ADRICOSM-INTERMEDIATE

D3.4.1 EPA Water Database User Manual

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Executive Summary

The Environmental Protection Agency-EPA Water Database is a data archive and catalogue database, that allows to discover, view and download inland, underground and marine water data for the Montenegro area.

The database was build with the support of the Italian Ministry for the Environment, Land and Sea, given to the Ministry of Sustainable Development and Tourism of Montenegro, through the Adricosm-Intermediate Project (http://www.cmcc.it/adricosm-intermediate/).

The project was carried out by a Joint venture between:

- EPA Montenegro
- Centro EuroMediterraneo per i Cambiamenti Climatici (CMCC), Lecce, Italy (*http://www.cmcc.it/*)
- CLU Ltd, Bologna, Italy (www.cluweb.com)

Data have been collected from EPA and different research projects (LSIEMP, Adricosm-Star - http://gnoo.bo.ingv.it/adricosm-star/ , SeaDataNet - http://www.seadatanet.org/, MyOcean – www.myocean.eu)

EPA WATER DATABASE USER MANUAL

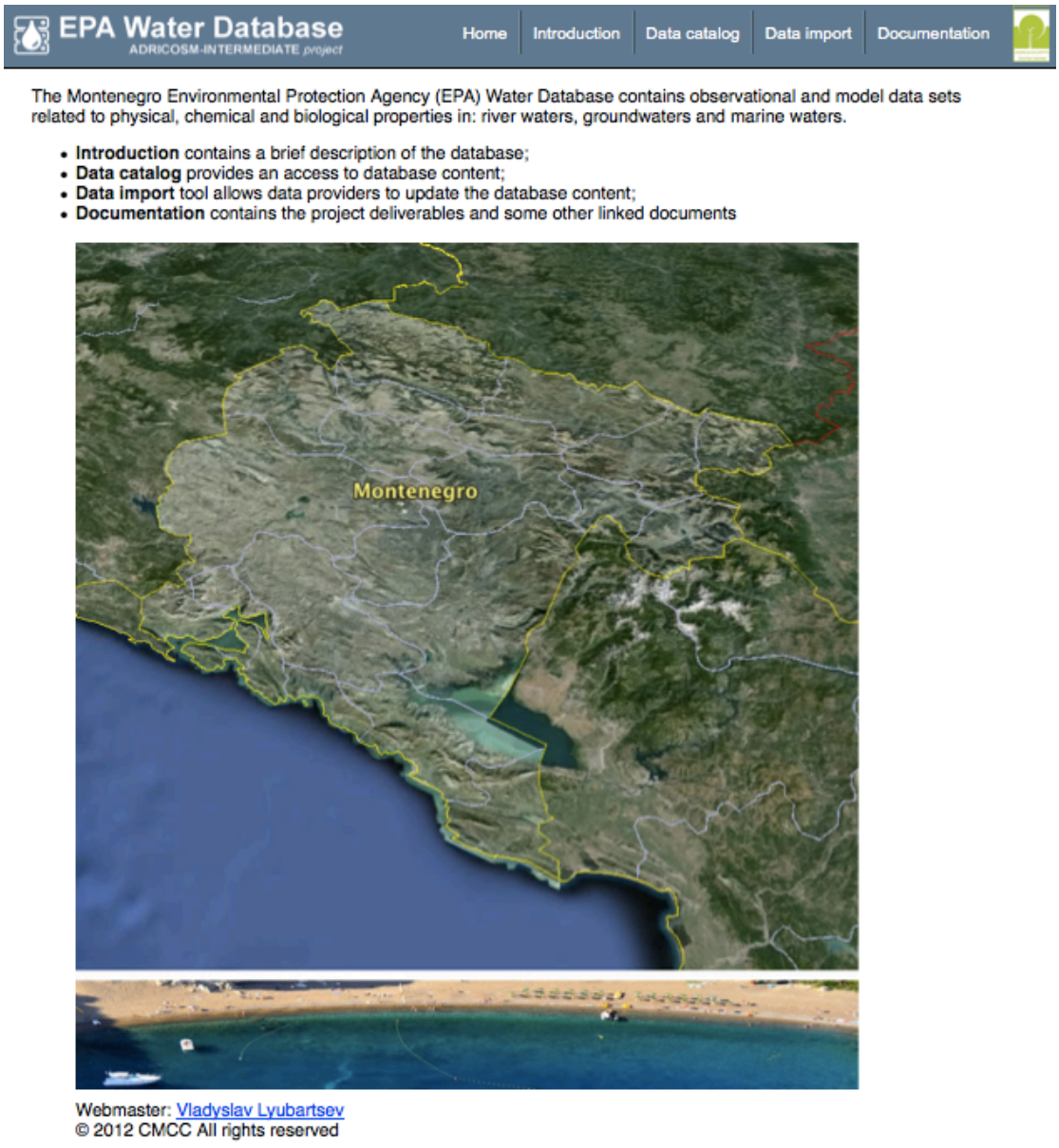
Introduction

This manual aims to explain:

- how to search and visualize data
- how to insert new data into the database.

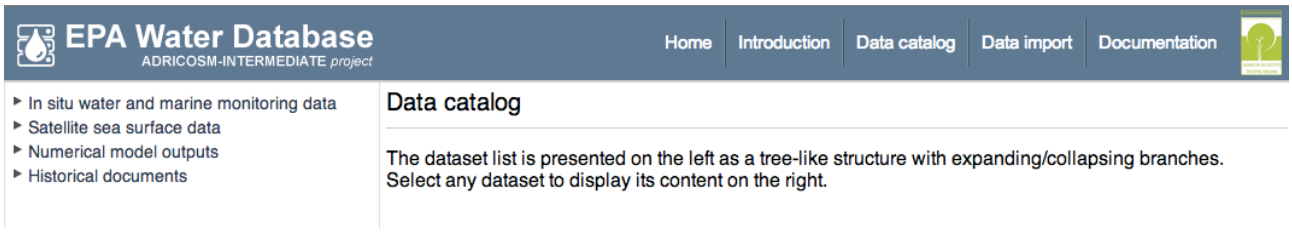
For any problem please contact the EPA technical assistance or the developers at CMCC (Vladyslav Lyubartsev)

The web application is optimized for Firefox 23.0.1 (Windows and Mac).



How to browse Data Catalog

From the upper menu click on Data Catalog, a new page will appear. The left menu allows opening the branches that contain the data components.



The data Catalogue consists of four major components:

- In situ water and marine monitoring data
- Satellite Sea Surface data
- Numerical Model outputs
- Historical documents

In the following we will describe each item and we will see how to plot the different data,

How to plot "In situ water and marine monitoring data"

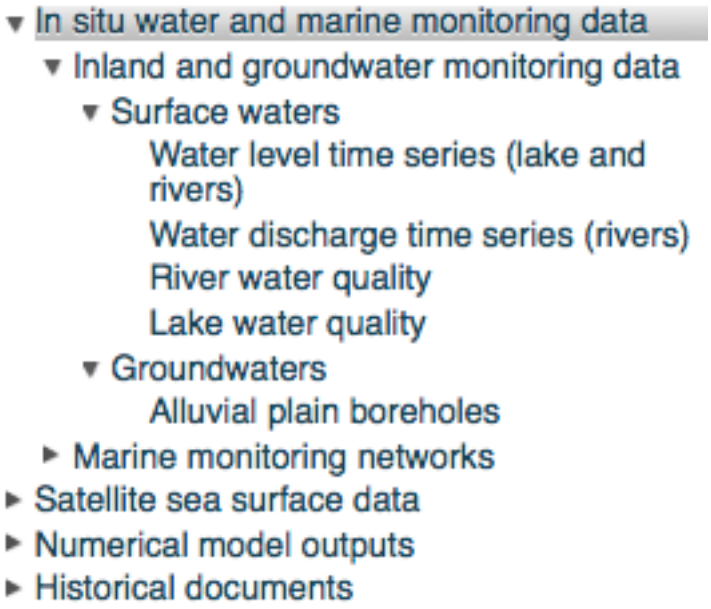
The "In situ water and marine monitoring data" are organized into two categories, listed below:

- Inland and ground water monitoring data
- Marine monitoring networks

Data in this section are collected by fixed automatic stations and/or repeated surveys at fixed locations. In the following we will describe the data contained in the two categories.

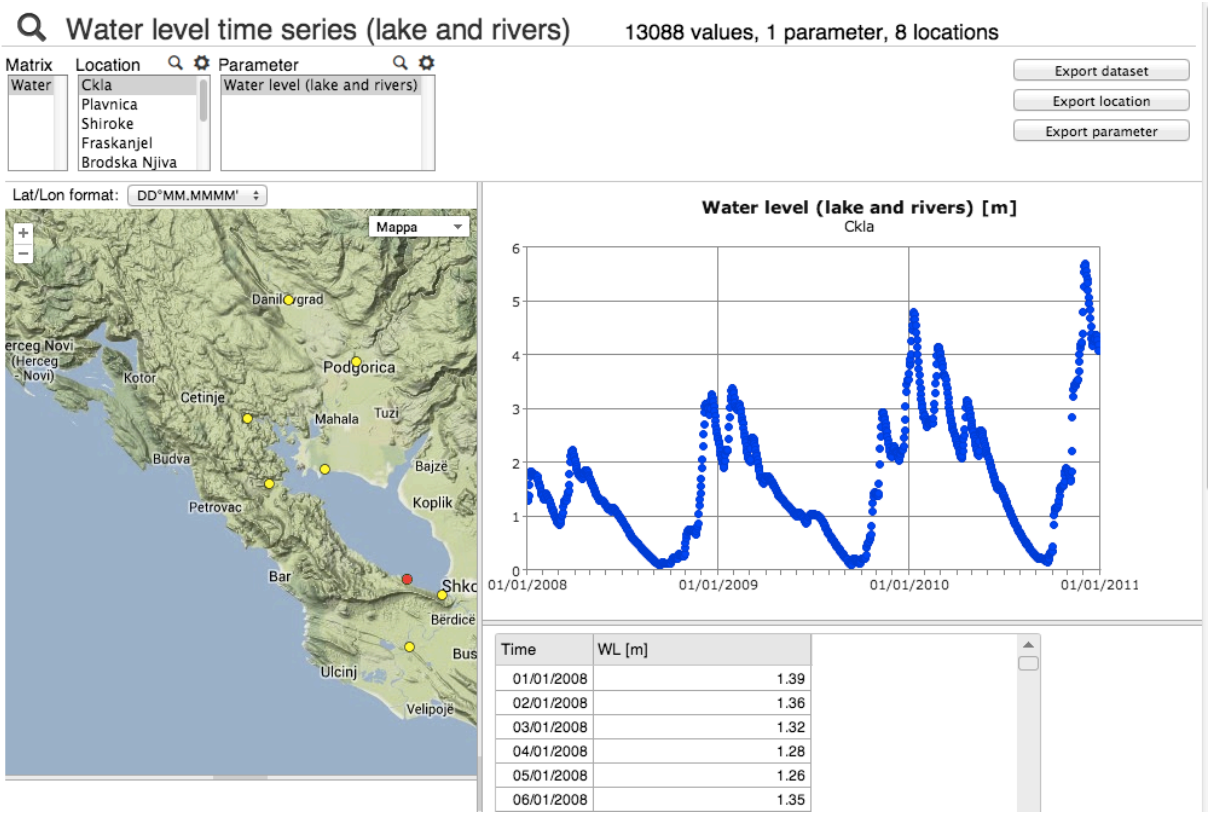
1. **Inland and ground water monitoring**

- Surface waters
    - Water level time series (lake and rivers)
    - Water discharge time series (rivers)
    - River water quality
    - Lake water quality
- Groundwaters
    - Boreholes



Clicking of each the last braches of the tree you reach the page to visualize data.

For example, click on Water level time series (lake and rivers). You will see the following results.



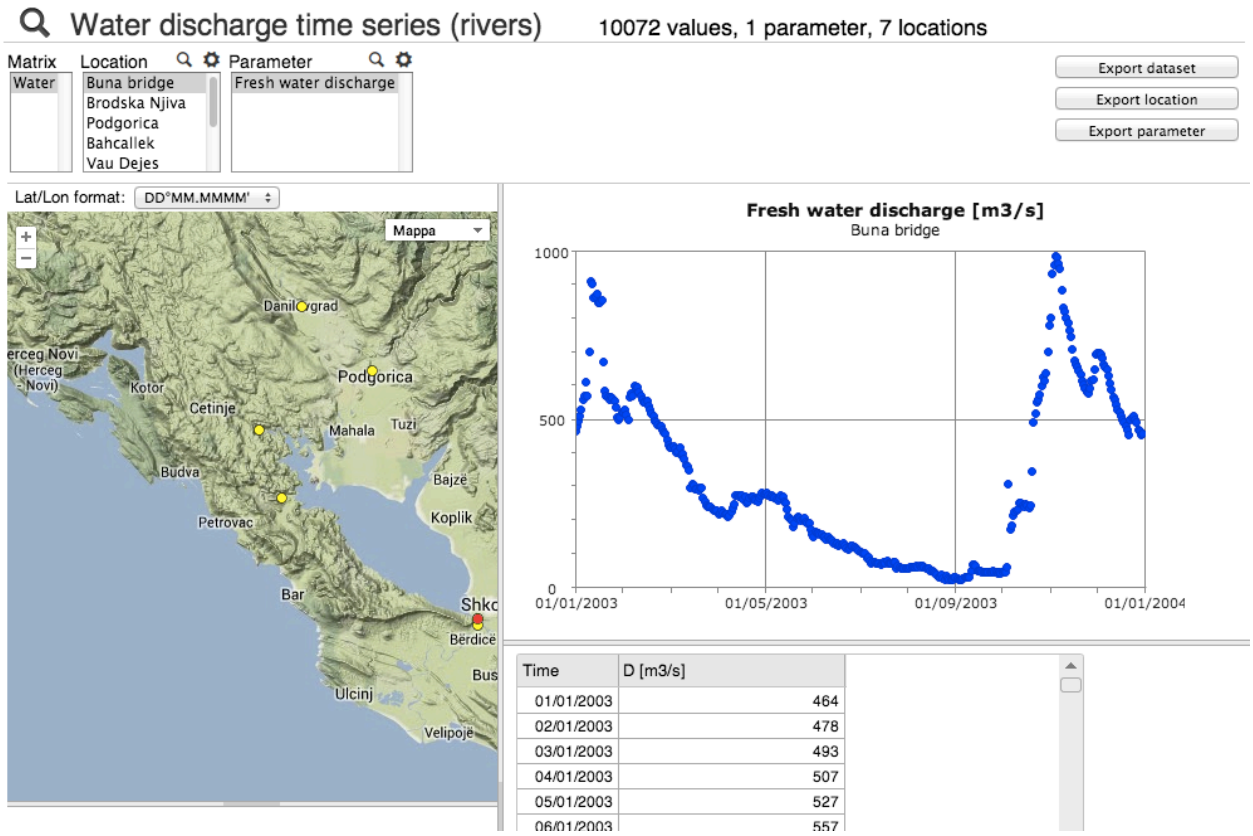
In the upper part of the page you have the following information: Name of the available matrixes, locations and parameters.

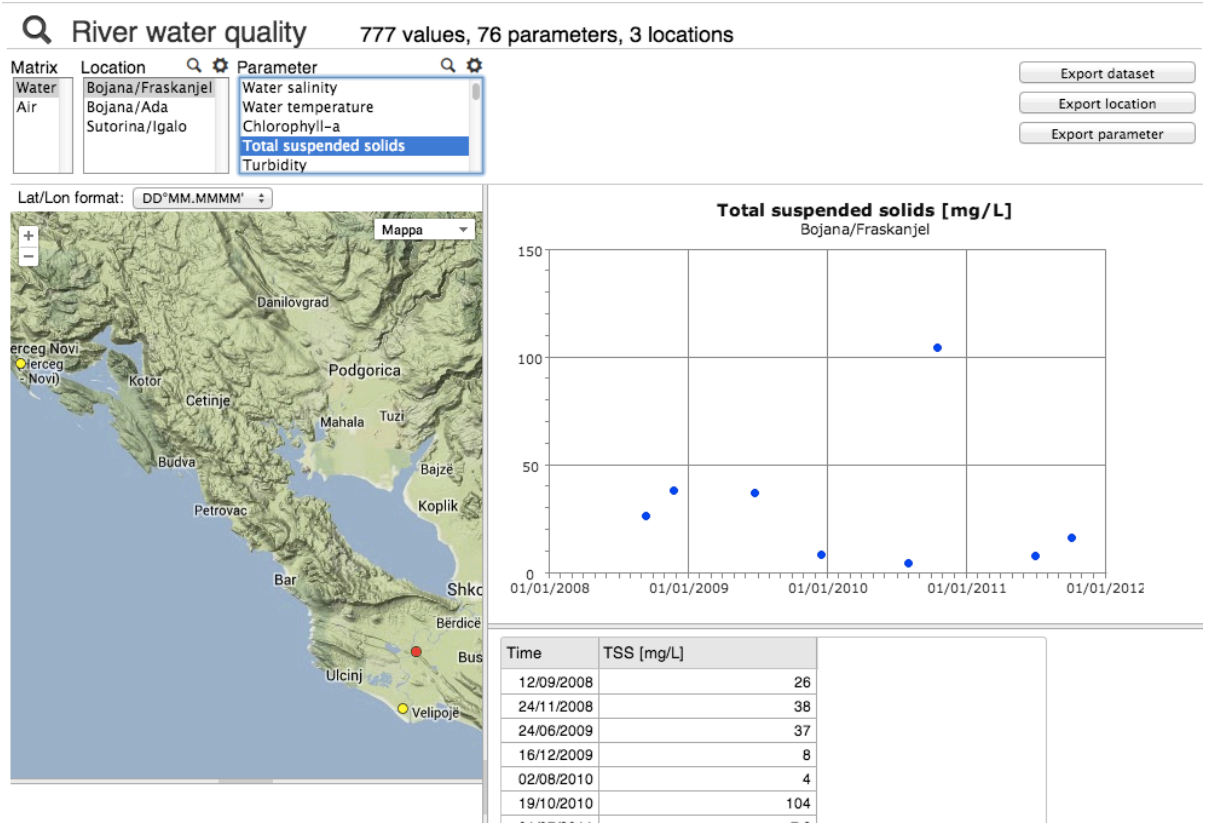
The locations are shown in the maps. The yellow circles allow directly plotting data for the selected location whilst the red is the one currently selected.

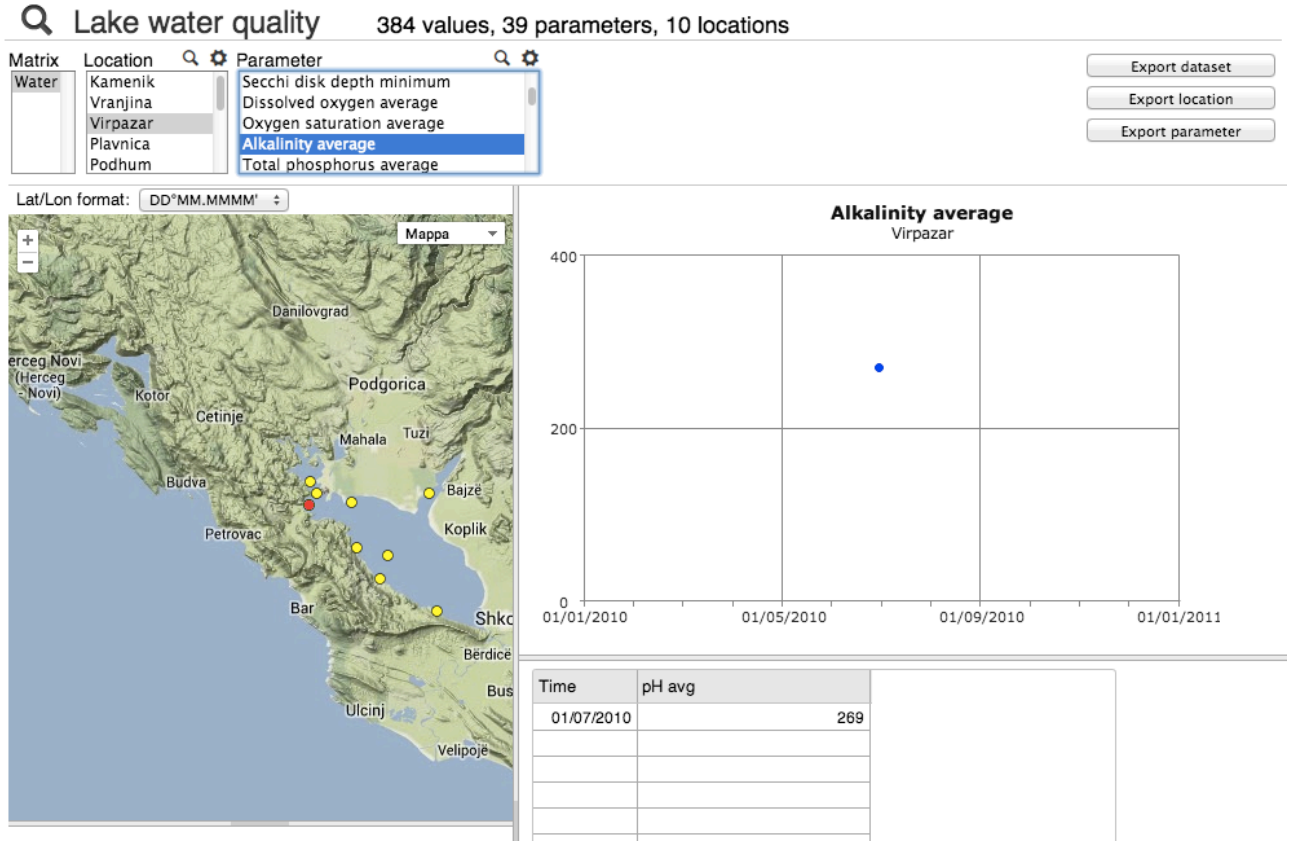
The plot changes automatically changing the matrix, the location and the parameters. The y-axis displays the parameter value and the x-axis displays the date in European format (dd/mm/aaaa).

In the bottom part of the page you can find a table with real data, which are currently plotted. A scrollbar allows the visualization to the data list.

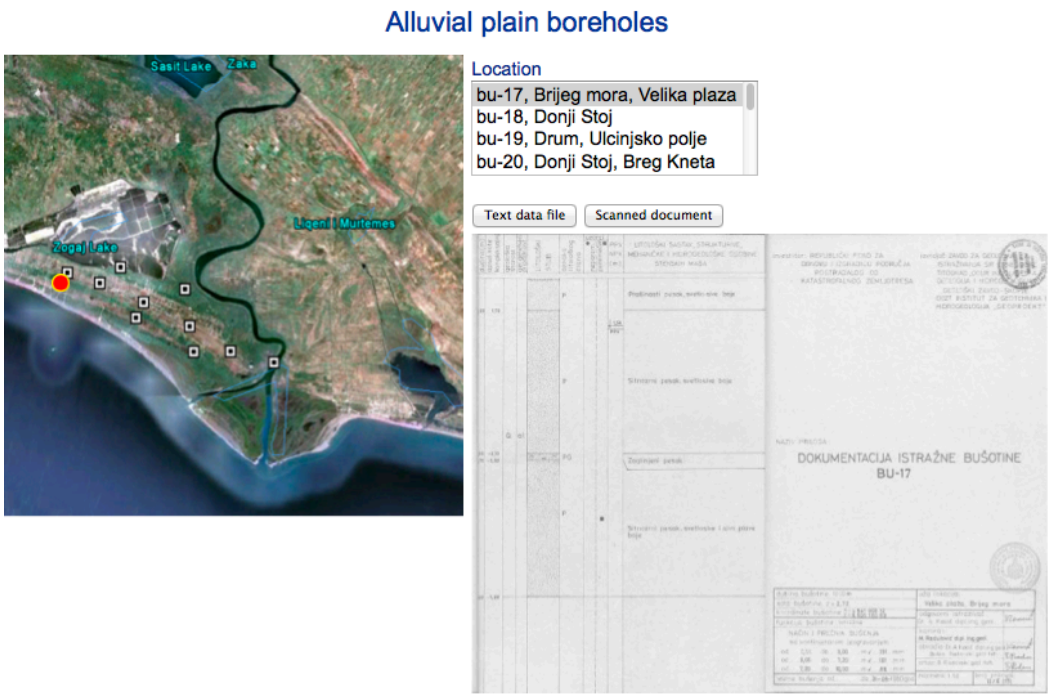
Below you can find the screenshots for Water discharge time series (rivers), River water quality and Lake water quality pages.




River water quality
777 values, 76 parameters, 3 locations
Matrix
Water
Air
Location
Bojana/Fraskanjel
Bojana/Ada
Sutorina/Igalo
Parameter
Water salinity
Water temperature
Chlorophyll-a
Total suspended solids
Turbidity
Export dataset
Export location
Export parameter
Lat/Lon format: DD°MM.MMMM'
Mappa
Danilovgrad
Podgorica
Kotor
Cetinje
Mahala
Tuzi
Budva
Bajze
Petrovac
Koplik
Bar
Shkoder
Berdice
Ulcinj
Velipojë
Total suspended solids [mg/L]
Bojana/Fraskanjel
150
100
50
0
01/01/2008
01/01/2009
01/01/2010
01/01/2011
01/01/2012
Time
TSS [mg/L]
12/09/2008 26
24/11/2008 38
24/06/2009 37
16/12/2009 8
02/08/2010 4
19/10/2010 104

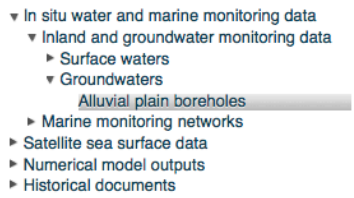

Lake water quality
384 values, 39 parameters, 10 locations
Matrix
Water
Location
Kamenik
Vranjina
Virpazar
Plavnica
Podhum
Parameter
Secchi disk depth minimum
Dissolved oxygen average
Oxygen saturation average
Alkalinity average
Total phosphorus average
Export dataset
Export location
Export parameter
Lat/Lon format: DD°MM.MMMM'
Mappa
Danilovgrad
Podgorica
Kotor
Cetinje
Mahala
Tuzi
Budva
Bajze
Petrovac
Koplik
Bar
Shkoder
Berdice
Ulcinj
Velipojë
Alkalinity average
Virpazar
400
200
0
01/01/2010
01/05/2010
01/09/2010
01/01/2011
Time
pH avg
01/07/2010 269

Another example of visualization is the “Alluvial plain boreholes”. After you have reached this page clicking on the related link you will see the page below.



In the left part of the page there is a map which clickable squares referring to the different locations. From the Location menu you can change the input as well. The result is a preview of the original scanned file.

Clicking on Text data file button, you can easily save the metadata information on your computer.




```
*METADATA*
* dataset = LSIEMP-PHM underground water and properties
* source = Geological Survey of Montenegro
* filename = UW_borehole_1980_bu17
* station = bu-17
* data = in situ measurement
* start of measurement = 31/08/1980
* end of measurement = 31/08/1980
* time scale = single measurement
* longitude = 19.27860529
* latitude = 41.90584977
* location = Velika plaza, Brijeg mora
* GPS zone = MGI, Balkans zone 6
* GPS X = 6606160.63
* GPS Y = 4641003.12
* missing value = -999
* comments =
** borehole elevation [m] = 2.72
** borehole depth [m] = 10
** terrain height above sea level [m] =
** borehole height from terrain [m] =
** borehole height above sea level [m] =
** borehole bottom (meters above sea level) [m] =
** date of drilling = 31/08/1980
*END*

# BOREHOLE GEOMETRY = 1
# LITHOLOGICAL CHARACTERIZATION = 1
# PHYSICAL CHARACTERIZATION = 0
# GROUNDWATER LEVEL = 1
*END*

*BOREHOLE GEOMETRY*
# name 0 = layer's top depth [m]
# name 1 = layer's bottom depth [m]
# name 2 = drilling diameter [mm]
*END*

0       3       131
3       7.2     101
7.2     10      86

*LITHOLOGICAL CHARACTERIZATION*
# name 0 = layer's top depth [m]
# name 1 = layer's bottom depth [m]
# name 2 = layer's lithological characterization
# name 3 = geological age
*END*

0       1       "dusty sand, light-grey"                        "quaternary"
1       6.5     "fine grain sand, light grey color"             "quaternary"
6.5     6.7     "clayey sand"                                   "quaternary"
6.7     10      "fine grain sand, light grey and grey-blue"     "quaternary"

#GROUNDWATER LEVEL#
# name 0 = date of sampling
# name 1 = groundwater level (meters below ground surface) [m]
*END*

31/08/1980      1.58
```

The Scanned document button downloads the original scanned file.

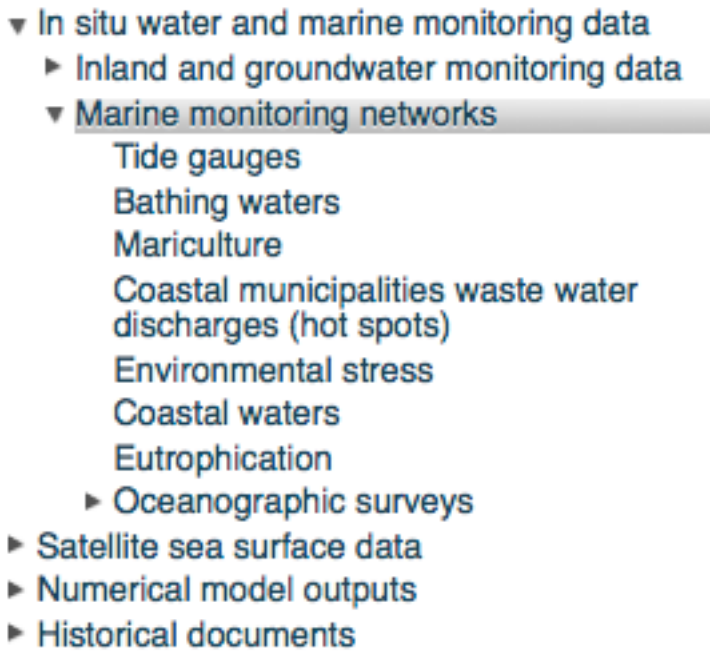
How to plot “Marine monitoring networks”

The marine network contains the following categories:

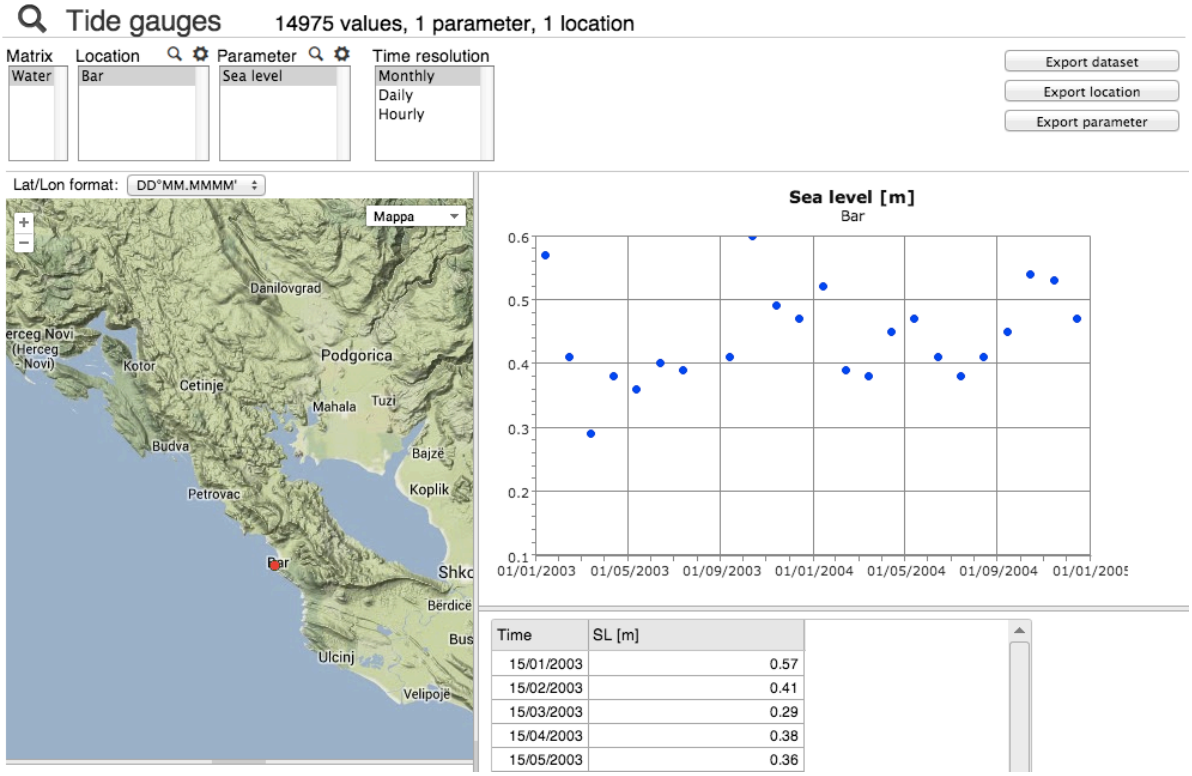
- Tide gauges
- Bathing waters
- Mariculture
- Hot spot pollution
- Environmental stress
- Coastal waters
- Eutrophication
- Oceanographic surveys
    - Sediment analysis
    - CTD data
        - CNR-ISMAR-ANCONA
    - Sediment analysis
    - XBT data
        - ENEA ADRICOSM

- ENEA ADRICOSM-STAR
- OGS

- SeaDataNet data



In the following example we will see how to plot the data related to these categories.
For example, click on Tide Gauges. You will see the following results.



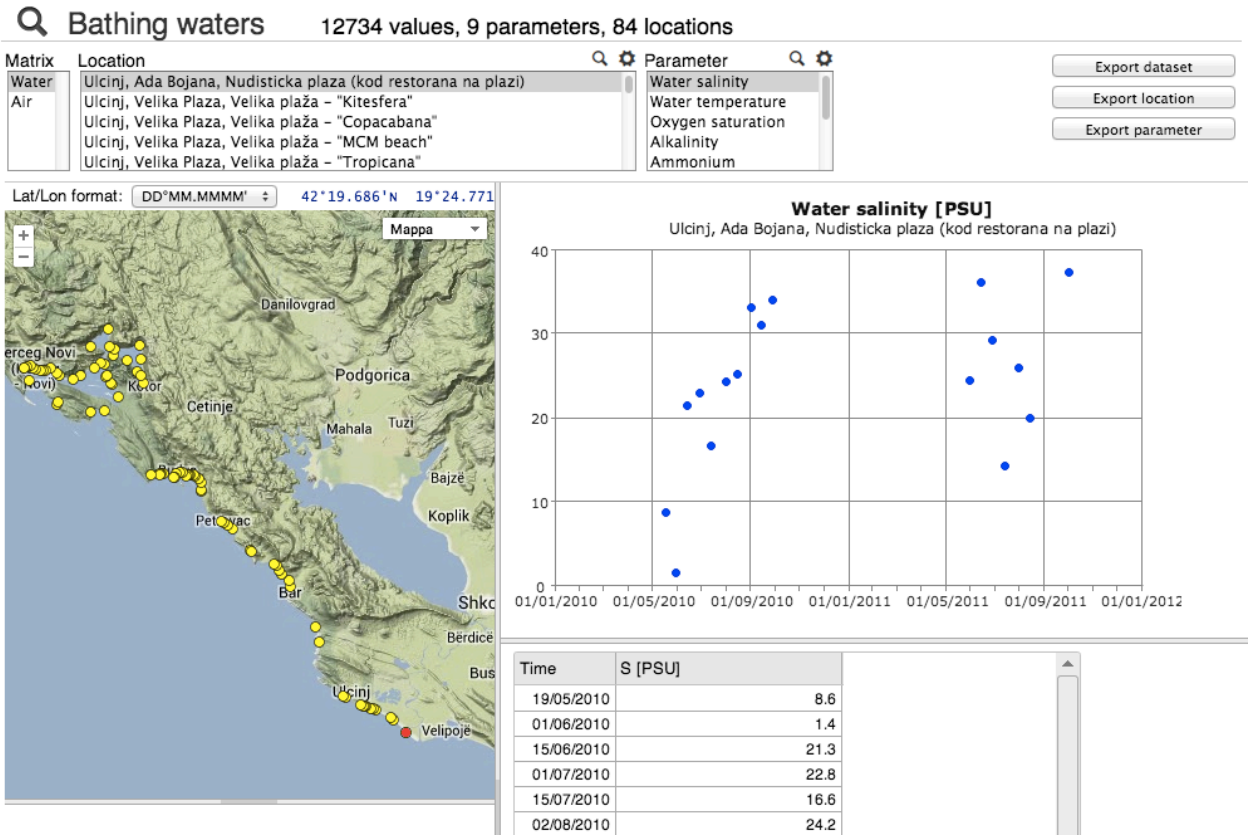
In the upper part of the page you have the following information: Name of the available matrixes, locations, parameters and time resolution.

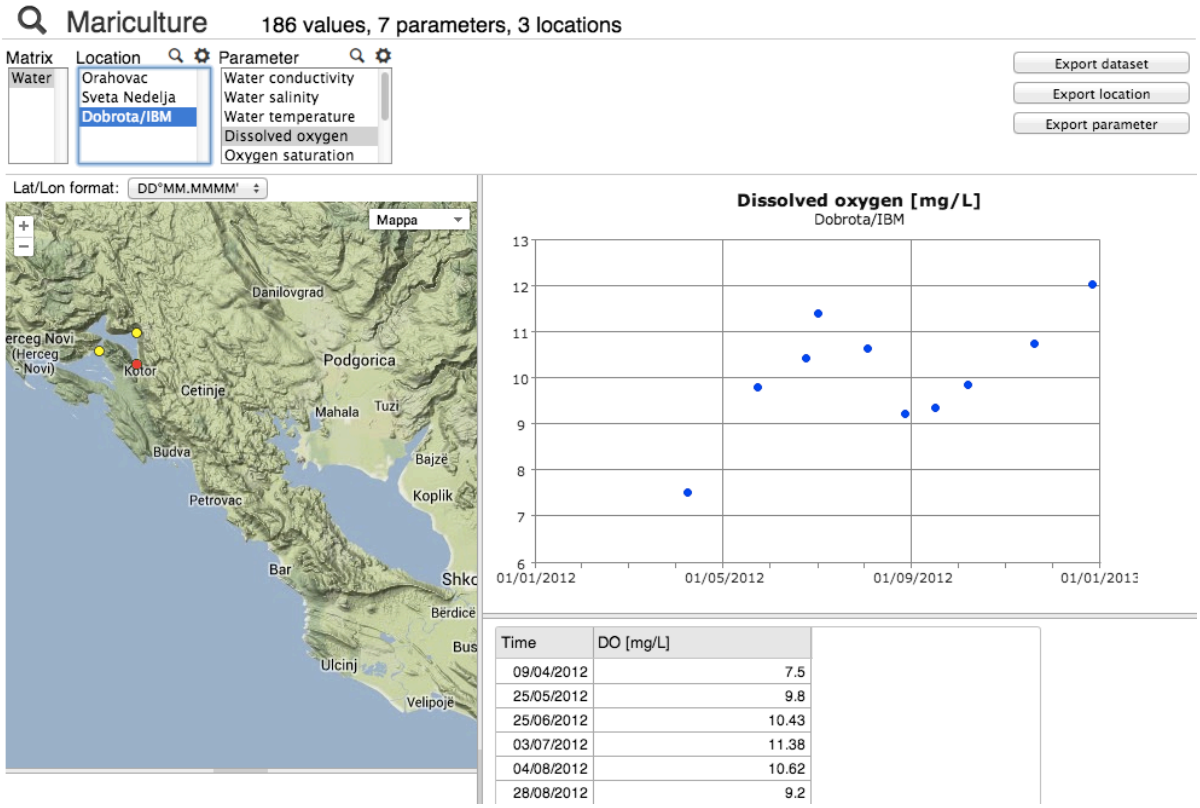
The locations are shown in the maps. The yellow circles allow directly plotting data for the selected location whilst the red is the one currently selected.

The plot changes automatically changing the matrix, the location, the parameters and the time resolution. The y-axis displays the parameter value and the x-axis displays the date in European format (dd/mm/aaaa).

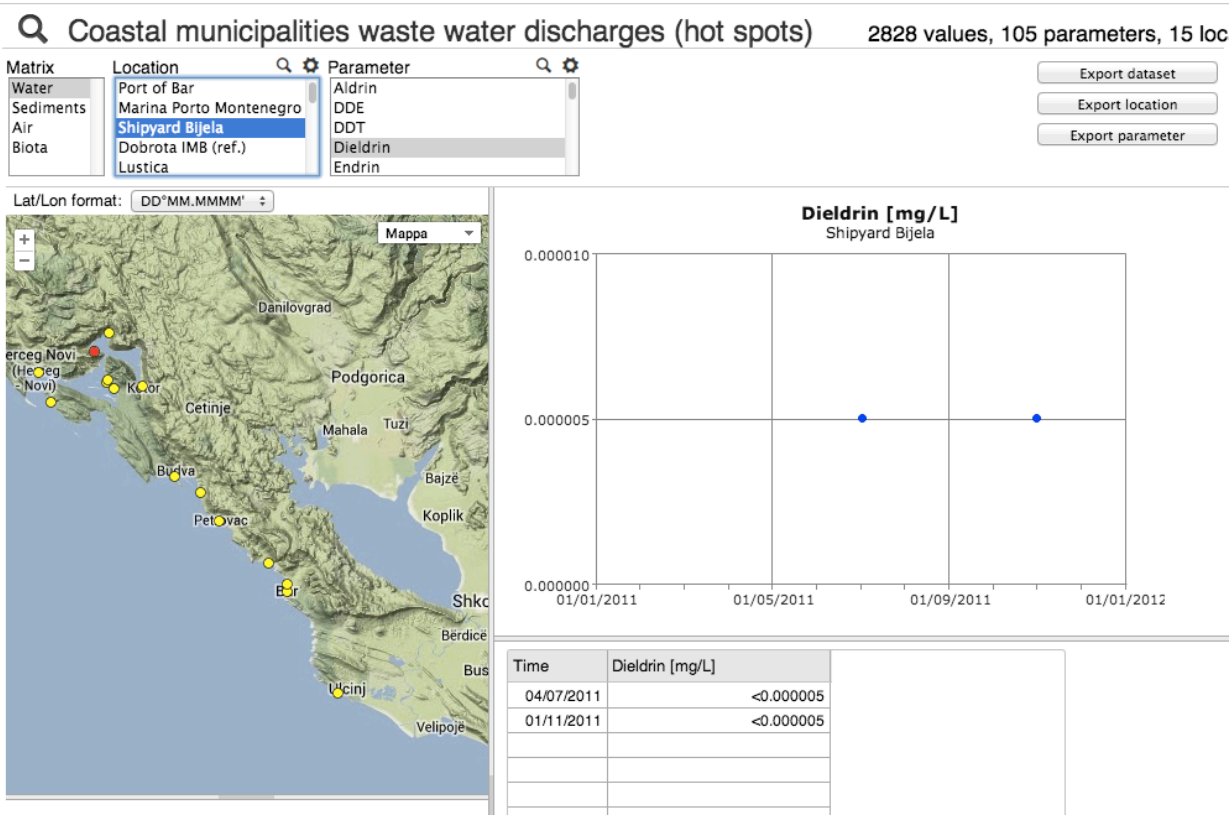
In the bottom part of the page you can find a table with real data, which are currently plotted. A scrollbar allows the visualization to the data list.

The following examples refer to Bathing water, Mariculture, Coastal municipalities waste water discharges (hot spots) and Environmental stress, where the Time Resolution option is missing.

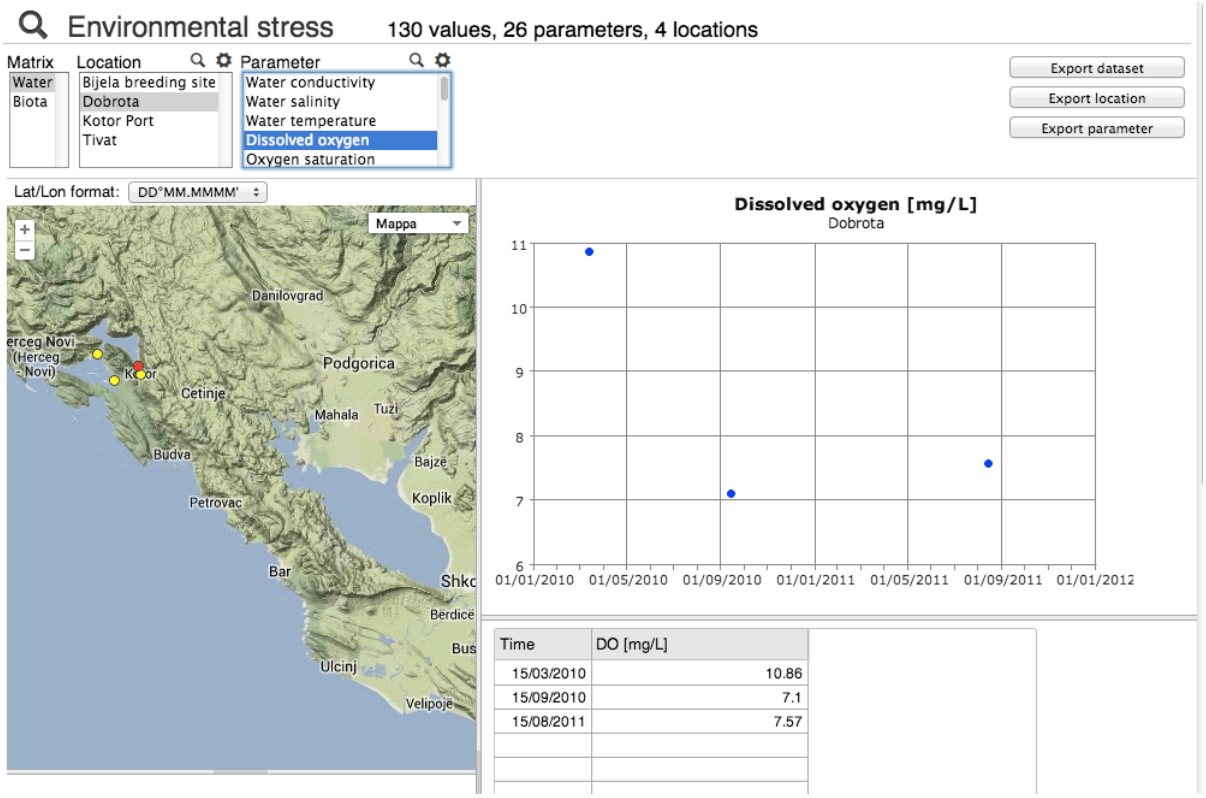




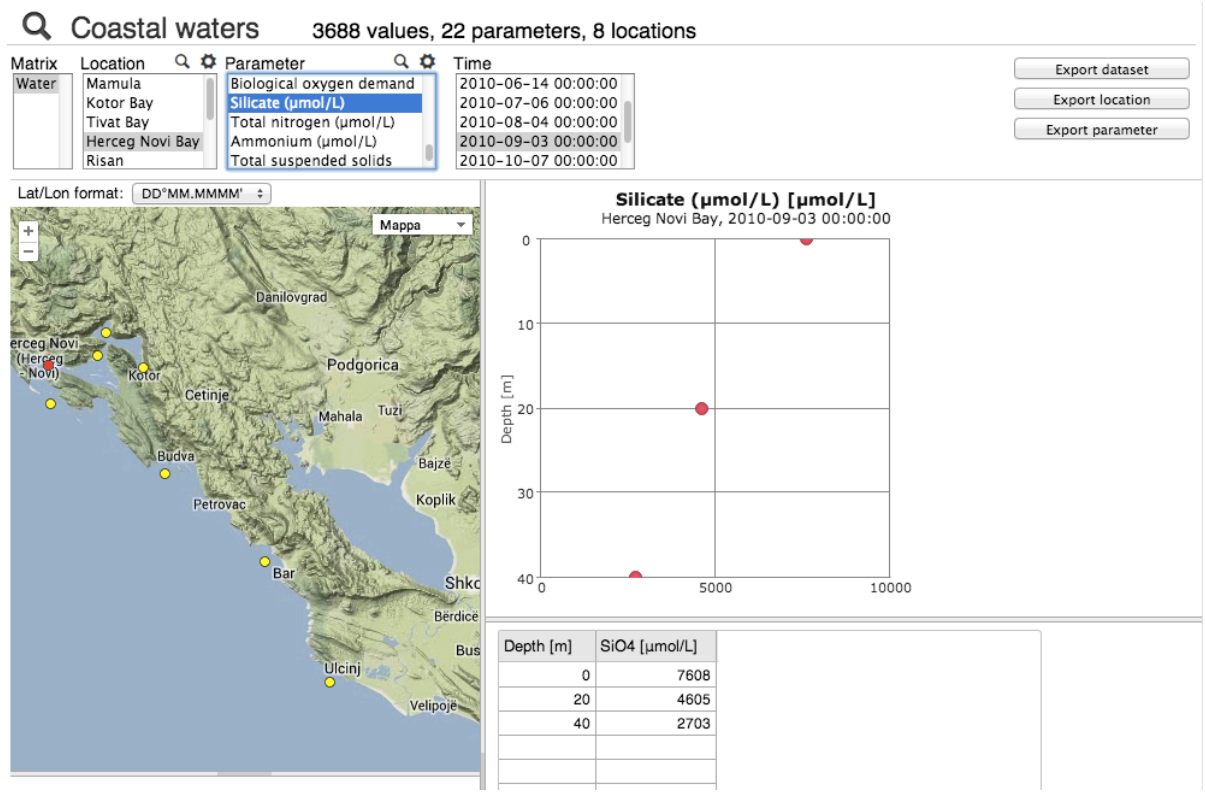
Time	DO [mg/L]
09/04/2012	7.5
25/05/2012	9.8
25/06/2012	10.43
03/07/2012	11.38
04/08/2012	10.62
28/08/2012	9.2

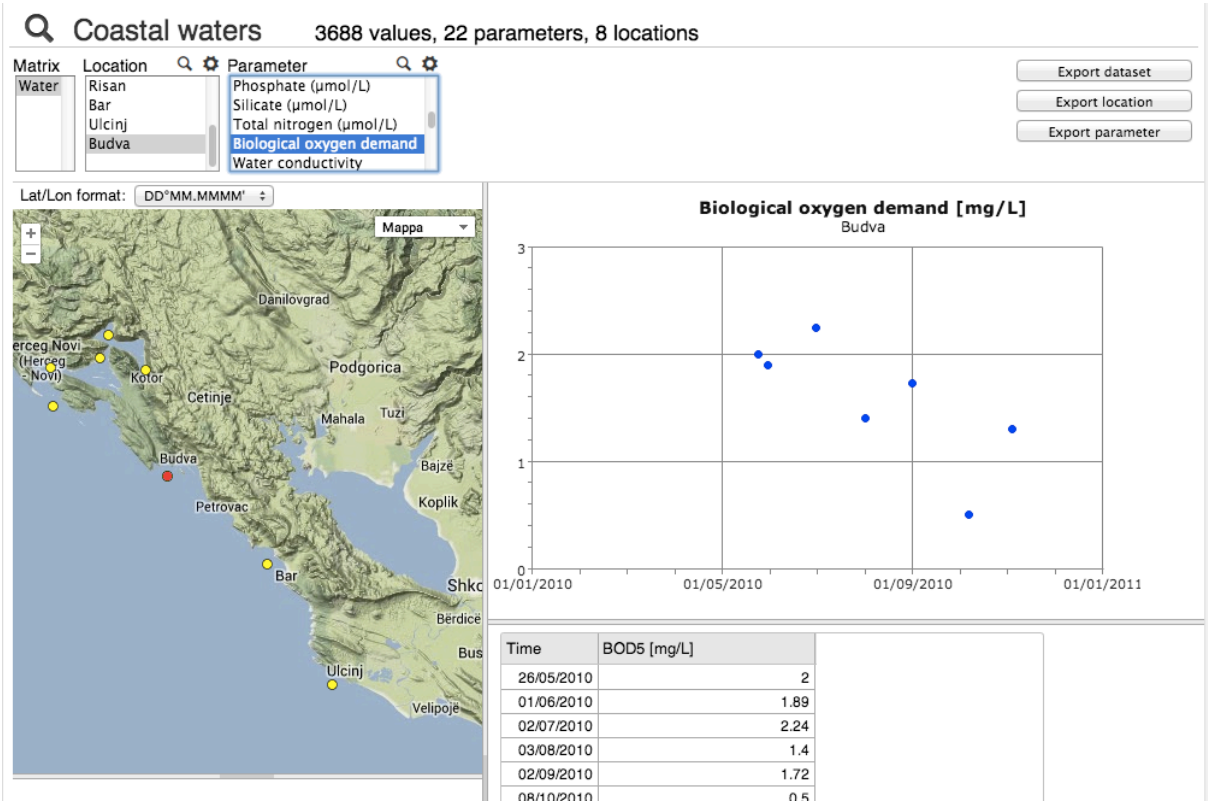


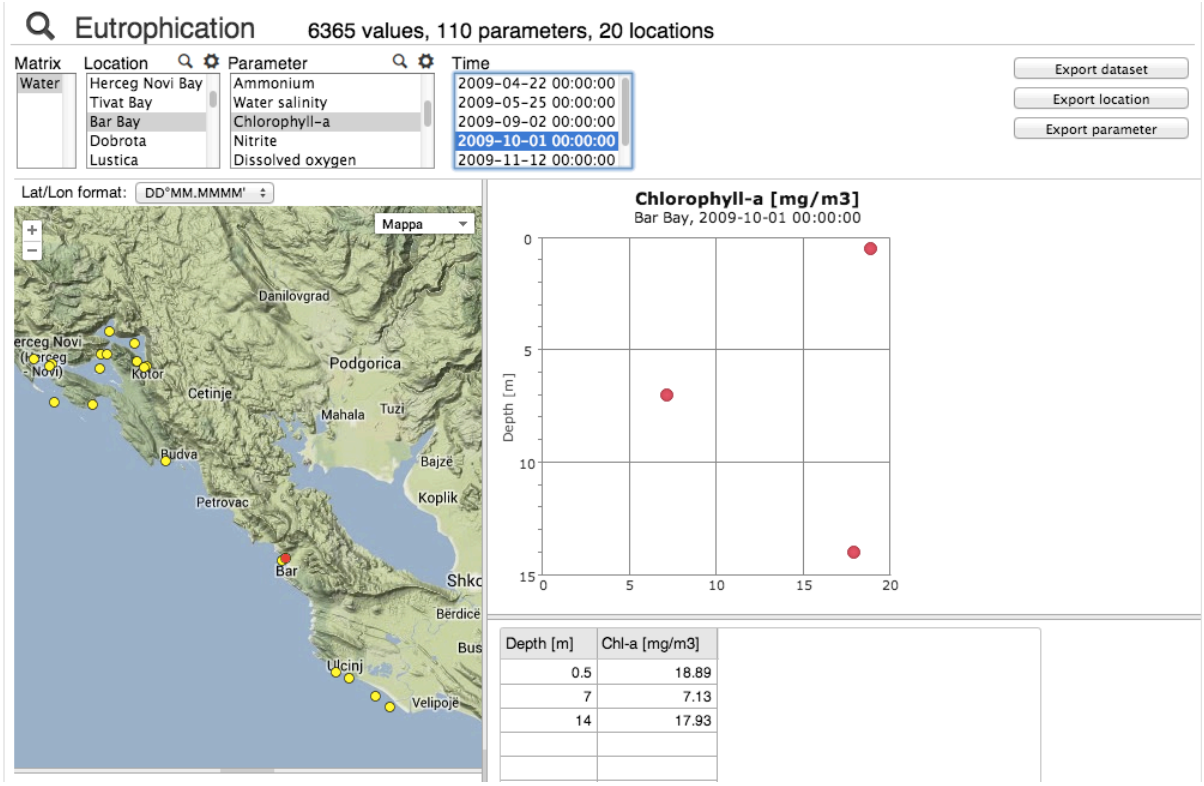
Time	Dieldrin [mg/L]
04/07/2011	<0.000005
01/11/2011	<0.000005



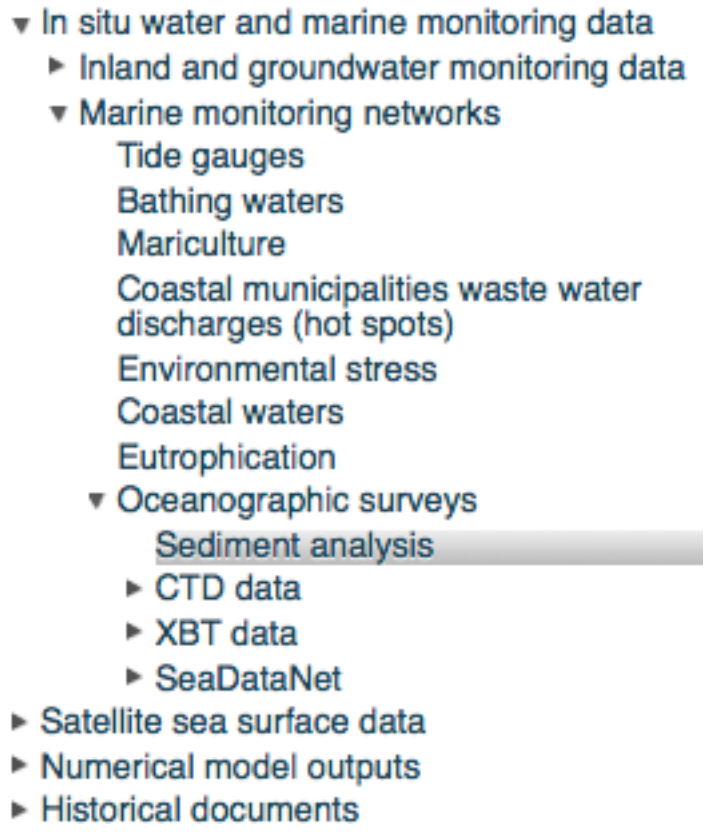
The “Coastal Waters” and “Eutrophication” can include the “Time” selection in addition to the Matrix, Location and Parameter. In this case the y-axis indicates the depth and the x-axis the value of the selected parameter.


Coastal waters
3688 values, 22 parameters, 8 locations
Matrix
Water
Location
Mamula
Kotor Bay
Tivat Bay
Herceg Novi Bay
Risan
Parameter
Biological oxygen demand
Silicate (µmol/L)
Total nitrogen (µmol/L)
Ammonium (µmol/L)
Total suspended solids
Time
2010-06-14 00:00:00
2010-07-06 00:00:00
2010-08-04 00:00:00
2010-09-03 00:00:00
2010-10-07 00:00:00
Export dataset
Export location
Export parameter
Lat/Lon format:
DD°MM.MMMM'
Mappa
Danilovgrad
Podgorica
Kotor
Cetinje
Mahala
Tuzi
Budva
Bajze
Petrovac
Koplik
Bar
Shkc
Berdicë
Ulcinj
Velipojë
Silicate (µmol/L) [µmol/L]
Herceg Novi Bay, 2010-09-03 00:00:00
Depth [m]
0
10
20
30
40
0
5000
10000
Depth [m]
SiO4 [µmol/L]
0
7608
20
4605
40
2703


Coastal waters
3688 values, 22 parameters, 8 locations
Matrix
Water
Location
Risan
Bar
Ulcinj
Budva
Parameter
Phosphate (µmol/L)
Silicate (µmol/L)
Total nitrogen (µmol/L)
Biological oxygen demand
Water conductivity
Export dataset
Export location
Export parameter
Lat/Lon format:
DD°MM.MMMM'
Mappa
Danilovgrad
Podgorica
Kotor
Cetinje
Mahala
Tuzi
Budva
Bajze
Petrovac
Koplik
Bar
Shkc
Berdicë
Ulcinj
Velipojë
Biological oxygen demand [mg/L]
Budva
0
1
2
3
01/01/2010
01/05/2010
01/09/2010
01/01/2011
Time
BOD5 [mg/L]
26/05/2010
2
01/06/2010
1.89
02/07/2010
2.24
03/08/2010
1.4
02/09/2010
1.72



The “Oceanography surveys” categories present two different kind of visualization for the “Sediment analysis “ and CDT and XBT parameters.



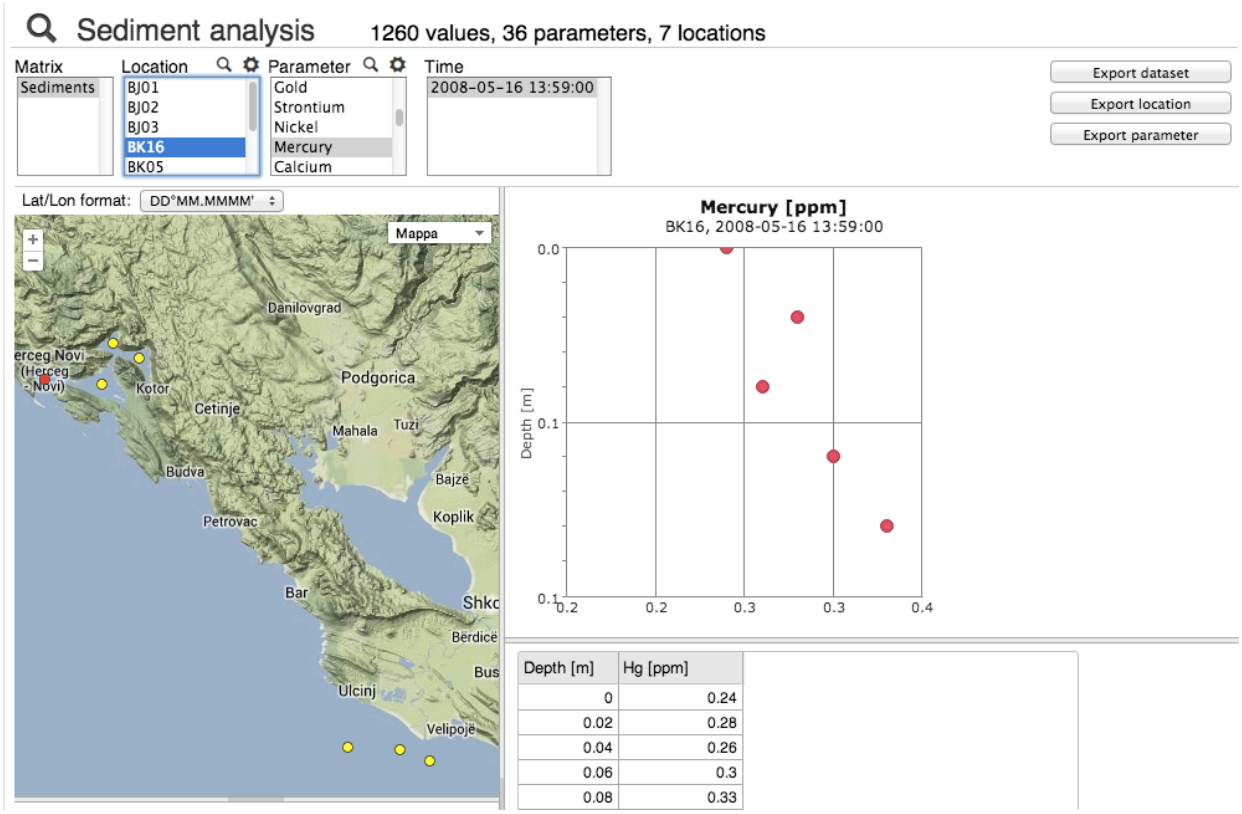
The first example refers to “Sediment analysis “.

In the upper part of the page you have the following information: Name of the available matrixes, locations, parameters and time.

The locations are shown in the maps. The yellow circles allow directly plotting data for the selected location whilst the red is the one currently selected.

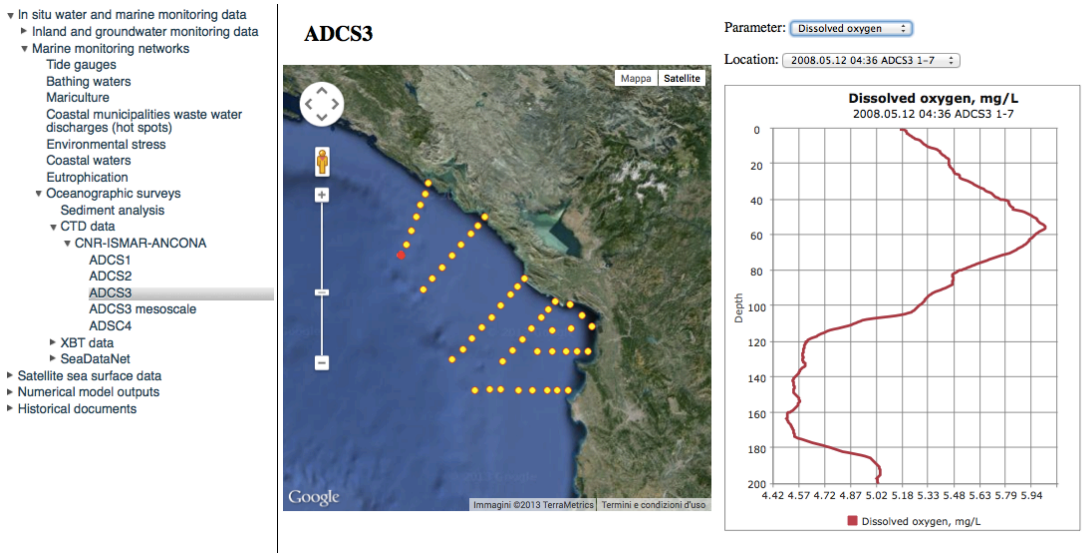
The plot changes automatically changing the matrix, the location, the parameters and the time resolution. The y-axis displays the depth and the x-axis displays the parameter value.

In the bottom part of the page you can find a table with real data, which are currently plotted. A scrollbar allows the visualization to the data list.



The CTD, XBT and SeaDataNet data are visualized as profiles.

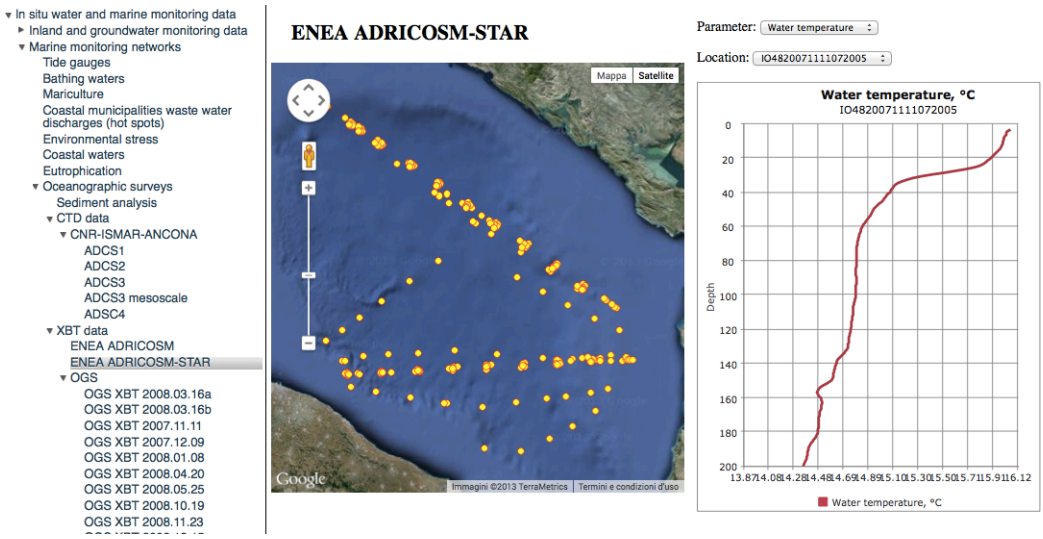
Open a branch to visualize the link and click on it. You will reach a page like the one below.

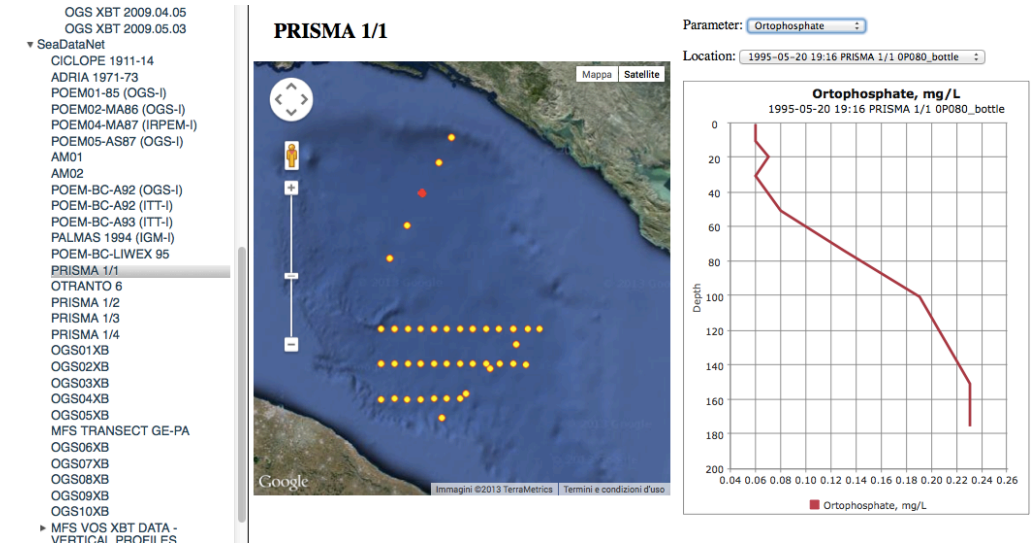


The map represents all the location for the specific campaign (i.e. ADCS3). The yellow circles allow directly plotting data for the selected location whilst the red is the one currently selected.

In the upper right part of the page you can use the two selectors to change parameters and location. The plot changes automatically changing the location and the parameter. The y-axis displays the depth and the x-axis displays the parameter value. The latitude and longitude of the profile is display both in the selected location item and under the title of the profile image.

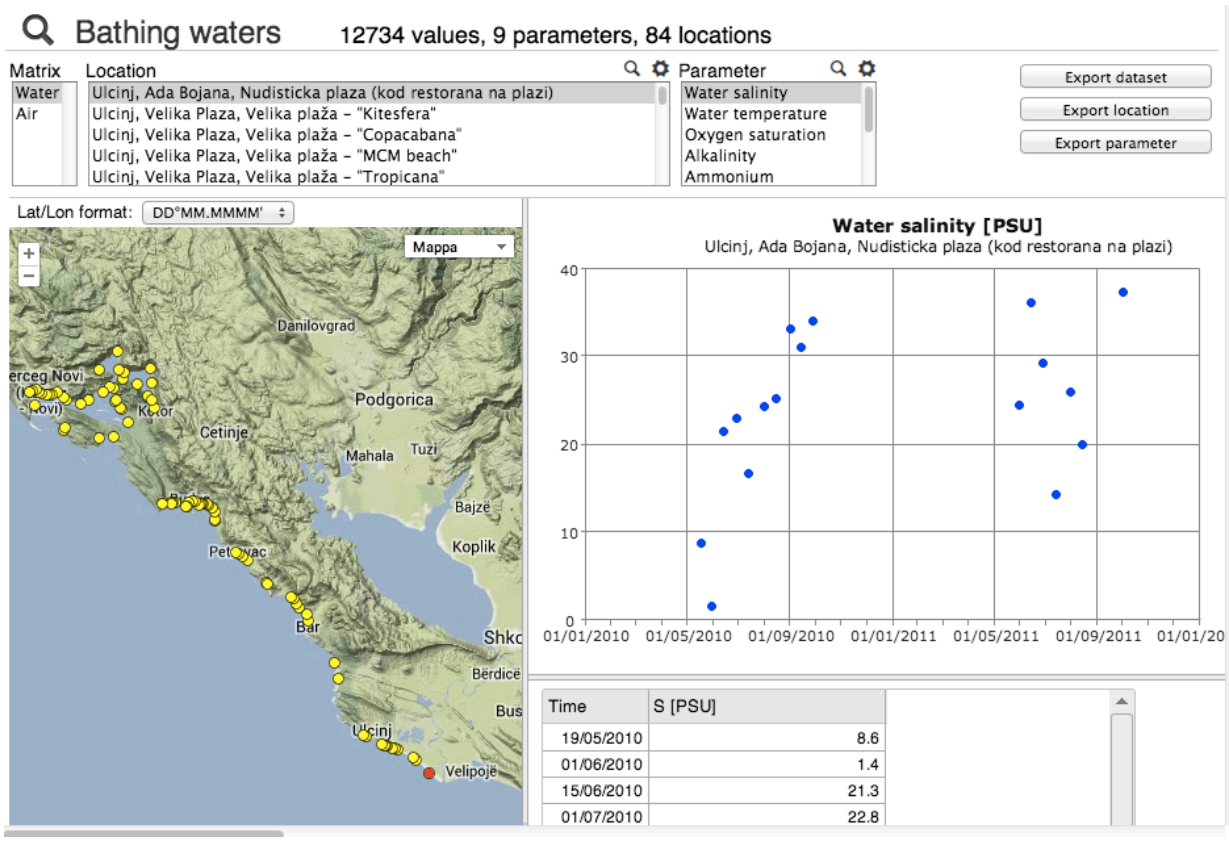
Some other examples are shown below.





How to export “In situ data”

Several the data set, of the “In situ water and marine monitoring data” section, include within the interface the additional feature to export data.
Three buttons are visible in the upper right part of interface: “Export Dataset”, “Export Locations” and “Export Parameter”.



"Export Dataset" button export the whole dataset, "Export Locations" button exports the data for the selected location for all the parameters available in the dataset and "Export Parameter" button exports the selected parameter for all locations available in this dataset.
The output of this request is an Excel file that can be easily saved and used for further data analyses.

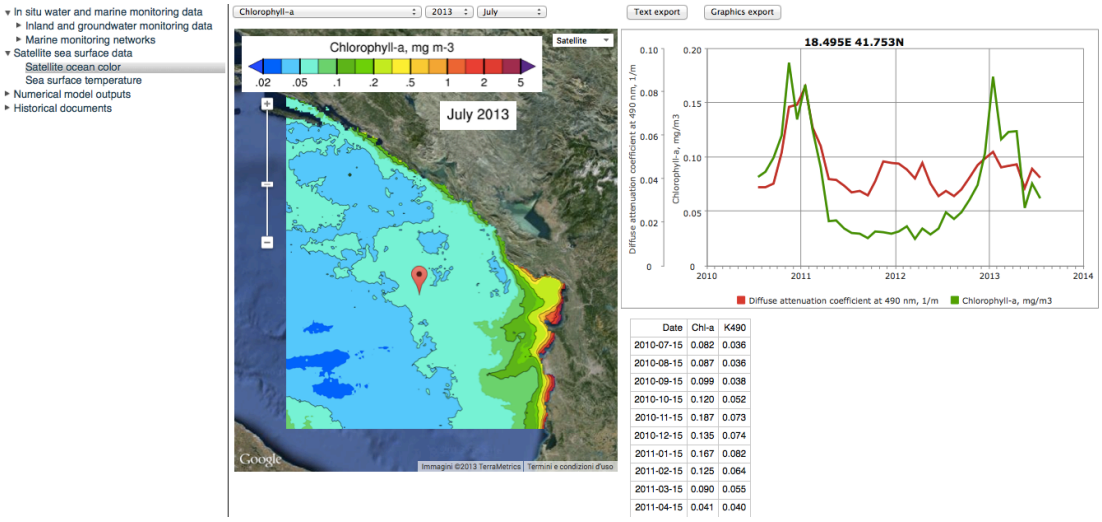
How to plot "Satellite sea surface data"

The "Satellite sea surface data" are organized into two categories, listed below:

- Satellite ocean color
- Sea surface temperature

In the following we will describe how to visualize each category data.

Open the "Satellite sea surface data" and click on "Satellite ocean color". The page below will appear.



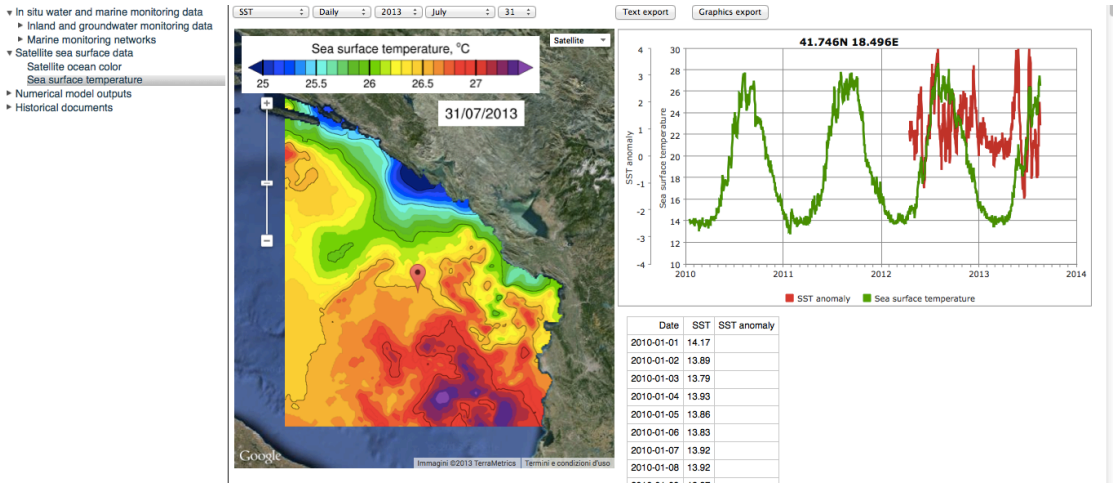
Date	Chl-a	K490
2010-07-15	0.082	0.036
2010-08-15	0.087	0.036
2010-09-15	0.099	0.038
2010-10-15	0.120	0.052
2010-11-15	0.187	0.073
2010-12-15	0.135	0.074
2011-01-15	0.167	0.082
2011-02-15	0.125	0.064
2011-03-15	0.090	0.055
2011-04-15	0.041	0.040

In the upper part of the page you have the following selectors: Name of the available parameters, year and month.

The image (on the left) and the plot (on the right) change automatically changing the parameter and the date. Clicking on the map the plot change accordingly. The plot displays the available parameters for the selected location. The y-axis displays the values and the x-axis displays the time.

In the bottom part of the page you can find a table with real data, which are currently plotted.

The "Sea Surface Temperature" includes additional selectors: Daily or Monthly View and the selector for days.



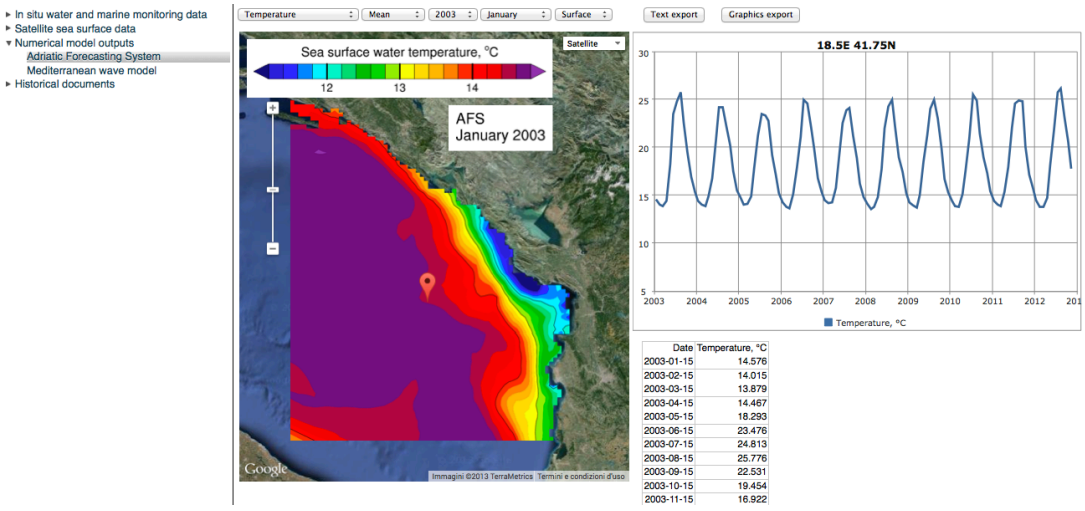
How to plot “Numerical model outputs”

The data in this section are organized into two categories:

- Adriatic Forecasting System
- Mediterranean wave model

In the following we will describe how to visualize each category data.

Open the “Numerical model outputs” and click on “Adriatic Forecasting System”. The page below will appear.

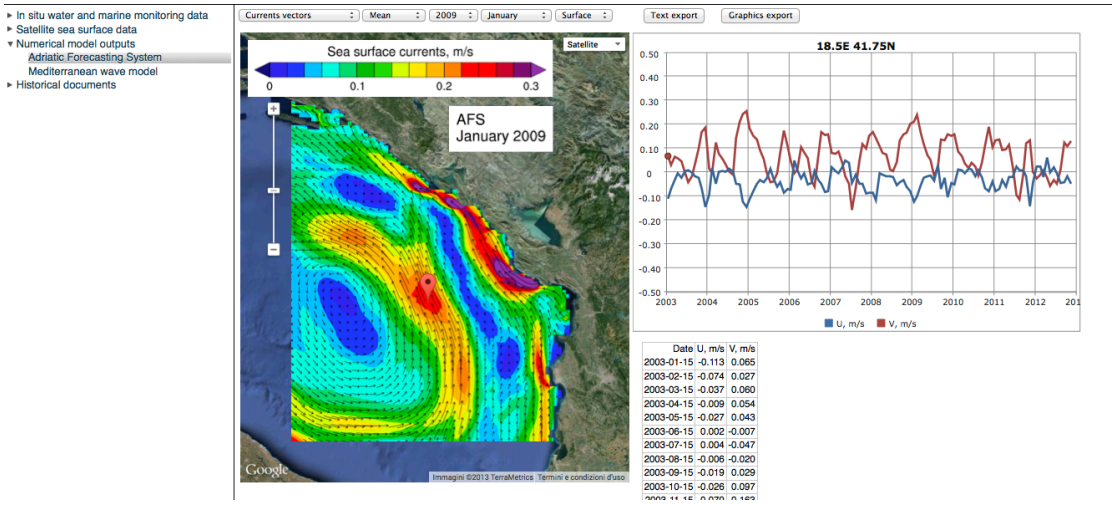


In the upper part of the page you have the following selectors: Name of the available parameters, mean or anomaly, year, month and the depth.

The image (on the left) and the plot (on the right) change automatically changing the parameter, the dates, depth or choosing mean or anomaly. Clicking on the map the plot change accordingly. The plot displays the available parameters for the selected location. The y-axis displays the values and the x-axis displays the time.

In the bottom part of the page you can find a table with real data, which are currently plotted.

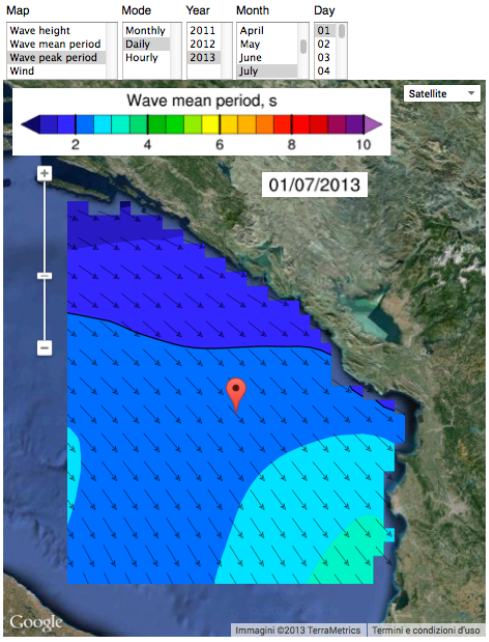
The current vector selection plots both u and v current components. See an example below.

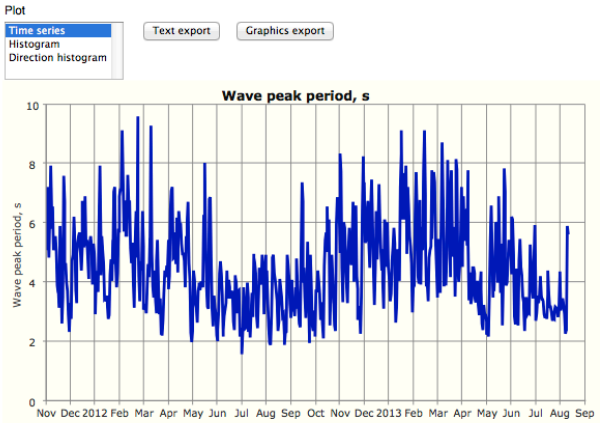


Date	U, m/s	V, m/s
2003-01-15	-0.113	0.065
2003-02-15	-0.074	0.027
2003-03-15	-0.037	0.060
2003-04-15	-0.009	0.054
2003-05-15	-0.027	0.043
2003-06-15	0.002	-0.007
2003-07-15	0.004	-0.047
2003-08-15	-0.006	-0.020
2003-09-15	-0.019	0.029
2003-10-15	-0.026	0.097

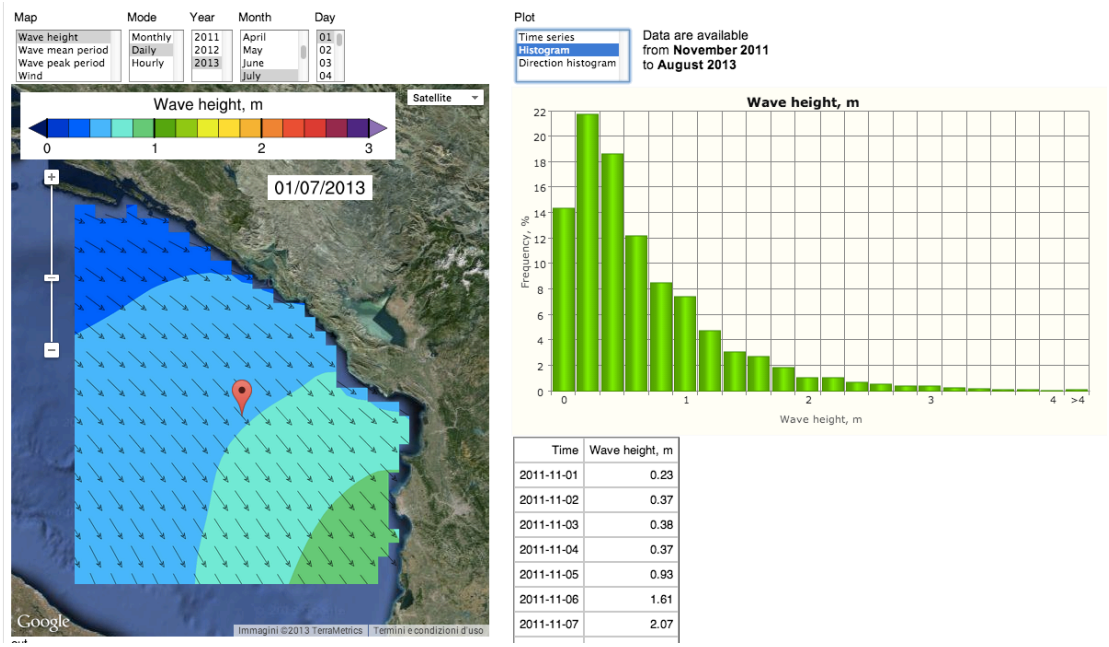
The “Mediterranean wave model” includes an additional selector for days.

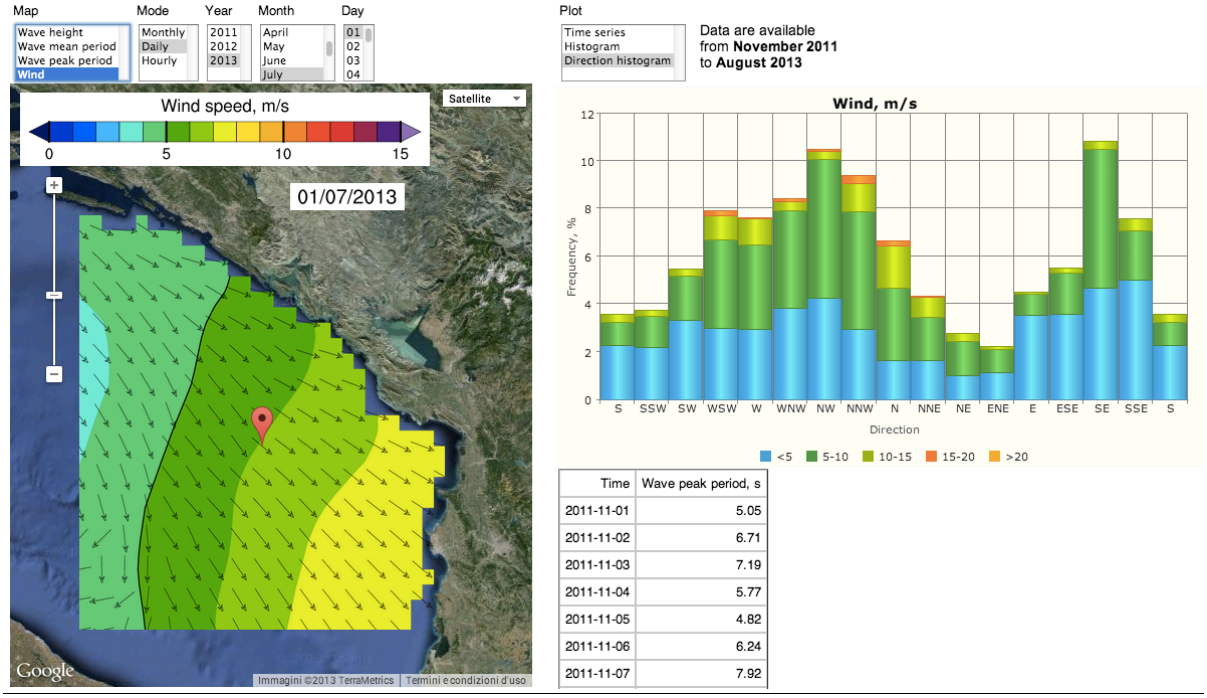
Besides you can choose if plot Time Series, Histograms or Direction Histograms.





Date	Wave peak period	Wave height
2011-11-01	5.05	5.0500841140747
2011-11-02	6.71	6.7057304382324
2011-11-03	7.19	7.185124874115
2011-11-04	5.77	5.7737460136414
2011-11-05	4.82	4.8194961547852
2011-11-06	6.24	6.2422676086426
2011-11-07	7.92	7.9211621284485
2011-11-08	6.37	6.3726162910461





Historical data sets

This part of the catalogue was built from the database constructed from the World Bank Project:''Lake Skadar-Shkoder Integrated Ecosystem Management Project (LSIEMP)- Development of a predictive Hydrological Model for the Skadar-Shkoder lake basin area''. (Contract No: MNE-LSIEMP-TF091939-QCBS-PHM-CS-10 given to the Ministry of Spatial Planning and Environment of Montenegro).

Data contained consider historical documents made available by the Ecotoxicological Center of Montenegro (CETI) to CMCC through the Adricosm-Star Geoportal.

How to insert new data

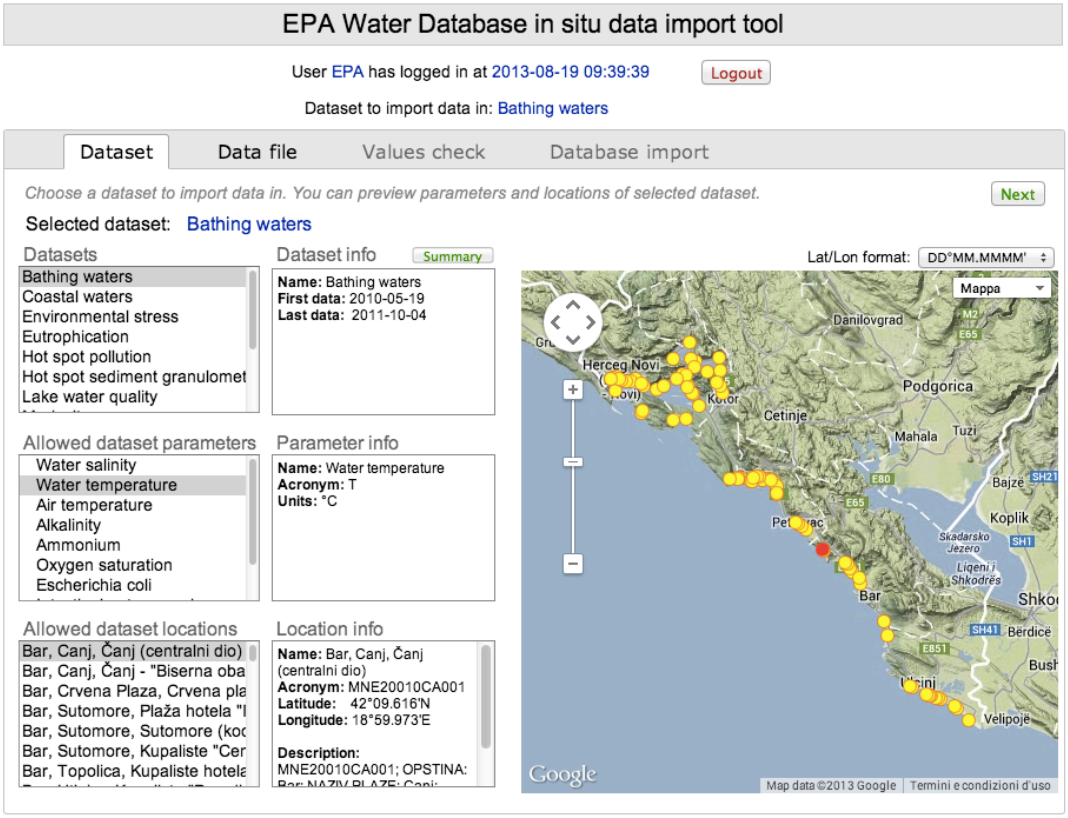
A tool, called Data Import, has been developed to allow data providers to insert new in situ data.

Click on Data Import link from the upper menu.

The page is password protected; please ask to the EPA technical assistance if you have not received the login information.

After you have logged in the Data Import tool, you can visualize all the in situ data already available. For each Dataset, you can see data set information.

Once selected a dataset, the related parameters and location are visualized. For each parameter and location a brief explanation is available.

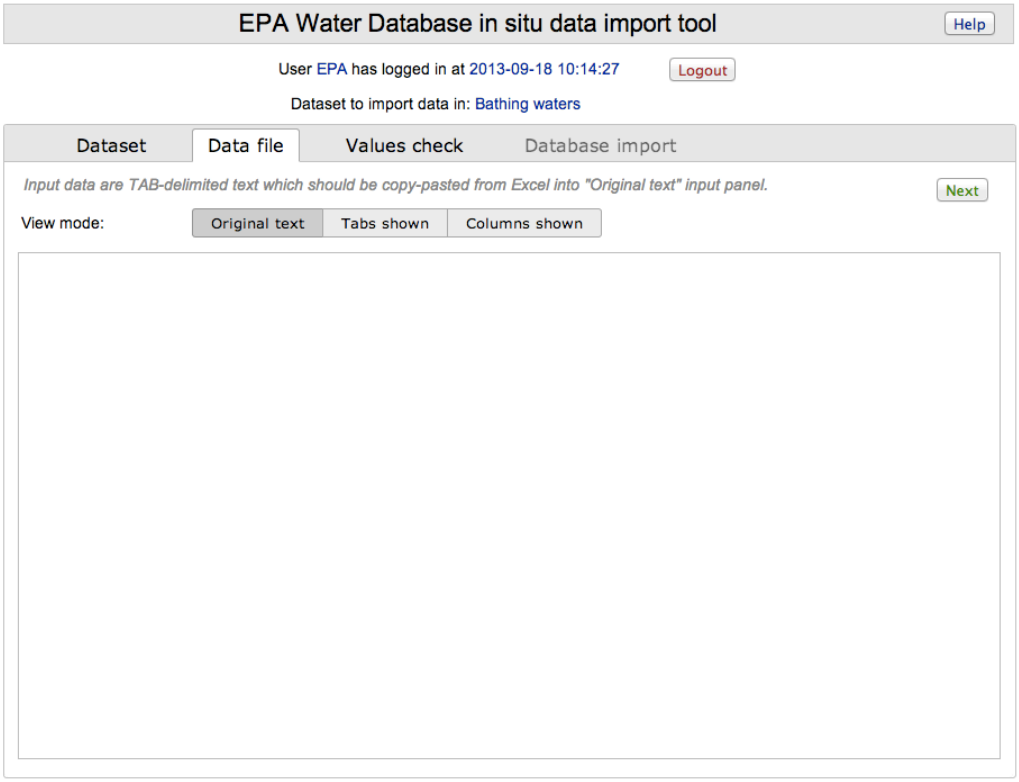


Clicking on the button Summary an overview is given for the selected database.

The map on the right part of the page gives an overview about data distribution. The red point indicates the selected location for the selected parameter. Latitude and longitude format can be changed using the drop down menu over the map.

To insert new data you have to select a database and then click on Next button.

Now you are into the inserting page.



Input data are TAB-delimited text which should be copy-pasted from Excel into "Original text" input panel.

Examples of import files are available in the “Help” page and in the Annex I of this manual.

Import file format

Import file is a text tab-delimited file. It can be created in Excel, and saved as "UTF-16 Unicode Text". Unicode option is recommended, otherwise non-Latin symbols (i.e. person/location names) can be corrupted during import file into the database.

Lines beginning with semicolon (;) are comments to be ignored during import. Comments can contain file format description, and some remarks from data providers if necessary. Data import files are uploaded to EPA Water database server and can be checked later by EPA personnel.

The first seven non-comment lines contain mandatory metadata. The next line contains column titles. Columns are separated by tabulations. The first three columns are fixed: Location, Time, Z [m]. The next columns are parameter names with the corresponding units in square brackets.

Parameters, locations, matrices

Matrix describes where samples were taken: air, biota, sediments, or water. Some datasets, for example Hot spots, contain parameter values measured at the same time and place but different samples (matrices). That is why it is necessary to mention a matrix in data files. Moreover, biota samples can be taken from different species (fish, seashels, etc), these species must be also defined in data files, for example, Matrix: Biota (Mytilus galloprovincialis).

Time format

Time format must be DD/MM/YYYY or DD/MM/YYYY hh:mm.

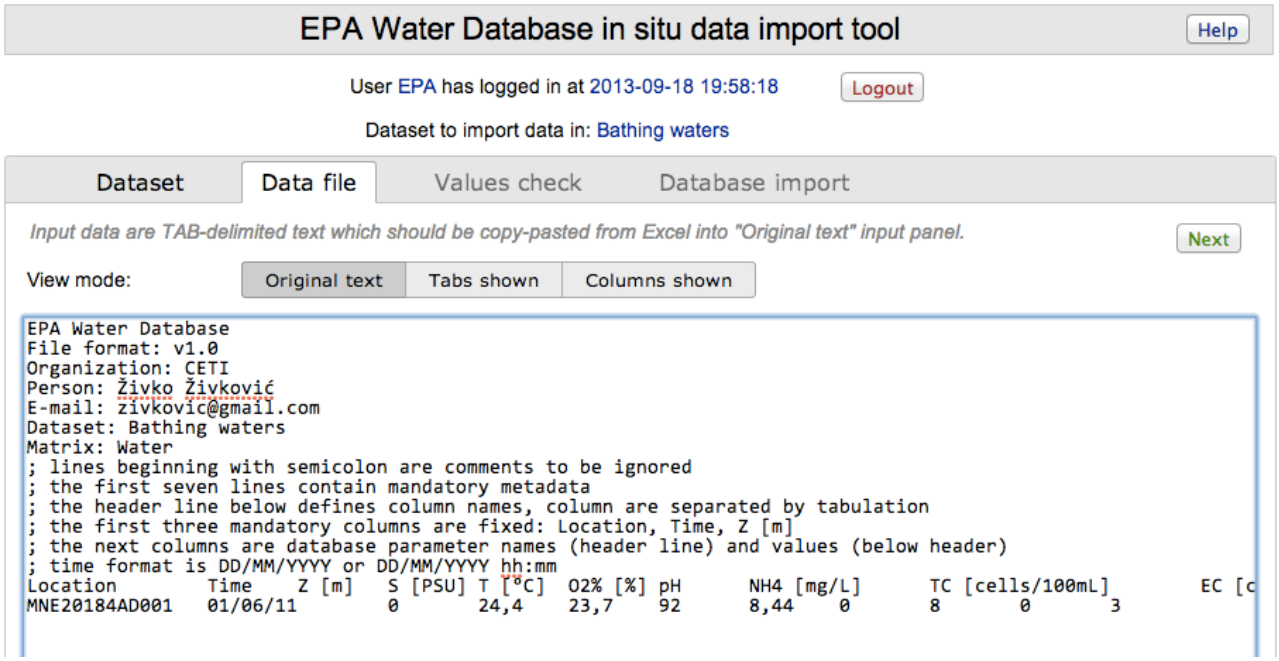
Data value format

Parameter values must be a single number (possible prefixes are < and >), or two numbers separated by ±.

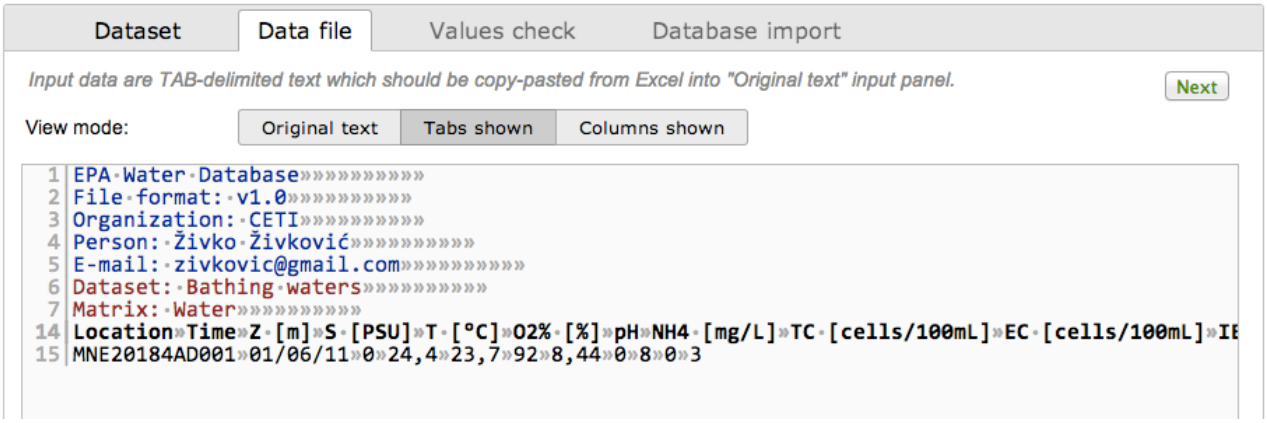
Import file templates are available for the following data network (see Annex 1 for example)

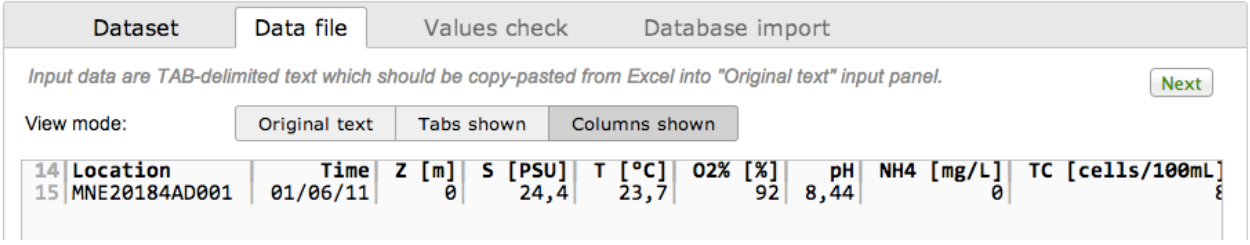
- Bathing waters
- Coastal municipalities waste water discharges (hot spots) - Biota matrix
- Coastal municipalities waste water discharges (hot spots) - Sediments matrix
- Coastal municipalities waste water discharges (hot spots) - Water matrix
- Coastal waters
- Environmental stress - Biota matrix
- Environmental stress - Water matrix
- Eutrophication - Biota matrix
- Eutrophication - Water matrix
- Lake water quality
- Mariculture
- River water quality
- Tide gauges
- Water discharge time series (rivers)
- Water level time series (lake and rivers)

Once the new excel data file is ready, copy and paste your data into the inserting text box.



Now the data are visualized in the text box. Use the Tab Shown option and the Column Shown option to verify the correct tabulation of the data.





Now click on “Next” to check the format of your data. If the data are correct, the message “Data are valid and ready to import into the database.” appears.

Now you are ready to import data into the database clicking on “Import”.

A pop-up window appears, listing the number of values added or updated.

If data are not correct, the system indicates the problem. Many checks have been implemented and the system always display where the error is. See an example below.

Update Satellite and Model Data

The satellite and model data need to be update monthly downloading data from data provider server and insert new data information into the EPA WATER Database.

The following scripts are available to the EPA DB system administrator.

1) "updater.auto.http.sh": this script automatically download data from the data provider to the EPA machine.
2) "updater.sh": this script manually download data from the data provider to the EPA machine.

All the scripts can be found in the following directories: **adrint/updates**

Procedures

Automatically update
To update EPA DB automatically you need to run once per day
sh updater.auto.http.sh
The script needs to be inserted into the server crontab.

This scripts contain inside a link to the corresponding http directory:
http://webservices.cmcc.bo.it/epa.water.db.updates
where all updates are provided.

Manually update
To install update manually you need to download **epa.water.db.update.YYYYMMDD.zip** file from the following web address (http://webservices.cmcc.bo.it/epa.water.db.updates) and copy into **adrint/updates** directory, and run
sh updater.sh YYYYMMDD
for example: sh updater.sh 20130921

If the script ends successfully, all the new data will be available on EPA server and will be possible visualize them in the User Interface.

Besides, the updater has been also implemented to upgrade the EPA Water Database code, in case of bug fix or further developments.

The updates.log file contains the log of the former updates.

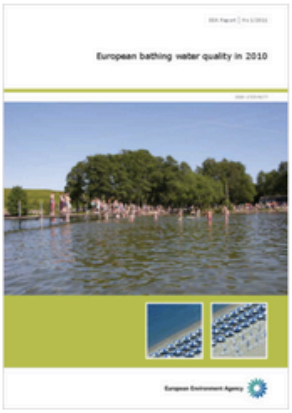
Documentation (to be revised)

This section contains the reports related to the Adricosm-Intermediate project and reports from EEA European Environmental Agency that can be of interest for coastal monitoring (European bathing water quality in 2010 and Eionet priority data flows May 2011–April 2012)

EPA Water Database documents

EEA reports

European bathing water quality in 2010



Eionet priority data flows May 2011–April 2012

Adricosm Intermediate deliverables

D1.2.1 Stakeholder Assessment Report

D3.1.1 Report on the EPA Water Database design

D5.1 First Management Report (September 2011 - June 2012)

ANNEX I: Examples of Import Files

Bathing waters

EPA Water Database										
File format: v1.0										
Organization: CETI										
Person: Živko Živković										
E-mail: zivkovic@gmail.com										
Dataset: Bathing waters										
Matrix: Water										
; lines beginning with semicolon are comments to be ignored										
; the first seven lines contain mandatory metadata										
; the header line below defines column names, column are separated by tabulation										
; the first three mandatory columns are fixed: Location, Time, Z [m]										
; the next columns are database parameter names (header line) and values (below header)										
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm										
Location	Time	Z [m]	S [PSU]	T [°C]	O2% [%]	pH	NH4 [mg/L]	TC [cells/100mL]	EC [cells/100mL]	IE [cells/100mL]
MNE20184AD0	01/06/11	0	24,4	23,7	92	8,44	0	8	0	3

Coastal municipalities waste water discharges (hot spots) - Biota matrix

EPA Water Database											
File format: v1.0											
Organization: CETI											
Person: Živko Živković											
E-mail: zivkovic@gmail.com											
Dataset: Coastal municipalities waste water discharges (hot spots)											
Matrix: Biota (Mytilus galloprovincialis)											
; lines beginning with semicolon are comments to be ignored											
; the first seven lines contain mandatory metadata											
; the header line below defines column names, column are separated by tabulation											
; the first three mandatory columns are fixed: Location, Time, Z [m]											
; the next columns are database parameter names (header line) and values (below header)											
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm											
Location	Time	Z [m]	Aldrin [mg/L]	DDE [mg/L]	DDT [mg/L]	Dieldrin [mg/L]	Endrin [mg/L]	HCB [mg/L]	Heptachlor [mg/L]	Lindan [mg/L]	Mirex [mg/L]
TZ-1	01/07/11 00:00	0	0,0019	<0.00025	<0.00025	0,0005	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025

Coastal municipalities waste water discharges (hot spots) - Sediments matrix

EPA Water Database													
File format: v1.0													
Organization: CETI													
Person: Živko Živković													
E-mail: zivkovic@gmail.com													
Dataset: Coastal municipalities waste water discharges (hot spots)													
Matrix: Sediments													
; lines beginning with semicolon are comments to be ignored													
; the first seven lines contain mandatory metadata													
; the header line below defines column names, column are separated by tabulation													
; the first three mandatory columns are fixed: Location, Time, Z [m]													
; the next columns are database parameter names (header line) and values (below header)													
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm													
Location	Time	Z [m]	Aldrin [mg/L	DDE [mg/L]	DDT [mg/L]	Dieldrin [mg/	Endrin [mg/L	HCB [mg/L]	Heptachlor [	Lindan [mg/L	Mirex [mg/L]	Toxaphene [	As [mg/L]
TZ-1	01/07/11 00:00	13	0,059	<0.005	<0.005	0,042	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	27.95±3.33

Coastal municipalities waste water discharges (hot spots) - Water matrix

EPA Water Database
File format: v1.0
Organization: CETI
Person: Živko Živković
E-mail: zivkovic@gmail.com
Dataset: Coastal municipalities waste water discharges (hot spots)
Matrix: Water
; lines beginning with semicolon are comments to be ignored
; the first seven lines contain mandatory metadata
; the header line below defines column names, column are separated by tabulation
; the first three mandatory columns are fixed: Location, Time, Z [m]
; the next columns are database parameter names (header line) and values (below header)
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm

Location	Time	Z [m]	Aldrin [mg/L	DDE [mg/L]	DDT [mg/L]	Dieldrin [mg/	Endrin [mg/L	HCB [mg/L]	Heptachlor [	Lindan [mg/L	Mirex [mg/L]	Toxaphene [
TZ-1	01/07/11	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005

Coastal waters

EPA Water Database
File format: v1.0
Organization: CETI
Person: Živko Živković
E-mail: zivkovic@gmail.com
Dataset: Coastal waters
Matrix: Water
; lines beginning with semicolon are comments to be ignored
; the first seven lines contain mandatory metadata
; the header line below defines column names, column are separated by tabulation
; the first three mandatory columns are fixed: Location, Time, Z [m]
; the next columns are database parameter names (header line) and values (below header)
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm

Location	Time	Z [m]	C [S/m]	S [PSU]	T [°C]	SD [m]	TSS [mg/L]	DO [mg/L]	O2% [%]	pH	TRIX	NH4 [µmol/L
MNE02	09/04/10	0	5,27	34,7	15,5	10		10,51	105	8,2	4,12	

Environmental stress - Biota matrix

EPA Water Database												
File format: v1.0												
Organization: CETI												
Person: Živko Živković												
E-mail: zivkovic@gmail.com												
Dataset: Environmental stress												
Matrix: Biota (Mytilus galloprovincialis)												
; lines beginning with semicolon are comments to be ignored												
; the first seven lines contain mandatory metadata												
; the header line below defines column names, column are separated by tabulation												
; the first three mandatory columns are fixed: Location, Time, Z [m]												
; the next columns are database parameter names (header line) and values (below header)												
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm												
Location	Time	Z [m]	MT avg [µg/g	MT med [µg/	MT stddev [µ	AchE avg [µn	AchE med [µ	AchE stddev	CI avg	CI med	CI stddev	GI avg
Kotor Port	15/09/11	0	337,41	340,01	26,54	411,83	434,81	105,57	2,46	2,47	0,59	45,843

Environmental stress - Water matrix

EPA Water Database												
File format: v1.0												
Organization: CETI												
Person: Živko Živković												
E-mail: zivkovic@gmail.com												
Dataset: Environmental stress												
Matrix: Water												
; lines beginning with semicolon are comments to be ignored												
; the first seven lines contain mandatory metadata												
; the header line below defines column names, column are separated by tabulation												
; the first three mandatory columns are fixed: Location, Time, Z [m]												
; the next columns are database parameter names (header line) and values (below header)												
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm												
Location	Time	Z [m]	C [S/m]	S [PSU]	T [°C]	DO [mg/L]	O2% [%]	pH	NH4 [µmol/L	NO2 [µmol/L	NO3 [µmol/L	PO4 [µmol/L
Tivat	15/08/11	0	52,5	34,46	22,8	9,3	110	8,22	0,044	0,356	0,394	0,667

Eutrophication - Biota matrix

EPA Water Database											
File format: v1.0											
Organization: CETI											
Person: Živko Živković											
E-mail: zivkovic@gmail.com											
Dataset: Eutrophication											
Matrix: Biota (Mytilus galloprovincialis)											
; lines beginning with semicolon are comments to be ignored											
; the first seven lines contain mandatory metadata											
; the header line below defines column names, column are separated by tabulation											
; the first three mandatory columns are fixed: Location, Time, Z [m]											
; the next columns are database parameter names (header line) and values (below header)											
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm											
Location	Time	Z [m]	Podocorryne	Podocoryne	Helgicircha [i	Aglaura hem	Muggiaea co	Muggiaea at	Penilia aviros	Evadne spinf	Evadne terge	Podon intern
OS-1	01/08/11	15	0	0	0	0	0	0	955,73	68,27	68,27	68,27

Eutrophication - Water matrix

EPA Water Database
File format: v1.0
Organization: CETI
Person: Živko Živković
E-mail: zivkovic@gmail.com
Dataset: Eutrophication
Matrix: Water
; lines beginning with semicolon are comments to be ignored
; the first seven lines contain mandatory metadata
; the header line below defines column names, column are separated by tabulation
; the first three mandatory columns are fixed: Location, Time, Z [m]
; the next columns are database parameter names (header line) and values (below header)
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm

Location	Time	Z [m]	S [PSU]	T [°C]	DO [mg/L]	pH	NH4 [mg/L]	NO2 [mg/L]	NO3 [mg/L]	o-PO4 [mg/L	SiO4 [mg/L]	TC [cells/100
08BE1	22/04/09	0,5	33,8	16,6	9,66	8,23	0,04	0,02	16,57	0,02	0,024	40

Lake water quality

EPA Water Database
File format: v1.0
Organization: CETI
Person: Živko Živković
E-mail: zivkovic@gmail.com
Dataset: Lake water quality
Matrix: Water
; lines beginning with semicolon are comments to be ignored
; the first seven lines contain mandatory metadata
; the header line below defines column names, column are separated by tabulation
; the first three mandatory columns are fixed: Location, Time, Z [m]
; the next columns are database parameter names (header line) and values (below header)
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm

Location	Time	Z [m]	C avg [S/m]	T avg [°C]	C min [S/m]	T min [°C]	SD avg [m]	SD min [m]	DO avg [mg/	O2% avg [%]	pH avg	TP avg [mg/L
ME-23-1/01	01/06/10	0	282	30,8	176	5,5	2,5	1	12,7	130	8,2	0,02

Mariculture

EPA Water Database
File format: v1.0
Organization: CETI
Person: Živko Živković
E-mail: zivkovic@gmail.com
Dataset: Mariculture
Matrix: Water
; lines beginning with semicolon are comments to be ignored
; the first seven lines contain mandatory metadata
; the header line below defines column names, column are separated by tabulation
; the first three mandatory columns are fixed: Location, Time, Z [m]
; the next columns are database parameter names (header line) and values (below header)
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm

Location	Time	Z [m]	C [S/m]	S [PSU]	T [°C]	DO [mg/L]	O2% [%]	EC [cells/100	IE [cells/100mL]
08M1OR	17/06/12	5	10,61		25	10,44	126	1	0

River water quality

EPA Water Database												
File format: v1.0												
Organization: CETI												
Person: Živko Živković												
E-mail: zivkovic@gmail.com												
Dataset: River water quality												
Matrix: Water												
; lines beginning with semicolon are comments to be ignored												
; the first seven lines contain mandatory metadata												
; the header line below defines column names, column are separated by tabulation												
; the first three mandatory columns are fixed: Location, Time, Z [m]												
; the next columns are database parameter names (header line) and values (below header)												
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm												
Location	Time	Z [m]	C [S/m]	S [PSU]	T [°C]	TSS [mg/L]	DO [mg/L]	O2% [%]	pH	NH4 [mg/L]	NO2 [mg/L]	NO3 [mg/L]
08B01	02/08/10	0	0,0248	0,12	22	4	9,3		8	0,13	<0.016	1,11

Tide gauges

EPA Water Database							
File format: v1.0							
Organization: CETI							
Person: Živko Živković							
E-mail: zivkovic@gmail.com							
Dataset: Tide gauges							
Matrix: Water							
; lines beginning with semicolon are comments to be ignored							
; the first seven lines contain mandatory metadata							
; the header line below defines column names, column are separated by tabulation							
; the first three mandatory columns are fixed: Location, Time, Z [m]							
; the next columns are database parameter names (header line) and values (below header)							
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm							
Location	Time	Z [m]	SL [m]				
Bar	01/12/04 00:00	0	0,37				

Water discharge time series (rivers)

EPA Water Database			
File format: v1.0			
Organization: CETI			
Person: Živko Živković			
E-mail: zivkovic@gmail.com			
Dataset: Water discharge time series (rivers)			
Matrix: Water			
; lines beginning with semicolon are comments to be ignored			
; the first seven lines contain mandatory metadata			
; the header line below defines column names, column are separated by tabulation			
; the first three mandatory columns are fixed: Location, Time, Z [m]			
; the next columns are database parameter names (header line) and values (below header)			
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm			
Location	Time	Z [m]	D [m3/s]
Podgorica	01/01/10	0	505

Water level time series (lake and rivers)

EPA Water Database						
File format: v1.0						
Organization: CETI						
Person: Živko Živković						
E-mail: zivkovic@gmail.com						
Dataset: Water level time series (lake and rivers)						
Matrix: Water						
; lines beginning with semicolon are comments to be ignored						
; the first seven lines contain mandatory metadata						
; the header line below defines column names, column are separated by tabulation						
; the first three mandatory columns are fixed: Location, Time, Z [m]						
; the next columns are database parameter names (header line) and values (below header)						
; time format is DD/MM/YYYY or DD/MM/YYYY hh:mm						
Location	Time	Z [m]	WL [m]			
Brodska Njiv	01/01/99 00:00	0	0,19			