



## Οδηγίες χρήσης

του «Δικτύου Ανοιχτής Πληροφορίας Υδροσυστημάτων» -  
OpenHi.net

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## 1 Εισαγωγή

Το «Δίκτυο Ανοιχτής Πληροφορίας Υδροσυστημάτων» (Open Hydrosystem Information Network, (<https://openhi.net/en/>)) είναι μια πληροφοριακή υποδομή για τα επιφανειακά νερά της χώρας, με ελεύθερη πρόσβαση σε σχετικά υδρολογικά, περιβαλλοντικά και γεωγραφικά δεδομένα.

Στο παρόν εγχειρίδιο περιγράφονται οι κύριες λειτουργίες του συστήματος. Στο **Κεφάλαιο 2** παρουσιάζεται η διαδικασία λήψης γεωγραφικών δεδομένων και εισαγωγής τους σε Σύστημα Γεωγραφικών Πληροφοριών από τους κοινούς χρήστες της υποδομής. Στα **Κεφάλαια 3 και 4** περιγράφονται οι δυνατότητες διαχείρισης μεμονωμένου σταθμού και ενημερώσεων σταθμών από τους διαχειριστές της υποδομής. Τέλος, στο **Κεφάλαιο 5** περιγράφεται η διαδικασία σύνδεσης ενός σταθμού με την υποδομή, από τους διαχειριστές, ούτως ώστε να πραγματοποιείται αυτόματα η επικαιροποίηση των δεδομένων του σταθμού εντός της υποδομής.



## 2 Λήψη γεωγραφικών δεδομένων και εισαγωγή σε σύστημα γεωγραφικών πληροφοριών

Η πλατφόρμα προσφέρει ελεύθερα γεωγραφικά δεδομένα σχετικά με τους επιφανειακούς υδατικούς πόρους και το μετρητικό δίκτυο (υδρογραφικό δίκτυο, λίμνες και ταμιευτήρες, σταθμοί μέτρησης, λεκάνες απορροής).

Τα επίπεδα γεωγραφικής πληροφορίας του Openhi.net ακολουθούν την οδηγία [Inspire](#), προσφέρονται ελεύθερα και είναι τα παρακάτω:

- Επιφανειακά ύδατα (Watercourse)
- Κύρια υδατορέματα (watecourseMain)
- Λίμνες, ταμιευτήρες (standingWater)
- Λεκάνες απορροής (riverBasin)
- Υπολεκάνες απορροής (drainageBasin)
- Λεκάνες απορροής ανάντη σταθμών μέτρησης (stationBasin)
- Υδρογραφικό δίκτυο (watercourseLink)
- Κόμβοι υδρογραφικού δικτύου (hydroNode)

### 2.1 Διαδικασία λήψης δεδομένων

Τα δεδομένα προσφέρονται μέσω της υπηρεσίας Web Feature Services ([WFS](#)), σύμφωνα με το Open Geospatial Consortium ([OGC](#)) από την διεύθυνση:

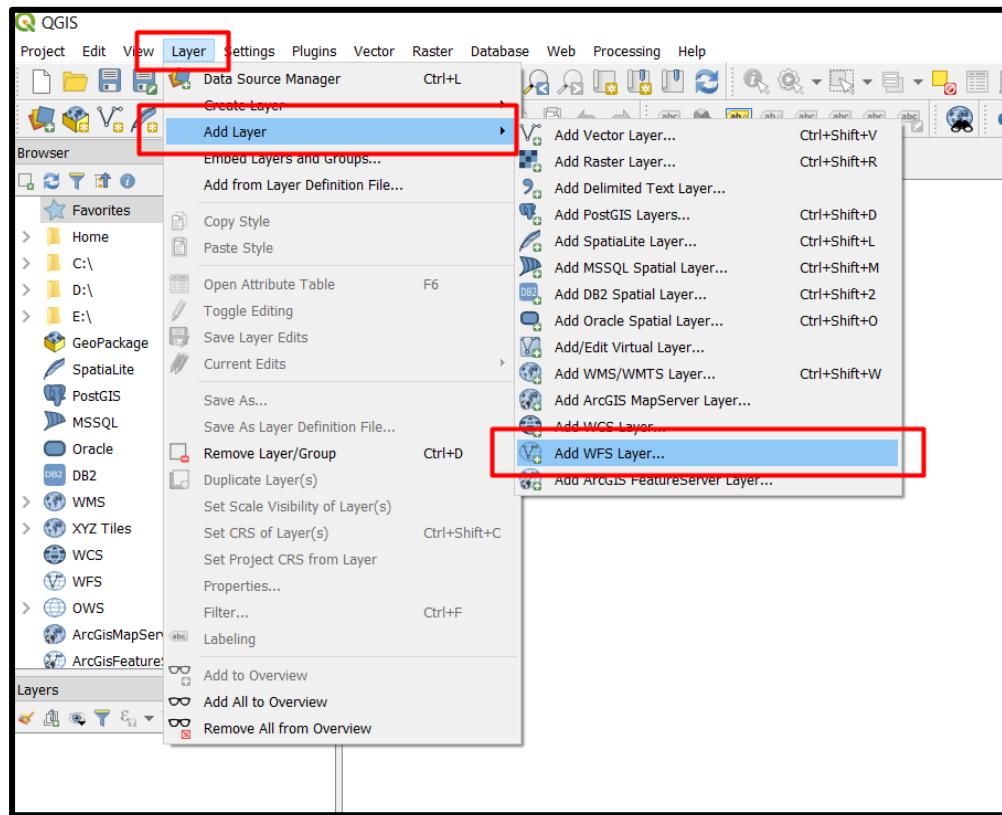
<https://system.openhi.net/cgi-bin/mapserv?map=/opt/enhydris-openhi/enhydris-openhigis/mapserver/openhigis.map>

### 2.2 Παράδειγμα: Εισαγωγή δεδομένων σε Σύστημα Γεωγραφικής Πληροφορίας (ΣΓΠ) ανοιχτού κώδικα

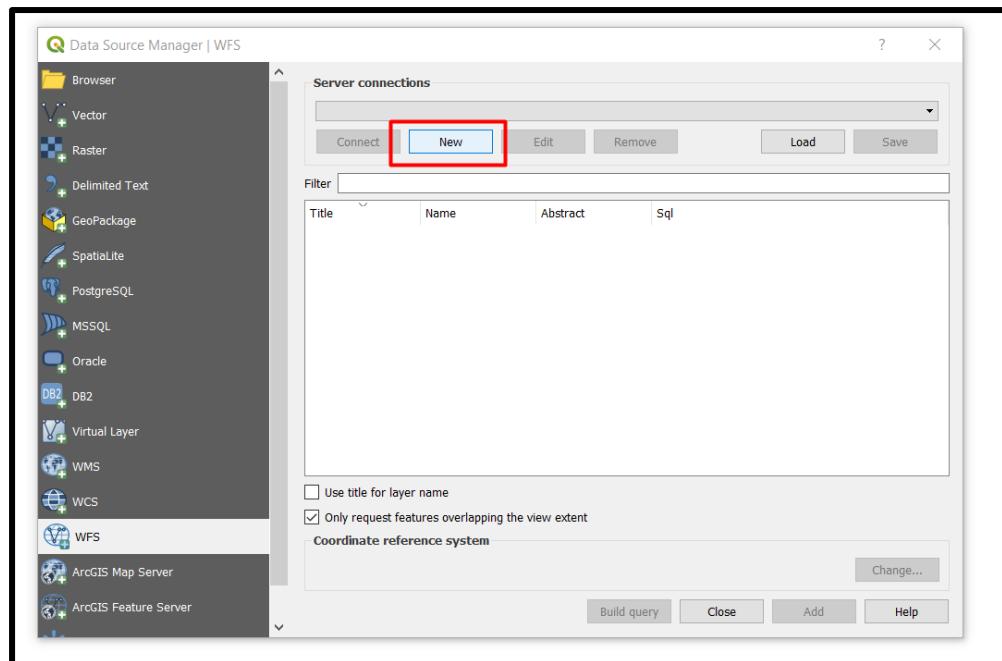
Στην ενότητα αυτή περιγράφεται η διαδικασία ανάκτησης των δεδομένων στο Σύστημα Γεωγραφικής Πληροφορίας ανοιχτού κώδικα [QGIS](#) (Quantum Geographic Information System).

Τα βήματα που ακολουθούνται είναι:

*Layer > Add Layer > Add WFS layer:*

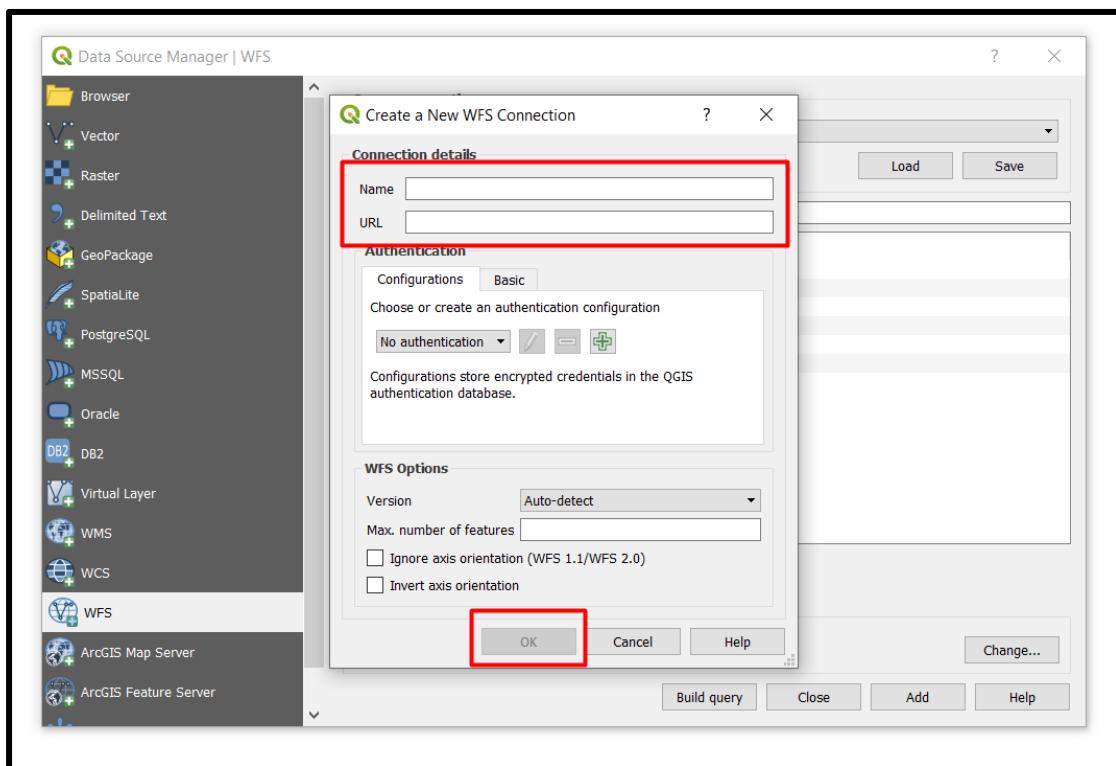


*Επιλογή new:*





Προσθήκη ονόματος στο πεδίο Name > Ορισμός της διεύθυνσης WFS στο πεδίο URL > ok:

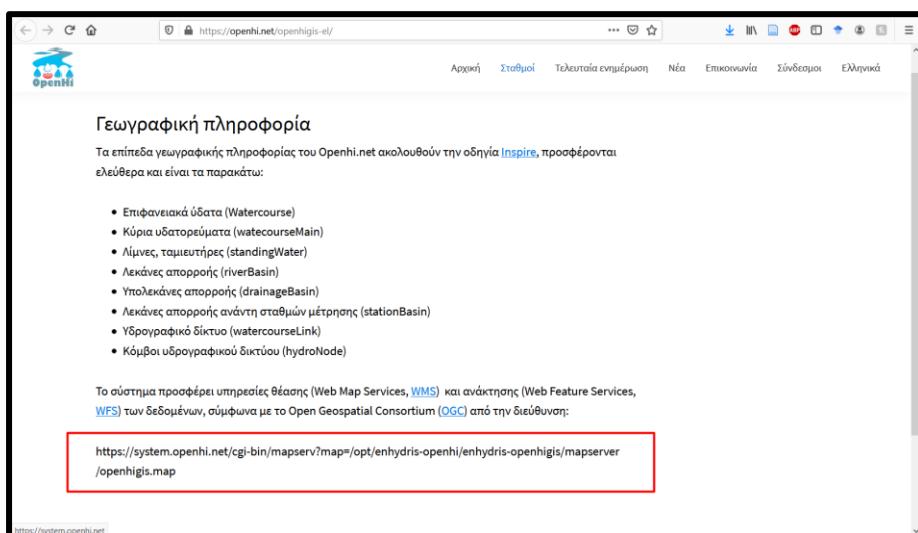


### Σημείωση:

Ο σύνδεσμος των δεδομένων για το WFS του συστήματος είναι:

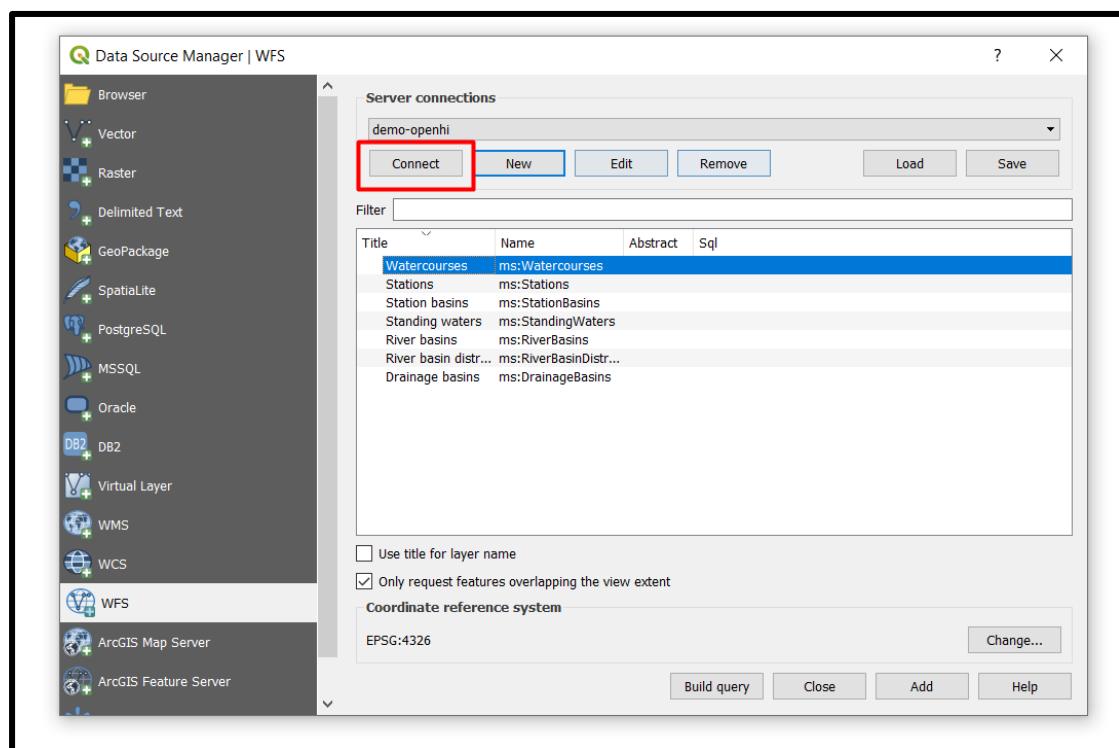
<https://system.openhi.net/cgi-bin/mapserv?map=/opt/enhydris-openhi/enhydris-openhigis/mapserver/openhigis.map>

Ο σύνδεσμος είναι επίσης προσβάσιμος από την ιστοσελίδα <https://openhi.net/openhigis-el/>, στο σημείο που φαίνεται στην ακόλουθη εικόνα:

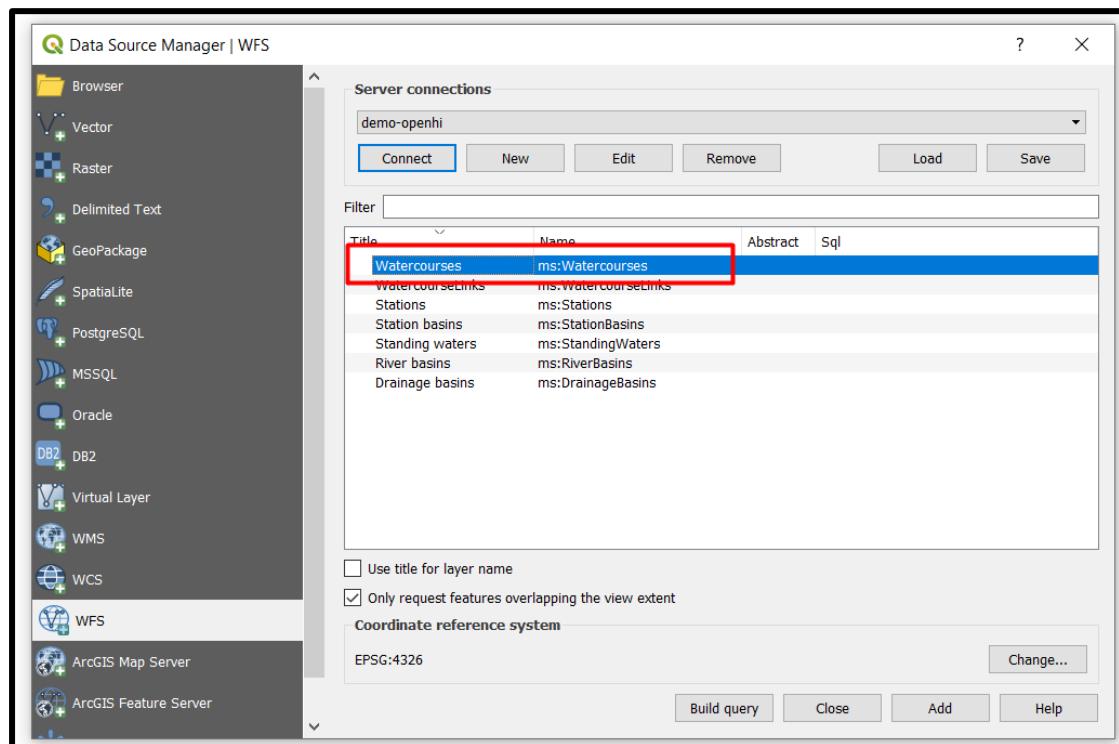




Επιλογή connect:

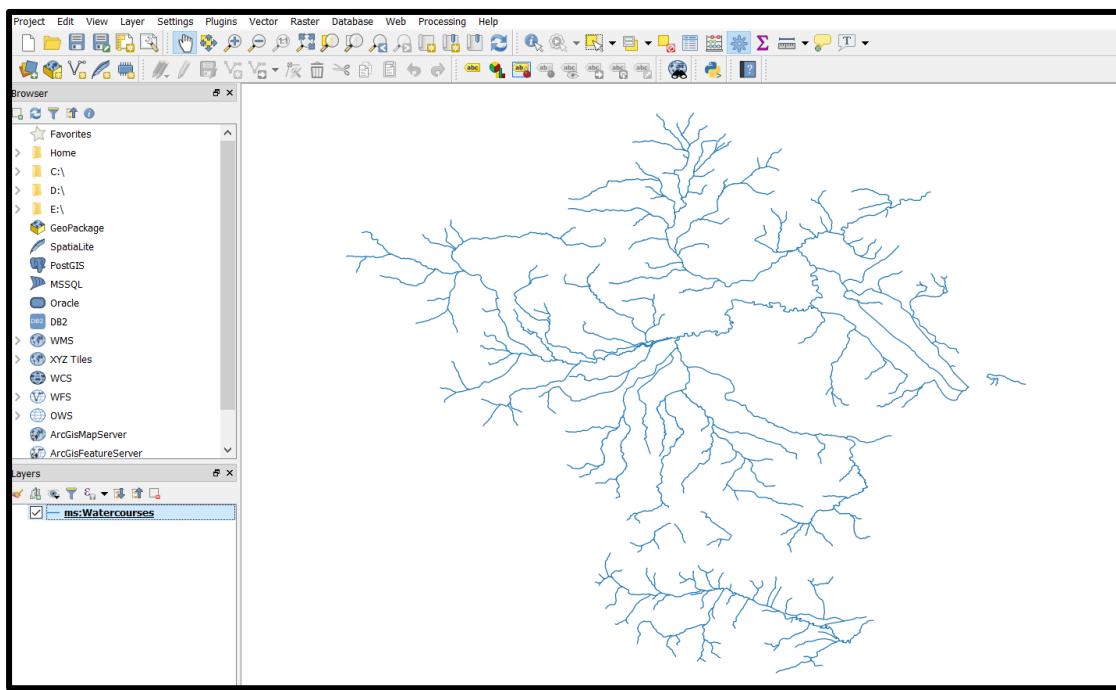


Για κάθε επίπεδο κάνουμε click στο όνομα του > add:



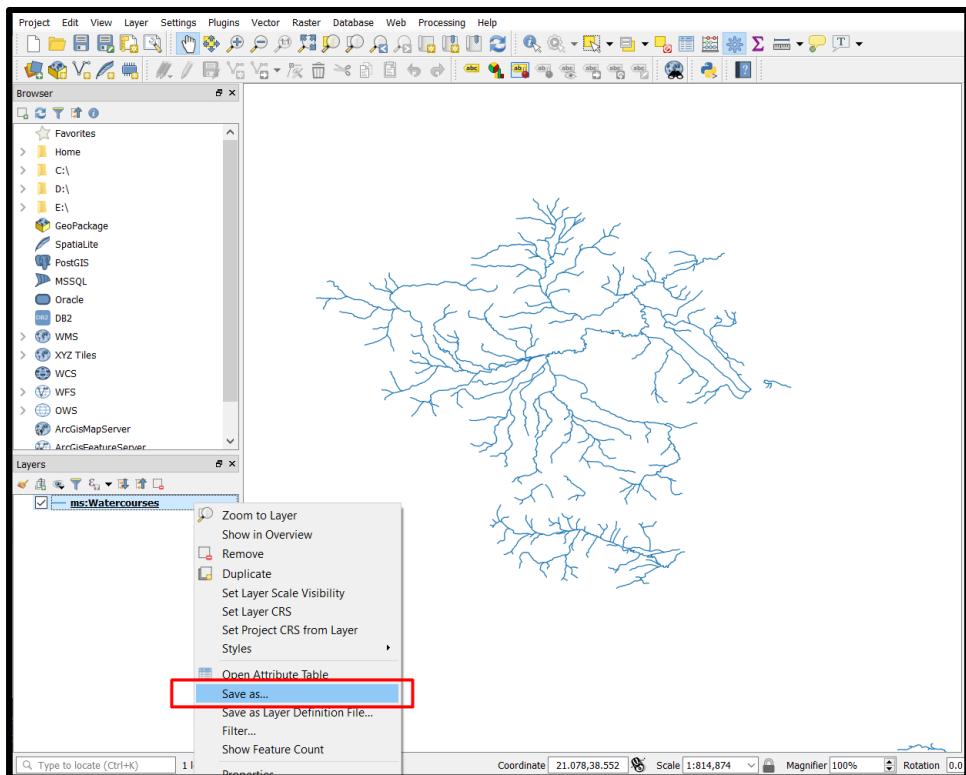


Και το επίπεδο εμφανίζεται στην οθόνη:



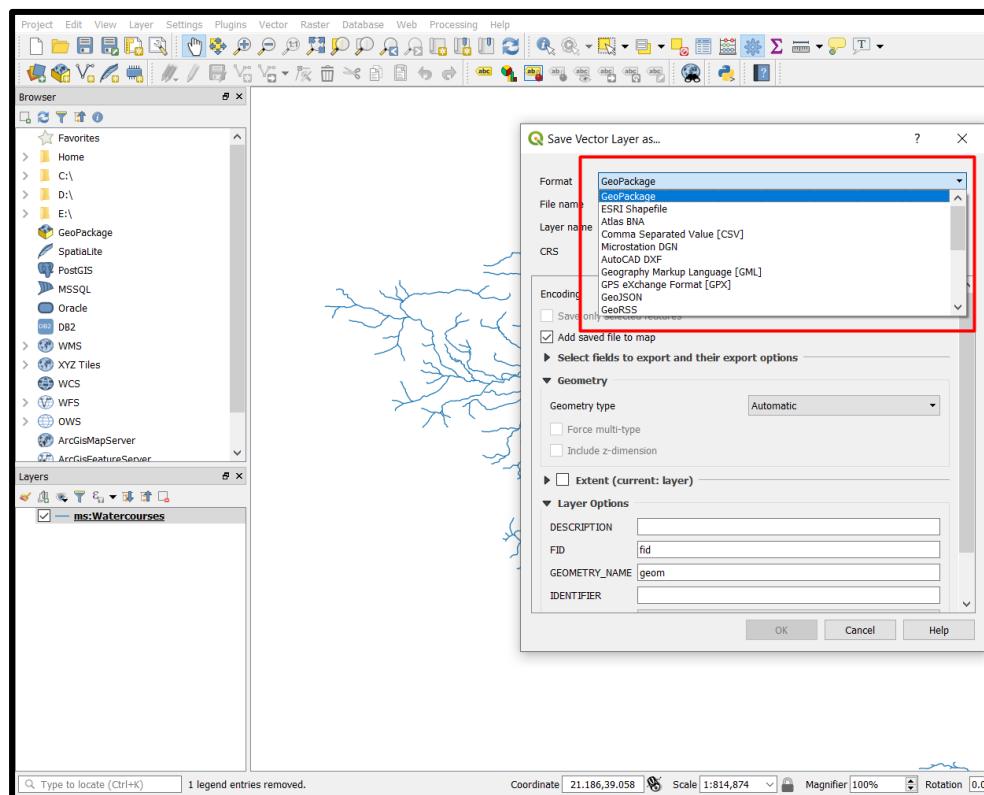
Για την ανάκτηση των δεδομένων:

**Δεξή click στο επίπεδο δεδομένων > save as:**





## Επιλογή του format των αρχείων





### 3 Διαχείριση μεμονωμένου σταθμού

#### 3.1 Βασικές δυνατότητες

*Home > Enhydris > Stations - Επιλογή σταθμού*

NAME	OWNER
Accommodation Halls of UoI	Laboratory of Knowledge and Intelligent Computing (KIC)
Agia Paraskevi	Laboratory of Knowledge and Intelligent Computing (KIC)
Ano Kostitata	TEI of Epirus
Arta's Bridge	Laboratory of Knowledge and Intelligent Computing (KIC)
Arta/Vlacherna	Αποκεντρωμένη Διοικηση Ηπείρου και Δυτικής Μακεδονίας
DemoOpenhiStation	Εθνικό Μετσόβιο Πολυτεχνείο - Τομέας Υδατικών Πόρων και Περιβάλλοντος

Κάθε σταθμός διαθέτει τις ακόλουθες καρτέλες:

#### 1. General information

The screenshot shows the 'Change Station' interface for the 'DemoOpenhiStation'. The 'General information' tab is active and highlighted with a red box. Other tabs include 'HISTORY' and 'MANAGEMENT'. The form fields include:

- Name: DemoOpenhiStation
- Code: (empty)
- Is automatic: (unchecked)
- Owner: Εθνικό Μετσόβιο Πολυτεχνείο - Τομέας Υδατικών Πόρων και Περιβάλλοντος
- Co-ordinates: 23.05928, 39.05928 (Longitude and latitude in decimal degrees)
- Original SRID: 4326 (Set this to 4326 if you have no idea what we're talking about. If the latitude and longitude has been converted from another co-ordinate system, enter the SRID of the original co-ordinate system.)
- Altitude: (empty)
- Remarks: (empty)
- Start date: (empty)
- End date: (empty)

#### 2. Permissions

The screenshot shows the 'Permissions' section. The 'Administrator' dropdown is set to 'nikosmamassis'. The 'Maintainers' list includes:

- pdedou
- Portablehg
- rozos
- sandra
- schweissertom
- scientact
- skozan
- slykoud
- solonts

A note at the bottom of the list says: "Hold down 'Control', or 'Command' on a Mac, to select more than one."



### 3. Files

**FILES (HIDE)**

File: #1

Description:  Date:  Today |

Content:  No file chosen

Remarks:

### 4. Log entries

**LOG ENTRIES (HIDE)**

Log entry: #1

User:  Date:  Today |

Type:

Report:

### 5. Time series groups

**TIME SERIES GROUPS (HIDE)**

Time series group: Level

METADATA (SHOW)  
RANGE CHECK (SHOW)  
TIME CONSISTENCY CHECK (SHOW)  
TIME SERIES (SHOW)  
CURVE INTERPOLATIONS (SHOW)  
AGGREGATIONS (SHOW)

Time series group: #2

METADATA (SHOW)  
RANGE CHECK (SHOW)  
TIME CONSISTENCY CHECK (SHOW)  
TIME SERIES (SHOW)  
CURVE INTERPOLATIONS (SHOW)  
AGGREGATIONS (SHOW)

Add another Time Series Group

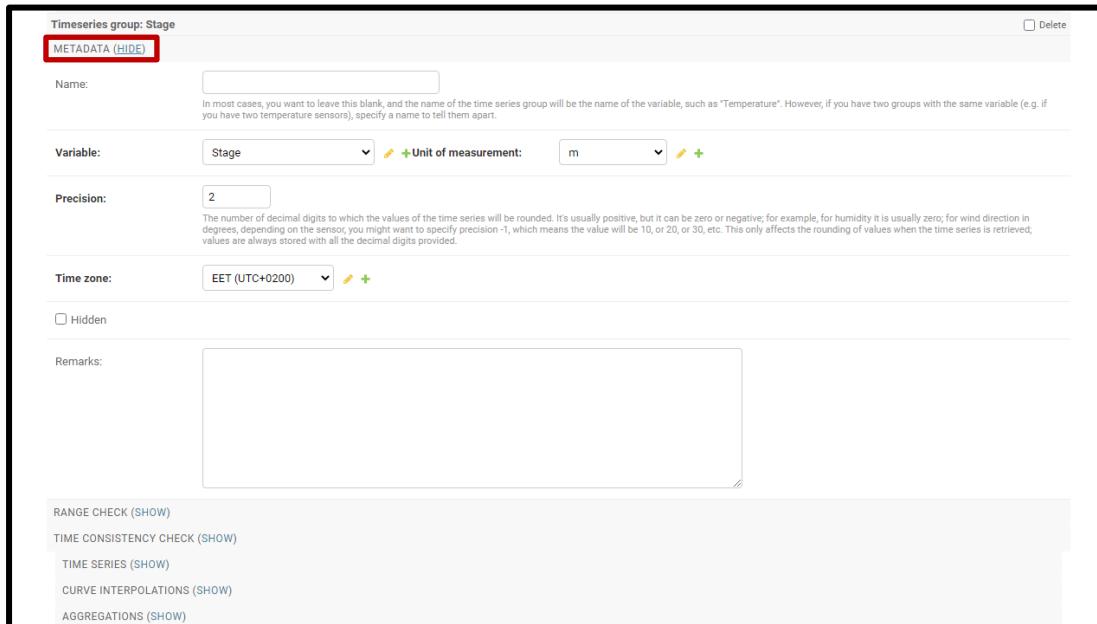
### 3.2 Δυνατότητες μεταφόρτωσης και επεξεργασίας χρονοσειρών

Στην καρτέλα TIMES SERIES GROUPS ο χρήστης μπορεί να επιλέξει από τις ακόλουθες φόρμες για τις επιμέρους ομάδες χρονοσειρών:

Ομάδες χρονοσειρών: Παροχής (1) μεταδεδομένα-metadata, (2) έλεγχο εύρους τιμών range check), (3) έλεγχο χρονικής συνέπειας –time consistency check (4) χρονοσειρές-timeseries (5) Παρεμβολές μέσω καμπυλών-curve interpolations (6) συναθροίσεις χρονοσειρών-aggregations	<b>Timeseries group: Discharge</b> <a href="#">METADATA (SHOW)</a> <a href="#">RANGE CHECK (SHOW)</a> <a href="#">TIME CONSISTENCY CHECK (SHOW)</a> <a href="#">TIME SERIES (SHOW)</a> <a href="#">CURVE INTERPOLATIONS (SHOW)</a> <a href="#">AGGREGATIONS (SHOW)</a>
---	--

Αναλυτικά παρουσιάζεται η διεπαφή και οι βασικές λειτουργίες κάθε ομάδας χρονοσειρών:

#### 1. Μεταδεδομένα



Timeseries group: Stage

**METADATA (HIDE)**

Name:

In most cases, you want to leave this blank, and the name of the time series group will be the name of the variable, such as "Temperature". However, if you have two groups with the same variable (e.g. if you have two temperature sensors), specify a name to tell them apart.

Variable: Stage

Precision: 2

The number of decimal digits to which the values of the time series will be rounded. It's usually positive, but it can be zero or negative; for example, for humidity it is usually zero; for wind direction in degrees, depending on the sensor, you might want to specify precision -1, which means the value will be 10, or 20, or 30, etc. This only affects the rounding of values when the time series is retrieved; values are always stored with all the decimal digits provided.

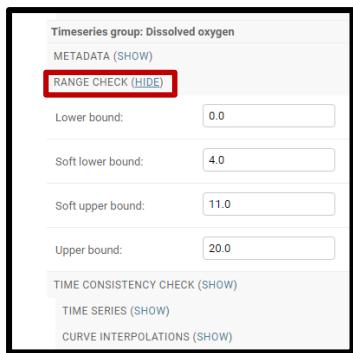
Time zone: EET (UTC+0200)

Hidden

Remarks:

RANGE CHECK (SHOW)  
TIME CONSISTENCY CHECK (SHOW)  
TIME SERIES (SHOW)  
CURVE INTERPOLATIONS (SHOW)  
AGGREGATIONS (SHOW)

#### 2. Έλεγχος εύρους τιμών range check



Timeseries group: Dissolved oxygen

**RANGE CHECK (HIDE)**

Lower bound: 0.0

Soft lower bound: 4.0

Soft upper bound: 11.0

Upper bound: 20.0

TIME CONSISTENCY CHECK (SHOW)  
TIME SERIES (SHOW)  
CURVE INTERPOLATIONS (SHOW)

Υπάρχουν 4 όρια (lower, soft lower, soft upper, upper). Οι τιμές εκτός των lower upper δεν μεταφέρονται στη διορθωμένη χρονοσειρά

### 3. Έλεγχος χρονικής συνέπειας –time consistency check

**TIME CONSISTENCY CHECK (HIDE)**

Thresholds:	15min 0.1 30min 0.15 1H 0.3
-------------	-----------------------------------

The allowed differences, one per line, like "10min 7.3" (without the quotes). This example means that any change higher than 7.3 within 10 minutes will be considered an error. The time length is specified as an optional number plus a unit, with no space in between. The units available are min (minutes), H (hours) and D (days).

Symmetric  
If this is selected, it is the absolute value of the change that matters, not its direction. In this case, the allowed differences must all be positive. If it's not selected, only rates larger than a positive or smaller than a negative difference are considered.

Τα κατώφλια γράφονται “χρόνος διαφορά τιμής” ενώ το Symmetric επιλέγεται στην περίπτωση που θέλουμε να ελέγχεται η αύξηση αλλά και η μείωση της τιμής της μεταβλητής στο χρονικό διάστημα. Στην εικόνα φαίνεται:

**15min 0.1** δηλαδή θα θεωρηθεί λάθος τιμή που θα είναι μεγαλύτερη (ή μικρότερη) κατά 20 από αυτήν πριν 15 λεπτά

**30min 0.15** δηλαδή θα θεωρηθεί λάθος τιμή που θα είναι μεγαλύτερη (ή μικρότερη) κατά 0.15 από αυτήν πριν 15 λεπτά

**1H 0.3** δηλαδή θα θεωρηθεί λάθος τιμή που θα είναι μεγαλύτερη (ή μικρότερη) κατά 0.3 από αυτήν πριν 1 ώρα

### 4. Χρονοσειρές-timeseries

Οι ημερομηνίες στις χρονοσειρές που εισάγονται πρέπει να είναι της μορφής **yyyy-mm-dd hh:mm** (πχ 2014-12-25 23:00) σε CSV (comma delimited) αρχεία (προσοχή: αναφερόμαστε στη μορφή που προβάλλονται οι ημερομηνίες αν ανοιχτεί το αρχείο με notepad, αν το αρχείο ανοιχτεί με excel η παρουσίαση των ημερομηνιών είναι θέμα επιλογών προβολής).

**TIME SERIES (HIDE)**

Type:	Raw
Time step:	15min
E.g. "10min", "H" (hourly), "D" (daily), "M" (monthly), "Y" (yearly). More specifically, it's an optional number plus a unit, with no space in between. The units available are min, H, D, M, Y. Leave empty if the time series is irregular.	
Data file:	<input type="button" value="Choose file"/> No file chosen
What to do:	Append this file's data to the already existing

**Time series: Checked**

Type:	Checked
Time step:	15min
E.g. "10min", "H" (hourly), "D" (daily), "M" (monthly), "Y" (yearly). More specifically, it's an optional number plus a unit, with no space in between. The units available are min, H, D, M, Y. Leave empty if the time series is irregular.	
Data file:	<input type="button" value="Choose file"/> No file chosen
What to do:	Append this file's data to the already existing

Οι τύποι χρονοσειρών είναι πέντε:

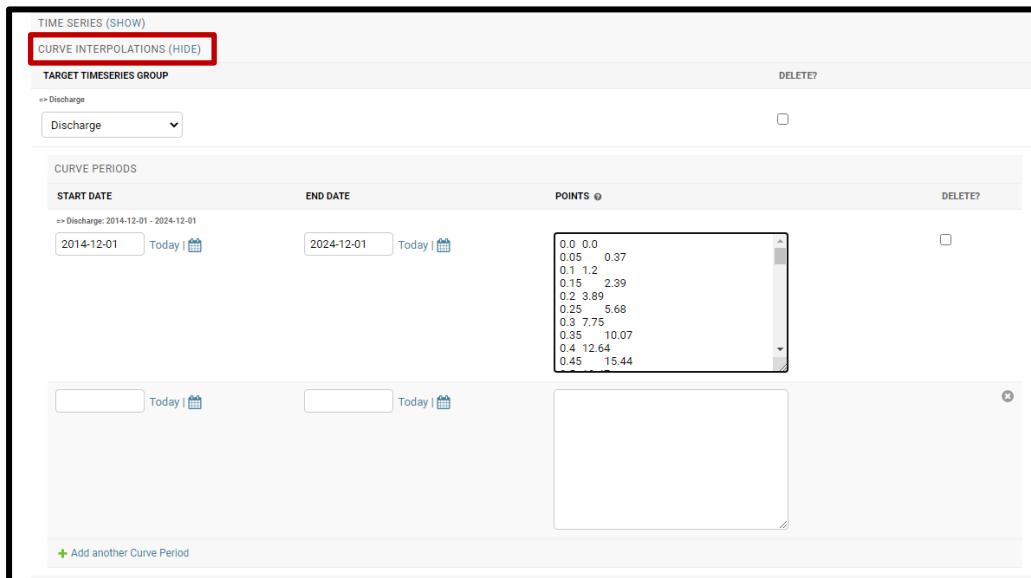
Raw, checked, processed, regularized, aggregated

#### Διόρθωση χρονοσειράς

- A. Τα πρωτογενή δεδομένα βρίσκονται στη raw χρονοσειρά

- B. Εφόσον ενεργοποιηθούν έλεγχοι (εύρους, χρονικής συνέπειας) δημιουργείται αυτόματα η checked χρονοσειρά η οποία και φαίνεται στα διαγράμματα
- C. Αν αλλάξουν τα όρια των ελέγχων η checked χρονοσειρά συνεχίζει να ενημερώνεται με τα καινούργια όρια. **Προσοχή:** Αν θέλω τα καινούργια όρια να ισχύσουν και για τις προηγούμενες τιμές θα πρέπει (α) να σβήσω την checked (β) να βάλω τα νέα όρια και (γ) θα δημιουργηθεί η checked αυτόματα
- D. Η checked χρονοσειρά μπορεί να ανακτηθεί σε αρχείο csv, να διορθωθεί χειροκίνητα και να ανέβει ξανά ώστε να φαίνεται διορθωμένη στα διαγράμματα
- E. Η checked χρονοσειρά θα συνεχίσει να ανανεώνεται από τη χρονική στιγμή που διορθώθηκε και μετά.

## 5. Παρεμβολές μέσω καμπυλών-curve interpolations



START DATE	END DATE	POINTS	DELETE?
2014-12-01	2024-12-01	0.0 0.0 0.05 0.37 0.1 1.2 0.15 2.39 0.2 3.89 0.25 5.68 0.3 7.75 0.35 10.07 0.4 12.64 0.45 15.44	<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

+ Add another Curve Period

Η χρονοσειρά της ελεγμένης στάθμης μετατρέπεται σε παροχή μέσω της καμπύλης στάθμης-παροχής (επιφάνειας-όγκου ταμιευτήρα) η οποία ισχύει για συγκεκριμένη χρονική περίοδο η οποία ορίζεται.

**Προσοχή:** Αν αναθεωρηθεί η καμπύλη στην εφαρμογή, θα αρχίσει να εφαρμόζεται μόνο για τις νέες τιμές της στάθμης. Σε αυτή την περίπτωση ο διαχειριστής θα πρέπει πρώτα να σβήσει την παλιά χρονοσειρά παροχής, να πατήσει αποθήκευση και να την ξαναδημιουργήσει ώστε να υπολογιστεί με την νέα καμπύλη

## 6. Συναθροίσεις χρονοσειρών-aggregations



TIMESERIES GROUPS (HIDE)

Timeseries group: Discharge

Delete

METADATA (SHOW)

RANGE CHECK (SHOW)

TIME CONSISTENCY CHECK (SHOW)

TIME SERIES (SHOW)

CURVE INTERPOLATIONS (SHOW)

AGGREGATIONS (HIDE)

TARGET TIME STEP <small>(H)</small>	METHOD	MAX MISSING	RESULTING TIMESTAMP OFFSET	DELETE?
H	Mean	0		<input type="checkbox"/>
	.....	0		<input checked="" type="checkbox"/>

+ Add another Aggregation



## 4 Διαχείριση ενημερώσεων σταθμών

### 4.1 Εισαγωγή λογαριασμών αλληλογραφίας για λήψη ενημερώσεων

*Home > Enhydris\_Synoptic > Synoptic groups*

Enhydris dashboard

WELCOME, NIKOS | VIEW SITE / CHANGE PASSWORD / LOG OUT

Home > Enhydris\_Synoptic > Synoptic groups

Select synoptic group to change

Action:  0 of 3 selected

SYNOPTIC GROUP  
 OpenHi  
 Irma  
 Itia

3 synoptic groups

**ADD SYNOPTIC GROUP +**

*Επιλογή Openhi*

Enhydris dashboard

WELCOME, NIKOS | VIEW SITE / CHANGE PASSWORD / LOG OUT

Home > Enhydris\_Synoptic > Synoptic groups > OpenHi

Change synoptic group

**HISTORY**

Name:

Slug:   
Identifier to be used in URL

Time zone:

Fresh time limit:   
Maximum time that may have elapsed for the data to be considered fresh. For data older than this the date on the map shows red; for fresh data it shows green. Specify it in seconds or in the format DD HH:MM:SS.

SYNOPTIC GROUP STATIONS		
STATION	ORDER	DELETE?
Ρέντης	1	<input type="checkbox"/>
Δακέλεια	2	<input type="checkbox"/>
Μοναστήρι	4	<input type="checkbox"/>
Ανθήλαι	6	<input type="checkbox"/>
Arta's Bridge	7	<input type="checkbox"/>

Στο τέλος της σελίδας: Εισαγωγή mail για ειδοποίηση

WHERE TO SEND EARLY WARNINGS

EMAIL

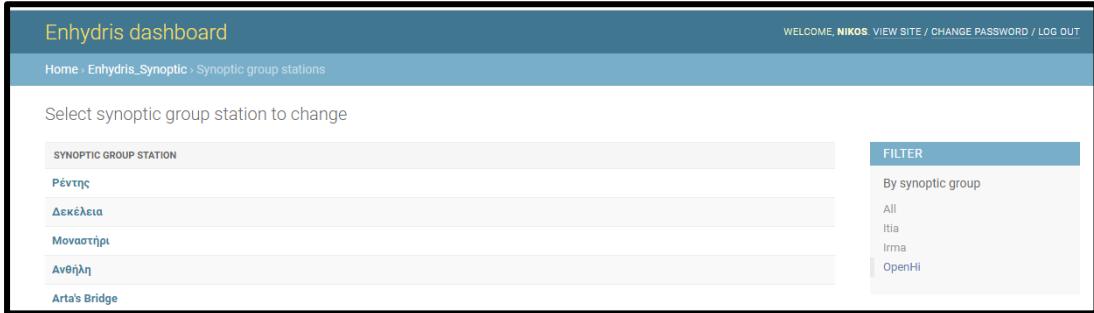
EarlyWarningEmail object (1)

Add another Email address to send early warnings

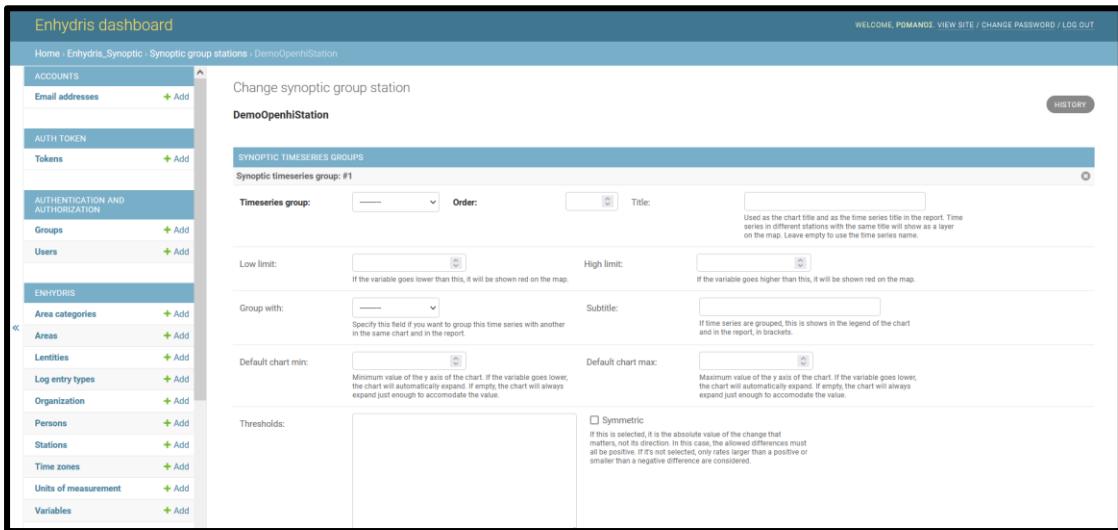
**Delete** **Save and add another** **Save and continue editing** **SAVE**

## 4.2 Εισαγωγή ορίων για ειδοποίηση

*Home > Enhydris\_Synoptic > Synoptic group stations*



*Επιλογή σταθμού > Add another Synoptic timeseries group*



*Title (Επιλογή μηνύματος μέσα στο μαιλ)*

*Low limit-high limit (Επιλογή ορίων)*

Το σύστημα **κάθε 10 λεπτά** διαβάζει την τελευταία μέτρηση και αν είναι εκτός ορίων στέλνει μήνυμα ηλεκτρονικού ταχυδρομείου σε επιλεγμένες διευθύνσεις. Οι διευθύνσεις ορίζονται μέσω επικοινωνίας με τους διαχειριστές του συστήματος.



## 5 Οδηγίες χρήσης loggertodb – συστήματος σύνδεσης με τη βάση δεδομένων Enhydris του Openhi.net

Οι οδηγίες αυτού του μέρους έχουν γραφτεί στα Αγγλικά.

### 5.1 Usage

loggertodb reads a data file (or several data files), connects to Enhydris, determines which records in the file are newer than those stored in Enhydris, and appends them. The details of its operation are specified in the configuration file specified on the command line.

### 5.2 Quick start

#### 5.2.1 Installation

Windows: loggertodb is just a single executable, `loggertodb.exe`. You download it and run it; there's no installer.

Download `loggertodb.exe` from <https://github.com/openmeteo/loggertodb/releases/>.

Linux: Simply execute this:

```
pip3 install loggertodb
```

#### 5.2.2 How to run it

First, you need to create a configuration file with a text editor such as `vim`, `emacs`, `notepad`, or whatever. Create such a file and name it, for example, `/var/tmp/loggertodb.conf`, or, on Windows, something like `C:\Users\user\loggertodb.conf`, with the following contents (the contents don't matter at this stage, just copy and paste them from below):

```
General]
base_url = https://openmeteo.org/
auth_token = 123456789abcdef0123456789abcdef012345678
loglevel = INFO
```

Then, open a command prompt and give it this command:

Unix/Linux:

```
loggertodb /var/tmp/loggertodb.conf
```

Windows:

```
C:\Program Files\Loggertodb\loggertodb.exe
C:\Users\user\loggertodb.conf
```

(the details may differ; for example, in 64-bit Windows, it may be C:Program Files (x86) instead of C:Program Files.)

If you have done everything correctly, it should show an error message similar to “No stations have been specified”. This means that, apart from the “General” section you have to add more sections to the configuration file.



### 5.2.3 Authentication

`loggertodb` needs to logon to Enhydris, and for this it needs an authentication token to be specified as the value of the `auth_token` parameter. You can get a token at the `/api/auth/login/` URL of Enhydris, such as <https://openmeteo.org/api/auth/login/>.

### 5.2.4 Configuration file examples

The following instructs `loggertodb` to use the single data file `zeno.data` and upload its data to `openmeteo.org`; the first field of each line (after the date and time) will be uploaded to time series group 232, the second to 233, and so on. The last field of each line will not be uploaded (symbolized with the 0):

```
[General]
loglevel = WARNING
logfile = /var/logloggertodb/itiameteo.log
base_url = https://openmeteo.org/
auth_token = 123456789abcdef0123456789abcdef012345678

[NTUA]
station_id = 1334
path = /var/local/openmeteo/logger_data_files/ntua/zeno.data
storage_format = simple
date_format = %y/%m/%d %H:%M:%S
fields =
232,233,247,248,237,238,236,9141,5461,6659,9139,6661,240,6539,6541
,230,234,0
```

The following instructs `loggertodb` to use two data files (one for meteorological station PRASINOS, one for VILIA; these are just labels to make it easy for you to read the file; that are not used anywhere). While reading that each line's fields, the value “NAN” instead of a number will be interpreted as an empty (or missing, or null) value. The `timezone` parameter is used for daylight saving time adjustments (see [Daylight saving time](#)):

```
[General]
loglevel = WARNING
logfile = /var/logloggertodb/defkalion.log
base_url = https://openmeteo.org/
auth_token = 123456789abcdef0123456789abcdef012345678

[PRASINOS]
station_id = 1345
path =
/var/local/openmeteo/logger_data_files/defkalion/prasino.data
storage_format = simple
date_format = %d/%m/%Y %H:%M:%S
fields = 9180,9182,9184,9178
null = NAN
timezone = Europe/Athens

[VILIA]
station_id = 1347
path = /var/local/openmeteo/logger_data_files/defkalion/vilia.data
storage_format = simple
date_format = %d/%m/%Y %H:%M:%S
fields = 9172,9174,9176,9170
null = NAN
timezone = Europe/Athens
```



The next is very similar to the previous one, but it's for Windows, it uses a star for null values, and the fields in the files are delimited with commas instead of spaces. In addition, the sixth field of each line (after the date and time) is not uploaded:

```
[General]
loglevel = INFO
logfile = C:\a2a\loggertodb-kostilata.log
base_url = https://openmeteo.org/
auth_token = 123456789abcdef0123456789abcdef012345678

[ANO_KOSTILATA]
station_id = 1387
path = C:\a2a\ano_kostilata_20130601.txt
storage_format = simple
delimiter =
date_format = %d-%m-%Y %H:%M:%S
fields = 9290,9285,9292,9294,9295,0,9291,9289,9288,9286
null =
timezone = Europe/Athens

[KATO_KOSTILATA]
station_id = 1388
path = C:\a2a\ano_kostilata_20130601.txt
storage_format = simple
delimiter =
date_format = %d-%m-%Y %H:%M:%S
fields = 9279,9274,9281,9283,9284,0,9280,9278,9277,9275
null =
timezone = Europe/Athens
```

Finally, an example of a configuration that uses the files produced by Davis WeatherLink. In this case, C:\WeatherLink\komboti is the directory that contains the .WLK files (it is necessary to read more below about [WDAT5 units](#) and the [WDAT5 format](#)):

```
[General]
loglevel = INFO
logfile = C:\WeatherLink\komboti\loggertodb.log
base_url = https://openmeteo.org/
auth_token = 123456789abcdef0123456789abcdef012345678

[KOMBOTI]
station_id = 1389
path = C:\WeatherLink\komboti
storage_format = wdat5
outsideTemp = 1256
hiOutsideTemp = 1257
rain = 1652
timezone = Europe/Athens
temperature_unit = F
rain_unit = inch
```

### 5.2.5 Running automatically

You probably want to have `loggertodb` automatically update the data. To do this, either run it periodically (from `cron` on Unix and `Task Scheduler` on Windows), or, if the software



you use to download the data from the meteorological station has the feature, add `loggertodb` as a trigger.

### 5.3 Configuration file reference

The configuration file has the format of INI files. There is a [General] section with general parameters, and any number of other sections, which we will call “file sections”, each file section referring to one file to be processed; this makes it possible to process many files in a single `loggertodb` execution using a single configuration file and fewer HTTP requests.

#### 5.3.1 General parameters

`loglevel`

Can have the values `ERROR`, `WARNING`, `INFO`, `DEBUG`, indicating the amount of output requested from `loggertodb`. The default is `WARNING`.

`logfile`

The full pathname of a log file. If unspecified, log messages will go to the standard error.

`base_url`

The base url of the Enhydris installation to connect to, such as  
<https://openmeteo.org/>.

`auth_token`

The token `loggertodb` will use to authenticate with Enhydris. Obviously the user to whom the token corresponds must have write permissions for all time series that will be uploaded.

#### 5.3.2 File parameters

`station_id`

The id of the station.

`path`

The full pathname of the data storage.

`storage_format`

The format of the data storage. See [Supported formats](#).

`fields`

(Not for the wdat5 format.) A series of comma-separated integers representing the ids of the time series groups to which the data file fields correspond (time series groups are what Enhydris lists as “Data” in the page for a station). A zero indicates that the field is to be ignored. The first number corresponds to the first field after the



date (and possibly other fixed fields depending on data file format, such as the subset identifier) and should be the id of the corresponding time series group, or zero if the field is dummy; the second number corresponds to the second field after the fixed fields, and so on.

Each time series group contains variations of the same time series, such as initial, checked and aggregated. `loggertodb` uploads the data to the “initial” time series of the group. If such a time series does not exist, it is created.

#### `nfields_to_ignore`

This is used only in the `simple` format; it’s an integer that represents a number of fields before the date and time that should be ignored. The default is zero. If, for example, the date and time are preceded by a record id, set `nfields_to_ignore=1` to ignore the record id.

#### `subset_identifiers`

Some file formats mix two or more sets of measurements in the same file; for example, there may be ten-minute and hourly measurements in the same file, and for every 6 lines with ten-minute measurements there may be an additional line with hourly measurements (not necessarily the same variables). `loggertodb` processes only one set of lines each time. Such files have one or more additional distinguishing fields in each line, which helps to distinguish which set it is. `subset_identifiers`, if present, is a comma-separated list of identifiers, and will cause `loggertodb` to ignore lines with different subset identifiers. (Which fields are the subset identifiers depends on the data file format.)

#### `null`

Indicates how null values are represented in the source file. For example, if `null = *`, then a \* in place of a number in the source file is interpreted as a missing value.

If the value is a number, e.g. `null = -9999`, then any string whose numeric value is that number will be interpreted as a missing value, e.g. `-9999`, `-9999.00` and `-9999.000000` will all be interpreted as missing values. The comparison is made with a tolerance of `1e-6`.

(`nullstr` is a deprecated synonym of `null`.)

#### `delimiter`, `decimal_separator`, `date_format`

Some storage formats may be dependent upon regional settings; these formats support `delimiter`, `decimal_separator`, and `date_format`. `date_format` is specified in the same way as for [`strftime\(3\)`](#).

#### `ignore_lines`



For storage formats that are text files, it specifies a regular expression that, if it matches, the line will be ignored. This is useful to ignore header lines or otherwise lines that shouldn't be processed.

#### encoding

For storage formats that are text files, it specifies the encoding. The default is utf8.  
[List of possible encodings.](#)

#### timezone

See [Daylight saving time](#).

temperature\_unit, rain\_unit, wind\_speed\_unit, pressure\_unit, matric\_potential\_unit

In the wdat5 format, you can select some of the units; C or F for temperature, mm or inch for rain and evapotranspiration, m/s or mph for wind speed, hPa or inch Hg for pressure, centibar or cm (of water) for matric potential. The defaults are C, mm, m/s, hPa, centibar.

outsideTemp, hiOutsideTemp, etc.

Only for wdat5 format; see its description below.

## 5.4 Supported formats

### Don't create yet another conversion script

Many people think they should create a script to convert their file to a format that will be acceptable to `loggertodb` and then use `loggertodb` to read it. Don't do that. Don't have yet another script and yet another file—it increases the complexity of the system. If `loggertodb` does not support your existing file directly, contact us so that we add it (or add it yourself if you speak Python, the API is documented).

The following formats are currently supported:

#### simple

The `simple` format is lines of which the first one or two fields are the date and time and the rest of the fields hold time series values. If the first field (after stripping any double quotation marks) is more than 10 characters in length, it is considered to be a date and time; otherwise it is a date only, and the second field is considered to be the time; in this case the two fields are joined with a space to form the date/time string. The field delimiter is white space, unless the `delimiter` parameter is specified. The date and/or time and the values can optionally be enclosed in double quotation marks. The format of the date and time is specified by the `date_format` parameter (enclosing quotation marks are removed before parsing; also if the date and time are different fields, they are joined together with a space before being parsed). If



`date_format` is not specified, then the date and time are considered to be in ISO8601 format, optionally using a space instead of T as the date/time separator, and ignoring any seconds. If `date_format` is specified, it must include a second specifier if the times contain seconds, but these seconds are actually subsequently ignored.

The `nfields_to_ignore` parameter can be used to ignore a number of fields in the beginning of each line; this is useful in some formats where the date and time are preceded by a record id or other field.

If `path` contains one of the characters \*?[], it is considered to be a pattern that matches many files whose concatenation (ignoring any headers) would be the complete list of records. [glob](#) is used to find the matching files. `loggertodb` does not assume the filenames are ordered in any way; it determines the order by opening all the files and reading a date from each one.

#### CR1000

Date and time in ISO8601, the first two fields after the date are ignored (they are a record number and a station id), and uses subset identifiers in the next field. It is not clear whether it is debugged and works properly, neither whether its features are a matter of different data logger model or different data logger configuration.

#### deltacom

The `deltacom` format is space-delimited lines of which the first field is the date and time in ISO8601 format YYYY-MM-DDTHH:mm, and the rest of the fields are either dummy or hold time series values, optionally followed by one of the four flags #, \$, %, or &.

#### lastem

The `lastem` format is dependent on regional settings, and uses the `delimiter`, `decimal_separator`, and `date_format` parameters. It is lines delimited with the specified delimiter, of which the first three fields are the subset identifiers, the fourth is the date, and the rest are either dummy or hold time series values.

#### pc208w

The `pc208w` format is comma-delimited items in the following order: subset identifier, logger id (ignored), year, day of year, time in HHmm, measurements.

#### wdat5

The `wdat5` format is a binary format used by Davis WeatherLink; the files have a `wlk` extension. When using it, set `path` to the directory name where your `wlk` files are stored (one file per month).

You can specify time series group ids like this:



```
outsideTemp = 1256
hiOutsideTemp = 1257
rain = 1652
```

The full list of variables is outsideTemp, hiOutsideTemp, lowOutsideTemp, insideTemp, barometer, outsideHum, insideHum, rain, hiRainRate, windSpeed, hiWindSpeed, windDirection, hiWindDirection, numWindSamples, solarRad, hiSolarRad, UV, hiUV, leafTemp1, leafTemp2, leafTemp3, leafTemp4, extraRad, newSensors1, newSensors2, newSensors3, newSensors4, newSensors5, newSensors6, forecast, ET, soilTemp1, soilTemp2, soilTemp3, soilTemp4, soilTemp5, soilTemp6, soilMoisture1, soilMoisture2, soilMoisture3, soilMoisture4, soilMoisture5, soilMoisture6, leafWetness1, leafWetness2, leafWetness3, leafWetness4, extraTemp1, extraTemp2, extraTemp3, extraTemp4, extraTemp5, extraTemp6, extraTemp7, extraHum1, extraHum2, extraHum3, extraHum4, extraHum5, extraHum6, extraHum7.

Many of these fields may be reserved by Davis for future use or they may not be used in the particular installation; just don't use them. It is also recommended to ignore the calculated values such as ET (evapotranspiration). More information about the meaning of the parameters can be found in the Davis manuals and in the WeatherLink README file.

## odbc

The sane place for loggers and logger software to store meteorological data is a plain text file. Databases shouldn't be used for that purpose. However, I've come across a system which was using MS Access, so I wrote this. It's only tested on Windows and MS Access, though in theory it should be usable anywhere. In that case, path is not actually a file name but an ODBC connection string, such as `DRIVER=Microsoft Access Driver (*.mdb);DBQ=C:\Somewhere\mydb.mdb`. table specifies the database table in which the data is stored; each variable should be in a plain text column, and there should also be an id column indicating order. date\_sql is an SQL expression that selects the date and time from the table (the resulting date and time format is defined by date\_format). data\_columns is a comma-separated list of (text) columns to retrieve from the table; fields must have as many entries as data\_columns.

You see that this was a hack made for a specific installation, but if you are unfortunate enough to really need it, we can elaborate it further.

## 5.5 Daylight saving time

### Important

Set your loggers to permanently use your winter time or any time that does not change.

In case this was not understood:

Set your loggers to permanently use your winter time or any time that does not change.



Loggertodb contains limited functionality to deal with cases where your loggers change time to DST. However, you should never, ever, use that functionality. Instead, you should configure your loggers to not do such an insane thing. If you use some kind of software+hardware stack that makes it necessary to configure your loggers to change to DST (something completely unnecessary, you can perfectly and easily store everything in one time zone and display it in another time zone), call your supplier and tell them they suck.

If you ignore this warning and set your loggers to use DST, don't expect loggertodb to do miracles. It can help of course, and it might work while things work smoothly. But whenever your government changes the date or time of the DST switch, or whenever something else goes wrong, you will be trying to fix a big mess instead of doing something useful. Really, you should get a life and set your loggers to permanently use your winter time or any time that does not change.

A time series is composed of records with timestamps. If we don't know exactly what these timestamps mean, the whole time series is meaningless. So, assuming you are in Germany, do you know exactly what 2012-10-28 02:30 means? No, you don't, because it might mean two different things. It could mean 02:30 CEST (00:30 UTC) or 02:30 CET (01:30 UTC). (In fact, several makes of loggers discard one of the two ambiguous hours during the switch from DST, meaning that if an incredible storm occurs at that time, you will lose it. Insane but true.)

In order to avoid insanity, Enhydris has a simple rule: all time stamps of any given time series must be in the same offset from UTC. So you can store your time series in your local time, in UTC time, in the local time of the antipodal point, whatever you like; but it may not switch to DST. If you have a time series that switches to DST, you must convert it to a constant UTC offset before entering it to Enhydris.

If you are unfortunate enough to have loggers that switch to DST, and are unable to change their configuration, loggertodb can attempt to convert it for you. The `timezone` parameter should be set to a string like "Europe/Athens":

```
timezone = Europe/Athens
```

(The list of accepted time zones is that of the [Olson database](#); you may find [Wikipedia's copy](#) handy.)

loggertodb assumes that the time change occurs exactly when it is supposed to occur, not a few hours earlier or later. For the switch towards DST, things are simple. For the switch from DST to winter time, things are more complicated, because there's an hour that appears twice. If the ambiguous hour occurs twice, loggertodb will usually do the correct thing; it will consider that the second occurrence is after the switch and the first is before the switch. If according to the computer's clock the switch hasn't occurred yet, any references to the ambiguous hour are considered to have occurred before the switch.

The `timezone` parameter is used only in order to know when the DST switches occur. The timestamp, after removing any DST, are entered as is. The time zone database field isn't checked for consistency, neither is any other conversion made.