect concentration (NOEC) on crustacean	0.5 [mg/l]
Highest no observed effect concentration (NOEC) on fishes	0.17 [mg/l]
Assessment factor (AF)	100 on the short term
	100 on the long term
Predicted No Effect Concentration (PNEC)	16.3 [µg/l] on the short term
	1.7 [µg/l] on the long term

Figure 10: Ecotoxicity of the HNS at sea

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Hazards

Danger

IDLH	85 [ppm]

Hazards statements
Physical
H225	Highly flammable liquid and vapour.

Health
H350	May cause cancer.
H335	May cause respiratory irritation.
H331	Toxic if inhaled.
H318	Causes serious eye damage.
H317	May cause an allergic skin reaction.
H311	Toxic in contact with skin.
H301	Toxic if swallowed.

Environmental
H411	Toxic to aquatic life with long lasting effects.

Precautionary statements
Prevention
P284	Wear respiratory protection.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P273	Avoid release to the environment.
P272	Contaminated work clothing should not be allowed out of the workplace.
P270	Do no eat, drink or smoke when using this product.
P262	Do not get in eyes, on skin, or on clothing.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P243	Take precautionary measures against static discharge.
P242	Use only non-sparking tools.
P231	Handle under inert gas.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P202	Do not handle until all safety precautions have been read and understood.
P201	Obtain special instructions before use.

Response
P331	Do NOT induce vomiting.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P370 + P378	In case of fire: Use ... for extinction.

Storage
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

Disposal
P501	Dispose of contents/container to ...

Figure 11: Hazard linked to the HNS

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GESAMP

GESAMP Hazard profile

A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
2	NR	3	0	2	3	3	2	2	CMSs	NT	DE	3

A1: Bioaccumulation

Rating	Description
2	Low potential to bioaccumulate

A1a: None

Rating	Description	Criteria [mg/l]
0	No potential to bioaccumulate	Log Kow < 1

A1b: None

Rating	Description	Criteria
2	Low potential to bioaccumulate	$10 \leq BCF < 100$

A2: Biodegradation

Rating	Description
NR	Not readily biodegradable

B1: Acute aquatic toxicity

Rating	Description	Criteria [mg/l]
3	Moderately toxic	$1 < LC/EC/IC_{50} \leq 10$

B2: Chronic aquatic toxicity

Rating	Description	Criteria [mg/l]
0	Negligible	NOEC > 1

C1: Acute oral toxicity

Rating	Description	Criteria [mg/Kg]
2	Moderate	$50 < AOTE \leq 300$

C2: Acute dermal toxicity (skin contact)

Rating	Description	Criteria [mg/Kg]
3	Moderately high	$50 < ADTE \leq 200$

C3: Acute inhalation toxicity

Rating	Description	Criteria [mg/l] (4 hours exposure)
3	Moderately high	$0.5 < AITE \leq 2$

D1: Skin irritation or corrosion

Rating	Description	Sign	GHS category
2	Irritating	Marked erythema Obvious and marked oedema Other signs of local injury	Irritant Category 2

D2: Eye irritation

Rating	Description	Sign	GHS category
2	Irritating	Marked conjunctival hyperaemia, chemosis, corneal injury – all reversible within 21 days	Irritant Category 2A

D3: Long-term health effects

Notation	Hazard endpoint	Description	GHS category
C	Carcinogenicity	Chemicals which have been shown to induce or increase the incidence of cancer	Category 1 for Carcinogens
M	Mutagenicity	Cause a permanent change in the amount or structure of genetic material in cells	Categories 1 and 2 for Germ Cell Mutagens
Ss	Skin Sensitization	Cause specific skin hypersensitivity or allergy following skin contact	Category 1 for Skin Sensitizers

E1: Tainting of seafood

Rating	Description
NT	The substance has been tested for tainting and found not to taint following exposure of the fish for 24h to 1mg/l.

E2: Behaviour of chemicals in the marine environment

Rating	Description
DE	Dissolver that evaporates

E3: Interference with the use of coastal amenities

Rating	Interference	Description	Interpretation	Warning
3	Highly objectionable	1) is highly acutely toxic and/or 2) is severely irritant or corrosive to skin or eyes and/or 3) is carcinogenic, mutagenic or reprotoxic and/or 4) is a floater or persistent floater with associated health effects	1) C1 and/or C2 and/or C3 = 4 and/or 2) D1 or D2 = 3, 3A, 3B, or 3C and/or 3) D3 contains C, M or R and/or 4) E2 = F or Fp and D3 contains Ss, Sr, T, A, N, or I	Warning issued leading to the closure of amenities

Figure 12: GESAMP profile of the HNS

6. API

The purpose of this API is to allow later developed tools to access the database via JSON documents. These tools can be but are not limited to:

- Administrative tools (check data quality, …)
- External mathematical model data source
- Machine to machine interaction
- …

Using of the HNS database's API is similar to using the graphical interface:

6.1.   Searching for an HNS:

https://manifests-project.eu/api/ChemicalFullQuickList/?format=json&limit=10&offset=0&search=acrylo

- Limit: Must be an integer not exceeding 100
- Offset: Must be an integer not exceeding Limit
- Search: Can be
    - a text like partial name of chemical compound (e.g. "acrylo" for "Acrylonitrile")
    - a CAS number
    - a UN number

For the result of the above request see 7.1. Annex I.

6.2.   Viewing detail of relevant HNS

Once a relevant HNS is found in the list, its ID (e.g. "19" for "Acrylonitrile") can be used in the following URL to get detailed information:

https://manifests-project.eu/api/Chemical/19/?format=json

For the result of the above request see 7.2. Annex II.

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7. Annexes

7.1. Annex I

```
{
  "total": 8,
  "totalNotFiltered": 3008,
  "rows": [
    {
      "synonym": "Acrylon",
      "id": 196,
      "cas_number": "107-13-1",
      "un_number": 1093,
      "original_owner": "REMPEC"
    },
    {
      "synonym": "Acrylonitrile",
      "id": 19,
      "cas_number": "107-13-1",
      "un_number": 1093,
      "original_owner": "CEDRE"
    },
    {
      "synonym": "Acrylonitrile",
      "id": 196,
      "cas_number": "107-13-1",
      "un_number": 1093,
      "original_owner": "REMPEC"
    },
    {
      "synonym": "Acrylonitrile Monomer",
```

    "id": 19,

    "cas_number": "107-13-1",

    "un_number": 1093,

    "original_owner": "CEDRE"

  },

  {

    "synonym": "Acrylonitrile Monomer",

    "id": 196,

    "cas_number": "107-13-1",

    "un_number": 1093,

    "original_owner": "REMPEC"

  },

  {

    "synonym": "Acrylonitrile-Styrene Copolymer",

    "id": 197,

    "cas_number": null,

    "un_number": null,

    "original_owner": "REMPEC"

  },

  {

    "synonym": "Copolymere D'Acrylonitrile-Styrene Dispersion Dans Polyether Polyol",

    "id": 197,

    "cas_number": null,

    "un_number": null,

    "original_owner": "REMPEC"

  },

  {

    "synonym": "Methacrylonitrile",

    "id": 533,

    "cas_number": "126-98-7",

```
            "un_number": 3079,

            "original_owner": "REMPEC"

        }

    ]

}
```

```
{

    "id": 19,

    "abilities": null,

    "accident": true,

    "accident_url": null,

    "acid_reaction": null,

    "aegl1_10min": null,

    "aegl1_30min": null,

    "aegl1_4h": null,

    "aegl1_60min": null,

    "aegl1_8h": null,

    "aegl2_10min": null,

    "aegl2_30min": null,

    "aegl2_4h": null,

    "aegl2_60min": null,

    "aegl2_8h": null,

    "aegl3_10min": null,

    "aegl3_30min": null,

    "aegl3_4h": null,

    "aegl3_60min": null,

    "aegl3_8h": null,

    "assessment_factor": {

      "long term": 100,

      "short term": 100

    },

    "base_reaction": null,

    "bioconcentration_factor": "1.00000000",

    "boiling_point": {

      "range": {},
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"units": "°C",

"value": 77.4,

"chevron": "",

"comment": "",

"pressure": {

"units": "Pa",

"value": 101325

}

},

"cargo_group": null,

"cas_number": "107-13-1",

"colour": null,

"combustible_reaction": null,

"combustion_efficiency": {

"units": "%",

"value": 98

},

"combustion_enthalpy": {

"units": "J/kg",

"value": 31900000

},

"created_at": "2021-11-26T18:00:00Z",

"critical_molar_volume": {

"units": "m³/mol",

"value": 0.000173

},

"critical_pressure": {

"units": "Pa",

"value": 4660000

},

"critical_temperature": {

 "units": "°C",

 "value": 540

},

"data_quality_check": false,

"data_quality_check_date": null,

"density": [

 {

   "range": {},

   "units": "kg/m³",

   "value": 810,

   "chevron": "",

   "comment": "",

   "temperature": {

     "units": "°C",

     "value": 20

   }

 }

],

"density_experimental": null,

"erpg1": null,

"erpg2": null,

"erpg3": null,

"estuary_half_life_period": {

 "units": "",

 "value": "Not biodegradable"

},

"explosive_efficiency": null,

"family_name": null,

"flash_point": null,

"flash_point_coc": null,

"flash_point_pmcc": {

"units": "°C",

"value": -1

},

"formula": "C3H3N",

"general_remarks": null,

"gesamp_revision": "2013",

"gesamp_profile": {

"E3": {

"name": "Interference with the use of coastal amenities",

"data": [

{

"rating": "3",

"notation": null,

"hazard_endpoint": null,

"interference": "Highly objectionable",

"description": "1 is highly acutely toxic; and/or 2 is severely irritant or corrosive to skin or eyes; and/or 3 is carcinogenic, mutagenic or reprotoxic; and/or 4 is a floater or persistent floater with associated health effects",

"criteria": null,

"sign": null,

"ghs_category": null,

"interpretation": "1 C1 and/or C2 and/or C3 = 4; and/or 2 D1 or D2 = 3, 3A, 3B, or 3C; and/or 3 D3 contains C, M or R; and/or 4 E2 = F or Fp and D3 contains Ss, Sr, T, A, N, or I",

"warning": "Warning issued leading to the closure of amenities",

"brackets": null

}

]

},

"E2": {

"name": "Behaviour of chemicals in the marine environment",

      "data": [

      {

        "rating": "DE",

        "notation": null,

        "hazard_endpoint": null,

        "interference": null,

        "description": "Dissolver that evaporates",

        "criteria": null,

        "sign": null,

        "ghs_category": null,

        "interpretation": null,

        "warning": null,

        "brackets": null

      }

    ]

  },

  "E1": {

    "name": "Tainting of seafood",

    "data": [

      {

        "rating": "NT",

        "notation": null,

        "hazard_endpoint": null,

        "interference": null,

        "description": "The substance has been tested for tainting and found not to taint following exposure of the fish for 24h to 1mg/l.",

        "criteria": null,

        "sign": null,

        "ghs_category": null,

        "interpretation": null,

        "warning": null,

        "brackets": null

      }

    ]

  },

  "D3": {

    "name": "Long-term health effects",

    "data": [

      {

        "rating": null,

        "notation": "Ss",

        "hazard_endpoint": "Skin Sensitization",

        "interference": null,

        "description": "Cause specific skin hypersensitivity or allergy following skin contact",

        "criteria": null,

        "sign": null,

        "ghs_category": "Category 1 for Skin Sensitizers",

        "interpretation": null,

        "warning": null,

        "brackets": null

      },

      {

        "rating": null,

        "notation": "M",

        "hazard_endpoint": "Mutagenicity",

        "interference": null,

        "description": "Cause a permanent change in the amount or structure of genetic material in cells",

        "criteria": null,

        "sign": null,

        "ghs_category": "Categories 1 and 2 for Germ Cell Mutagens",

```
        "interpretation": null,

        "warning": null,

        "brackets": null

      },

      {

        "rating": null,

        "notation": "C",

        "hazard_endpoint": "Carcinogenicity",

        "interference": null,

        "description": "Chemicals which have been shown to induce or increase the incidence of cancer",

        "criteria": null,

        "sign": null,

        "ghs_category": "Category 1 for Carcinogens",

        "interpretation": null,

        "warning": null,

        "brackets": null

      }

    ]

  },

  "D2": {

    "name": "Eye irritation",

    "data": [

      {

        "rating": "2",

        "notation": null,

        "hazard_endpoint": null,

        "interference": null,

        "description": "Irritating",

        "criteria": null,

        "sign": "Marked conjunctival hyperaemia, chemosis, corneal injury – all reversible within 21 days",
```

```
      "ghs_category": "Irritant Category 2A",

      "interpretation": null,

      "warning": null,

      "brackets": null

    }

   ]

 },

 "D1": {

  "name": "Skin irritation or corrosion",

  "data": [

   {

     "rating": "2",

     "notation": null,

     "hazard_endpoint": null,

     "interference": null,

     "description": "Irritating",

     "criteria": null,

     "sign": "Marked erythema; Obvious and marked oedema; Other signs of local injury",

     "ghs_category": "Irritant Category 2",

     "interpretation": null,

     "warning": null,

     "brackets": null

    }

   ]

 },

 "C3": {

  "name": "Acute inhalation toxicity",

  "data": [

   {

     "rating": "3",
```

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"notation": null,

"hazard_endpoint": null,

"interference": null,

"description": "Moderately high",

"criteria": "0.5 < AITE ≤ 2",

"sign": null,

"ghs_category": null,

"interpretation": null,

"warning": null,

"brackets": null

}

]

},

"C2": {

"name": "Acute dermal toxicity (skin contact)",

"data": [

{

"rating": "3",

"notation": null,

"hazard_endpoint": null,

"interference": null,

"description": "Moderately high",

"criteria": "50 < ADTE ≤ 200",

"sign": null,

"ghs_category": null,

"interpretation": null,

"warning": null,

"brackets": null

}

]

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and gaseous **S**ubstances To population **S**afety   27

        },

        "C1": {

         "name": "Acute oral toxicity",

         "data": [

          {

           "rating": "2",

           "notation": null,

           "hazard_endpoint": null,

           "interference": null,

           "description": "Moderate",

           "criteria": "50 < AOTE ≤ 300",

           "sign": null,

           "ghs_category": null,

           "interpretation": null,

           "warning": null,

           "brackets": null

          }

         ]

        },

        "B2": {

         "name": "Chronic aquatic toxicity",

         "data": [

          {

           "rating": "0",

           "notation": null,

           "hazard_endpoint": null,

           "interference": null,

           "description": "Negligible",

           "criteria": "NOEC > 1",

           "sign": null,

```
      "ghs_category": null,

      "interpretation": null,

      "warning": null,

      "brackets": null

    }

  ]

},

"B1": {

 "name": "Acute aquatic toxicity",

 "data": [

  {

    "rating": "3",

    "notation": null,

    "hazard_endpoint": null,

    "interference": null,

    "description": "Moderately toxic",

    "criteria": "1 < LC/EC/IC50 ≤ 10",

    "sign": null,

    "ghs_category": null,

    "interpretation": null,

    "warning": null,

    "brackets": null

  }

 ]

},

"A2": {

 "name": "Biodegradation",

 "data": [

  {

    "rating": "NR",
```

```
              "notation": null,

              "hazard_endpoint": null,

              "interference": null,

              "description": "Not readily biodegradable",

              "criteria": null,

              "sign": null,

              "ghs_category": null,

              "interpretation": null,

              "warning": null,

              "brackets": null

          }

      ]

  },

  "A1b": {

   "name": null,

   "data": [

    {

        "rating": "2",

        "notation": null,

        "hazard_endpoint": null,

        "interference": null,

        "description": "Low potential to bioaccumulate",

        "criteria": "10 ≤ BCF < 100",

        "sign": null,

        "ghs_category": null,

        "interpretation": null,

        "warning": null,

        "brackets": null

    }

   ]
```

```
    },

    "A1a": {

     "name": null,

     "data": [

      {

        "rating": "0",

        "notation": null,

        "hazard_endpoint": null,

        "interference": null,

        "description": "No potential to bioaccumulate",

        "criteria": "Log Kow < 1",

        "sign": null,

        "ghs_category": null,

        "interpretation": null,

        "warning": null,

        "brackets": null

      }

     ]

    },

    "A1": {

     "name": "Bioaccumulation",

     "data": [

      {

        "rating": "2",

        "notation": null,

        "hazard_endpoint": null,

        "interference": null,

        "description": "Low potential to bioaccumulate",

        "criteria": null,

        "sign": null,
```

```
                "ghs_category": null,

                "interpretation": null,

                "warning": null,

                "brackets": null

            }

          ]

        }

      },

      "henry_constant": {

        "units": "mol/(m³·Pa)",

        "value": 8.7

      },

      "hydrolysis_half_life_period": {

        "units": "",

        "value": "Not hydrolysable"

      },

      "idlh": {

        "units": "ppm",

        "value": 85,

        "comment": ""

      },

      "ignition_temp": null,

      "imo_class": null,

      "interfacial_tension": null,

      "issues": null,

      "labelling": [

        {

          "label": {

            "type": "GHS",

            "symbol": "GHS-SGH09.png",
```

```
                "name": "Environmental Hazard"

            }

        },

        {

            "label": {

                "type": "GHS",

                "symbol": "GHS-SGH08.png",

                "name": "Health Hazard"

            }

        },

        {

            "label": {

                "type": "GHS",

                "symbol": "GHS-SGH06.png",

                "name": "Toxic"

            }

        },

        {

            "label": {

                "type": "GHS",

                "symbol": "GHS-SGH05.png",

                "name": "Corrosive"

            }

        },

        {

            "label": {

                "type": "GHS",

                "symbol": "GHS-SGH02.png",

                "name": "Flammable"

            }
```

```
    }
  ],
  "label_warning": "Danger",
  "language": null,
  "lc50_algae": {
    "units": "mg/l",
    "value": 1.63,
    "chevron": ""
  },
  "lc50_crustacean": {
    "units": "mg/l",
    "value": 6,
    "chevron": ""
  },
  "lc50_fish": {
    "units": "mg/l",
    "value": 5.16,
    "chevron": ""
  },
  "log_koc": "-0.07000000",
  "log_kow": "-0.92000000",
  "lower_explosive_limit": {
    "range": {},
    "units": "% in volume",
    "value": 3,
    "comment": "",
    "temperature": {}
  },
  "marine_half_life_period": {
    "units": "",
```

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and gaseous **S**ubstances **T**o population **S**afety

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"value": "Not biodegradable"

},

"marine_pollutant": null,

"marpol_annex_ii": {

"category": "Y",

"description": "Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a hazard to either marine resources or human health or cause harm to amenities or other legitimate uses of the sea and therefore justify a limitation on the quality and quantity of the discharge into the marine environment."

},

"mass_flow_rate_combustion_surface": {

"units": "kg/(m²·s)",

"value": 0.05

},

"melting_point": {

"range": {},

"units": "°C",

"value": -83,

"chevron": ""

},

"metal_reaction": null,

"mixed": null,

"molar_mass": {

"range": {},

"units": "g/mol",

"value": 53.06,

"chevron": "",

"comment": ""

},

"name_en": "Acrylonitrile",

"name_fr": "Acrylonitrile",

"name_modifier": null,

"noec_algae": {

  "units": "mg/l",

  "value": 0.8,

  "chevron": ""

},

"noec_crustacean": {

  "units": "mg/l",

  "value": 0.5,

  "chevron": ""

},

"noec_fish": {

  "units": "mg/l",

  "value": 0.17,

  "chevron": ""

},

"notable_risks": "Oxidizer. Polymerization.",

"odour": null,

"odour_threshold": null,

"organic_reaction": null,

"original_owner": "CEDRE",

"oxidizing_reaction": null,

"package_group": null,

"persistence": null,

"physical_state": [

 {

  "value": "Liquid",

  "pressure": {

   "units": "Pa",

   "value": 101325

  },

```json
      "temperature": {

        "units": "°C",

        "value": 25

      }

    }

  ],

  "pnec": {

    "long term": {

      "units": "µg/l",

      "value": 1.7

    },

    "short term": {

      "units": "µg/l",

      "value": 16.3

    }

  },

  "radiative_fraction": {

    "units": "%",

    "value": 26

  },

  "radioactivity": null,

  "reducing_reaction": null,

  "revision": "20220201",

  "sea_guide": null,

  "sea_guide_uid": null,

  "ship_type": null,

  "shore_guide": null,

  "shore_guide_uid": null,

  "specific_heat_capacity": {

    "units": "J/(kg·K)",
```

    "value": 2050,

    "temperature": {

      "units": "°C",

      "value": 25

    }

  },

  "standard_behavior_classification": null,

  "static_electricity_reaction": null,

  "surface_tension": [

    {

      "units": "mN/m",

      "value": 27.22,

      "temperature": {

        "units": "°C",

        "value": 20

      }

    },

    {

      "units": "mN/m",

      "value": 26.63,

      "temperature": {

        "units": "°C",

        "value": 25

      }

    }

  ],

  "surface_tension_experimental": null,

  "synonyms": [

    "Acrylonitrile",

    "Nitrile Acrylique",

  "Cyanure De Vinyle",

  "Vinyl Cyanide",

  "Propenoic Acid Nitrile",

  "2-Propenenitrile",

  "Cyanoethylene",

  "Acrylonitrile Monomer"

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"teel1": null,

"teel2": null,

"teel3": null,

"title": null,

"tlvtwa": null,

"transport_mode": null,

"transportation_density": null,

"transportation_pressure": null,

"transportation_state": null,

"transportation_temperature": null,

"uid": null,

"un_number": 1093,

"updated_at": "2021-12-17T11:50:39.827375Z",

"updated_by": "CEDRE",

"upper_explosive_limit": {

  "range": {},

  "units": "% in volume",

  "value": 17,

  "comment": "",

  "temperature": {}

},

"vaporization_enthalpy": [

  {

```
      "units": "J/kg",

      "value": 616000,

      "temperature": {

        "units": "°C",

        "value": 77.4

      }

    }

  ],

  "vapour_density": {

    "range": {},

    "units": "",

    "value": 1.9,

    "chevron": "",

    "comment": ""

  },

  "vapour_pressure": [

    {

      "range": {},

      "units": "Pa",

      "value": 11500,

      "chevron": "",

      "temperature": {

        "units": "°C",

        "value": 20

      }

    },

    {

      "range": {},

      "units": "Pa",

      "value": 14470,
```

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and gaseous **S**ubstances **T**o population **S**afety

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```json
    "chevron": "",

    "temperature": {

      "units": "°C",

      "value": 25

    }

  }

],

"vapour_pressure_07_critical_temperature": null,

"viscosity": [

 {

   "units": "cSt",

   "value": 0.43,

   "temperature": {

     "units": "°C",

     "value": 20

   }

 },

 {

   "units": "cSt",

   "value": 0.42,

   "temperature": {

     "units": "°C",

     "value": 25

   }

 }

],

"viscosity_experimental": null,

"water_photolysis_half_life_period": {

 "units": "",

 "value": "Not photolysable"
```

```
        },

        "water_reaction": null,

        "water_solubility": [

          {

            "units": "mg/l",

            "value": 79000,

            "salinity": {

              "units": "‰",

              "value": 0

            },

            "temperature": {

              "units": "°C",

              "value": 20

            }

          }

        ],

        "water_solubility_experimental": null,

        "statements": {

          "Hazards statements": {

            "Environmental": [

              {

                "number": "H411",

                "statement": "Toxic to aquatic life with long lasting effects.",

                "complement": null

              }

            ],

            "Health": [

              {

                "number": "H350",

                "statement": "May cause cancer.",
```

      "complement": null

    },

    {

      "number": "H335",

      "statement": "May cause respiratory irritation.",

      "complement": null

    },

    {

      "number": "H331",

      "statement": "Toxic if inhaled.",

      "complement": null

    },

    {

      "number": "H318",

      "statement": "Causes serious eye damage.",

      "complement": null

    },

    {

      "number": "H317",

      "statement": "May cause an allergic skin reaction.",

      "complement": null

    },

    {

      "number": "H311",

      "statement": "Toxic in contact with skin.",

      "complement": null

    },

    {

      "number": "H301",

      "statement": "Toxic if swallowed.",

```
          "complement": null

        }

      ],

      "Physical": [

        {

          "number": "H225",

          "statement": "Highly flammable liquid and vapour.",

          "complement": null

        }

      ]

    },

    "Precautionary statements": {

      "Disposal": [

        {

          "number": "P501",

          "statement": "Dispose of contents/container to ...",

          "complement": null

        }

      ],

      "Storage": [

        {

          "number": "P403 + P233",

          "statement": "Store in a well-ventilated place. Keep container tightly closed.",

          "complement": null

        },

        {

          "number": "P405",

          "statement": "Store locked up.",

          "complement": null

        }
```

          ],

          "Response": [

            {

              "number": "P370 + P378",

              "statement": "In case of fire: Use ... for extinction.",

              "complement": null

            },

            {

              "number": "P305 + P351 + P338",

              "statement": "IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.",

              "complement": null

            },

            {

              "number": "P304 + P340",

              "statement": "IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.",

              "complement": null

            },

            {

              "number": "P302 + P352",

              "statement": "IF ON SKIN: Wash with plenty of soap and water.",

              "complement": null

            },

            {

              "number": "P301 + P310",

              "statement": "IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.",

              "complement": null

            },

            {

              "number": "P331",

        "statement": "Do NOT induce vomiting.",

        "complement": null

      }

    ],

    "Prevention": [

      {

        "number": "P284",

        "statement": "Wear respiratory protection.",

        "complement": null

      },

      {

        "number": "P280",

        "statement": "Wear protective gloves/protective clothing/eye protection/face protection.",

        "complement": null

      },

      {

        "number": "P273",

        "statement": "Avoid release to the environment.",

        "complement": null

      },

      {

        "number": "P272",

        "statement": "Contaminated work clothing should not be allowed out of the workplace.",

        "complement": null

      },

      {

        "number": "P270",

        "statement": "Do no eat, drink or smoke when using this product.",

        "complement": null

      },

```
    {

      "number": "P262",

      "statement": "Do not get in eyes, on skin, or on clothing.",

      "complement": null

    },

    {

      "number": "P260",

      "statement": "Do not breathe dust/fume/gas/mist/vapours/spray.",

      "complement": null

    },

    {

      "number": "P243",

      "statement": "Take precautionary measures against static discharge.",

      "complement": null

    },

    {

      "number": "P242",

      "statement": "Use only non-sparking tools.",

      "complement": null

    },

    {

      "number": "P231",

      "statement": "Handle under inert gas.",

      "complement": null

    },

    {

      "number": "P210",

      "statement": "Keep away from heat/sparks/open flames/hot surfaces. No smoking.",

      "complement": null

    },
```

    {

      "number": "P202",

      "statement": "Do not handle until all safety precautions have been read and understood.",

      "complement": null

    },

    {

      "number": "P201",

      "statement": "Obtain special instructions before use.",

      "complement": null

    }

   ]

  }

 },

 "authors": "Royal Belgian Institute of Natural Sciences - Operational Directorate Natural Environment - Scientific web sites and applications",

 "license": "This work is licensed under the Creative Commons Attribution-ShareAlike 4.0 International License. To view a copy of this license, visit https://creativecommons.org/licenses/by-sa/4.0/ or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA."

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Models user guide

Guide for OSERIT HNS, fire model and explosion model

Ludovic Lepers, Sébastien Legrand

Project Acronym	MANIFESTS
Project Full Title	**MAN**aging risks and **I**mpacts **F**rom **E**vaporating and gaseous **S**ubstances To population **S**afety
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1. Table of content

2. Introduction

In the framework of the MANIFESTS project, a new fire model and a new explosion model have been developed by RBINS with the help of ARMINES. The fire and explosions models are very lightweight and fast to run, they predict the impact of a fire or an explosion on the surrounding environment. The OSERIT model has been improved, and it is now able to simulate HNS drift. To accommodate all these new models and development, a new web interface was needed. For this reason, a new interface was developed and allows to run simulations and visualize the results.

These models require interpretation by a trained user, and the user guide aims to help in navigating the interface, starting a simulation, and visualizing results. The guide is organized into several sections to provide comprehensive support to the user. The first section focuses on how to access the tool.

The second section (section 4), titled "Basic of running and visualizing the simulation", provides an overview of the steps required to perform and visualize a simulation in general. This section is essential for new users who are not familiar with the tool and want to get started with their simulations. It includes instructions on how to set up a simulation, select the appropriate model, input data, and run the simulation. Additionally, it provides information on how to interpret the results and understand the output data.

The subsequent sections provide detailed information about each of the individual models. They cover the theory behind each model, the input data required, and the types of output data that can be obtained. It is recommended that users first familiarize themselves with the content in the section 4 "Basic of running and visualizing the simulation" section before diving into the specifics of each model.

3. How to access the tools

To access the models, a user must be registered. This can be done on the website
https://odnature.naturalsciences.be/oserit/. This will lead to the registration page (Figure 1).
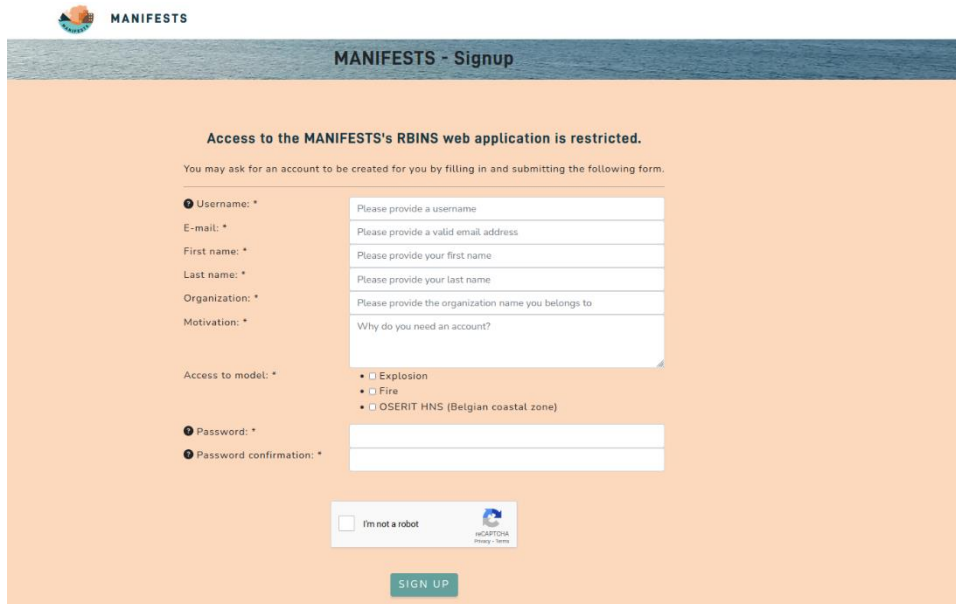
Figure 1: Registration page

The user must provide its credential and choose which model he or she needs an access and motivate why an access to these models is needed. Once the form is filled, the user must press the "sign up" button. The request is then sent to an administrator and the user can access the model once the administrator have accepted it. When this is done, the user can connect to the tools and can logout or change of password on the "profile section" (Figure 2).
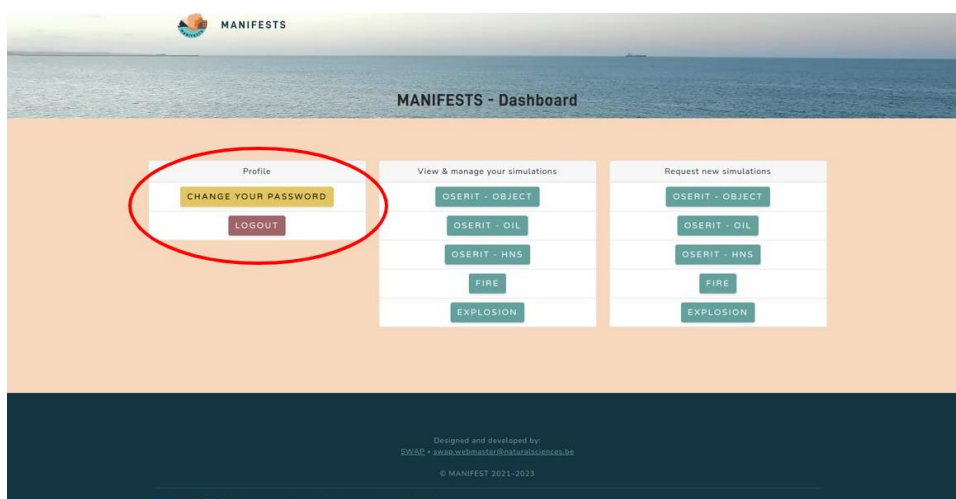
Figure 2: Charging password and logout

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4. Basic of running and visualizing the simulation

This section will explain the basic of running a simulation. The topics discussed here applies for most of the models and the user should be familiar with them before running a new simulation of any type.

4.1. Running a simulation

The user can start a simulation by clicking on any of the item in "Request new simulations" (Figure 3).
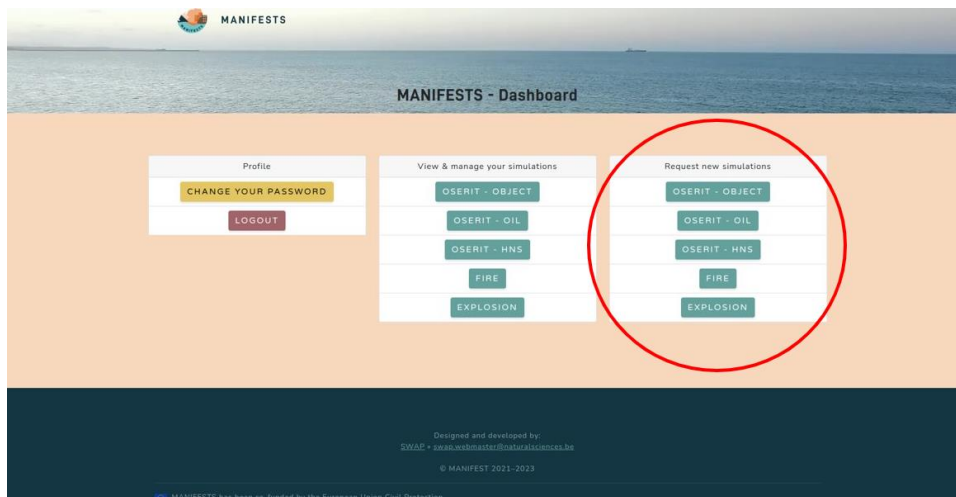
Figure 3: How to request new simulation

The detailed information on how to run a simulation will be described on the section corresponding to each model, each of these buttons lead to the simulation request form for the selected model (section 5 for an explosion simulation, section 6 for a fire simulation and section 7 for a HNS simulation). The common part on each of these forms is described in the following sections.

4.1.1. Common features for all the simulation request form

To ensure a successful simulation, it is important for the user to provide all relevant information needed by the model. This is done through a form composed of fields, some of which are mandatory and marked with a "*". The mandatory fields must be filled in by the user to start the simulation. Non-mandatory fields are either not needed in certain scenarios or their values can be estimated by the model, but it is always better to provide the information if it is available.

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Figure 4: simulation metadata

At the top of the form (Figure 4), there are several fields that do not impact the computations done by the model but are still especially important because they are used by the simulation manager itself. These fields are the same for every model and are described in detail here:

- Title *: name of the simulation, useful to perform search on all the simulations, this field is mandatory
- Summary: description of the simulation, used afterwards to understand what the simulation was about
- Tags: it is possible to search through the simulation list with the tag provided. To enter tags, the user must write some text in the "Tags" field and then hit the "enter" key. This will add one tag to the list of tags, several can be added. This can be use if there is a need to run several simulations on the same event for instance. Then, it will be quite easy to find back all the simulations about this event just by looking for this tag.
- Is shared: Checking this box allows all registered users to access this simulation results: the simulation will appear in the simulation listing of all the users. They will have right to visualize the simulation request form and the simulation results. They cannot modify the simulation form, but they can duplicate it to relaunch a new simulation.
- Is protected: By default, simulation results are automatically deleted after 15 days. Checking this box will prevent the automatic deletion of the simulation results, until the box is unchecked.

After submitting the simulation, the user cannot modify the input fields, except for the one just described above.

4.1.2. Navigation through HNS list

For fire, explosion and OSERIT-HNS models, an HNS must be selected.

HNS listed in the MANIFESTS HNS database (https://manifests-project.eu/hns-database/) can be easily selected through a drop-down menu linked (Figure 5). There, HNS are sorted by alphabetical order. It is possible to perform a search on the list by opening the menu and typing with the keyboard the name of the HNS of interest. The selection will automatically go to the first HNS

containing the letters typed. Once an HNS is selected, the app automatically fills in in the form with the HNS physico-chemical parameters needed for the simulation.

Note: The drop-down list only contains HNS entries containing all the physico-chemical parameters needed to run a simulation. Should a specific HNS be not available in the drop-down list, users can manually enter the physico-chemical parameters directly in the form. In that case, it is advised to add a tag with the HNS name.

Figure 5: List of HNS

4.1.3. Submitting a simulation

When the user clicks on the big green "submit simulation" button (Figure 6) at the bottom of the form, the simulation request will be sent to the model. This action cannot be reverted, and the information provided (but the general description) will no longer be editable, even after the end of the simulation.
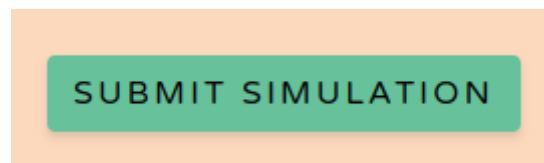
Figure 6: the button "submit simulation" is located at the bottom of the form.

Once the simulation is submitted, the user is redirected to the simulation list where the simulation results will be available as soon as the simulation is finished. The page will not refresh automatically, the user will need to refresh the simulation list manually to see the results when the simulation is done.

4.1.4. Time format

When a time must be provided, time is given following the ISO -601 format

"**YYYY-MM-DDTHH:MM:SSZ**".

For instance, to write the 12 March 2023 at 2:35PM, the input will be

"2023-03-12T14:35:00Z"

Note: The time must always be provided in UTC.

Note: In case several times must be provided in the same field, they must be separated by a semi-colon **";":**

"2023-03-12T14:35:00Z; 2023-03-12T15:35:00Z"

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4.1.5. Coordinates format

Coordinates can be provided following 6 different formats.

For instance, the formats are in case of a latitude:

- Signed decimal degree: 5.5 (northern hemisphere) or -5.5 (southern hemisphere)
- Decimal degree: 5.5N or 5.5S
- Signed degree and decimal minutes: 5°30.0' (northern hemisphere) or -5°30.0' (southern hemisphere)
- Degree and decimal minutes: 5°30.0'N or 5°30.0'S
- Signed degree, minutes and seconds: 5°30'00" or -5°30'00"
- Degree, minutes and seconds: 5°30'00"N or 5°30'00"S

The same formats exist for longitude, with E (or nothing) and W (or -).

Note: The app automatically identifies the selected format.

Note: To be processed, coordinates are converted into the format "signed degree decimal".

Note: In case several latitudes (resp.: longitudes) must be provided, they must be separated with a semicolon "**;**".

4.2.   Performing action on already existing simulations

The user can review all the simulation he/she has run, or the simulations shared with him/her in "View & manage your simulations" (Figure 7).
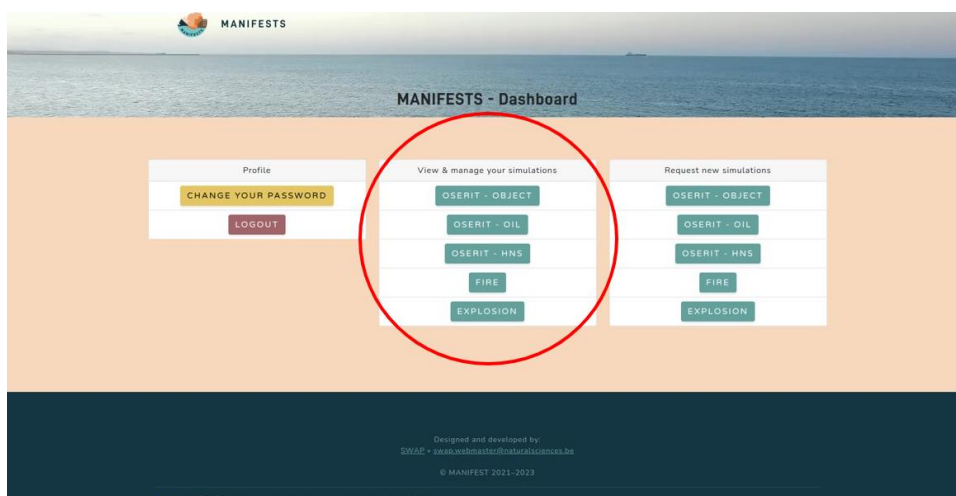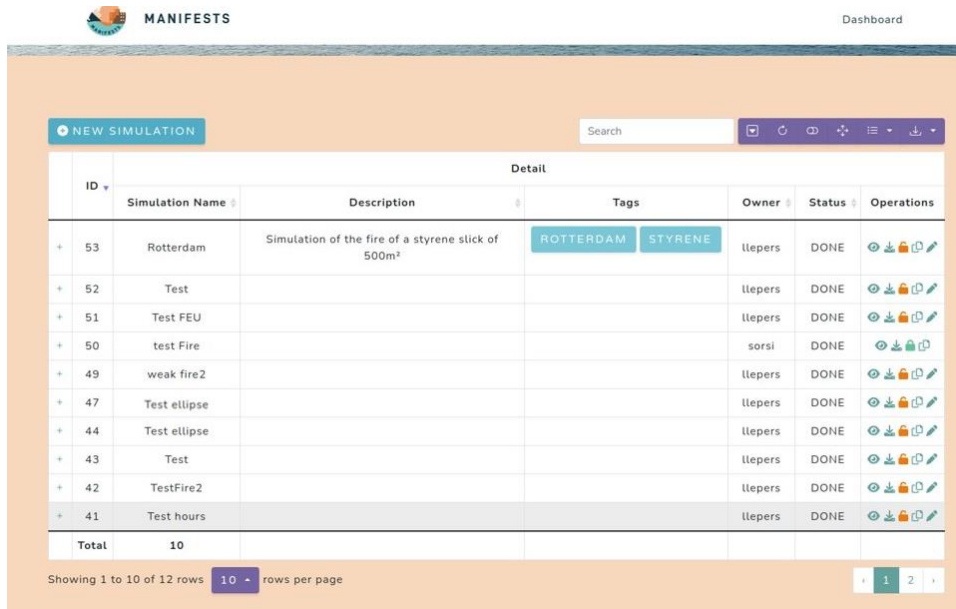
Figure 7: View and manage simulation

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Only the tools the user has access to will be available here (Figure 8). Once a tool is selected, the user will arrive to this page, and can **click on the small eye under "Operations" to see the simulation results.**

Figure 8: Simulation listing

4.2.1. Simulation list table

The simulation list is ordered by decreasing order of ID by default. The user can order the list by clicking on the name of the column for:

- ID: simulation ID. It is unique for each model and allows to discriminate from each simulation.
- Simulation Name: filled by the user and not used by the model
- Description: filled by the user and not used by the model
- Tags: filled by the user and not used by the model
- Owner: the user who started the simulation
- Status: status of the simulation

The status is one of the following:

- CREATED: the simulation request has been registered by the website
- SENT: the simulation request has been sent to the model
- ERROR: an error occurred during the simulation
- COMPUTING: the model is currently working on the simulation
- DONE: all the results of the simulation are available on the website

If the status is staying at CREATED or SENT, an error has probably occurred. The user can try to rerun the simulation (for instance using the "duplicate' operation) but if the new simulation is stuck at this status also, please do not run any new simulation and contact the administrator. If the status is at

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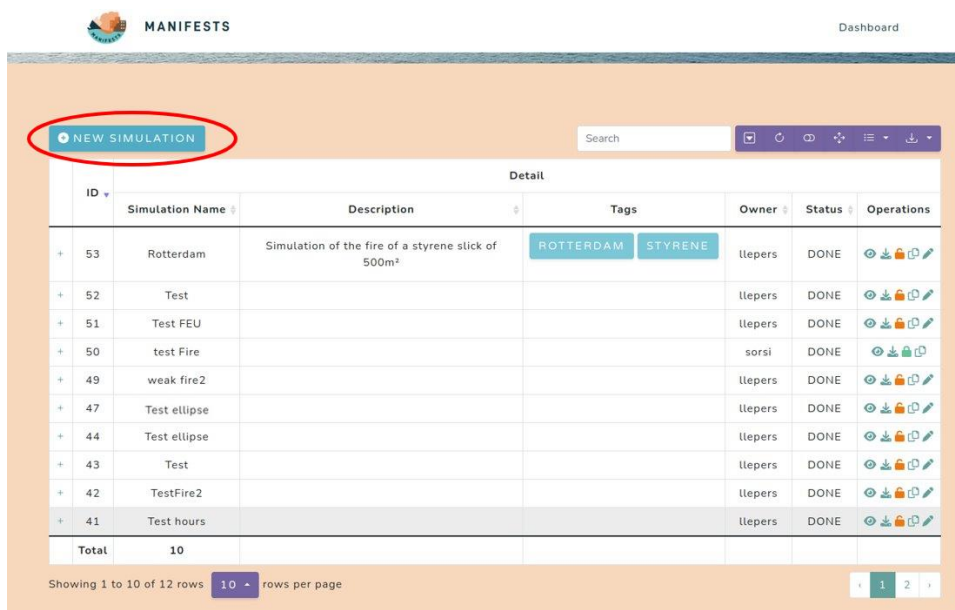
ERROR, the simulation will never be set to DONE and the user should start a new simulation and pay a lot of attention to the input parameters to be sure there no mistake there. If the new simulation still does not work, the user can contact the administrator to report it. A simulation can stay a COMPUTING for a very long time before going to DONE, this is expected due to all the computations needed by the model to run. If the simulation if nevertheless stuck at computing for a time longer than normal, the user should start a new one, and if the issue persists, contact the administrator.

The operation column allows the user to perform action on the simulation by clicking on the small symbols:

- ⊙ : Bring the user to the simulation results (only for "DONE" simulation).

- ⬇ : Initiate the download of the simulation result as a .zip archive (only for "DONE" simulation).

- 🔓 or 🔒 : If the lock is orange the simulation will be deleted days after it has been performed. If the lock is green, the simulation will not be deleted. The user can cycle trough these states by clicking on them (only for "DONE" simulation).

- ⎘ : Create a new simulation with the same input as the one used by the simulation selected, the user will be invited to modify some value if needed.

- ✏ : The user will be allowed to change the name, description and tags of a simulation. Do not forget to apply change by pressing the green button "Save changes" at the bottom of the page. This option is only available for the owner of the simulation and for "DONE" simulation.

4.2.2. Shortcut to run a new simulation

The user can run a new simulation with the same model by pressing the "New simulation" button (Figure 9).

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4.2.3. Navigate on the pages of the results

The user can change the number of rows on the page using the drop-down menu (Figure 10).
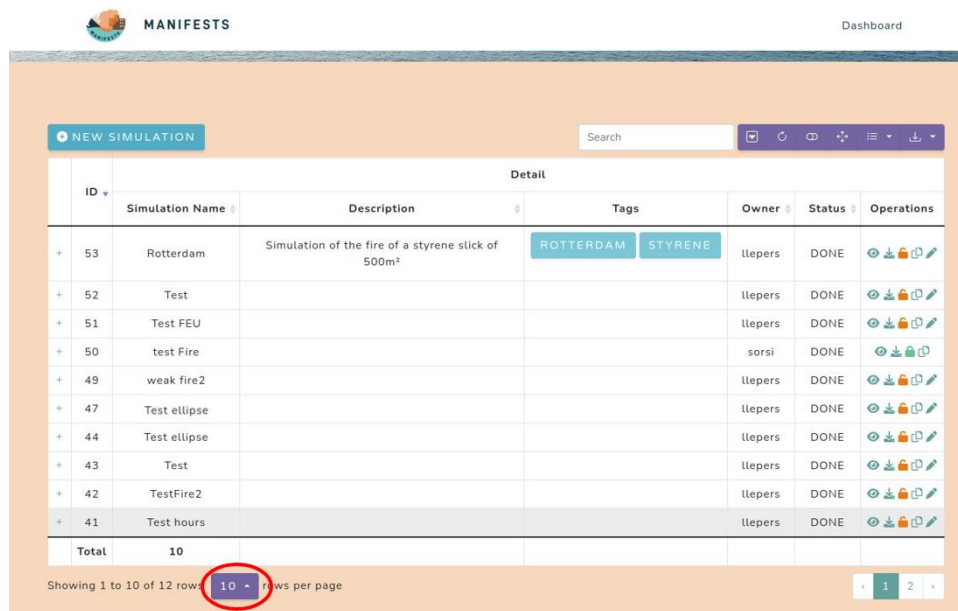
Figure 10: Changing number of simulations displayed

Navigate through the pages (Figure 11).
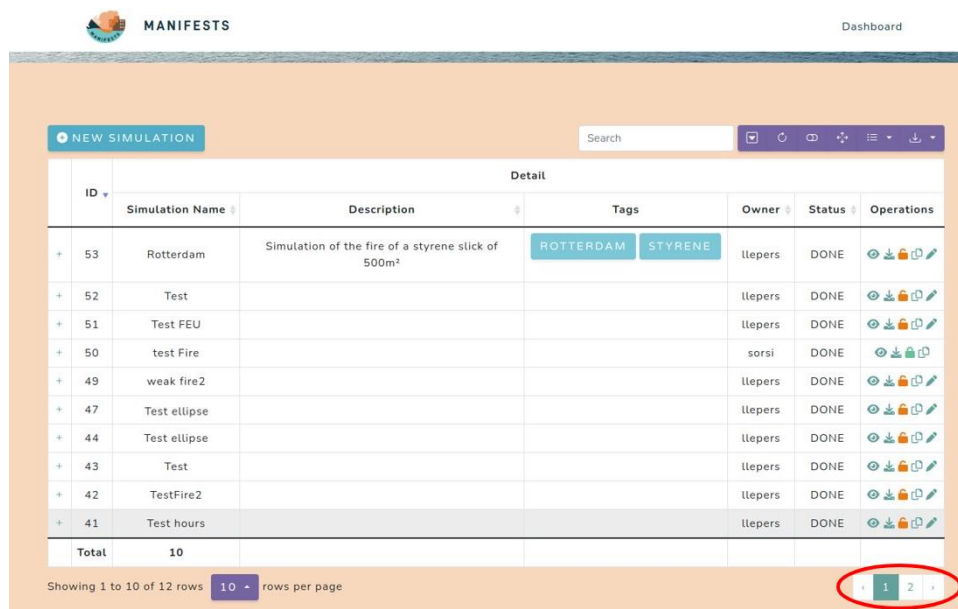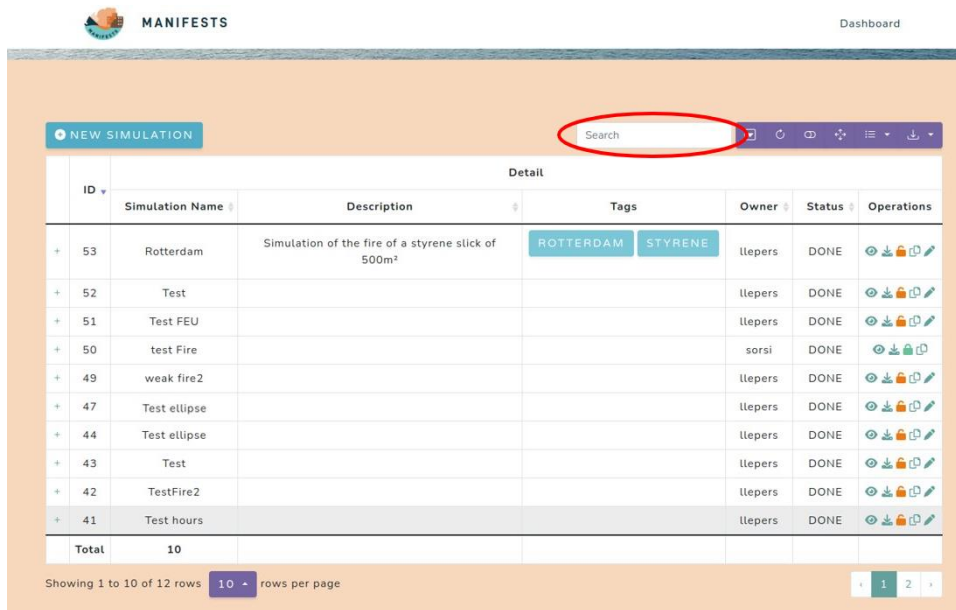
Figure 11: Page navigation

4.2.4. Performing a search on simulation results

The user can do a search to only show simulations containing a defined set of characters on the simulation name, description, tags, owner or status by typing on the "Search" field (Figure 12).

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Figure 12: Searching through the simulation listing

4.2.5. Performing action on the simulation list table

There are several actions available on the simulation list table (Figure 13).
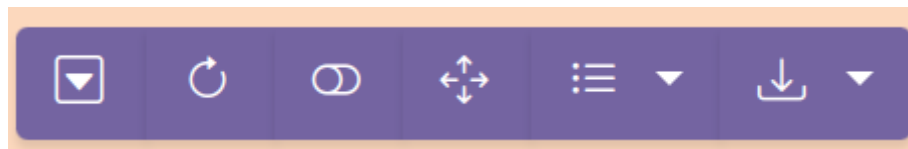
Figure 13: Options available for the simulation listing

- Hide/show the pagination
- Refresh the table (useful to see when a simulation is going from "COMPUTING" to "DONE")
- Show the entry in a single column
- Making the table full screen
- Removing some column from the table
- Downloading the table

4.3.   Visualising simulation result

When a simulation is set to the status "DONE", the user can access the results of it such as explained in the previous sections. The page will look like the Figure 14.

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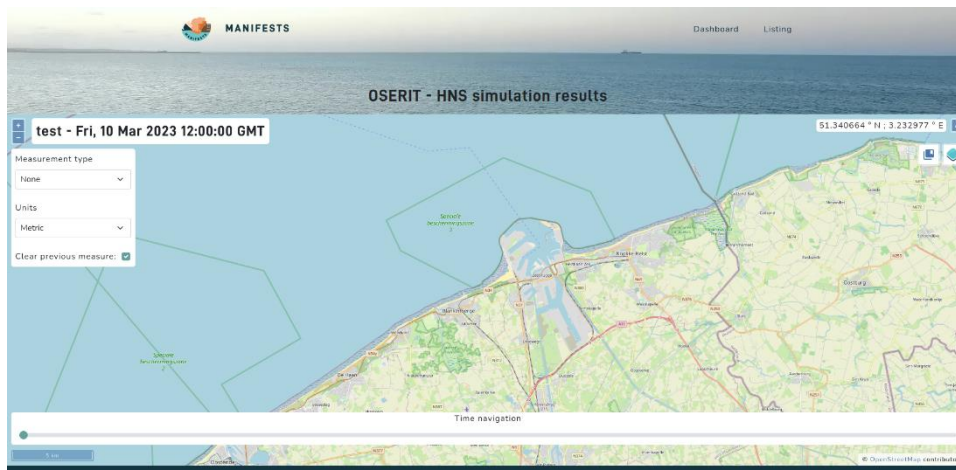
Figure 14: overview of a simulation result, the "dashboard" and "listing" links on the top right of the page get the user back to the dashboard with the view of all the tools and to the simulation listing for the model used respectively

4.3.1. Spatial and temporal navigation

By default, the screen will be on the map at a place where most of the simulation results are easily visible and at the time of the start of the simulation. It is possible to move the map around by clicking and dragging it. The zoom level can be adjusted by clicking the "+" and "- "button in the top left of the page (Figure 15).
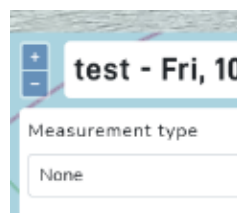
Figure 15: zooming on a simulation

On the top right of the screen (Figure 16), there are the coordinate (decimal degrees) of the cursor on the map and a button with two arrow which allows to put the map in full screen. Once in this mode, the user can go back to the normal mode by hitting the "escape" key or by clicking again on the button (which will become a cross in full screen mode).

Figure 16: cursor coordinate and making the app full screen

On the bottom left (Figure 17), there is the scale of the map, adjusting automatically to the zoom level. On the top left, near the zoom button, there is the name of the simulation and the time (in GMT). In the bottom of the screen, there is the time navigation bar. This bar is only visible when the

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simulation results are time dependant, is going for the entire simulation duration, moving the small blue dot on it will change the time of the visualisation (and update the time at the top left at the same time).
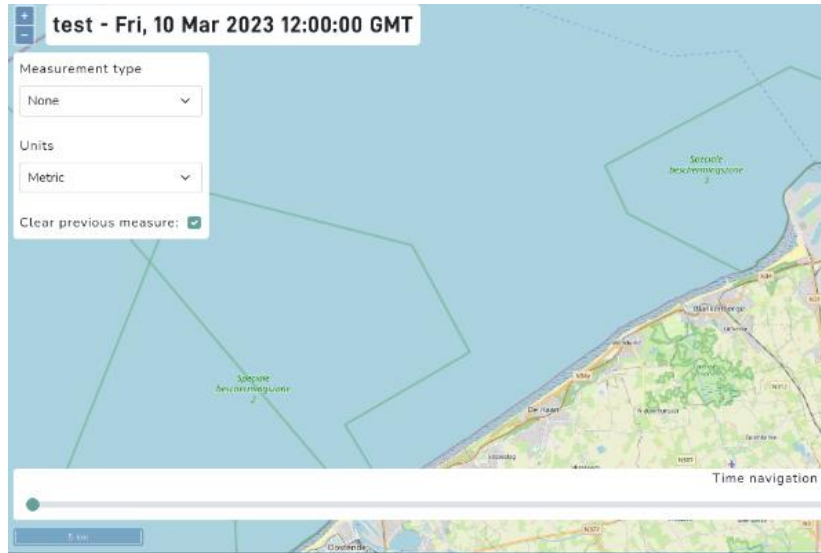
Figure 17: scale and time navigation, the name of this simulation is "test"

4.3.2. Simulation actions and non-spatial results

The user can click on the "show more option" button on the top right (Figure 18) to show the results that cannot be put on a map and the action on the simulation

Figure 18: "show more option" button

This will open a menu on the left of the screen such as in the Figure 19.

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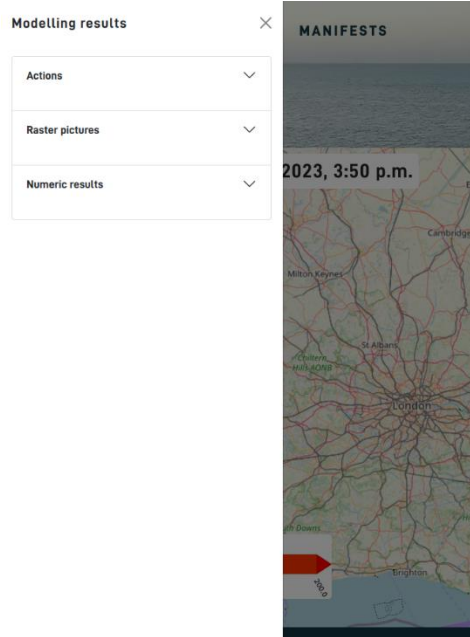
Figure 19: left menu, for some simulation "Raster pictures" and "Numeric results" will not be present

The action menu contains the same option as the one of the listing of the simulation, (cf 4.2.5 Performing action on the simulation list table)

The "Raster pictures" menu contains pictures that can be zoomed in by clicking on them and the "Numeric results" menu contains numeric value provided by the simulation.

4.3.3. Data layers

The layers are used to add simulation results and data to the map. Several of them can be added at the same time, but the one available depends on the simulation type. To show them, the user must click the "Layers" button (Figure 20: Layers button).

Figure 20: Layers button

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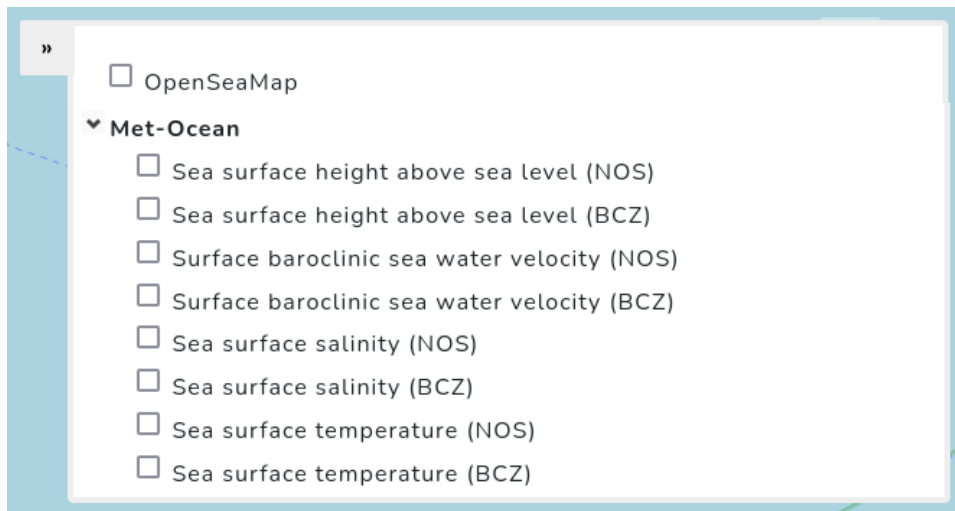
Figure 21: List of layers

OpenSeaMap layer

The OpenSeaMap layer (Figure 21) add useful static information on the map from OpenSeaMap, for instance the location of buoy and navigation line.

Met-OCEAN layers

The Met-Ocean layers (Figure 21) add data on the map about the parameters of the sea that are varying with time. Data are available for the whole North Sea (NOS) or for the Belgian coastal zone (BCZ) in higher resolution. Several layer of information can be showed on the map, they adapt to the time chosen on the time navigation slider:

- Sea surface height above sea level
- Surface baroclinic sea water velocity
- Sea surface salinity
- Sea surface temperature

All are data that are provided with external models from the ones discussed here.

4.3.4. Measurement tool

The measurement tool is located on the top left of the window (Figure 22) and is composed of 3 fields:

- Measurement type
- Units
- Clear previous measure

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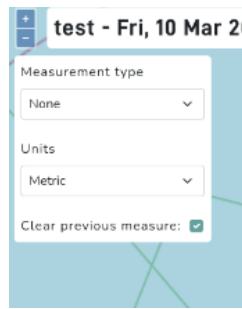
Figure 22: measurement tools overview

The measurement type can be:

- None: the tool is deactivated
- Length
- Area and length

To activate the tools, the user must choose "Length" or "Area and length". The units field is for choosing the type of units showed on screen, it can be:

- Metric
- Nautical
- Imperial
- US

The clear previous measure checkbox allows to have multiple measure shown at once on the map if is not checked, if checked making a new measure will delete the previous one.

To make a measure, the user must activate the tools by selecting "length" or "area and length". The next click on the map will create a new point. Each new click on the map will add another point, until a double click is made by the user (after at least one point for "length" and two for "area and length"), which will finish the measure by placing the last point. The user can then click again to start a new one (If the clear previous measure box is checked, the previous measure will be deleted when the new one is made). The total length for the measure made with "length" and area for the measure made with "area and length" will be shown on the map (Figure 23).

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Figure 23: example of measurement, "area and length" in the bottom left and "length" in the top right

Choosing "None" as measurement type will remove all the measure from the map and no new measurement will be done when the user clicks on the map again.

4.4. Providing geometrical release scenario (advanced user)

For the model using a release area, it is possible to provide several release scenarios. These are abstract scenarios; the user must try to use one in a way that is the closest to the reality. This is used to release particle at the correct location and time. This section is more advanced and is not important for simulations with the fire and explosion models or for simple release scenario with OSERIT.

6 fields are available to describe the shape of the spill or slick:

- Geometry: point, line or polygon
- Latitude(s)
- Longitude(s)
- Depth(s) (meters below sea level), only available for 3D simulation
- Horizontal radius
- Release time(s) (Release time in the model, not necessarily of the spill!)

Here are some examples to make a release as close as possible from the reality:

4.4.1. Small or medium slick at the water surface

A slick is spotted at the sea surface on the 12 April 2023 at 03:55PM UTC. The radius of the slick is approximatively 50 meters (100 meters in diameter). The location of the slick is 50°N, 3°30'E

- Geometry: point
- Latitude: 50°N
- Longitude: 3°30'E
- Depth: 0

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- Horizontal radius: 50
- Release time: 2023-04-12T15:55:00Z

4.4.2. Very elongated slick at the sea surface

A slick is spotted at the sea surface on the 12 April 2023 at 03:55PM UTC, but its shape is very elongated. The location ranges from 51.550°N,3.060°E to 51.545°N,3.088°E and the slick is 80 meters in width along this axis.

- Geometry: line
- Latitude: 51.550°N; 51.545°N
- Longitude: 3.060°E; 3.088°E
- Depth: 0;0
- Horizontal radius: 40
- Release time: 2023-04-12T15:55:00Z

4.4.3. Continuous spill from underwater or above the water source

A leak from an underwater source (shipwreck, pipe…) is causing the release of pollutant in water. The event is occurring at 50°N, 3°30'E at 15 meters below sea level, the leak started on the 12 April 2023 at 03:55PM UTC and it is estimated that this will last for 2 days for all the pollutant to have exited the leaking source.

- Geometry: Point
- Latitude: 50°N
- Longitude: 3°30'E
- Depth: 15
- Horizontal radius: 0
- Release time: 2023-04-12T15:55:00Z; 2023-04-14T15:55:00Z

This can model spill on the water when the depth is selected to be 0.

4.4.4. Release from a moving vessel

A moving vessel was leaking while moving. It has been spotted 3 times on the 9 April 2023; location is in Table 1.

Table 1: location of a moving vessel

Latitude	Longitude	Time (UTC)
51.392°N	3.159°E	13:17
51.417°N	3.021°E	13:28
51.487°N	2.929°E	13:40

- Geometry: Line
- Latitude: 51.392°N; 51.417°N; 51.487°N
- Longitude: 3.159°E; 3.021°E; 2.929°E
- Depth: 0

- Horizontal radius: 0
- Release time: 2023-04-09T13:17:00Z;2023-04-09T13:28:00Z;2023-04-09T13:40:00Z

4.4.5. Huge noncircular and nonlinear slick

A slick with an unusual shape has been spotted on the 12 April 2023 at 03:55PM UTC. To describe it, a polygon must be provided. This can be visualized as a small boat going around the slick only in straight line, an making sharp turns when it needs to do it to neither enter nor move away from the slick. The coordinate of the sharp turns is the one that are put on the form. The first coordinate and the last one must be the same!

- Geometry: Polygon
- Latitude: 51.421°N;51.431°N;51.450°N;51.437°N;51.421°N
- Longitude: 2.940°E:2.967°E:2.984°E:2.962°E:2.940°N
- Depth: 0;0;0;0;0
- Horizontal radius: 0
- Release time: 2023-04-12T15:55:00Z

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5. Explosion model

This section describes how to use the explosion model, what it should be used for and what its limitations are. To use this model, the user must have read section 4: Basic of running and visualizing the simulation.

5.1.   Model description and limitations

When a surface explosion occurs, a shockwave of overpressure is created and will travel through the atmosphere, with the potential of injuring people and destroying building. The "strength" of this overpressure is measured in pressure units (Pascal, Bar…). The model can run anywhere on earth, it does not need to be at sea.

This model aims to estimate several radiuses of impacts due to the overpressure generated by an HNS explosion. Farther away from the explosion center, there will be less impact of the overpressure. The model assumes that all the chemicals will react, which is a worst-case scenario.

The model does not account for domino effect or for the impact of the terrain and infrastructures on the shockwave propagation. For instance, the presence of a building could decrease or increase the overpressure at a precise location due to the complex physics of wave propagation. The model simulates the release of all the energy on a single point, not on a volume.

5.2.   Starting a new simulation

To start a new simulation, the user must be registered on the website. Then click on "EXPLOSION" under "request new simulations" (Figure 24).
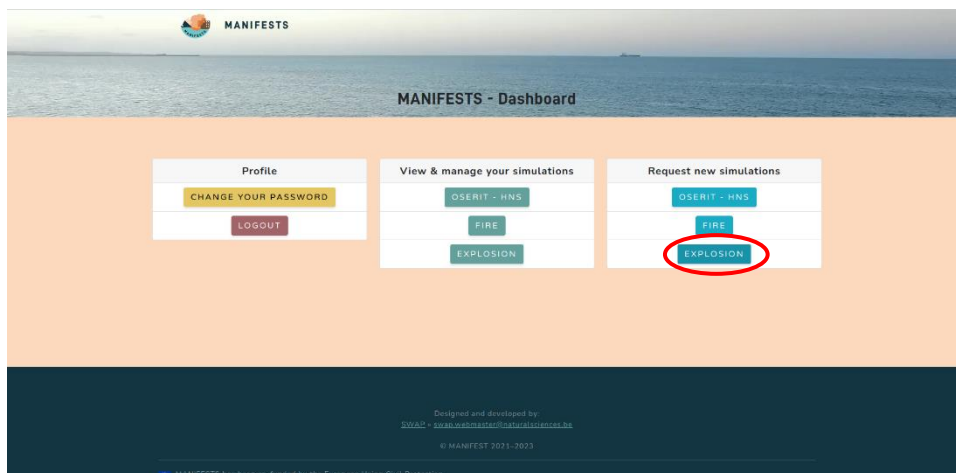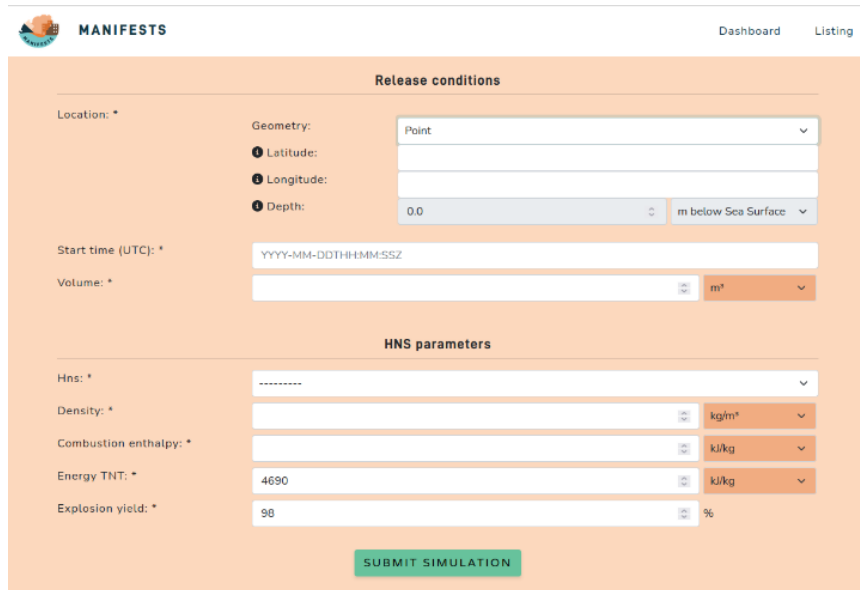

Figure 24: starting an explosion simulation

Once on the explosion form, the user can fill several fields (Figure 25). The field "general description" is described in a previous section (4.1.1:Common features for all the simulation request form).

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Figure 25: explosion simulation form

- Release conditions
  The user must fill here where the explosion occurs, when it occurs, and how much explode. The geometry will always be a point, the user must provide the latitude and longitude of the center of the explosion. The user must provide a time of explosion, and the volume of HNS that explode.
- HNS parameters
  The user must choose an HNS to run simulation on it. This will fill automatically all the field.

To start the simulation, the user must click on the "Submit simulation" button. The results should arrive in under 10 seconds.

5.3.   Results visualization

5.3.1. Results on the web
The map will contain several ellipses (Figure 26), which can be activated or deactivated from the layer panel.

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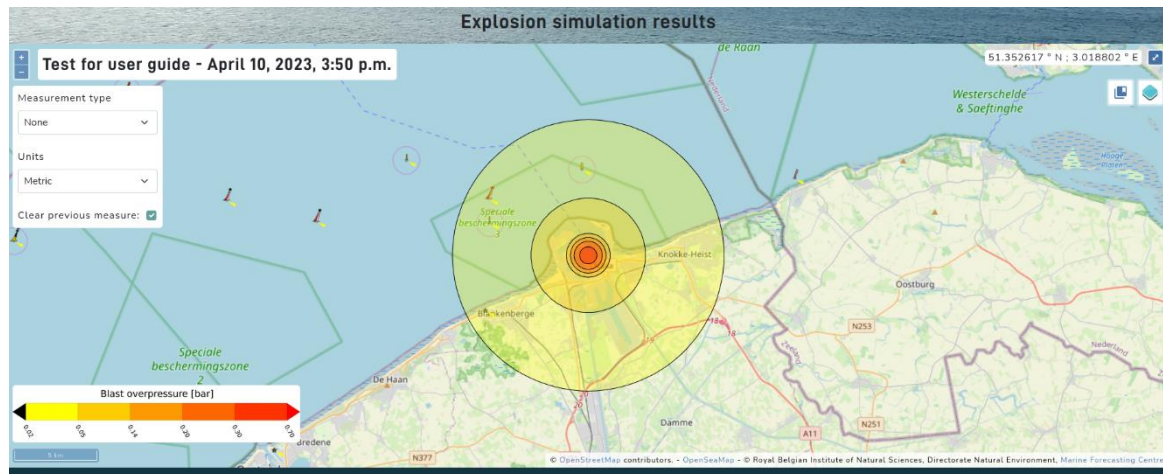Co-funded by the European Union Civil Protection

Figure 26: Map view of a simulation of an explosion

Inside each of them, the model predicts that there will be no less overpressure than the one on the legend, in the bottom right of the screen. When the user puts the cursor above one ellipse, an information panel will appear to explain what the minimum overpressure in this area is and what are the impacts. This information is also available in the Table 2.

Table 2: impacts of overpressure ("Guide technique relatif aux valeurs de référence des seuils d'effets des phénomènes accidentels des installations classées," 2004)

Overpressure [bar]	Impact on human	Impact on structure
> 0.02	Risk of indirect injuries, e.g., due to glass breakage	Significant risk of glass breakage
> 0.05	Risk of direct injuries	Small impact on structures: deterioration and destruction of window frames according to their nature
> 0.14	Risk of severe and potentially lethal injuries	Heavy impact on structures: Partial collapse of the walls and tiles of the houses; destruction of metallic frames
> 0.2	High risk for human life, 1% of direct lethality	Domino effects; destruction of lightweight metal frame buildings, rupture storage tanks (including oil tanks)
> 0.3	Extremely high risk of direct lethality	Huge impact on structures: Almost complete destruction of houses, light industrial buildings blown away
> 0.7	99% of direct lethality	Destruction of reinforced concrete walls, probable total destruction of buildings

5.3.2. Results on the downloadable archive

The .zip archive will contain a .png file with the ellipses of the same color as the ones on the website, and also a .csv file with two column, one for each overpressure threshold described in the table and one for the linked distance from the center (this is the farthest point at which the model predict to have an overpressure above the threshold).

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6. Fire model

This section describes how to use the explosion model, what it should be used for and what are its limitations. To use this model, the user must have read the section 4: Basic of running and visualizing the simulation.

6.1. Model description and limitations

When a slick is on fire, one of the hazards to the people and building is the thermal flux. This is the amount of energy receive by time, and if it is high enough can cause severe burn and even destroy building.

The model computes a burning rate, from which a burning time can be deduced. It will also produce several ellipses with the minimum thermal flux perceived inside of each of them.

This model does not consider the effect of building or terrain, which will impact the flux. The model does not account for the radius of the fire to estimate the flux, this assumption is only valid for small fire. Bigger fire could also be limited by the amount of oxygen.

6.2. Starting a new fire simulation

To start a new simulation, the user must be registered on the website. Then click on "Fire" under "request new simulations" (Figure 27**Error! Reference source not found.**).
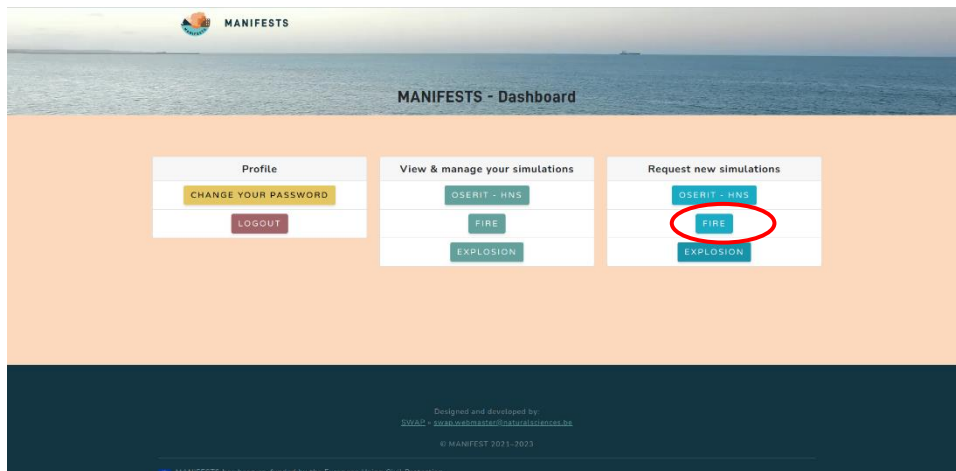

Figure 27: starting a fire simulation

Once on the fire form, the user can fill several fields (Figure 28). The field "general description" is described in a previous section (4.1.1:Common features for all the simulation request form).

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Figure 28: Fire model simulation form

- Weather condition
  The windspeed (m/s) and the ambient temperature must be provided.
- Release conditions
  The user must fill here where the explosion occurred, when it occurred, and how much exploded. The geometry will always be a point, the user must provide the latitude and longitude of the center of the fire. The user must provide a time of fire (for instance of the start of the fire), and the volume of HNS that will burn. The fire surface is the area of the slick which is burning.
- HNS parameters
  The user must choose an HNS to run simulation on it. This will fill automatically all the field.

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6.3. Results visualization

6.3.1. Results on the web

The map will contain several ellipses (Figure 29) which can be activated or deactivated from the layer panel.
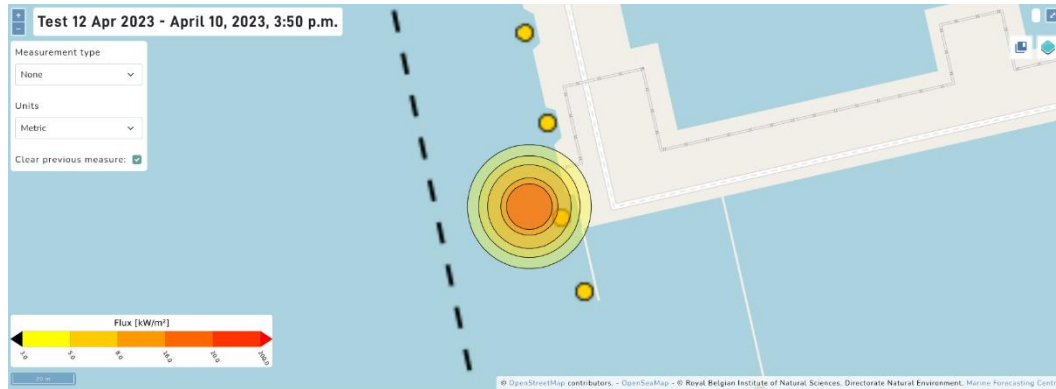

Figure 29: Map view of a fire simulation

Inside each of these ellipses, the model predicts that there will not be a smaller thermal flux than the one on the legend, at the bottom right of the screen. When the user put the cursor in one of the ellipses, an information panel will appear to explain what the minimum overpressure in this area is and what are the impacts. This information is also available in the Table 3.

Table 3: Impact of a thermal flux on human and building ("Guide technique relatif aux valeurs de référence des seuils d'effets des phénomènes accidentels des installations classées," 2004)

Thermal flux [kW/m²]	Impact on human	Impact on structure
3	Irreversible effect on human health	
5	First lethal effects on human	Glass destruction
8	Significative lethal effects on human	Domino effect, serious destruction
16		Very serious impact on non-concrete construction
20		Concrete resist several hours, serious damage on concrete construction
200		Concrete destruction in less than one hour

The fire model also provides a rough estimation of the combustion rate in the menu at the left of the page, in "Numeric results" (Figure 30) and of the burning time in the "Raster picture" tab (Figure 31).
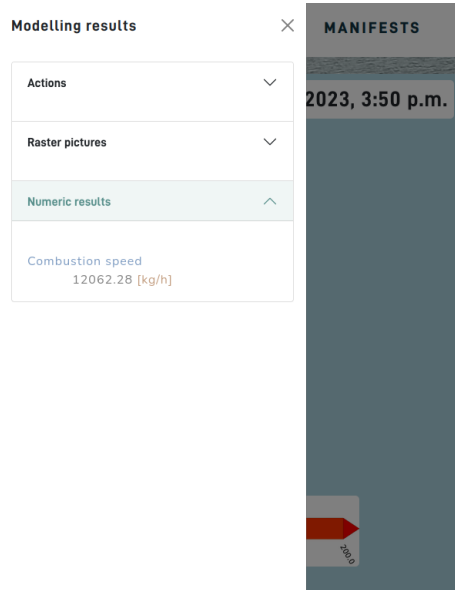
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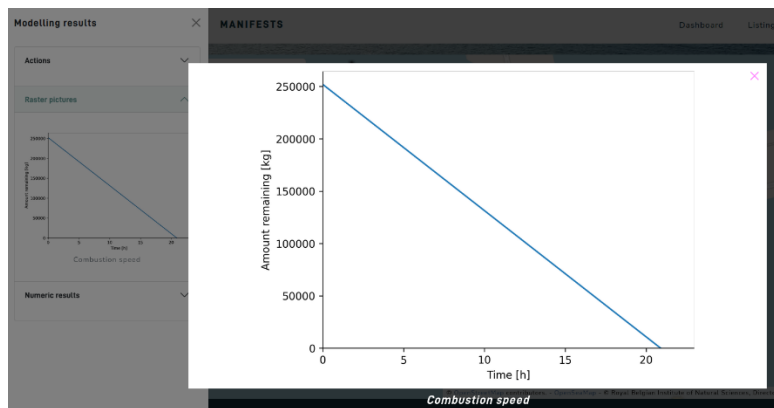
Figure 30: Combustion speed

Figure 31: Amount of HNS remaining against the time since the fire started

6.3.2. Results on the downloadable archive

The .zip archive will contain a .png file with the ellipses of the same color as the ones on the website, and also a .csv file with two column, one for each thermal flux threshold described in the table and one for the linked distance from the center (this is the farthest point at which the model predict to have a thermal flux above the threshold). There is also the .png from the Figure 31.

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7. OSERIT HNS

This section describes how to use the explosion model, what it should be used for and what are its limitations. To use this model, the user must have read the section 4: Basic of running and visualizing the simulation.

7.1. Model description and limitations

OSERIT HNS is a model that simulate the drift of an HNS at sea, and some of the processes occurring on it. It is a Lagrangian particle model, that means that the HNS volume will be divided into hundreds or thousands of "particles", and they will drift separately from each other. This is done automatically by the model, and it will create useful data from them, they can still be visualized by the user.

This model can simulate a basic drift of HNS in the atmosphere.

To produce accurate results, OSERIT needs to have access to data about the hydrodynamics, wave and wind. These data are varying from hour to hour, so the model needs to be feed with up-to-date information. To do that, it gets data provided from the MFC (RBINS), CMEMS and ECMWF. This means that OSERIT can only run in a defined area and in a limited timeframe (typically not too far in the future). The model output accuracy relies on the accuracy of the input data, and the resolution of them.

7.2. Starting a new OSERIT simulation

To start a new simulation, the user must be registered on the website then click on "OSERIT-HNS" under "Request new simulations" (Figure 32).
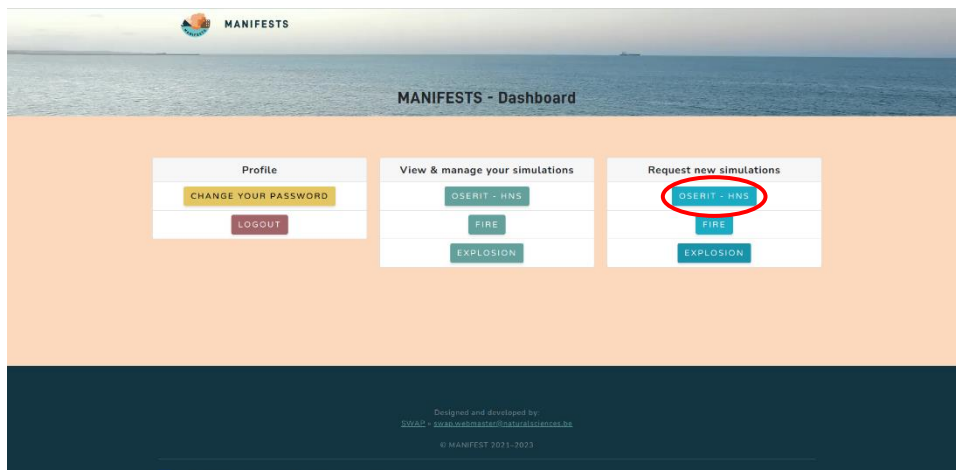

Figure 32: Starting an OSERIT HNS simulation

Once on the explosion form, the user can fill several fields (Figure 25). The field "general description" is described in a previous section (4.1.1:Common features for all the simulation request form). For OSERIT, a simulation starts, and end time must be provided (Figure 33).

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Figure 33: OSERIT HNS start and end time

The start time must always be before the end time (except for backward simulation, then it is the opposite). The model will then start from the start time and compute all the processes on the particles every 10 minutes, until it reaches the end time. This means that the particle will not do anything if their release time is after the end time, and they will not be released before the start time if their release time is before it. The time interval between the start and the end time defines the time interval of the simulation, and the computing time needed to run it is proportional to it. A simulation of 1 day will take more or less half the time needed for a 2-day simulation (all other parameters being equals).

Figure 34: Release conditions for the OSERIT HNS model

The release conditions format is explained in the section 4.4: Providing geometrical release scenario. For this model, the form is showed in the Figure 34.

The simulation can be forward in time or backward in time. Forward in time mode is the standard mode. The backward in time is useful in case of a pollution is found and the user want to find its origin. In this mode, most of the processes will be deactivated and the simulation will run only in 2D. The number of particles is the number of Lagrangian particle used by the model to describe the entire HNS volume, it is recommended to not change this parameter if not needed. Increasing the number of particles will increase the computation time.

Figure 35: HNS parameters for OSERIT HNS simulation

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The user must choose the HNS in the HNS list. This will autofill all the needed field to run an OSERIT HNS simulation except for the volume spilled. It needs to be filled by the user.

Once this is done, the simulation can be started.

7.3. Results visualization

7.3.1. Results on the web

Map layers

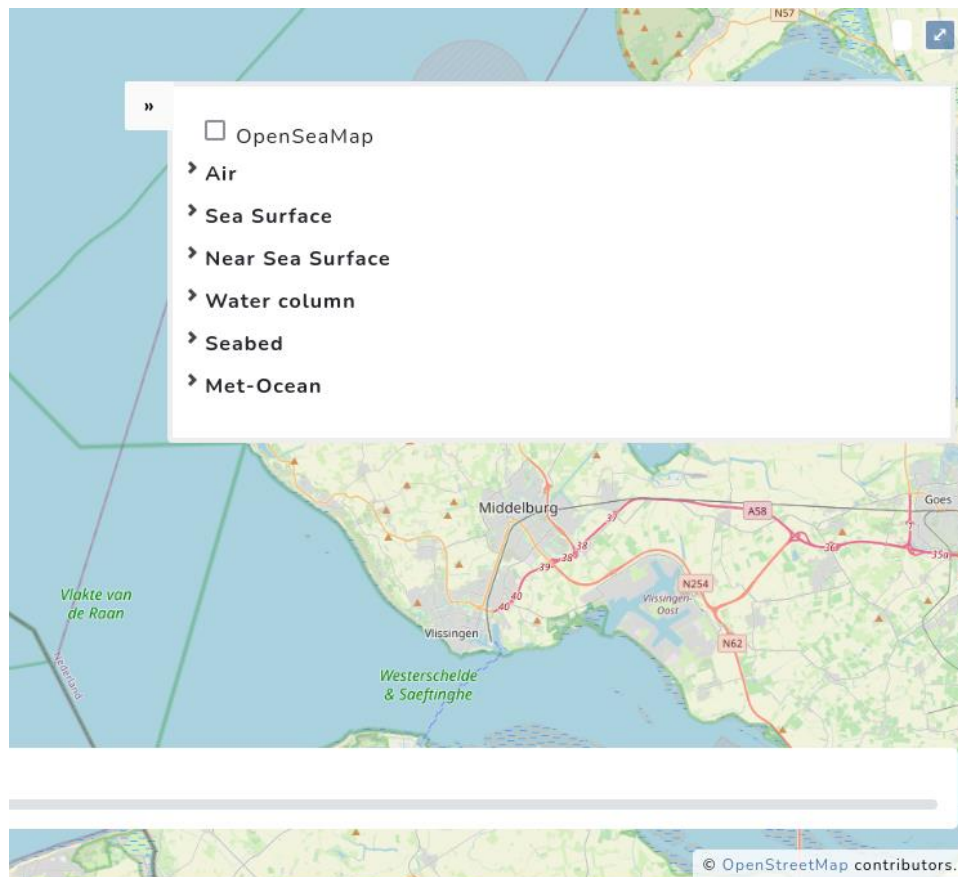There are several map layers available for OSERIT HNS (Figure 36).

Figure 36: Layers available for OSERIT HNS

- The "Air" layer gives information about the gas cloud (if present)
- The "Sea Surface" layer is for the particle that are at the surface
- The "Near Sea Surface" layer is about the particle that are close to the sea surface (in the first meters)
- The "Water column" layer is for the particles that are between the "Near Sea Surface" layer and the "Seabed" layer
- The "Seabed" layer is for all the particles that are the closest (last meters of the water column) from the seabed.

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Only one result layer which add a legend to the bottom left can be showed at the same time, selecting another one will deselect the other layer.

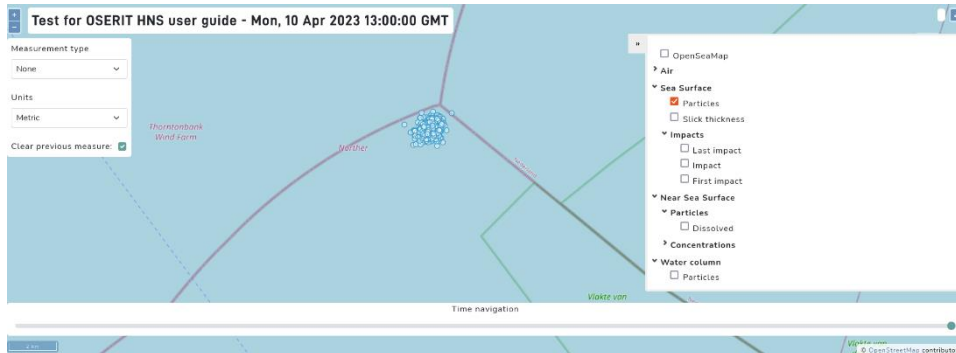*Figure 37: Sea surface particle location for OSERIT HNS*

The "particles" sublayer shows the location of the particles of the layer ("Air", "Sea Surface", "Near Sea Surface" and "Water column") at the time selected on the "Time navigation" selector. Multiple particle layer can be selected at the same time, and at the same time as other layers. If multiple particle layers are selected at once, there will be no difference between the particle of each layer, it can be hard to evaluate which particles are in which layers.
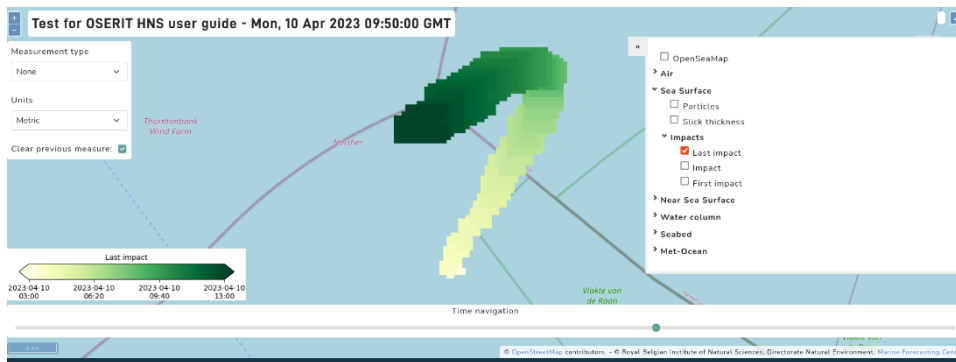
Figure 38: Last impact for OSERIT HNS

The footprint of the pollution (Figure 38) is the area that the model predicts to be potentially impacted. The colour is the time at which the first particle entered the area (for First impact) or when the last particle left the area (for Last impact). "Impact" is the area impacted by particle at a given time chosen by the user with the time navigation bar. The impact layer is available for the "Sea surface" and "Sea bed" layers. In the Figure 39, there is an example of the superposition of the particle location and the "First impact" layer. This can be done with any layer.
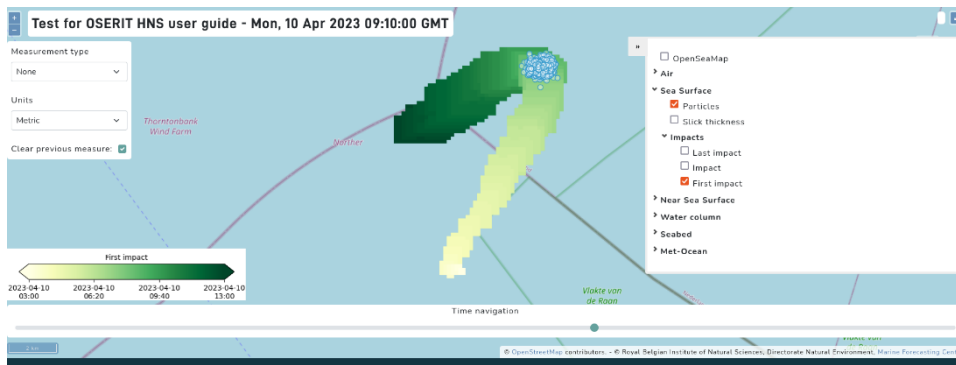
Figure 39: Superposition of the First impact and the surface particles

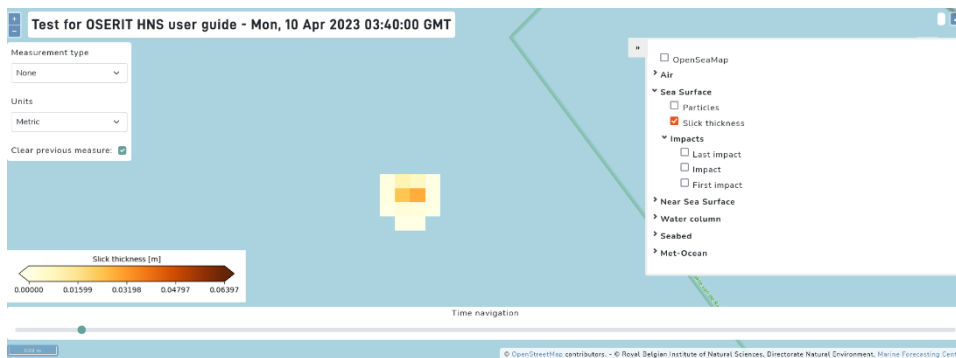The slick thickness (Figure 40) is only there in the "Sea Surface" layer.

Figure 40: Slick thickness in OSERIT HNS

It is used to estimate the thickness of the slick.

The water concentration is available for the "Near surface" and the "Seabed" layers. For the "Near surface", there is the concentration "Dissolved" and "Fresh". The dissolved concentration is the concentration predicted by the model; the "Fresh" concentration is the maximum concentration achievable by the model if all the HNS was dissolved. For the "Sea bed", this is the concentration if all the HNS at the seabed is dissolved near the seabed.
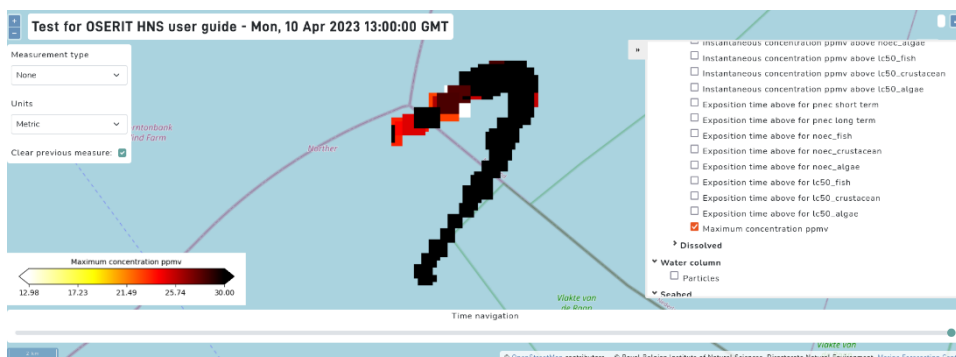
Figure 41: Maximum concentration for OSERIT HNS

The model shows the maximum concentration for the entire simulation (Figure 41), but it can also give an estimation of the time an area was exposed above given thresholds (Figure 42) defined in the database. It is also possible to show an instantaneous concentration above these given thresholds.
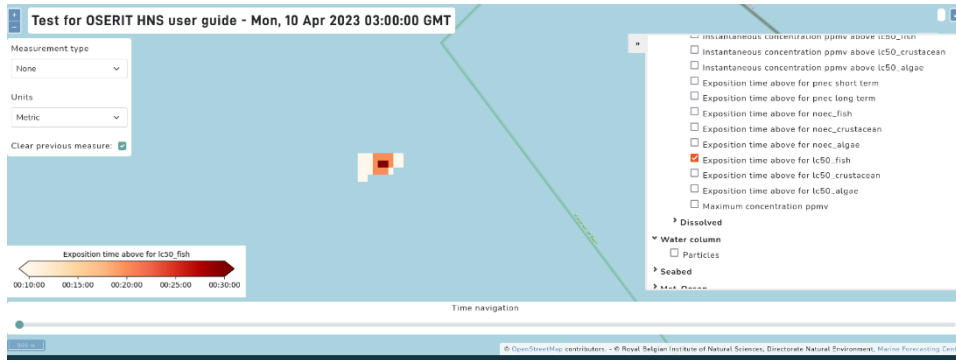

Figure 42: Exposure time above a threshold in OSERIT HNS

For the air concentration, the model shows the maximum air concentration in a small domain near the release point, on only for the first hours of the release (Figure 43).
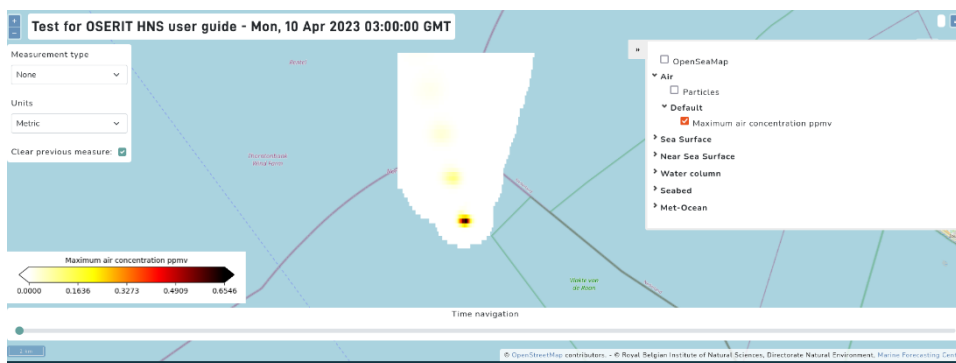
Figure 43: Maximum air concentration for OSERIT HNS

Raster image
Several images are available in the tab on the left. They are described below.
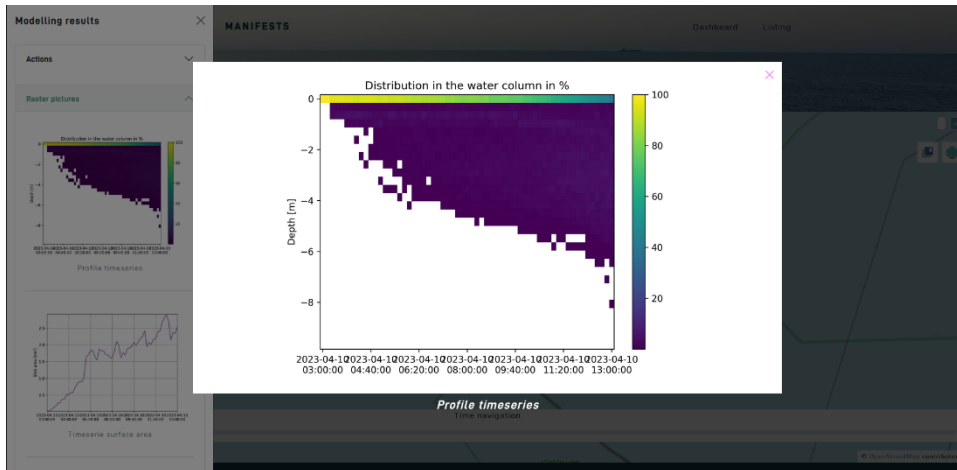
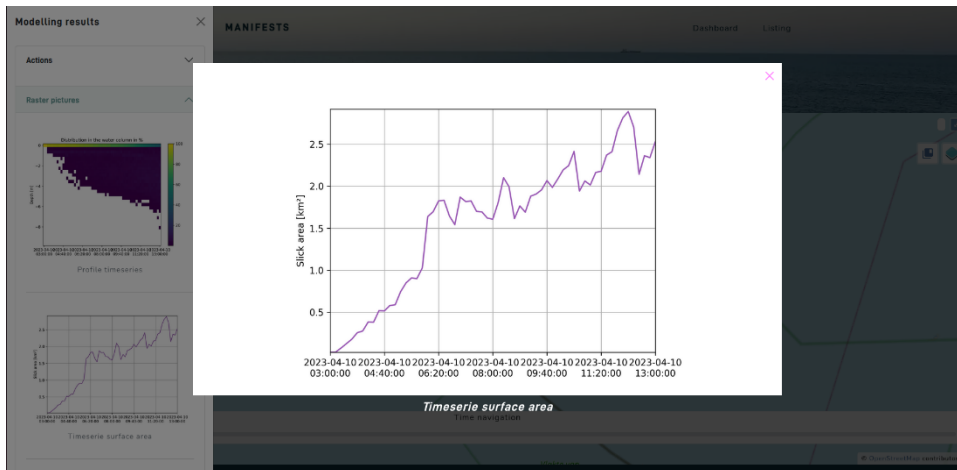*Figure 44: Distribution of the particle in the water column for OSERIT HNS*

Figure 45: Area of the slick as a function of time for OSERIT HNS
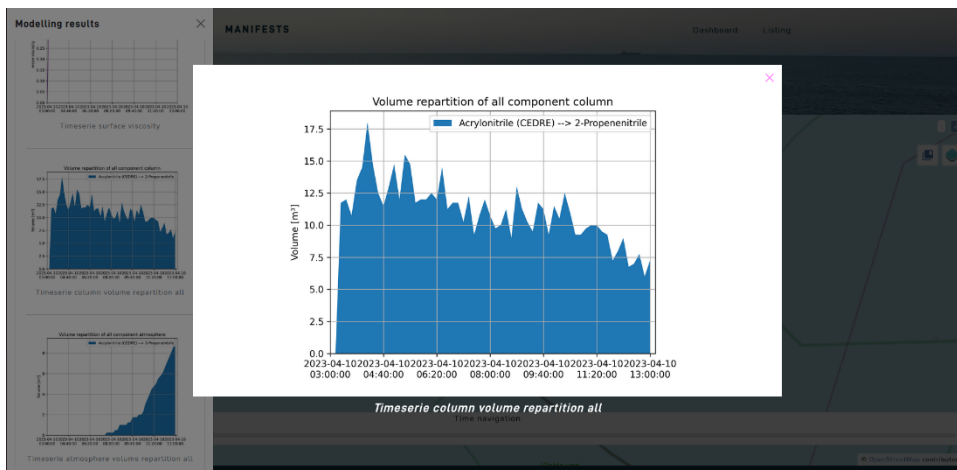

Figure 46: Amount of HNS in the water column as a function of time for OSERIT HNS
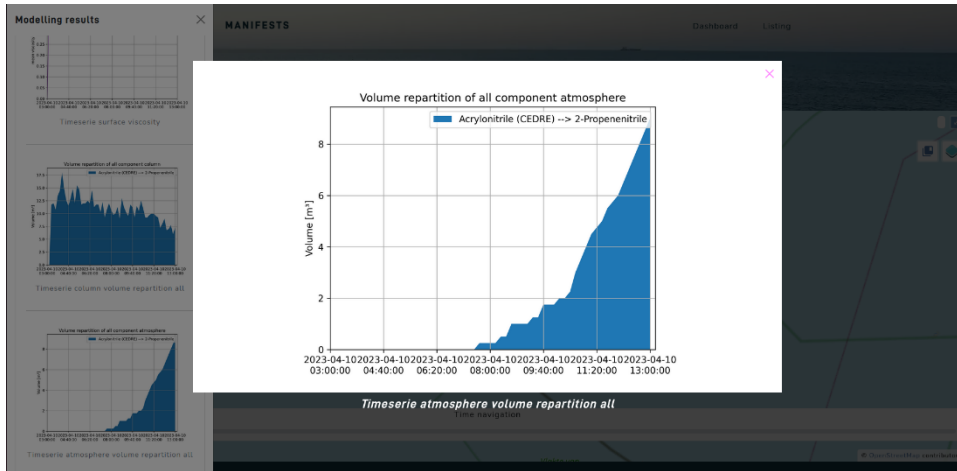
Figure 47: Amount of HNS in the atmosphere as a function of time for OSERIT HNS
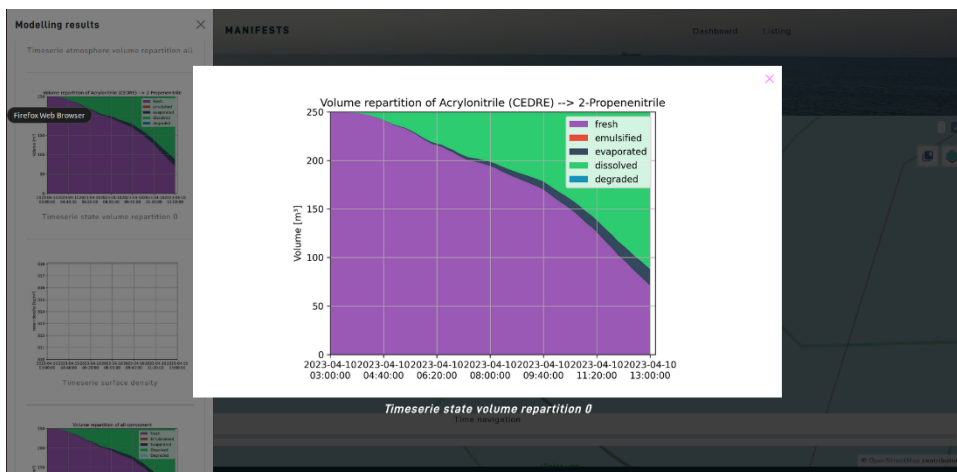

Figure 48: Amount of HNS in each of the fractions available for OSERIT HNS. "Fresh" is the HNS that has not been altered
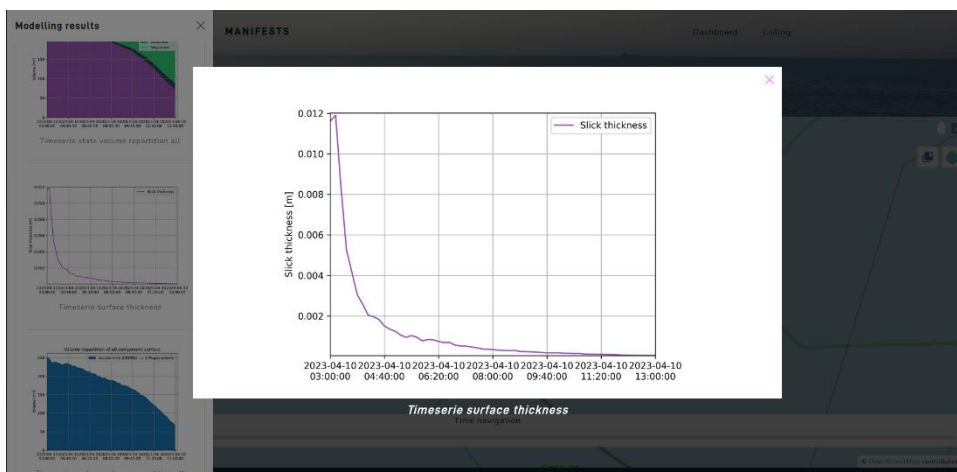

Figure 49: evolution of the slick thickness as a function of time for OSERIT HNS
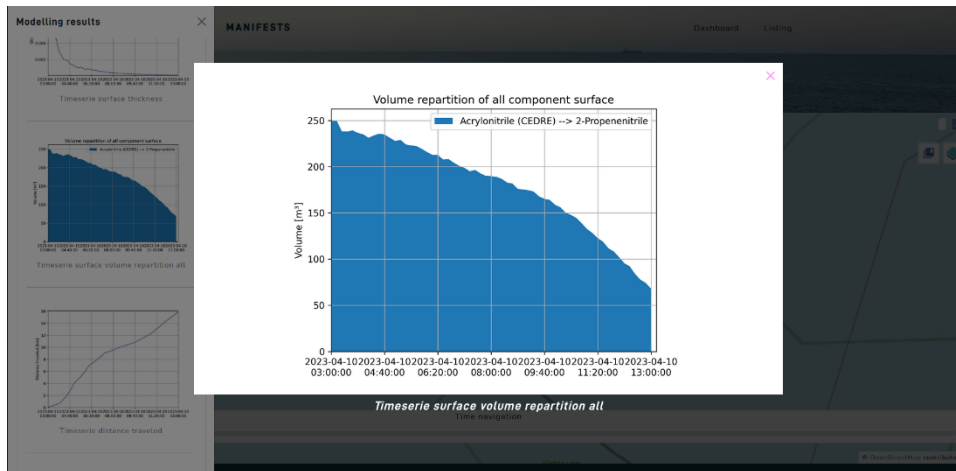
Figure 50: Amount of HNS at the surface as a function of time for OSERIT HNS
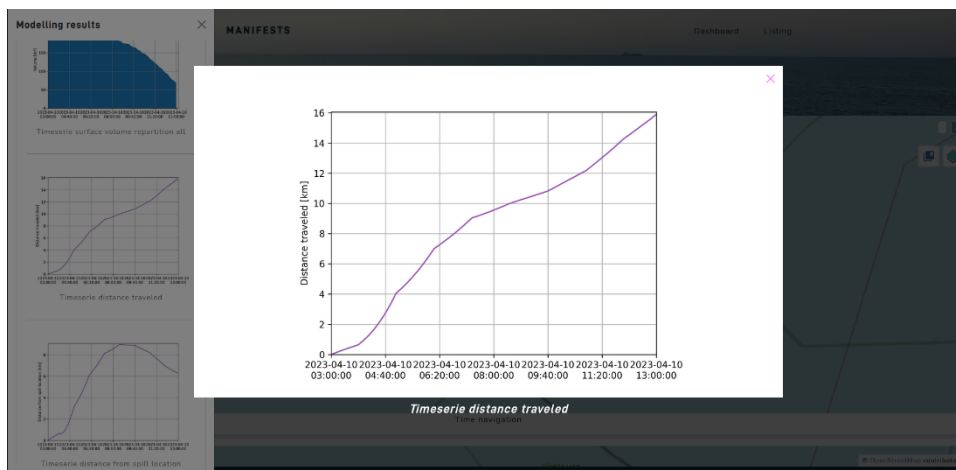

Figure 51: Distance travelled by the center of mass of the surface slick for OSERIT HNS

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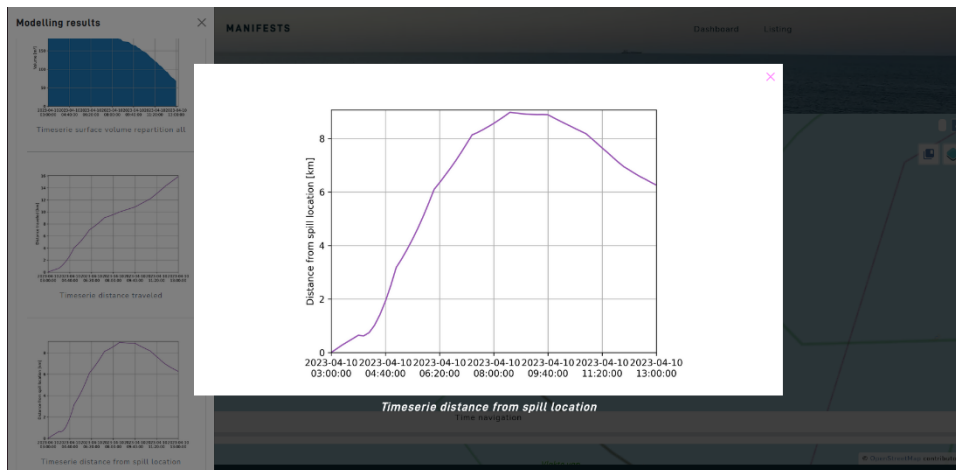and gaseous **S**ubstances To population **S**afety

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Figure 52: Distance between the center of mass of the slick and the release point of the slick for OSERIT HNS

All the figures are timeseries, the time is the abscises axis.

7.3.2. Results on the downloadable archive

In the zip archive, there are several files (xxxxx is the id of the simulation):

- A folder "timeseries" with all the pictures described in the section above, in .png format.
- Xxxxx.nc is a netcdf with raw data on particles
- Xxxxx_air_data.nc is a netcdf which contains the data showed in the "air" layer in the web interface
- Xxxxx_area.csv is a csv file with the area of the slick as a function of time
- Xxxxx_particles_location.geojson is a geojson with the particle location at several timestep
- Xxxxx_water_data.nc is a netcdf with the data showed in the layer about the data in the water

8. Disclaimer

The Royal Belgian Institute of Natural Sciences (hereinafter "RBINS ") uses the best technical standards and makes every possible effort to ensure that the provided information is complete, accurate and up-to-date.

If there would be any inaccuracies or errors in the provided information, the users are requested to inform the responsible person for this matter by e-mail [marine-forecasting-officer at naturalsciences dot be] or by post to the Royal Belgian Institute of Natural Sciences, Operational Directorate Natural Environment, OD Nature, Rue Vautier 29, 1000 Brussels, Belgium.

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9. References

Guide technique relatif aux valeurs de référence des seuils d'effets des phénomènes accidentels des installations classées [WWW Document], 2004. URL https://primarisk.ineris.fr/node/936

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