DigiWater Platform - Quick Manual

1. Access the DigiWater platform

- On your web browser, open URL: https://digiwater.ddns.net/visualization (recommend using Edge).
- Select: *Case Studies/DigiWater Platform*.
- Provide username and password when asked (Figure 1.1).

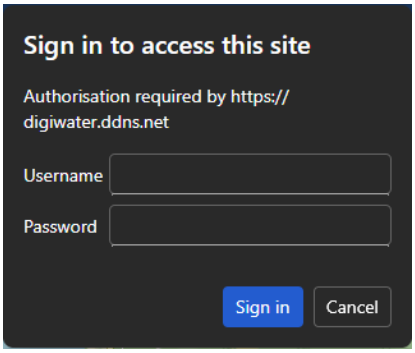

Figure 1.1. Fill username and password to access the platform

- Wait for the platform to set up the database and load components successfully until you see an overview map (Figure 1.2).

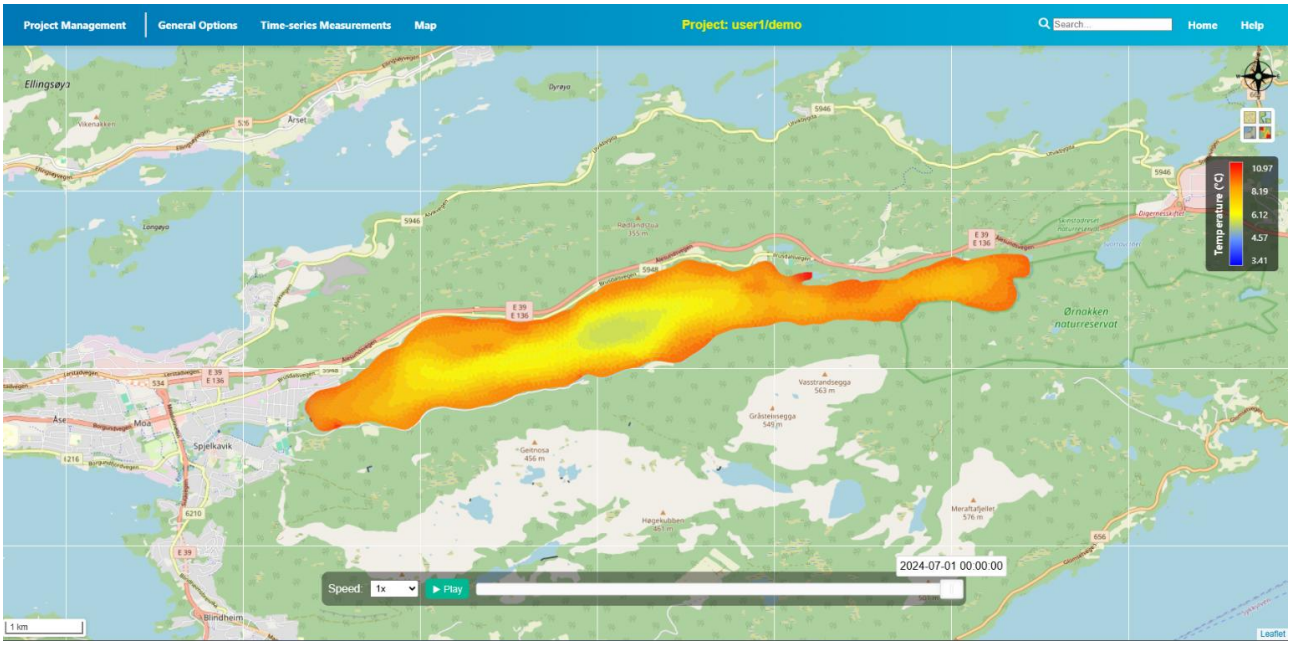

Figure 1.2. Main window

2. Main components

2.1. Project Management

- The *Project Management* allows users to create and run a hydrodynamic (HYD) simulation, create and run a water quality (WAQ) simulation, and select a scenario to visualize on a map.

- Components of the main menu are shown in Figure 2.2.

Figure 2.1. Project management

2.2. Main menu

- After the user selects and opens a specific project, the main menu provides functionality to interact with different elements of the project. For example, project information, load objects, contact information, etc.,
- The number of main menu elements will depend on the availability of each project.
- The main components of the main menu are shown in Figure 2.2.

Figure 2.2. Main menu

2.3. Workspace

- Workspace is a place where all important information and visualizations are displayed.
- The main interface of the workspace is a map-based interface where spatial and non-spatial information are visualized. Users can change map backgrounds by hovering the mouse over this symbol  in the top-right corner. There are some mapping templates that can be shown in Figure 2.3.

Figure 2.3. Base map

3. Set up and run a hydrodynamic (HYD) simulation

3.1. Set up a HYD scenario

- Open HYD Editor: *Project Management/HYD Scenario*. This window also allows you to create a new scenario, open a existing scenario to modify, clone an existing scenario, and delete a scenario (Figure 3.1).

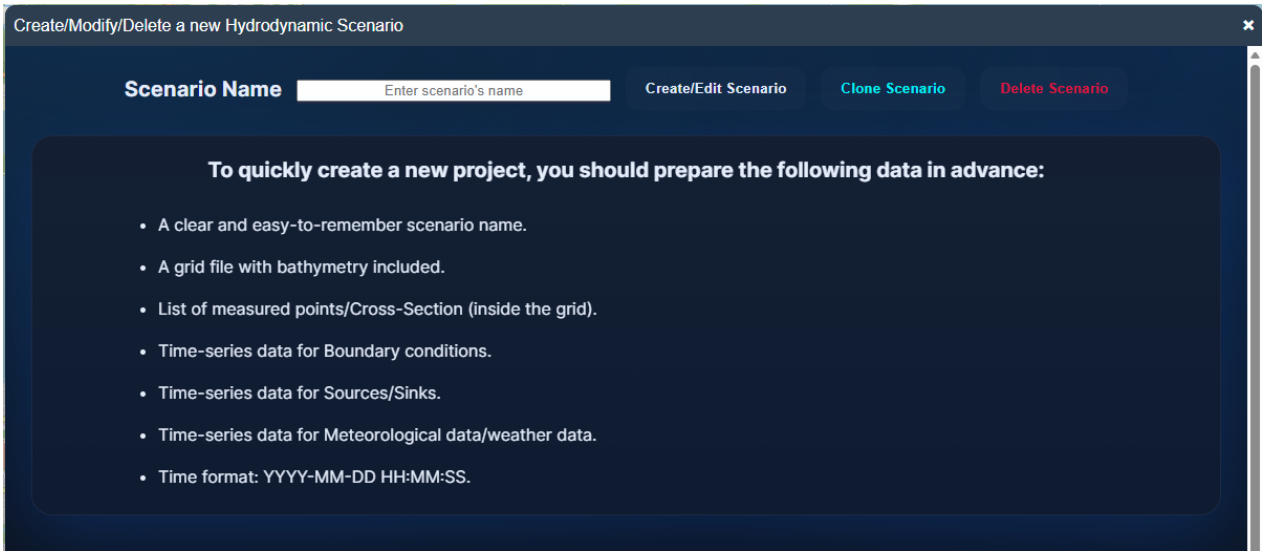

Figure 3.1. Create a new scenario

- *Create a new HYD scenario*: provide name of the scenario, then hit button "***Create/Edit Scenario***".
- *Open an existing scenario*: type the name of the scenario in the text, select the scenario from the list (Figure 3.2)

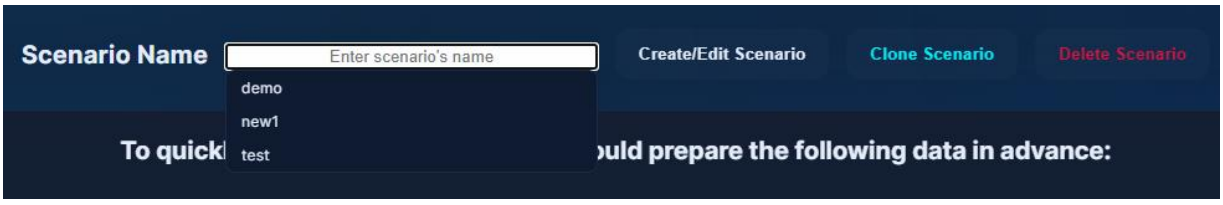

Figure 3.2. Open an existing scenario

❖ ***Model Settings***: initiate basic configurations for the scenario (Figures 3.3.x).

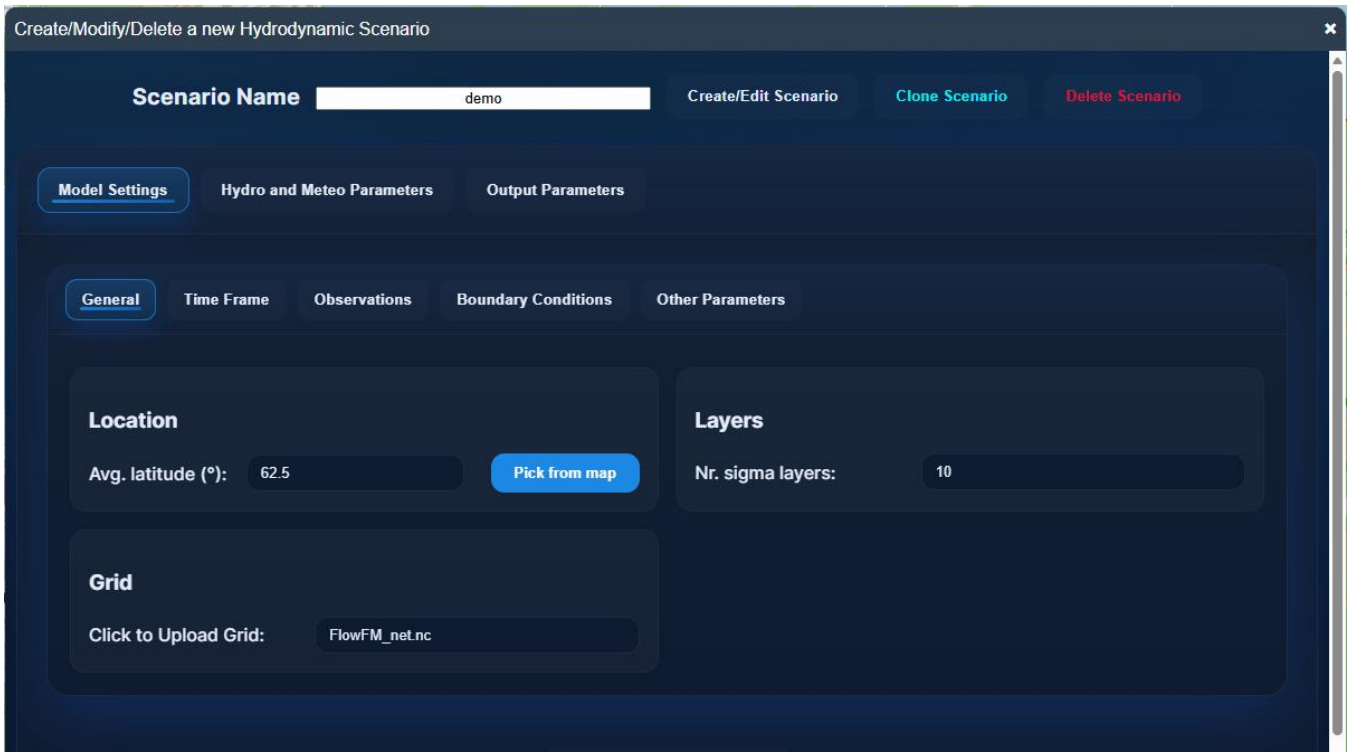

Figure 3.3.1. Model Settings: Set up general options

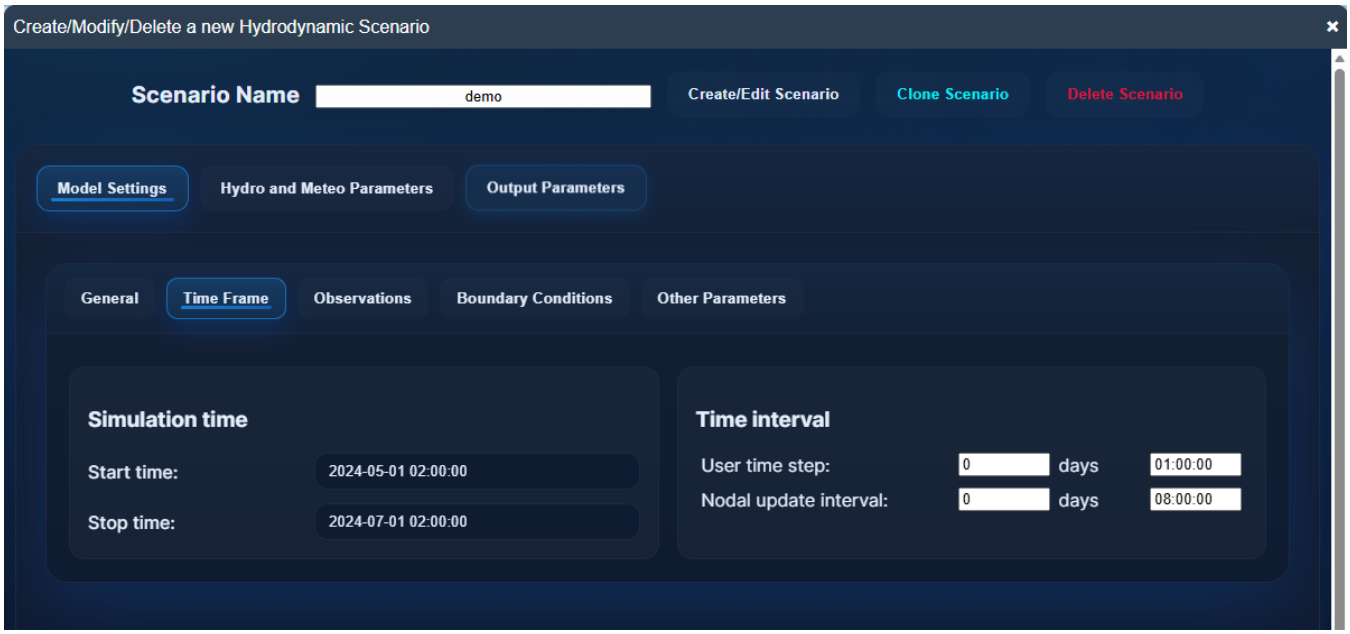

Figure 3.3.2. Model Settings: Set up simulation period

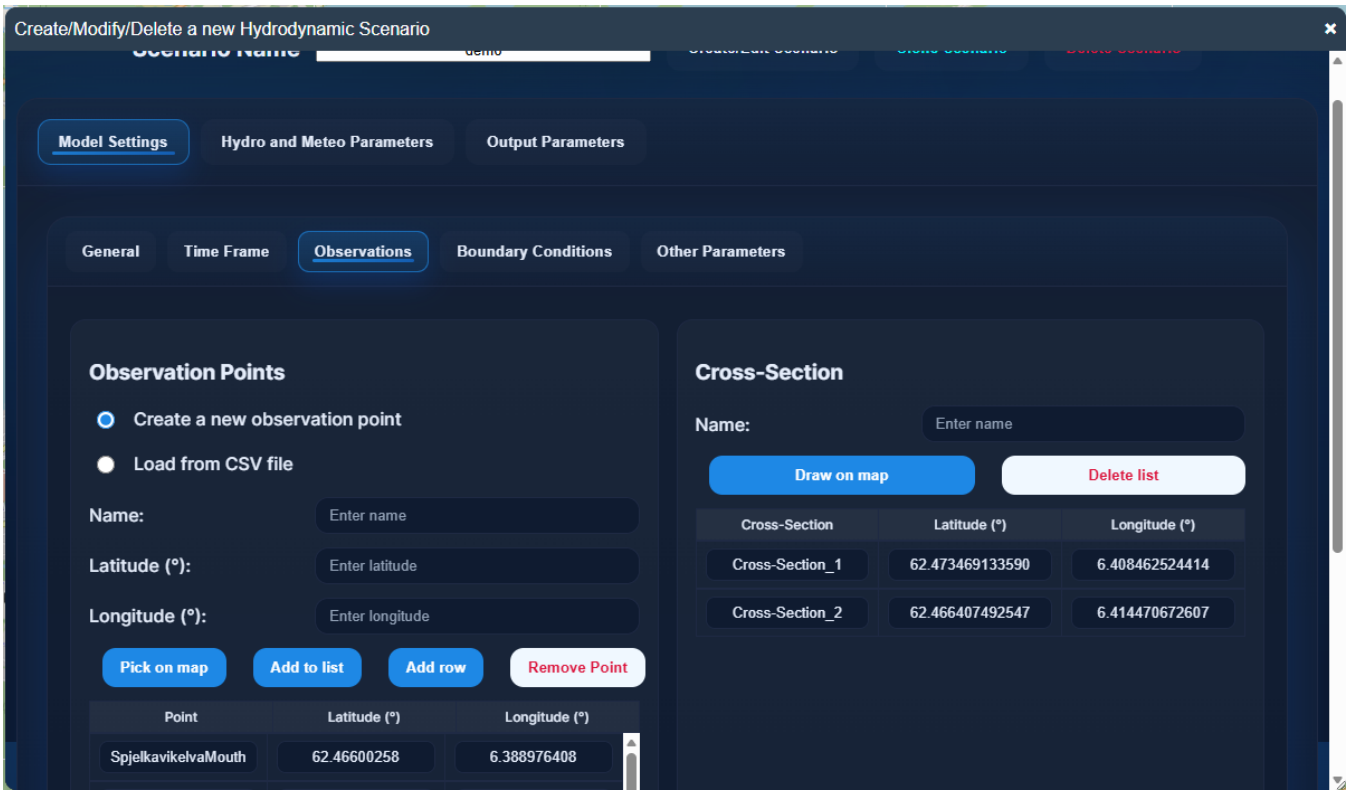

Figure 3.3.3. Model Settings: Set up observation positions

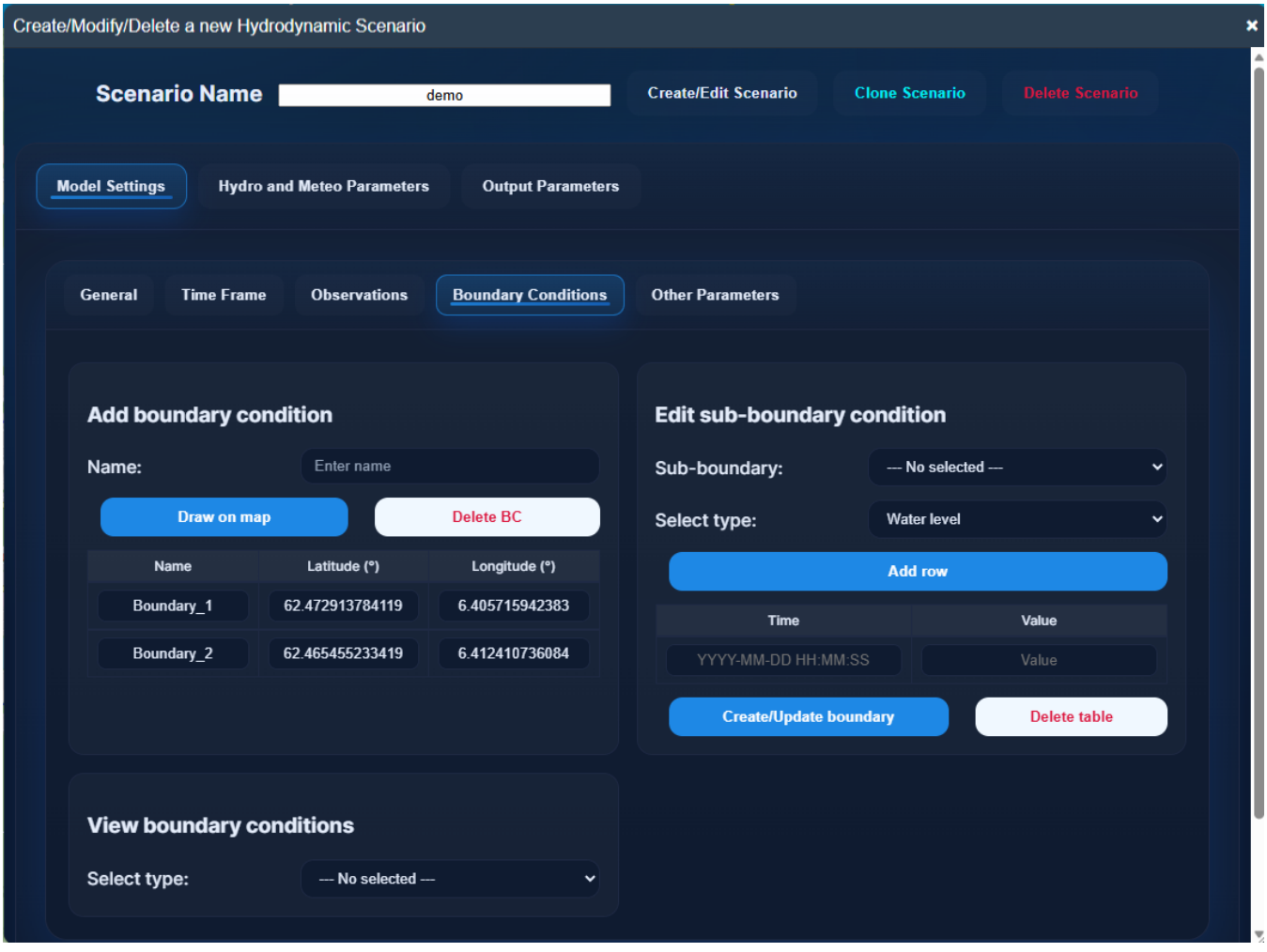

Figure 3.3.4. Model Settings: Set up boundary conditions

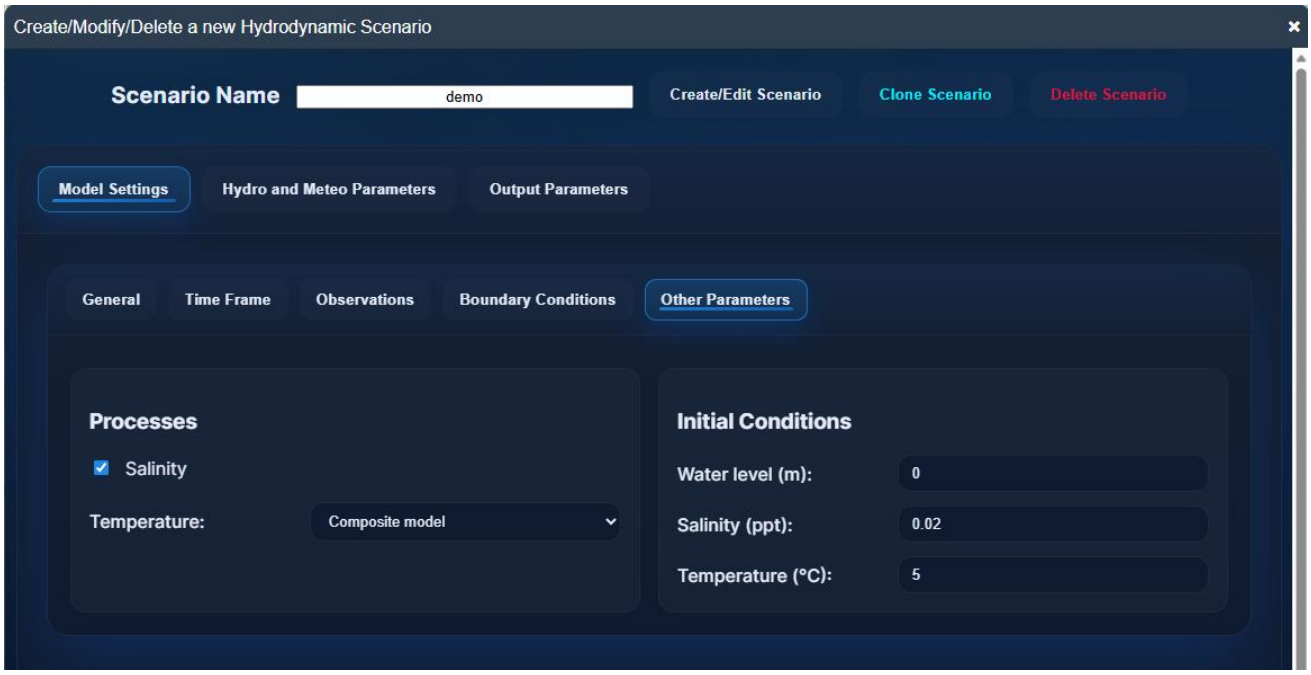

Figure 3.3.5. Model Settings: Set up other initial parameters

- ***Hydro and Meteo Parameters***: setup parameters for hydrological and meteological options (Figures 3.4.x).

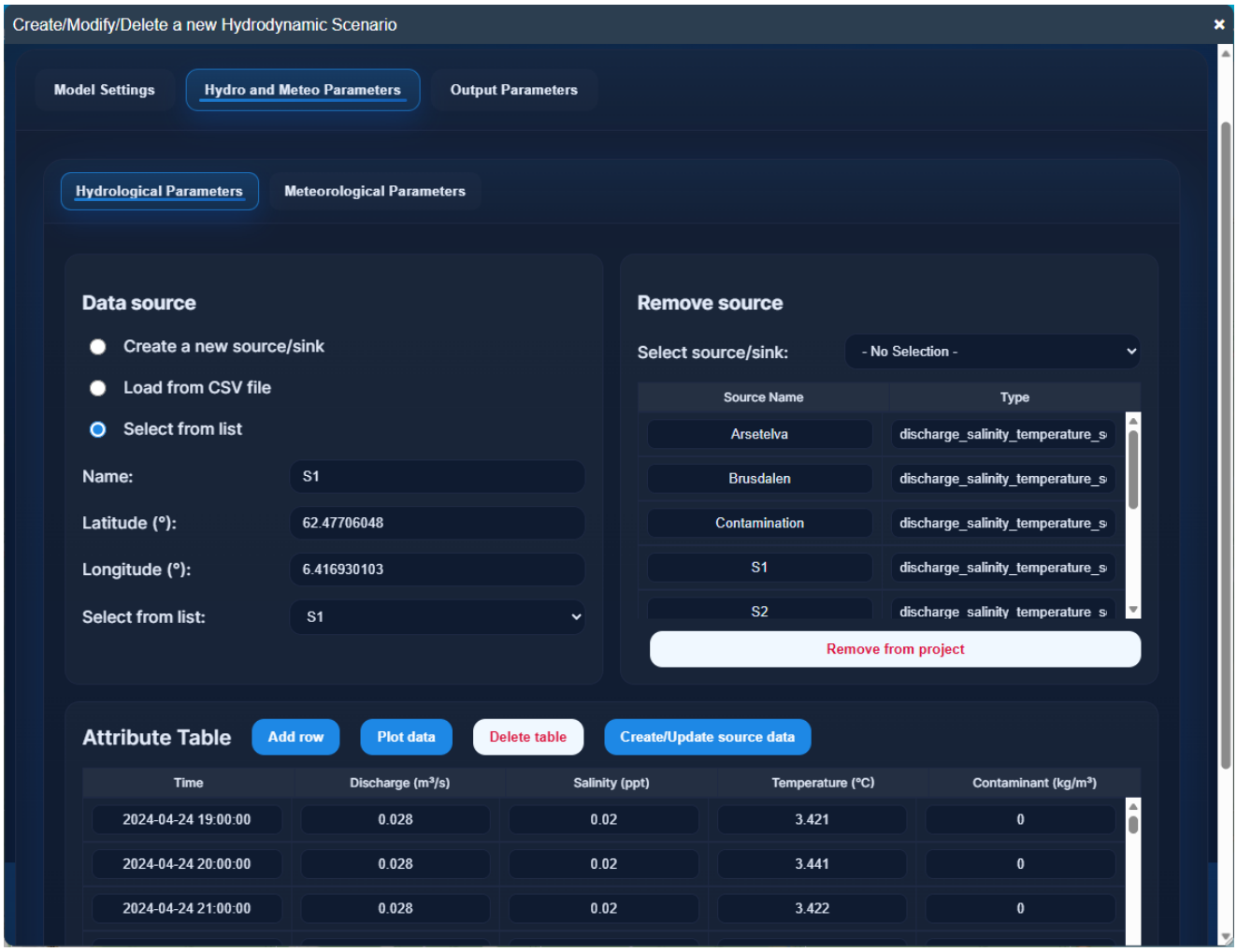

Figure 3.4.1. Set up hydrological parameters

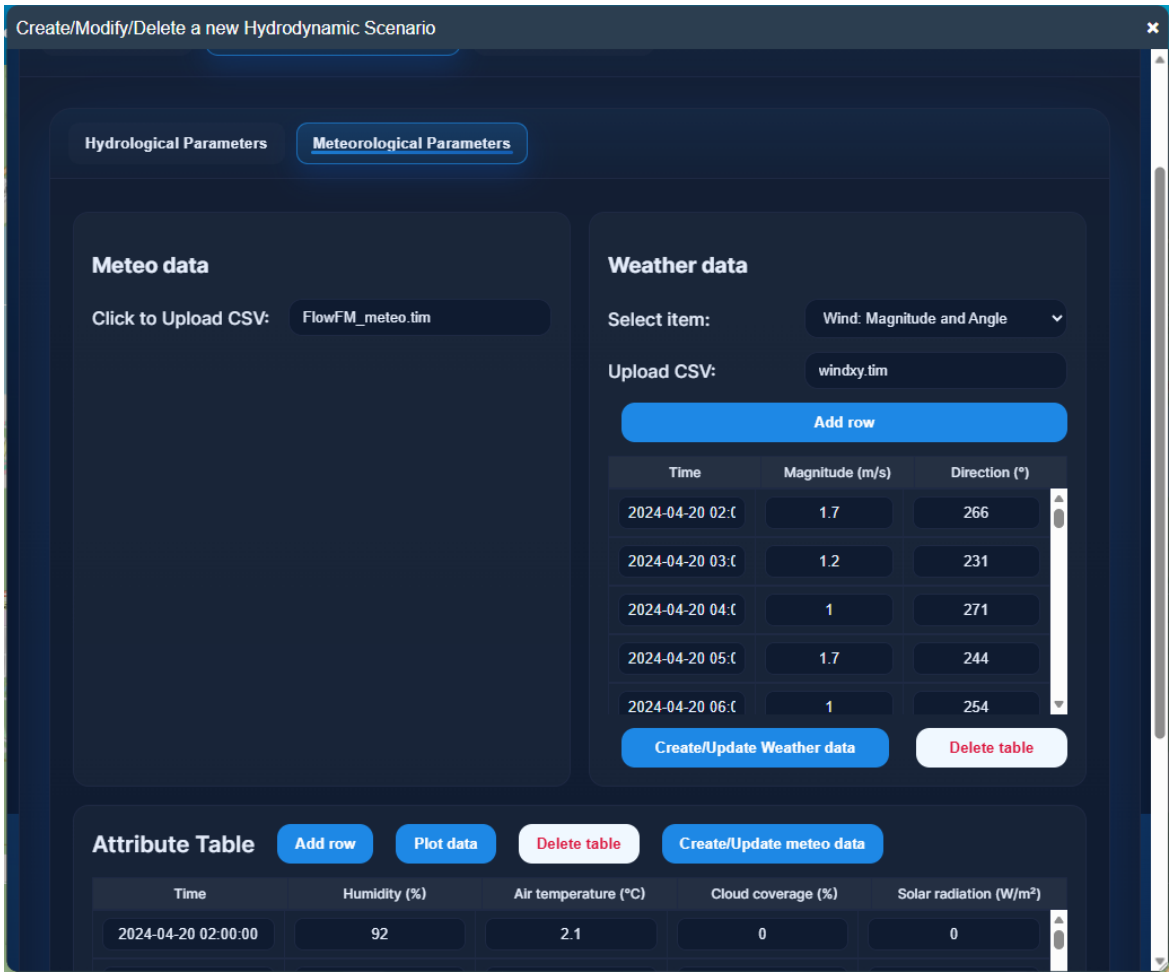

Figure 3.4.2. Set up meteological parameters

❖ ***Output Parameters***: setup parameters for outputs (Figure 3.5).

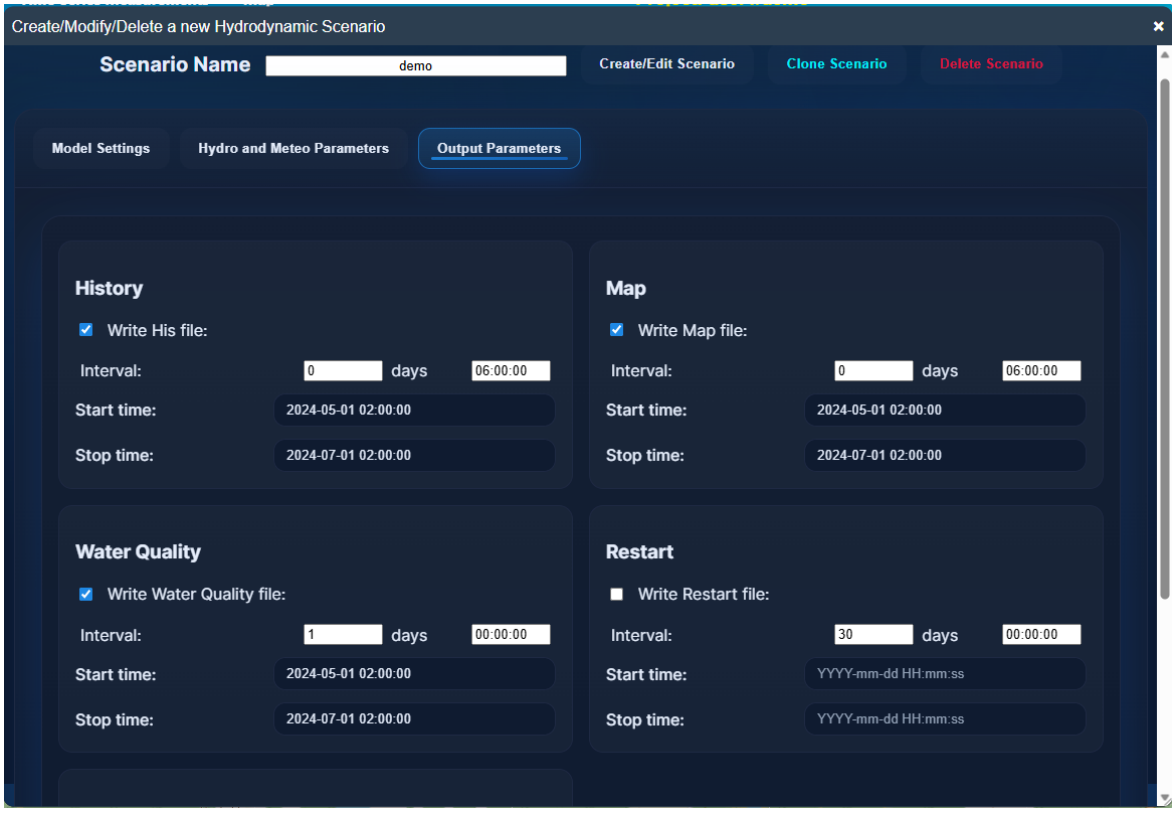

Figure 3.5. Set up output parameters

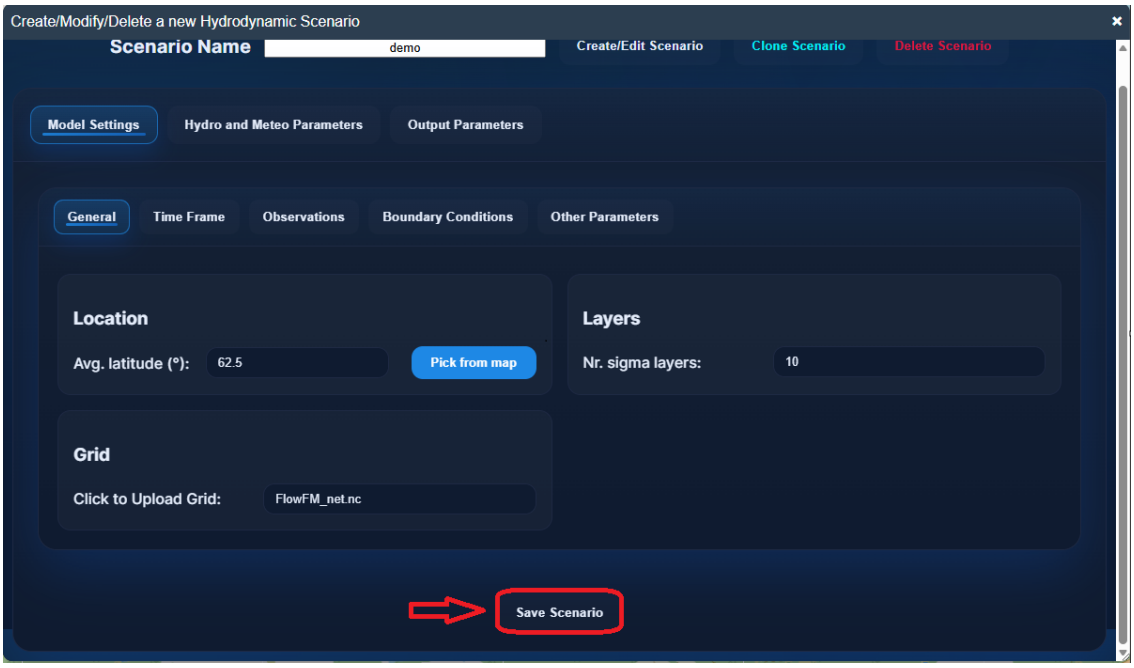

Figure 3.6. Save scenario

- After all parameters are defined, user can save a scenario by using the button "***Save Scenario***". Now, the scenario is ready for running a HYD simulation.

3.2. Run a HYD scenario

- To run a HYD scenario, select *Project Management/Run HYD Simulation*. You can see a window allow selecting scenario to run (Figure 3.7).

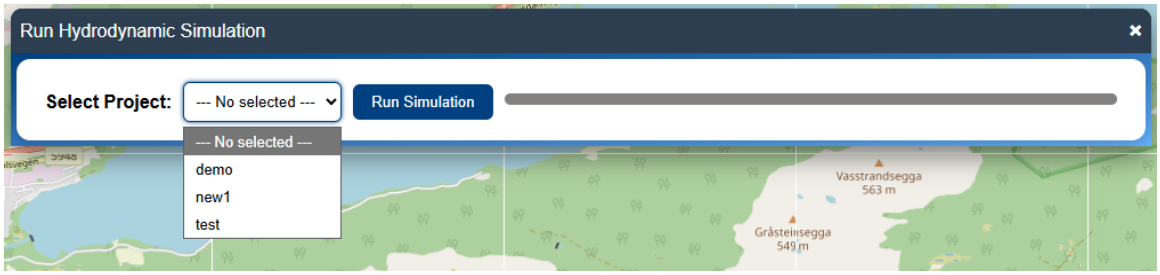

Figure 3.7. Select scenario to run HYD simulation

- After selecting a scenario, hit the button "***Run Simulation***" to run an HYD simulation. You can see the process of simulation (for example, percentage completed, time used and time left of this simulation) (Figure 3.8).

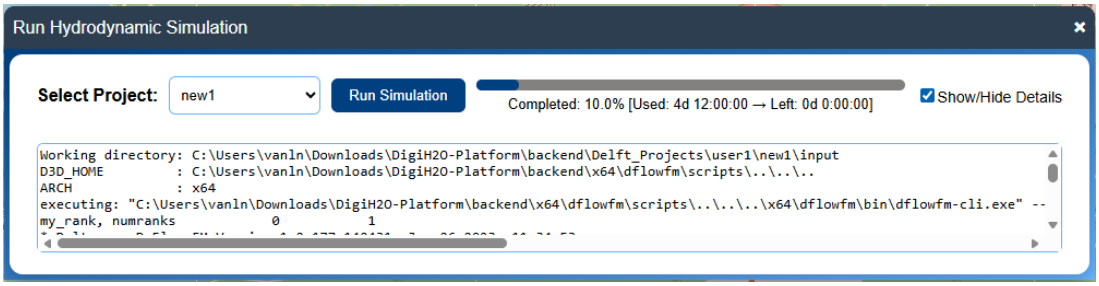

Figure 3.8. Run an HYD simulation

4. Set up and run a water quality (WAQ) simulation

- ***A WAQ simulation only can be executed with an HYD simulation prepared.***
- Select Project Management/WAQ Simulation to create and run a WAQ scenario (Figure 4.1).

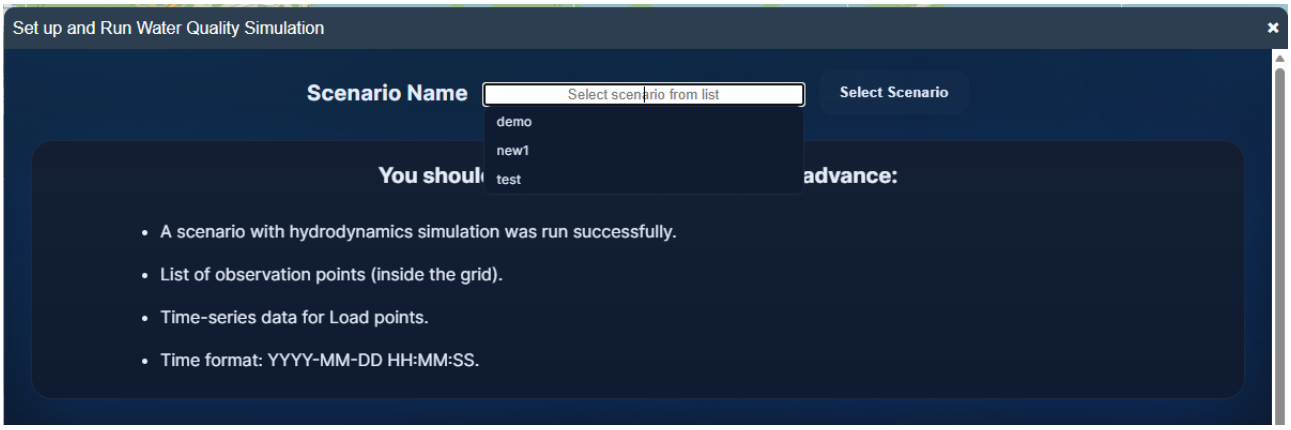

Figure 4.1. Create a WAQ scenario

❖ ***Model Overview***: This tab summaries properties of HYD scenario used (Figure 4.2). User don't have to do or make any changes in this tab.

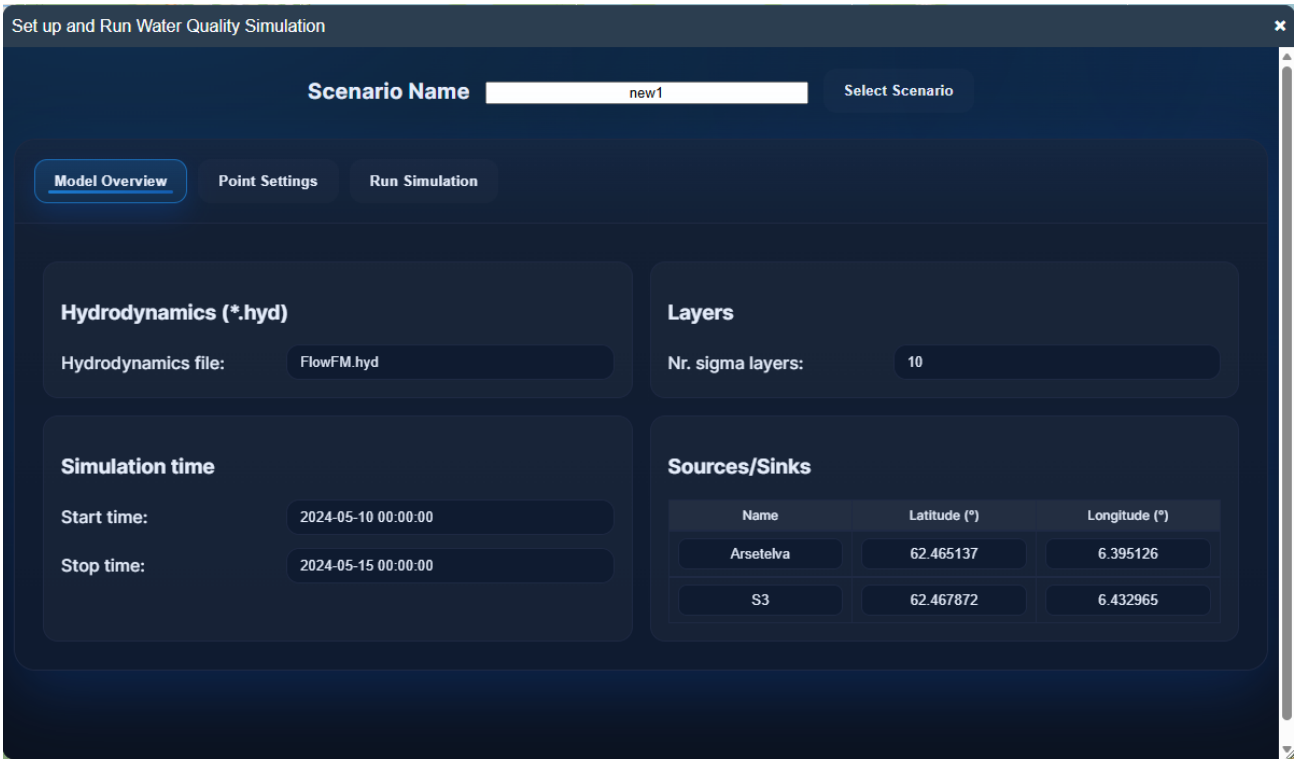

Figure 4.2. Properties of the selected HYD scenario

❖ ***Point Settings***: This tab allows user to add observation points and loads for the WAQ simulation (Figure 4.3). Name of loads has to be the same as the name defined in the field "***Location***" of *Time-Series Preparation* table in tab "***Run Simulation***" (Figure 4.4).

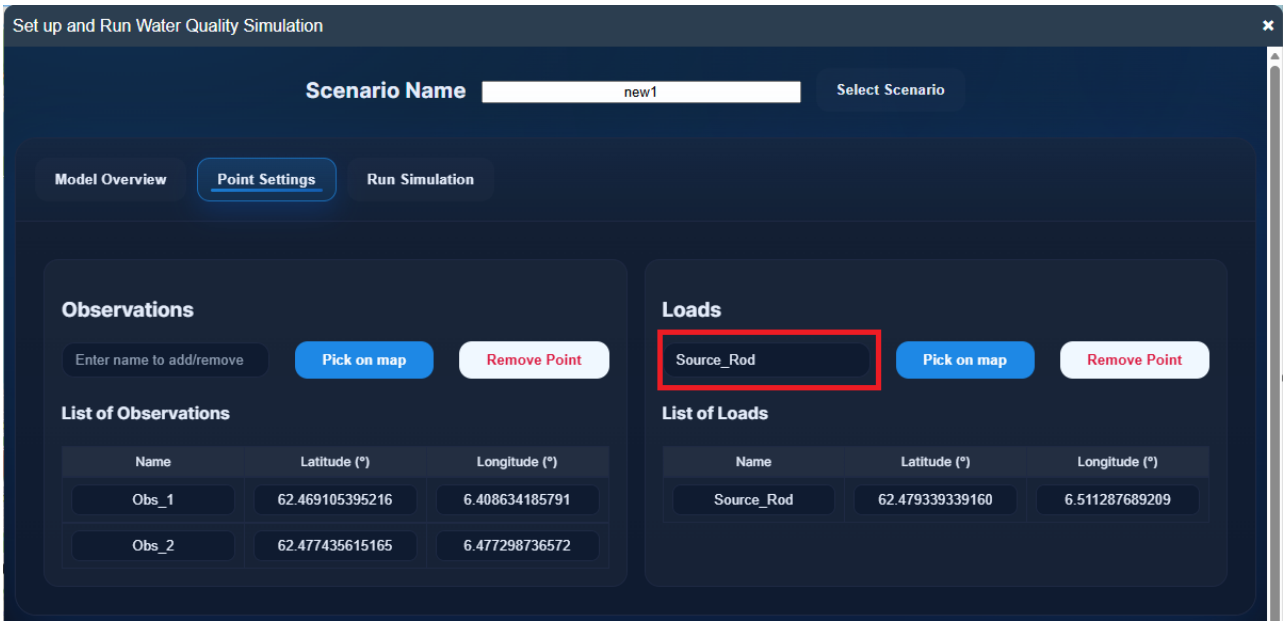

Figure 4.3. Observations and Loads definition

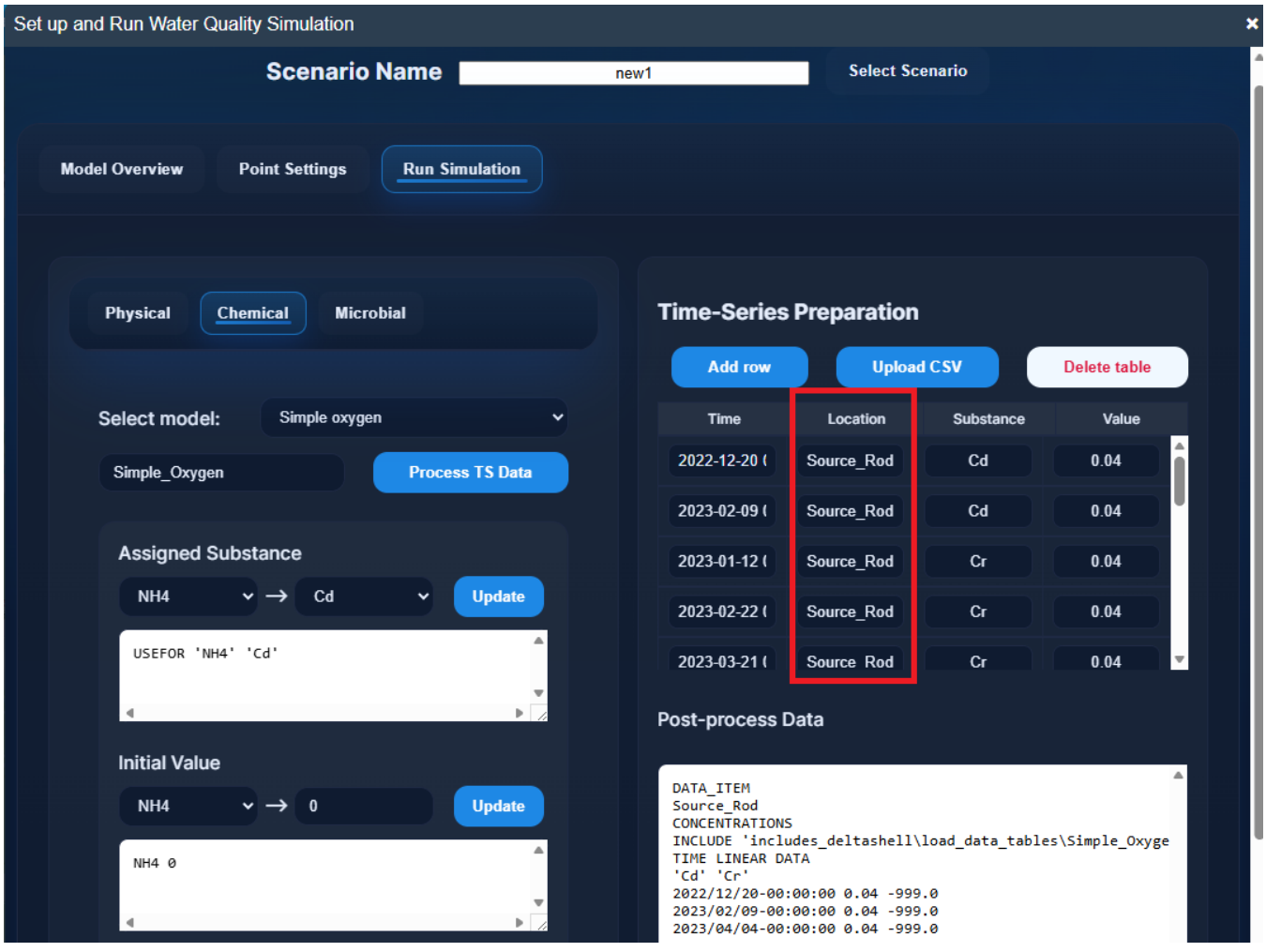

Figure 4.4. Observations and Loads definition

- Steps need to be implemented to set up a WAQ scenario correctly:
    - Select tab: *Physical*, *Chemical* or *Microbia*
    - Select model that you want to create from the list at the field "***Select model***". The

models can be:

- ➢ Tab *Physical*: *Conservative and decaying tracers* and *Suspended sediment (three fractions)*.
- ➢ Tab Chemical: *Simple oxygen, Oxygen and BOD (water phase only), Cadmium, Eutrophication (Eutrof 1a)*, and *Trace metals*.
- ➢ Tab Microbial: *Coliform bacteria*.

- Upload CVS file that contains loads data or provide data manually.
- Hit the button "***Process TS Data***" to preprocess provided time-series data.
- Define substances and initial values for them.
- User can whether change integration method, maximum iteration or tolerance or not. These values can be considered when a WAQ simulation doesn't run successfully (Figure 4.5).

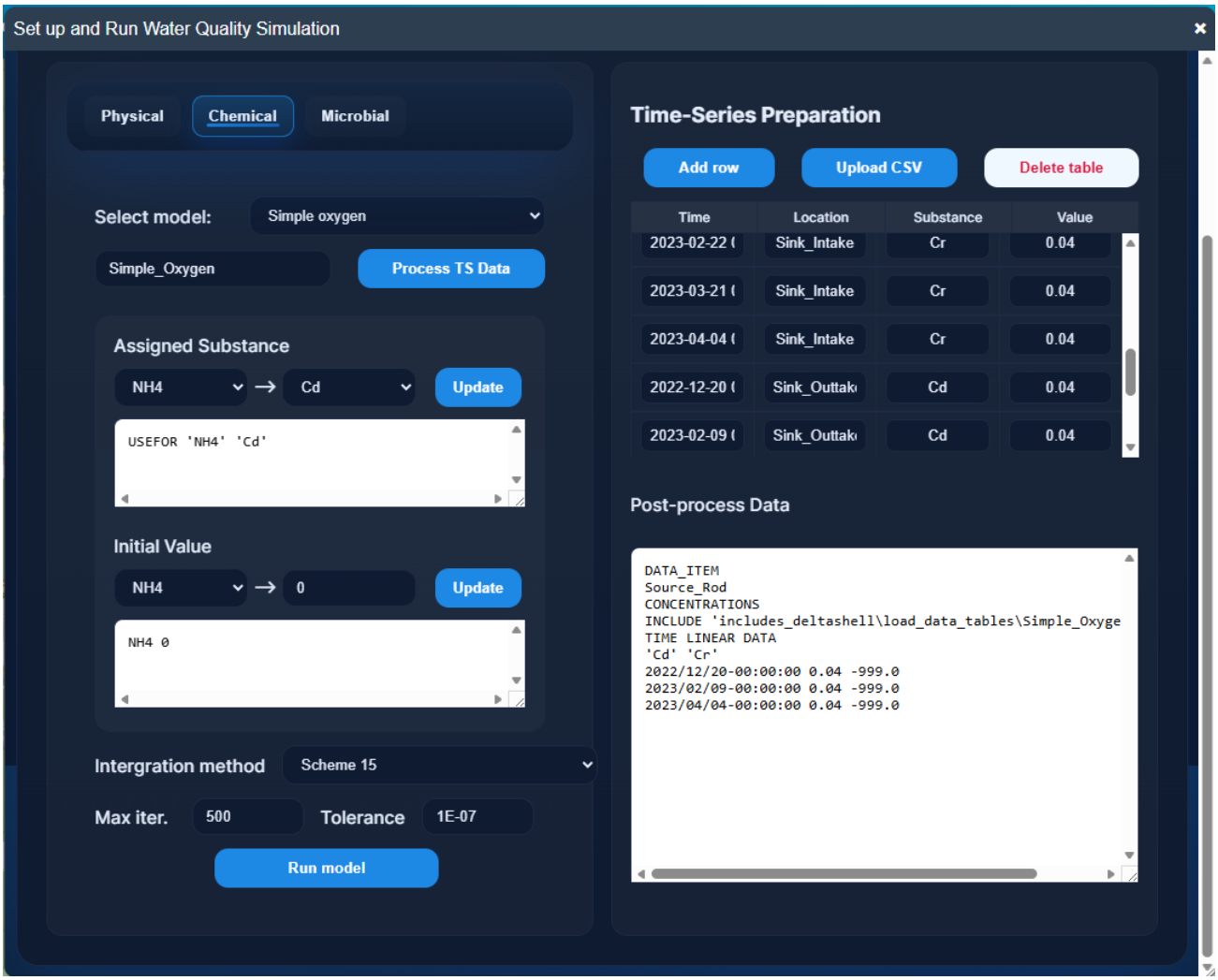

Figure 4.5. WAQ scenario's definition

- After all above steps done, a WAQ simulation is ready to run. By hitting the button "***Run model***", a new window appears and shows the process of simulation (Figure 4.6).

Figure 4.6. Run WAQ simulation

5. Visualization

- This platform can visualize HYD and WAQ simulations simultaneously or separately.
- To open HYD and/or WAQ simulations, select *Project Manager/Visualization*. You can select project from a drop-down list. If this project has only HYD simulation, you can see it in the field "*Hydrodynamic Simulation*". If the project has both HYD and WAQ simulations, you can find them in "*Hydrodynamic Simulation*" and "*Water Quality Simulation*" fields (Figure 5.1).
- Hit button "***Open Project***" to visualize the output(s).

Figure 5.1. Visualize simulations

- After a project is loaded, user can use menu to visualize different properties of the outputs. There are three items that user can select from menu: ***General Options***, ***Time-Series Measurements***, and ***Map***.

5.1. General Options

- Select *Project Summary* to see an overview of the project (Figure 5.2).

Project Summary

Computation started	2025-12-18 13:16:04
Computation finished	2025-12-18 13:21:18
Area (m2)	7549217.331
Volume (m3)	254478989.9
Start Date (Hydrodynamic Simulation)	2024-05-10 00:00:00
Stop Date (Hydrodynamic Simulation)	2024-05-15 00:00:00
Number of Time Steps	11
Number of Layers	10
Number of Observation Stations	5
Number of Cross Sections	1
Number of Sources/Sinks	2
Start Date (Water Quality Simulation)	2024-05-10 00:00:00
Stop Date (Water Quality Simulation)	2024-05-15 00:00:00
Number of Time Steps (Water Quality Simulation)	6
Number of Observation Stations (Water Quality Simulation)	2

Figure 5.2. Project overview

- Select *Points of Interest* to see locations of componented produced from the simulation (Figure 5.3).

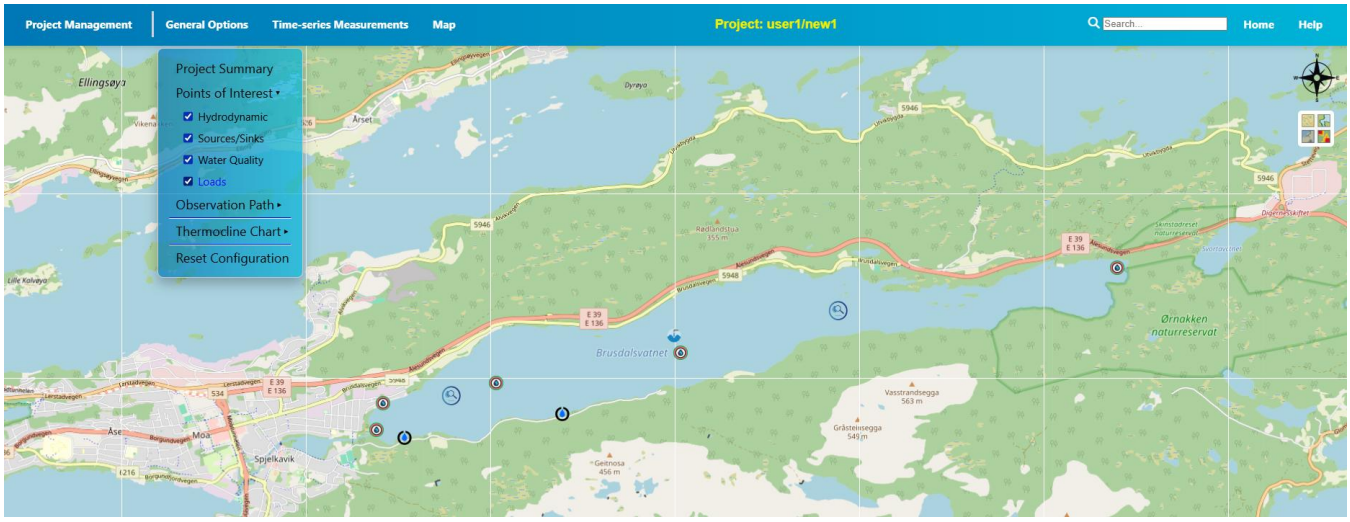

Figure 5.3. Location of interest points

- Once option for "*Hydrodynamic*" is selected, user can click on the specific point and select more detailed information to see (Figure 5.4).

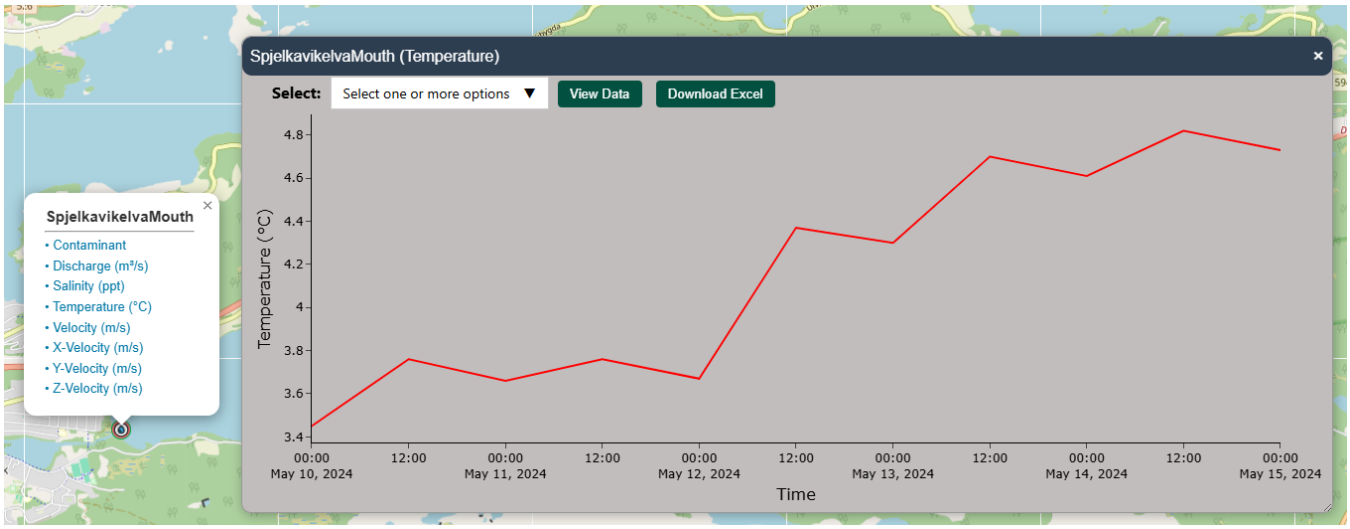

Figure 5.4. In-situ observations

- With "*Observation Path*", user can show/hide *Cross-Sections* (if HYD simulation has this in output) and define "*Profile*" from an available map (Figure 5.5).

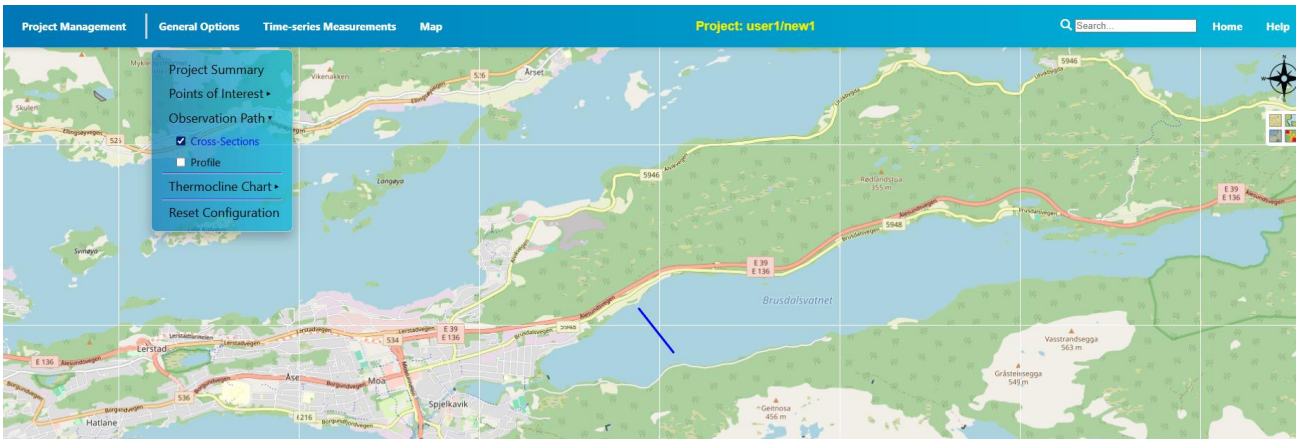

Figure 5.5. Cross-Sections option

- By selecting cross-section on the map, user can select and visualize properties associated with this cross-section (Figure 5.6).

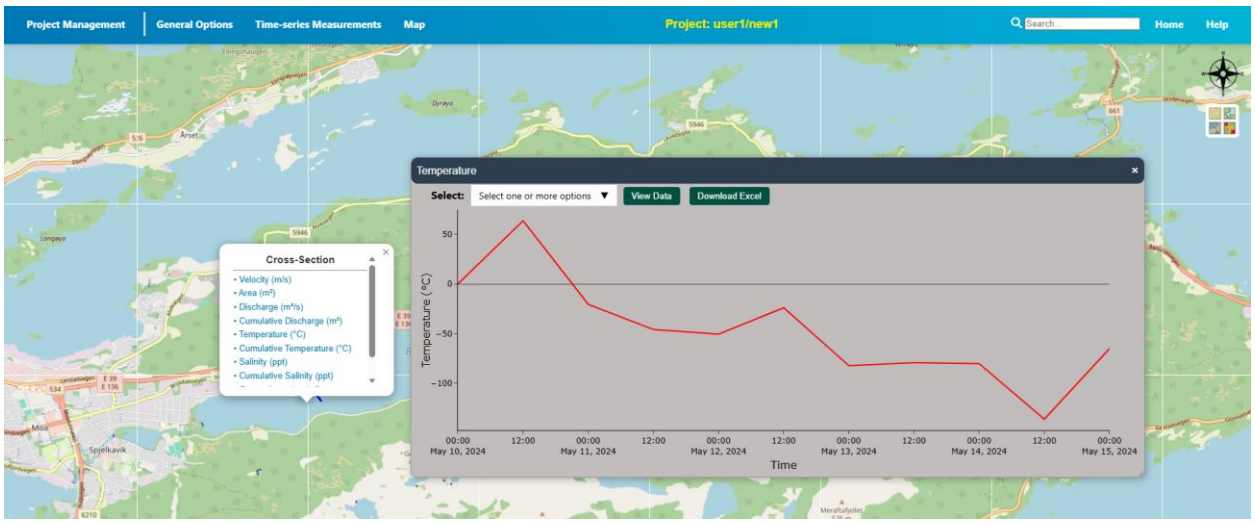

Figure 5.6. Cross-Sections properties

- User can visualize a thermocline chart for HYD simulation and vertical profile for WAQ simulation at specific location by using *Thermocline Chart/Depth vs. Temperature* and *Thermocline Chart/Depth vs. Water Quality*, respectively. To active a thermocline change, follow below steps:
    - Select *Depth vs. Temperature* or *Depth vs. Water Quality* from *Thermocline Chart*
    - Select location from the grid printed on map (Figure 5.7). Change name of point if you prefer for another name. Hit "***Plot Chart***" to draw.
    - A window containing a dynamic chart for HYD (Figure 5.8a) or WAQ (Figure 5.8b) simulation appears and user can hit button "*Play*" to see animation.

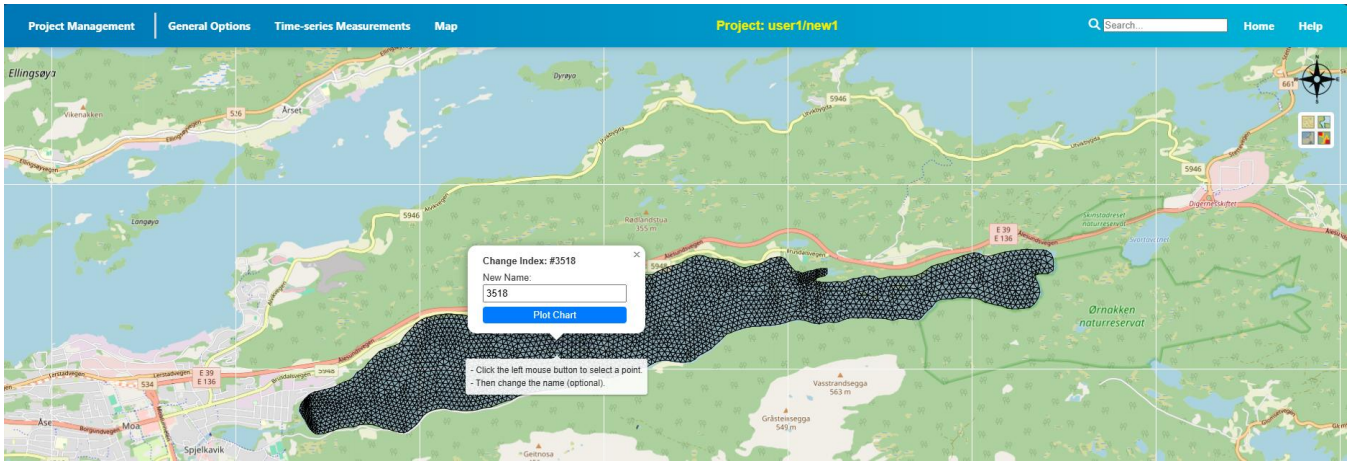

Figure 5.7. Select location for thermocline chart

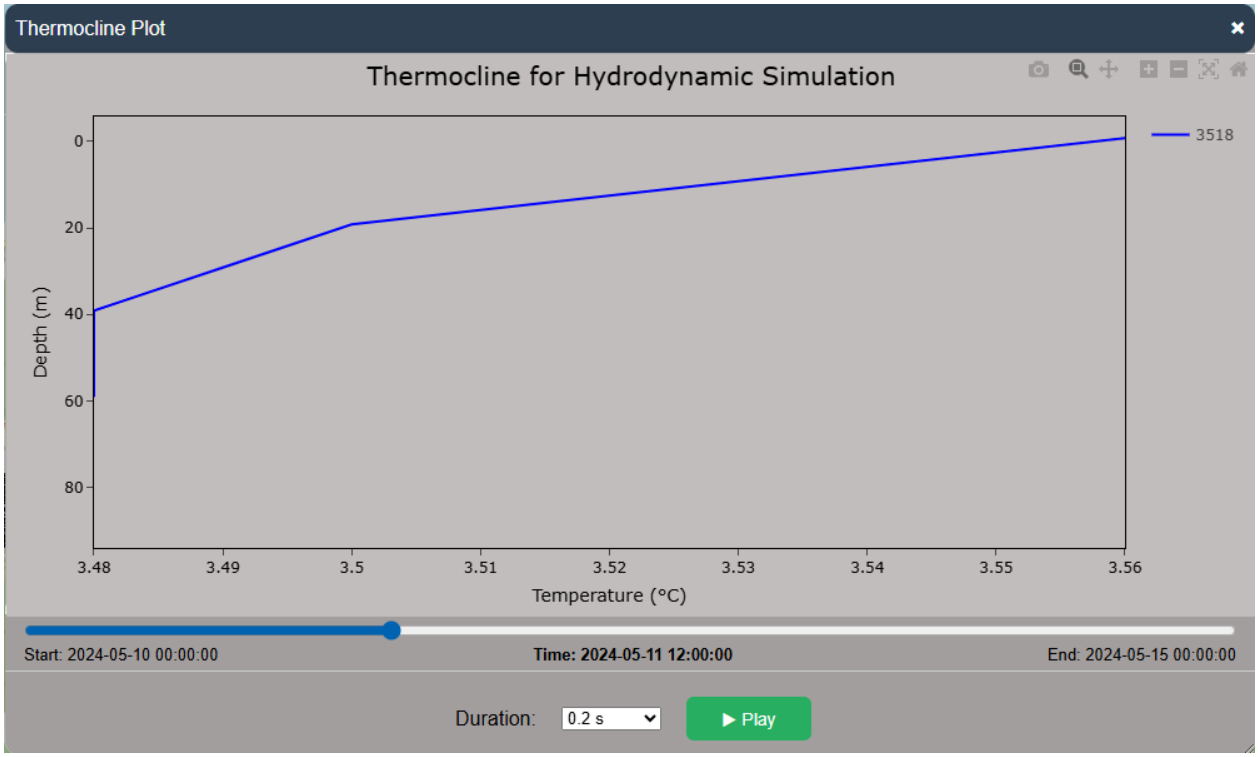

Figure 5.8a. Thermocline chart for HYD simulation

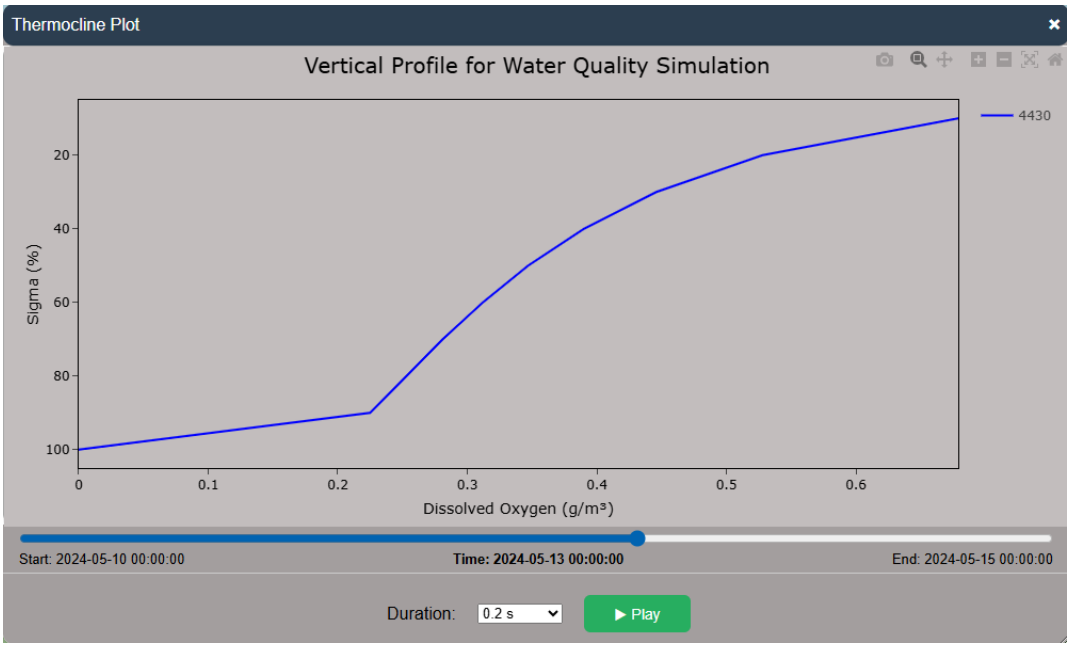

Figure 5.8b. Thermocline chart for WAQ simulation

5.2. *Time-Series Measurements*

- With the option "*Time-Series Measurements*", user can see all time-series based outputs produced from HYD (Figure 5.9a) and WAQ (Figure 5.9b) simulations.

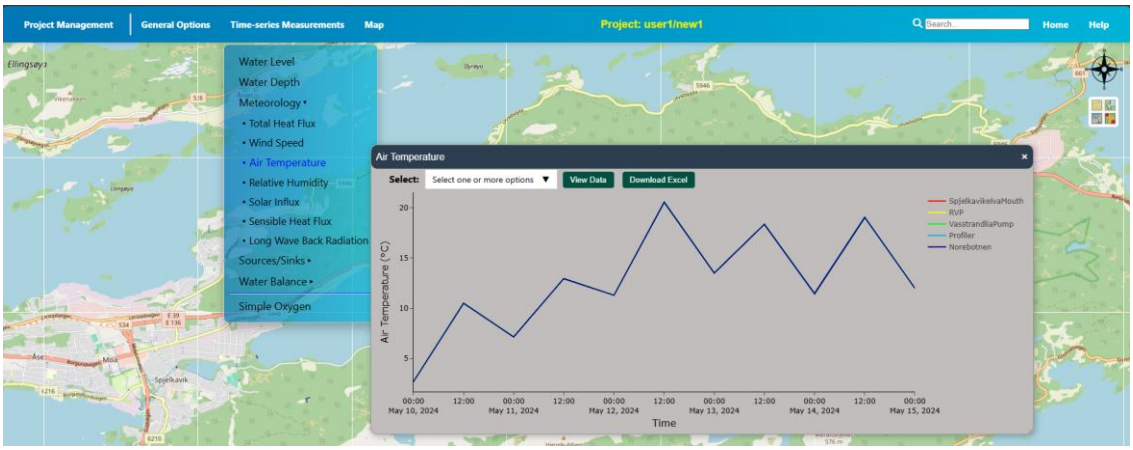

Figure 5.9a. Time-series chart for HYD simulation

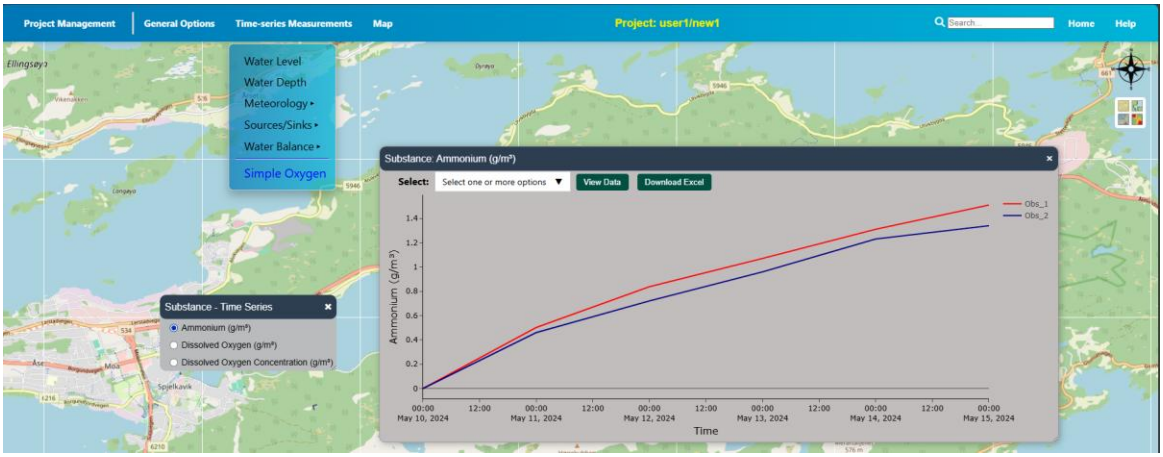

Figure 5.9b. Time-series chart for WAQ simulation

- When time-series based option for WAQ simulation is selected, user can change the substance in an additional window to see their attributes.

5.3. Map

- Menu "*Map*" allows user to see many types of dynamic maps including single layer and multiple layer. An example of a single layer dynamic map is shown in Figure 5.10. User can change type of substance from an additional window, and click button "*Play*" to see animation.

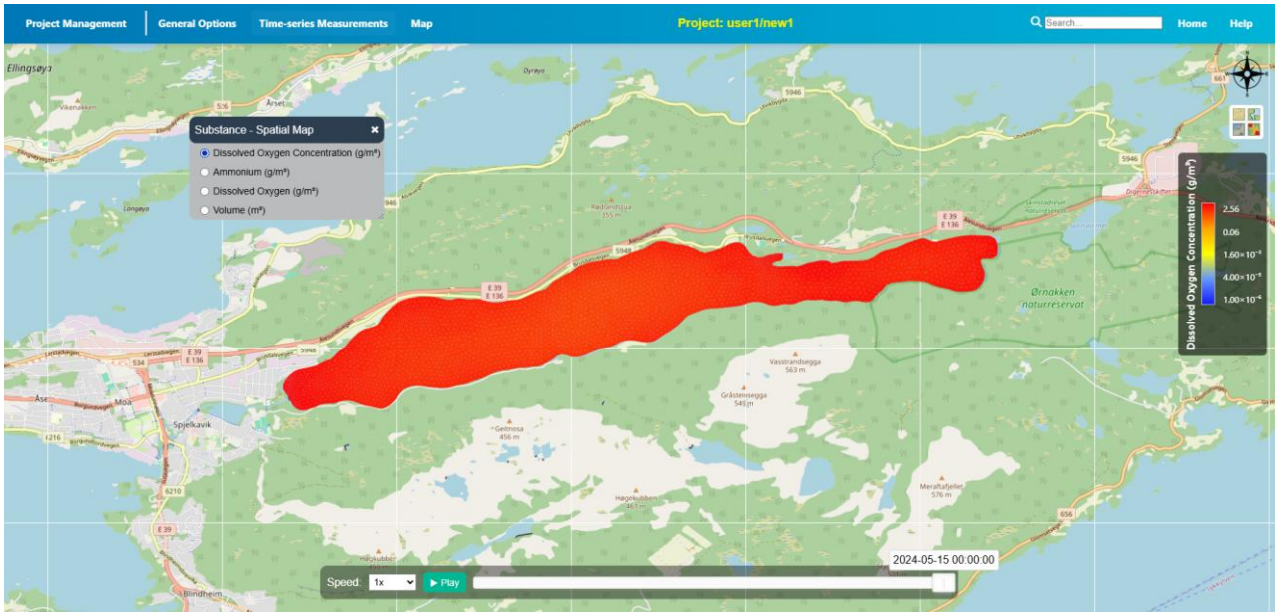

Figure 5.10. A single layer dynamic map for WAQ simulation

- With "*Multiple Layer*" option, user can decide which type of layer and value to visualize.

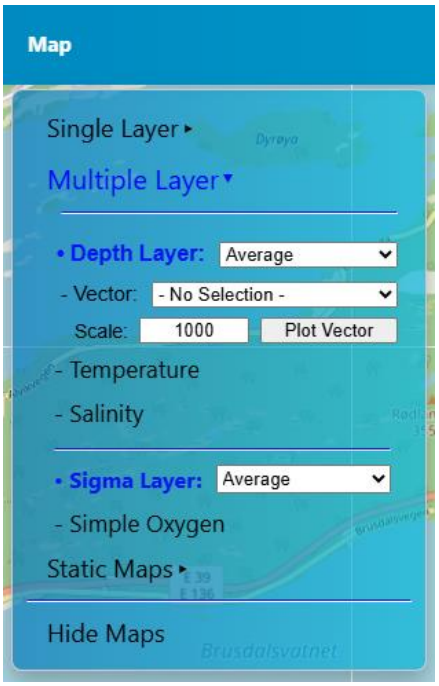

Figure 5.11. Mutiple layer dynamic options

- One example of dynamic map for average value of temperature is shown in Figure 5.12a, velocity is shown in Figure 5.12b, average values for WAQ simulation is shown in Figure 5.12c, and combined map between average values of temperature and velocity is shown in Figure 5.12d.

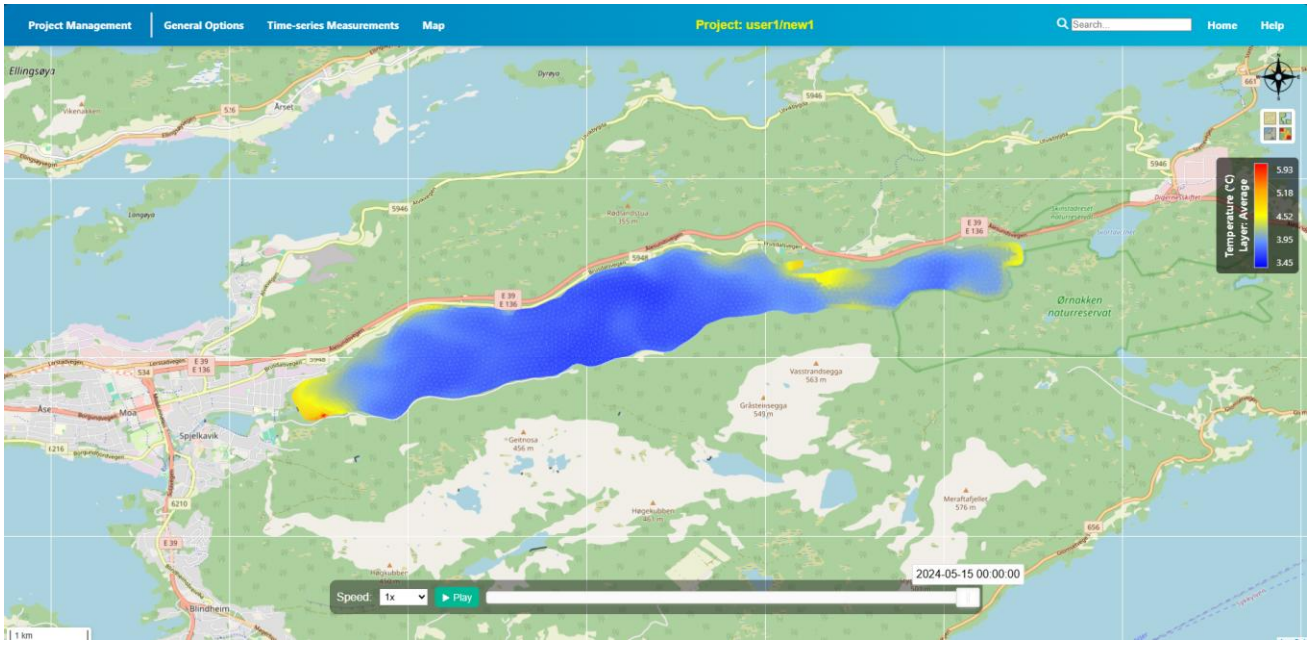

Figure 5.12a. Mutiple layer dynamic map for average temperature

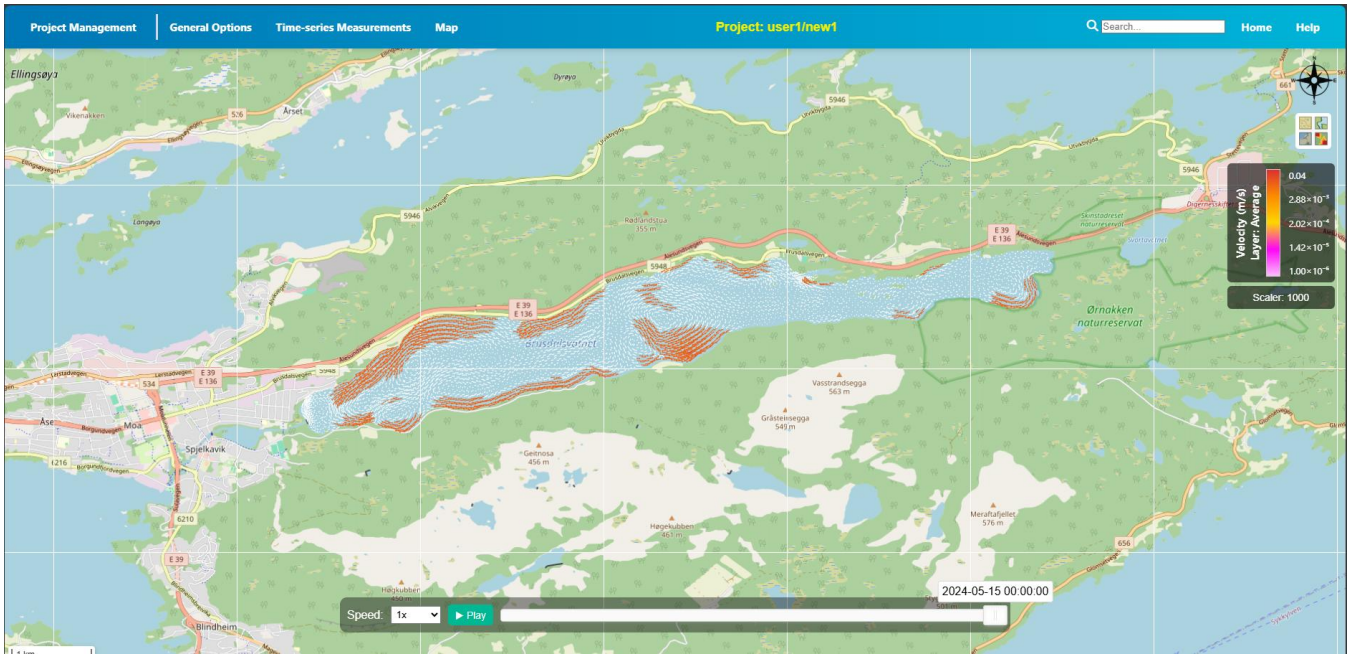

Figure 5.12b. Mutiple layer dynamic map for average velocity

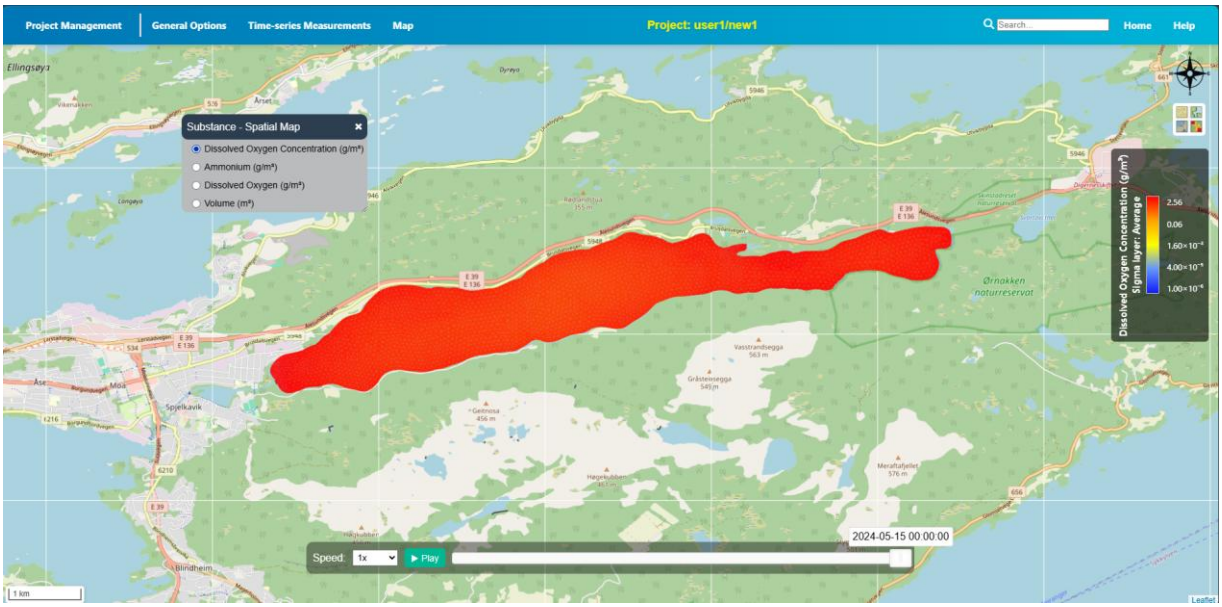

Figure 5.12c. Mutiple layer dynamic map for average simple oxygen (WAQ simulation)

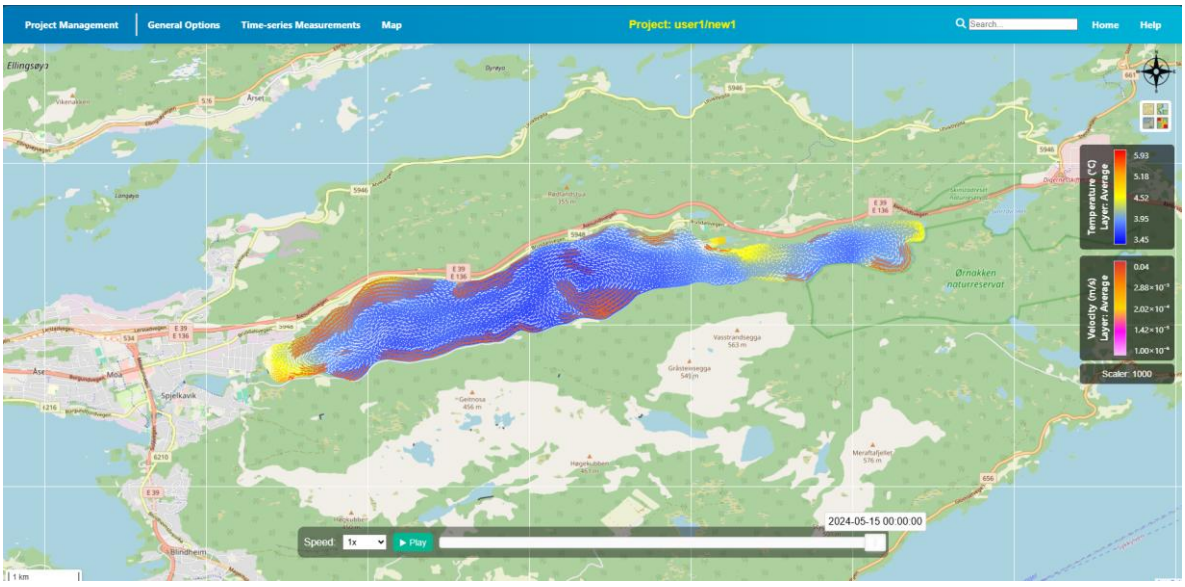

Figure 5.12d. Mutiple layer dynamic map for average temperature and velocity

- The option "*Static*" allows user to visualize a static map. One example of bed depth map is shown in Figure 5.13.

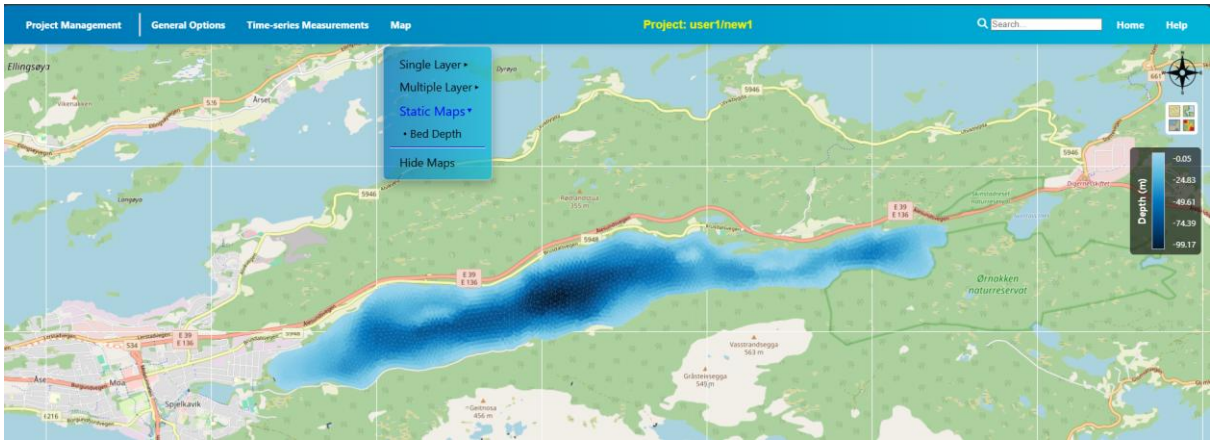

Figure 5.13. Bed depth map