

**Interreg**



EUROPEAN UNION

**ADRION**

**ADRIATIC-IONIAN**

European Regional Development Fund - Instrument for Pre-Accession II Fund

**I-STORMS**



# Integrated Sea sTORM Management Strategies

[www.iws.seastorms.eu](http://www.iws.seastorms.eu)

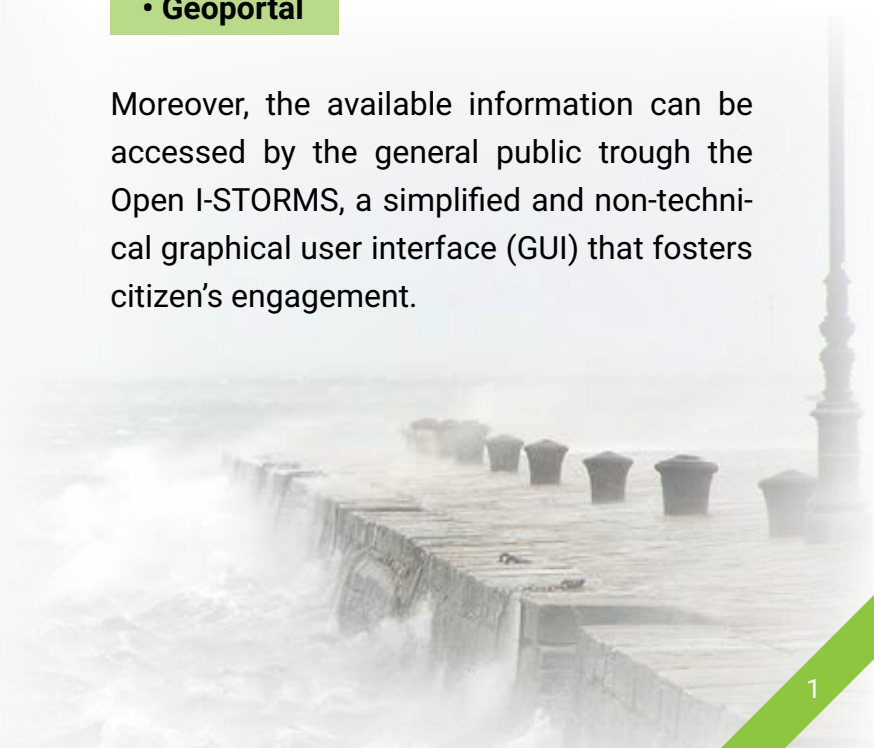


# User Orientation

The **I-STORMS Web System (IWS)**, which can be accessed by Project Partners, researchers, public administrations and civil protection organizations, is organized in four main components:

- **Sea storm atlas**
- **Measurements**
- **Multi-model forecasts**
- **Geoportal**

Moreover, the available information can be accessed by the general public through the Open I-STORMS, a simplified and non-technical graphical user interface (GUI) that fosters citizen's engagement.



# The Project

The I-STORMS project seeks to improve the early warning and civil protection procedures in sea storms.

I-STORMS aims through transnational collaboration to enhance innovative policies and develop joint strategies to safeguard the Adriatic-Ionian area from sea storms.

The I-STORMS Web System, included in the Project's activities, is a combination of a common data system for sharing sea measurements and forecasts, a multi-model forecasting system, a geoportal and interactive geo-visualization tools to make results available to the general public (Open I-STORMS). This Project is funded by the "Interreg V-B Adriatic-Ionian Programme".

# The IWS Platform

The I-STORMS Web System aggregates measurements and forecasting data from already existing forecasting systems in the Adriatic – Ionian area, in order to achieve prompt emergency response during sea storm events.

**IWS is structured into six subsystems:**

- the **Resource Layer**
- the **Data importer**
- the **Transnational Multi-model Ensemble System (TMES)**
- the **Task Manager middleware**
- the **Common Data Sharing System (CDSS) (Access Layer)**
- the **Geoportal (Graphical User Interface)**

The IWS implementation follows a full-fledged Free and Open Source Software (FOSS) approach in compliance with open source software strategy of the European Commission.



# Sea Storm Atlas

All available information on coastal disaster due to sea storm events (historical and current) are organized and mapped in geospatial layers which constitute the Sea Storms Atlas.

The data collected can be used to draw the map of risk characterization of the coast with the aim of identifying the most vulnerable areas and supporting the planning of coastal area use and development.

Through the Atlas Event Catalog, provided by the Event Catalog menu option, the user can view information on each Region, as well as the list of its past events.



# Measurements

A joint asset which could be exploited through fruitful collaboration is the existence in the whole Adriatic-Ionian coastal territories of large networks of sensors and stations.

The Common Data Sharing System (CDSS) allows for aggregating the observed data from several monitoring networks. The aggregating approach for collecting and sharing observations is crucial for providing real-time information about the sea state - and its evolution - to be used by several countries for prompt emergency response and to increase the overall preparedness to sea storms.

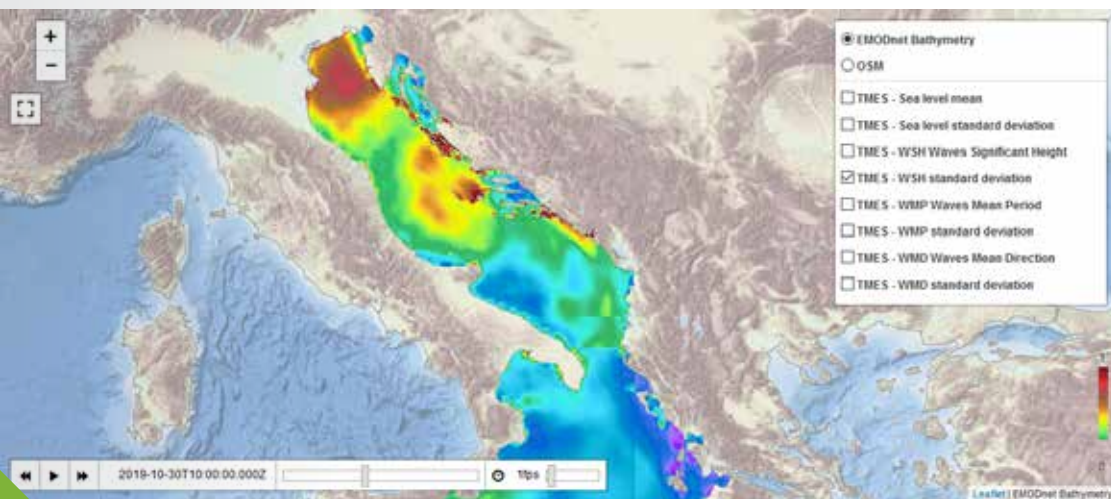


# Forecasts

The transnational multi-model ensemble system (TMES) combines the outcomes of existing sea and wave forecasting systems, helping in improving the forecast reliability on one hand and by adding indications to the forecast uncertainty on the other hand.

All numerical model results are interpolated, through a distance-weighted average remapping, on a common regular lat-lon grid covering the Adriatic-Ionian macro-region with a resolution of 0.02 deg.

TMES produces results in terms of the ensemble mean and standard deviation, accounted for a measure of the forecast uncertainty.



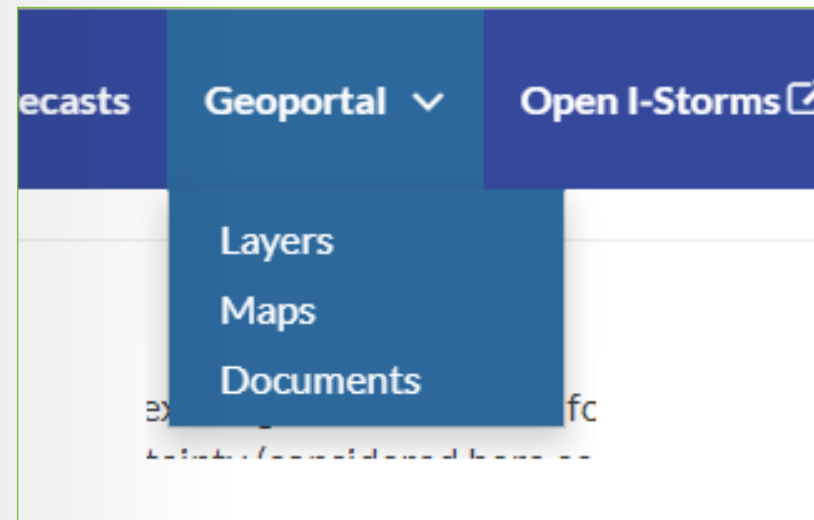
# Geoportal

The Geoportal provides interactive tools in order to search, visualize, explore and download observation datasets and forecast outputs capitalizing on existing experiences in the ADRI-ON area (ADRIPLAN, SHAPE, HAZADR projects).

**The Geoportal menu of the IWS Platform contains:**

1. Layers
2. Maps
3. Documents

The above sub-menus are analyzed in the following sections of this Handbook.



# Open I-Storms

The Open I-STORMS implements an advanced web mapping application to make geospatial and multi-temporal information on waves and sea level from both measurements sensor networks and forecast model outputs accessible.

The Open I-STORMS allows the IWS data (measurements, sea forecast results and information about sea storms) to be explored by non-experts.

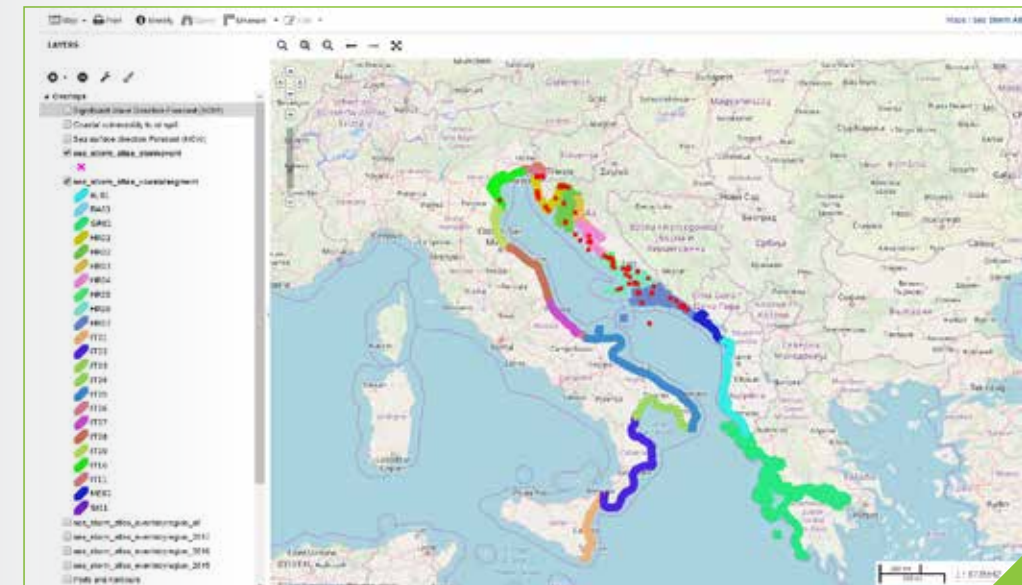
# The Sea Storm Atlas Menu - Map

The Map of the Sea Storm Atlas Menu visualizes the information on coastal disasters due to sea storm events.

End-users may choose the base map and the overlay to the base map from the Table of Contents (ToC) on the left.

Additionally, the following user options are included:

- **Save map**
- **Publish map**
- **Print map**
- **Identify Feature**
- **Query the selected layer**
- **Measure distance/area**



# The Sea Storm Atlas Menu – Event Catalogue

The Sea storm Events by region is the list of regions that the user can select to depict the relevant information and then view each region's Events list from the provided button on the right. The user can also insert a new event to the list, by selecting the Insert new event button.

## Sea storm Events by region

Select region

- AL01 - Albania
- BA01 - Bosnia-Herzegovina
- GR01 - Greece
- HR01 - Croatia, Istrija
- HR02 - Croatia, Primorje-Gorski Kotar
- HR03 - Croatia, Lika-Senj
- HR04 - Croatia, Zadar
- HR05 - Croatia, Šibenik-Knin
- HR06 - Croatia, Split - Dalmacija
- HR07 - Croatia, Dubrovnik-Neretva
- IT01 - Italy, Sicilia
- IT02 - Italy, Calabria
- IT03 - Italy, Basilicata
- IT04 - Italy, Puglia
- IT05 - Italy, Puglia
- IT06 - Italy, Molise
- IT07 - Italy, Abruzzo
- IT08 - Italy, Marche
- IT09 - Italy, Emilia-Romagna, Delta Po River
- IT09 - Italy, Emilia-Romagna, Others
- IT10 - Italy, Veneto, Others
- IT10 - Italy, Veneto, Venice Lagoon
- IT11 - Italy, Friuli Venezia Giulia
- ME01 - Montenegro
- SI01 - Slovenia

## Region: GR01/00

### Greece

- Sea: Ionian
- Early warning system: ✓
- EWS risk: Wave and Tide Storm, Meteotsunami
- Institutional forecasting service: ✓
- Specific Civil Protection procedures: ✓
- Intervention procedures: ✓
- Risk sources of coastal flooding: None
- Network for marine measurement/observation: ✓
- Post event monitoring system: ✓

# The Measurements Menu

The Measurements Menu allows the end-user to:

- Selected the variables and monitoring stations to be visualized
- Pick any time-range, either from predefined quick ranges or create a custom time-range and select the refreshing time
- Quickly change the time-range to the next or previous set when using a custom time-range
- Share the dashboard
- Toggle kiosk mode on/off.

The screenshot shows a dashboard interface with a search bar at the top. Below the search bar, there are two main sections: 'Recent' and 'General'. The 'Recent' section lists several dashboards, including 'Sea level', 'ARPAE - Porto Garibaldi (2015)', and 'Embedded panels'. The 'General' section lists 'ARPAE - Porto Garibaldi (2015)', 'Dashboard prova', 'Embedded panels', 'Sea level', and 'Sea level Copy'. On the right side, there is a 'Filter by:' panel with a 'Tags' dropdown menu and a 'Clear' button.

The screenshot shows a specific dashboard titled 'ARPAE - Porto Garibaldi (2015)'. At the top, there is a time range selector set to 'Jan 1, 2015 01:00:00 to Jan 1, 2016 01:00:00'. Below the time range, there is a data table with the following structure:

ARPAE - Porto Garibaldi (2015)	
1.25	

# The Forecasts Menu

The Forecasts Menu allows the user to:

- **Choose the variable to be visualized:**
  - Sea level mean
  - Sea level standard deviation
  - Waves Significant Height mean
  - Waves Significant Height standard deviation
  - Waves Mean Period
  - Waves Mean Period standard deviation
  - Waves Mean Direction
  - Waves Mean Direction standard deviation
- **Play/forward/backward the animation of the map**
- **Change the fps of the animation of the map**
- **Move the slider of the time range of the map**
- **Zoom in/out of the map**
- **Enter/exit full screen mode**
- **View the scale of the metrics on the bottom right.**

# The Geoportal Menu – Layers (1)

The Geoportal Menu contains the list of all existing layers. The end-user may choose any number of layers to add to a map, upload a new layer, associate it with metadata - ratings - comments.

The end-user may also download a layer or share it to social networks.

The screenshot shows the '3 Layers found' interface. On the left, there is a sidebar with 'Selected Layers' (empty), 'Add layers through the "checkboxes"', 'Set permissions', 'Create a Map', and a 'Filters' section with expandable categories: TEXT, KEYWORDS, TYPE, Vector Layers (3), CATEGORIES, OWNERS, DATE, REGION, and EXTENT. The main area displays three layers:

- domain\_areas0**: No abstract provided. Created by marcopolo on 28 Oct 2019. 3 likes, 0 comments, 0 stars. Includes a 'Create a Map' link and a thumbnail map.
- domain\_areas**: No abstract provided. Created by marcopolo on 27 Oct 2019. 2 likes, 0 comments, 0 stars. Includes a 'Create a Map' link and a thumbnail map.
- I\_STORMS\_monitoring\_station\_details\_station\_1**: No abstract provided. Created by I-STORMS on 25 Oct 2019. 0 likes, 0 comments, 0 stars. Includes a 'Create a Map' link and a 'no image' placeholder.

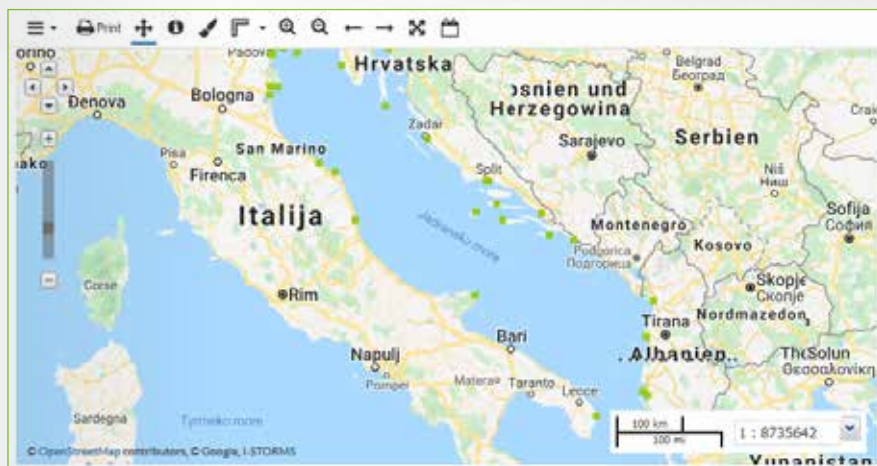


# The Geoportal Menu – Layers (2)

The top bar of the Layer sub-menu includes the following user options:

- Choice of a background map.
- Print the layer.
- Pan the map.
- Get feature info.
- Layer Styles.
- Measure length/area.
- Zoom in/out.
- Zoom to previous/next extent.
- Zoom to max extent.
- Show legend.

The bottom right widget allows the user to select the scale manually and zoom in/out of the map.



# The Geoportal Menu – Layers (3)

The right bar of the Layer sub-menu allows the user to manage the layers subsystem and specifically to:

- Download Layer
- Metadata Detail
- View Layer
- Download Metadata

It also allows the user to create a map using the chosen layer. The right bar also depicts certain useful information:

- Legend
- Maps using this layer
- Styles
- About the layer

A screenshot of the right-hand side of the Geoportal Layer sub-menu. It features a vertical stack of buttons and sections. At the top are buttons for 'Download Layer', 'Metadata Detail', 'View Layer', and 'Download Metadata'. Below these is a 'Legend' section with a dark yellow square point style and a dark yellow square point style. Next is a 'Maps using this layer' section with a list of maps, including 'Monitoring Station Map'. Below that is a 'Create a map using this layer' section with a 'Create a Map' button. The 'Styles' section shows a list of styles, with '(default style) dark yellow square point style' selected. Finally, the 'About' section displays 'Owner, Point of Contact, Metadata Author' and the logo for 'I-STORMS No Group'.

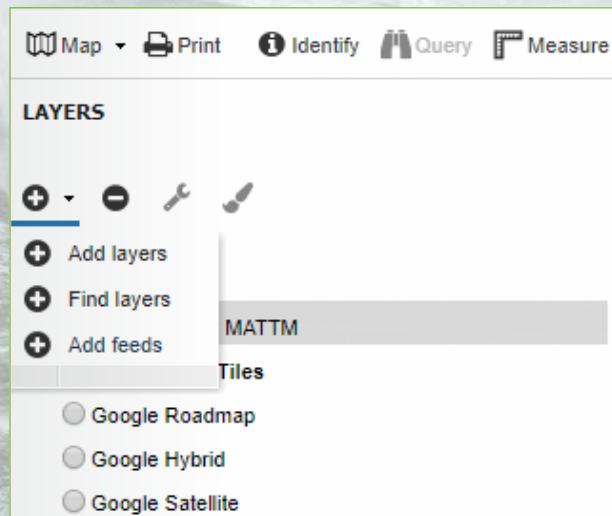
# The Geoportal Menu – Maps

## Create a New Map

This option allows end-users to create their own Map by clicking the Create Map button from the Maps option of the Geoportal Menu.

The end-user is transferred to an empty map view, void of all layers, with the following options:

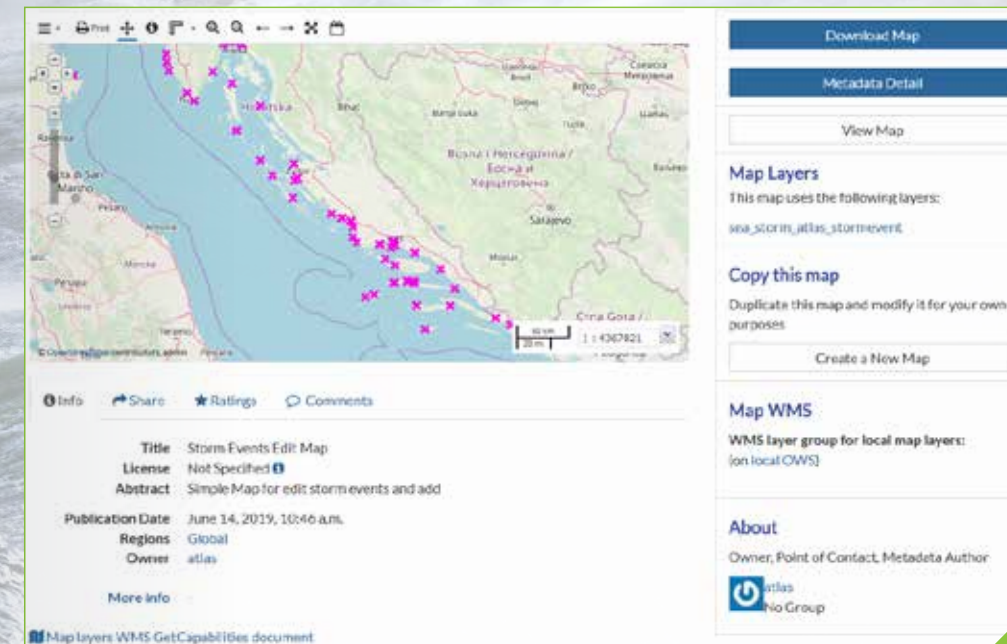
- Choose an underlying map
- Add layers
- Print map
- Save map
- Publish map



# The Geoportal Menu – Maps

## Publish a Map

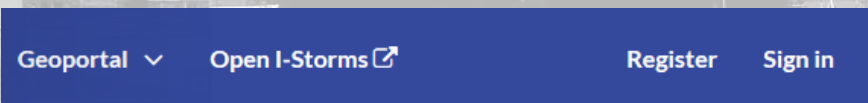
End-users may publish the Maps they create, so that they are accessible by all users of the Geoportal.



# People – Accounts and User Profile

Users may Create a New Account by clicking on the Register button and then fill in the related form. An email will be sent by the system to the administrators: since the registration in IWS/Geoportal is moderated the user will need to wait until an administrator approves the request.

When the request is approved, an email will be sent confirming that the user account has been approved and is active.



### Sign up

Create a new local account

**E-mail**

**Username**

**Password**

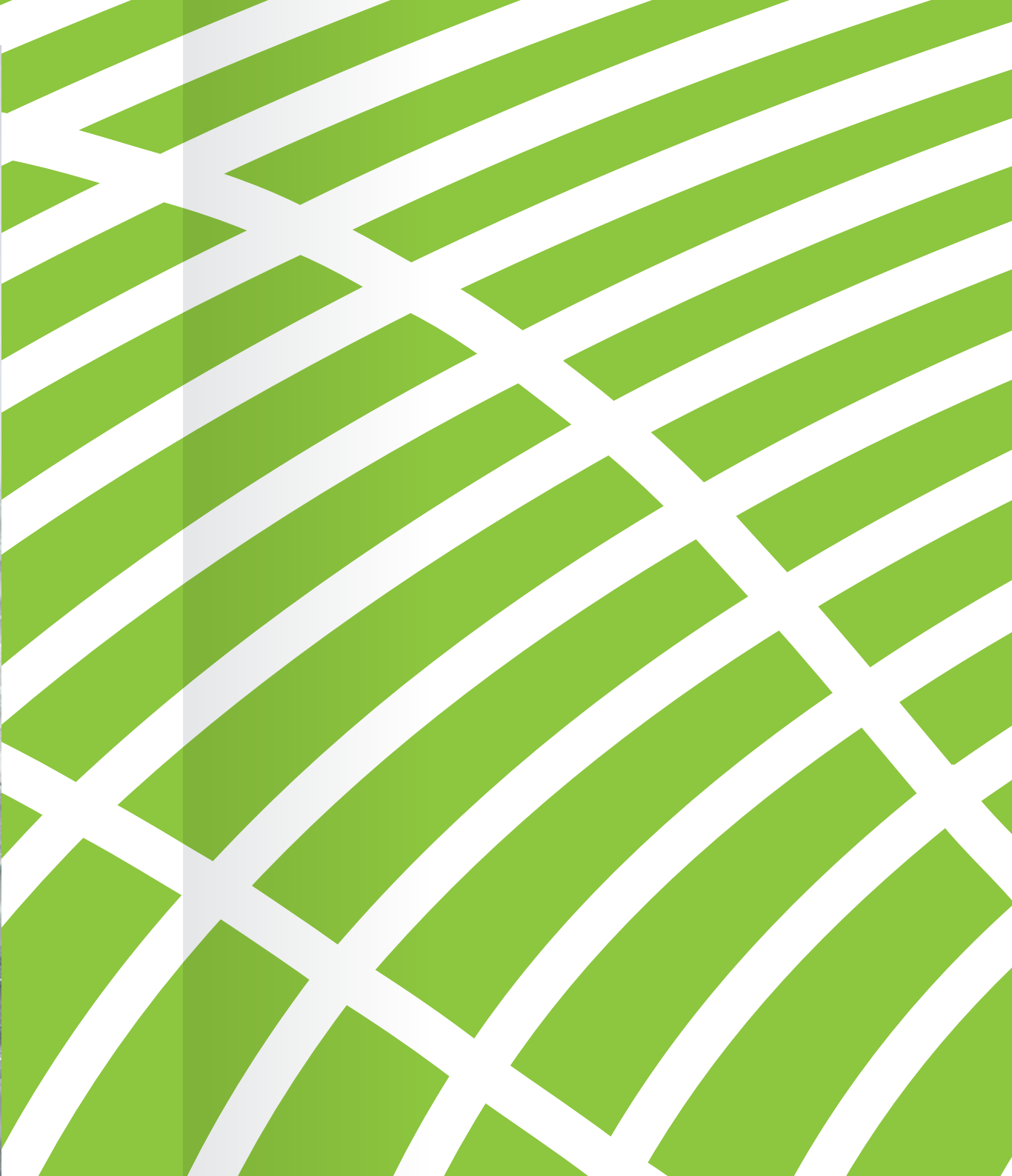
**Password (again)**

# The Open I-Storms Menu

The Open I-Storms Menu includes the following options:

- **Choose between:**
  - Station Wave
  - Station Seal Level
- **Switch view of:**
  - Wave
  - Sea Level
- **Change metric:**
  - Standard deviation
  - Mean
- **Play/stop animation of changes during the time range selected**
- **Zoom in/out of the map.**





**Interreg**   
EUROPEAN UNION

**ADRION** **ADRIATIC-IONIAN**

European Regional Development Fund - Instrument for Pre-Accession II Fund

**I-STORMS**



# Integrated Sea sTORM Management Strategies

Discover more about I-STORMS  
[istorms.adrioninterreg.eu](http://istorms.adrioninterreg.eu)

 @istormsproject  @istorms\_project  I-STORMS EU Project

This handbook has been produced with the financial assistance of the European Union. The content of the document is the sole responsibility of the National Research Council-Institute of Marine Sciences and can under no circumstances be regarded as reflecting the position of the European Union and/or ADRION programme authorities.