Nesa Srl
Environmental Monitoring Systems and Remote Controls

SunFlower
&
Iris

User Manual

Ver. 16.2

English

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1 Overview

SunFlower is a **multi-user web application** for network management, data telemetry and much more. It interfaces to the MySQL database and SQL-Server, and through simple steps, you can:

1. extract any type of data catalogued by **time period**, by **type**, **class** to they belong;
2. automatically generate **reports in Excel format, pdf or images**, which can be automatically **sent to one or more different e-mail addresses**;
3. **check alarm situations by sending one or more emails and/or text message** to one or more personnel in charge;
4. create macro to **automatically export data from database** and user customization;
5. display **data in a dynamic graphical format**, with the ability to interact with them;
6. display **wind rose, also over google maps**;
7. obtain the **geo-referenced representation of monitoring stations on GIS map** such as Google Maps (satellite mode, terrain, road), with the option to view automatically the latest data and/or the wind rose superimposed on the map;
8. display **dynamic tables of data** with the option of interact for calculating averages, minimum and maximum values, accumulation or perform selection using filters or directly export the table to Excel;

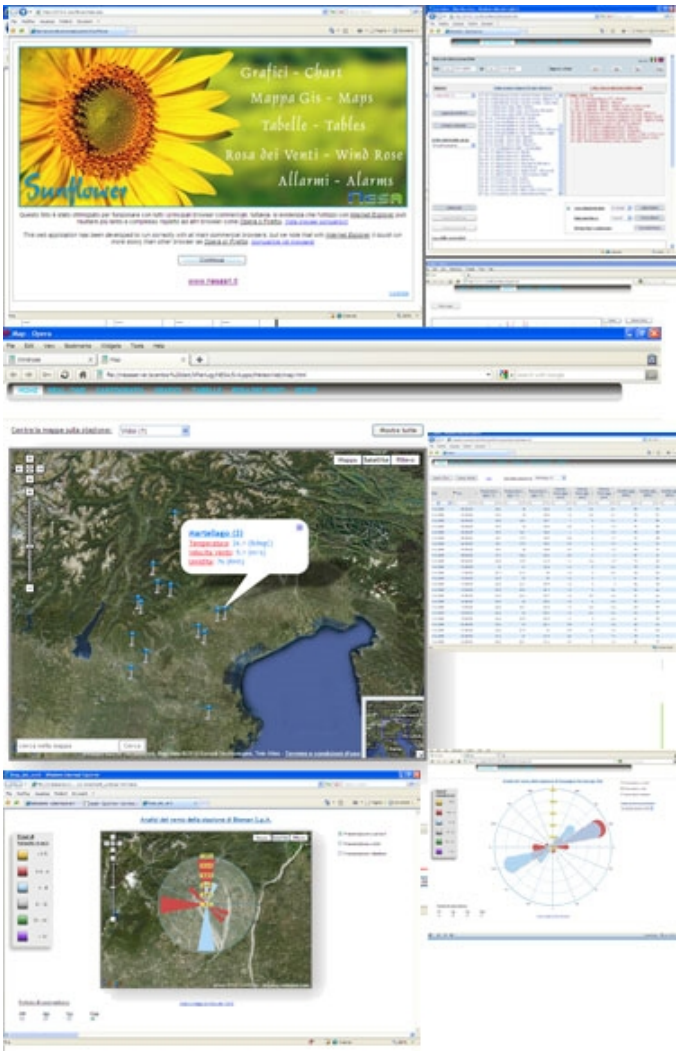


Figure. 1.1

9. manage **multi-user access** with specific permissions (username and password for each user in unlimited numbers.), associating them different maps, stations etc.;
10. **multi Database**: is possible to associate to different users, different databases (always MySQL Database with the same structure), for example for different kind of networks.
11. manage the **Iris's pages, multi-users**, **customizing** them for user/station.
12. manage the **validation, manually, automatically or semi-automatically of collected data**, preserving the original copy of the data.
13. **backup** of database or part of it.

The application can be supplied complete with all features or only partial according to customer's request. In particular, the **validation function is optional** to the basic configuration, that includes instead all the other functions.

BEWARE: Suitable for operating systems with UTF 8 encoding

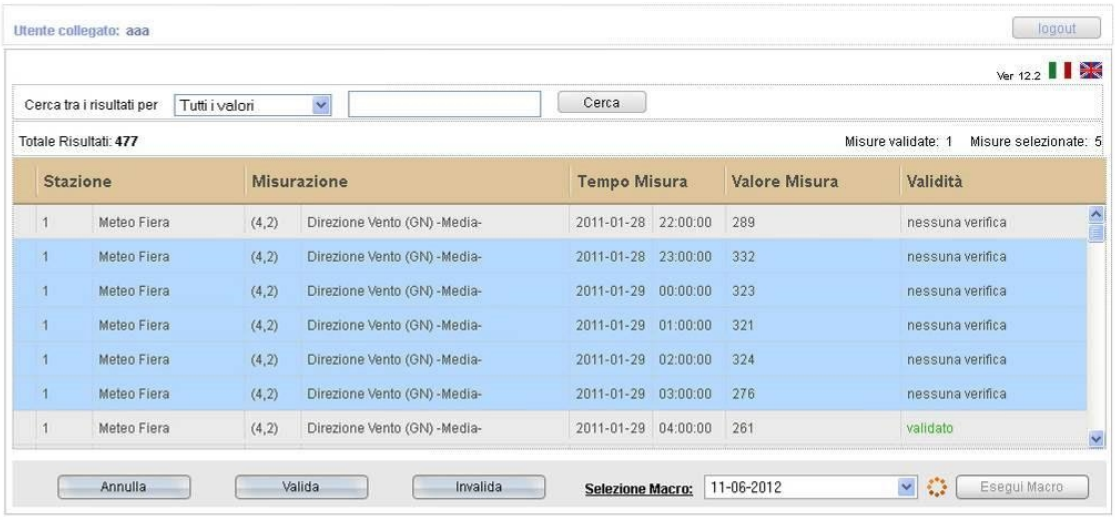


Fig. 1.2 – Validation and GIS

2 Installation

When you start the installation there are two choices, one for tools (i.e. Apache, PhP etc. not here described) and one for the last version of SunFlower. To work properly, SunFlower requires an active connection to the Internet/intranet network. Here we choose to install only SunFlower, follow the steps at video.

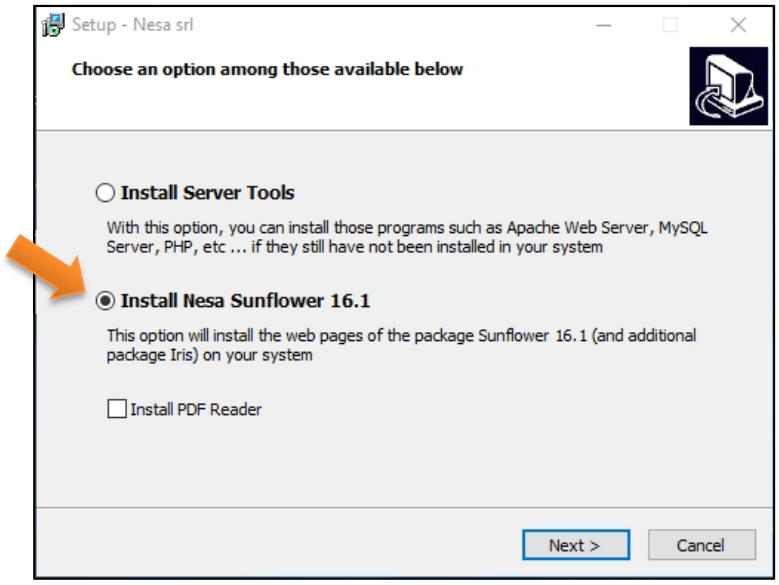


Figure 2.1 – Choose the installation

During the installation a specific box appear asking you the alias name for SunFlower and Iris for address them on your web browser:

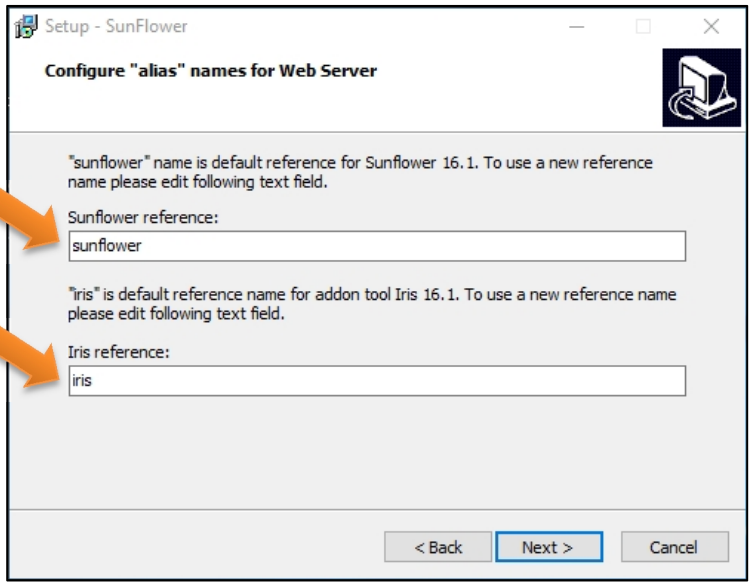


Figure 2.2 – Alias names

2.1 First start of SunFlower

The program starts with a default browser in the operating system on which it is installed. It's compatible with Internet Explorer, Firefox, Opera, Chrome, Netscape, Safari.

At the first run, appears a window for few seconds that permits the software to create an empty database and add a demo station. In this way you can use immediately SunFlower with demo data and understand how it works.

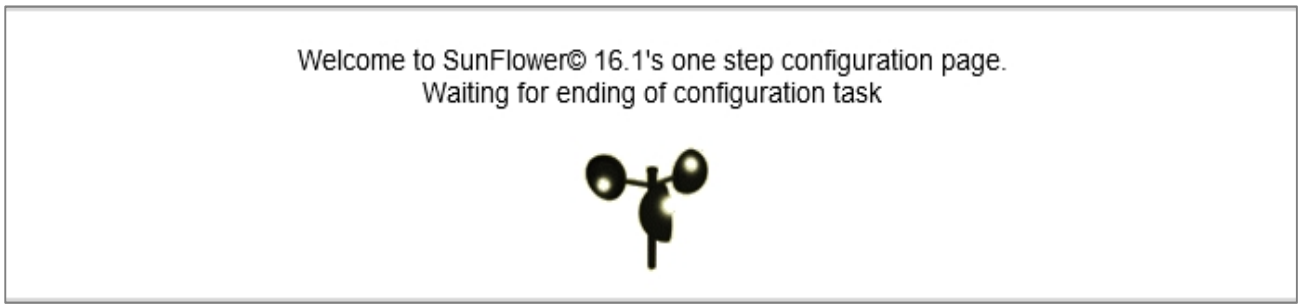


Figure 2.3 – First run

At the end a message informs that the process has been done and pressing **Continue** button you can proceed.

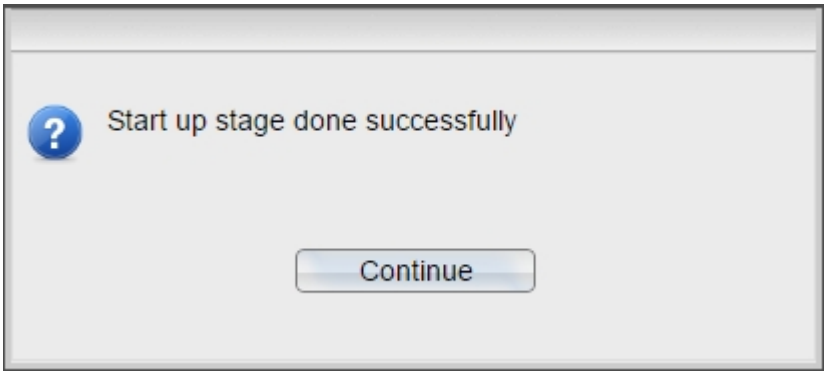


Figure 2.4 – End of first auto setup

After the first time, at the run of the program you will see the presentation page of SunFlower (*Figure 2.5 – Start of SunFlower*). Click the button ***Continue*** to proceed with the execution.

Figure 2.5 – Start of SunFlower

The response time depends on the speed of connection to the database's server (especially if the installation of the database and SunFlower are not in the same server), in any case you will be redirected to the main setup program (Administration Section).

3 ADMINISTRATION menu - *first authentication and access*

SunFlower is a multiuser web application and looks like a website divided into pages or sections each with its own name and always identifiable from the menu at the top of each page:

Figure 3. 1 – SunFlower Menù

All SunFlower pages are protected with single operational user level management. The administrator of the software (which has full access) can decide, user by user, to enable or disable access to one or more contents defining the credentials, also in a different way user by user. He can also customize the measure's name, (see section 4.4) and **associate different SunFlower's databases and maps to each user**.

If the configuration does not contain any defined user, as obviously occurs if at the first use the database is still empty, it is assumed that the user is also the administrator user and this, after appropriate notice, is redirected to the user management (Administration Section).

Figure 3. 2 – Redirect to user definition page

In order to prevent unauthorized access to the user definition page, each time you log **as administrator**, an authentication is requested. The default authentication for the first login is:

Administrator: **Nesasrl**

Password: **Nesasrl**

and can be changed at any time by the administrator of the software after the first recognized access pressing the appropriate button ("Changes") on USERS's page, next to **User Administrator** words on the top left.

User and administrator credentials are handled with each other in a different way.

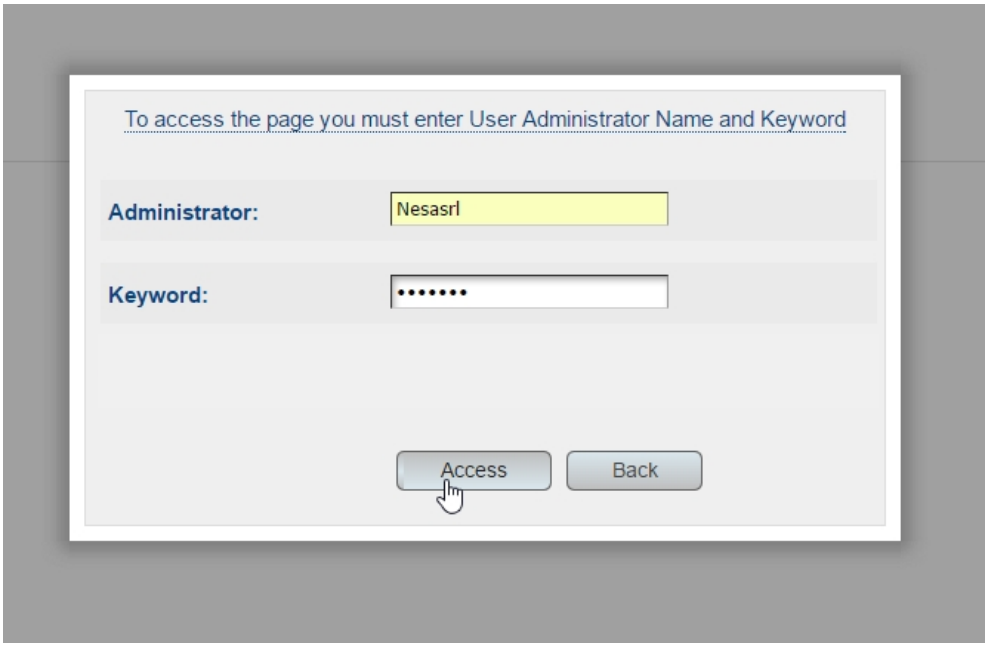


Figure 3. 3 – Software administrator access

You can also log in as a demo user with username and password (**demo** : **demo**) and start immediately to use SunFlower

Remember that the timeout for all login not used, is 30 minutes.

Once logged in as an administrator, a list of users (under 'USERS') are listed in a simple table (*Figure 3. 4 – Users definition*), with names and their permissions to use the various parts of the program. On first use the table will obviously be almost empty with only demo user. To define a new user, simply click on the ***Add User*** and fill in the various fields (*Name, Surname, Username and Password, note, etc.*).

All fields are required.

Pressing the other "**Add user**" button on the bottom right, the page will reload and if the operation is successful, a row is added showing the new user you just created.

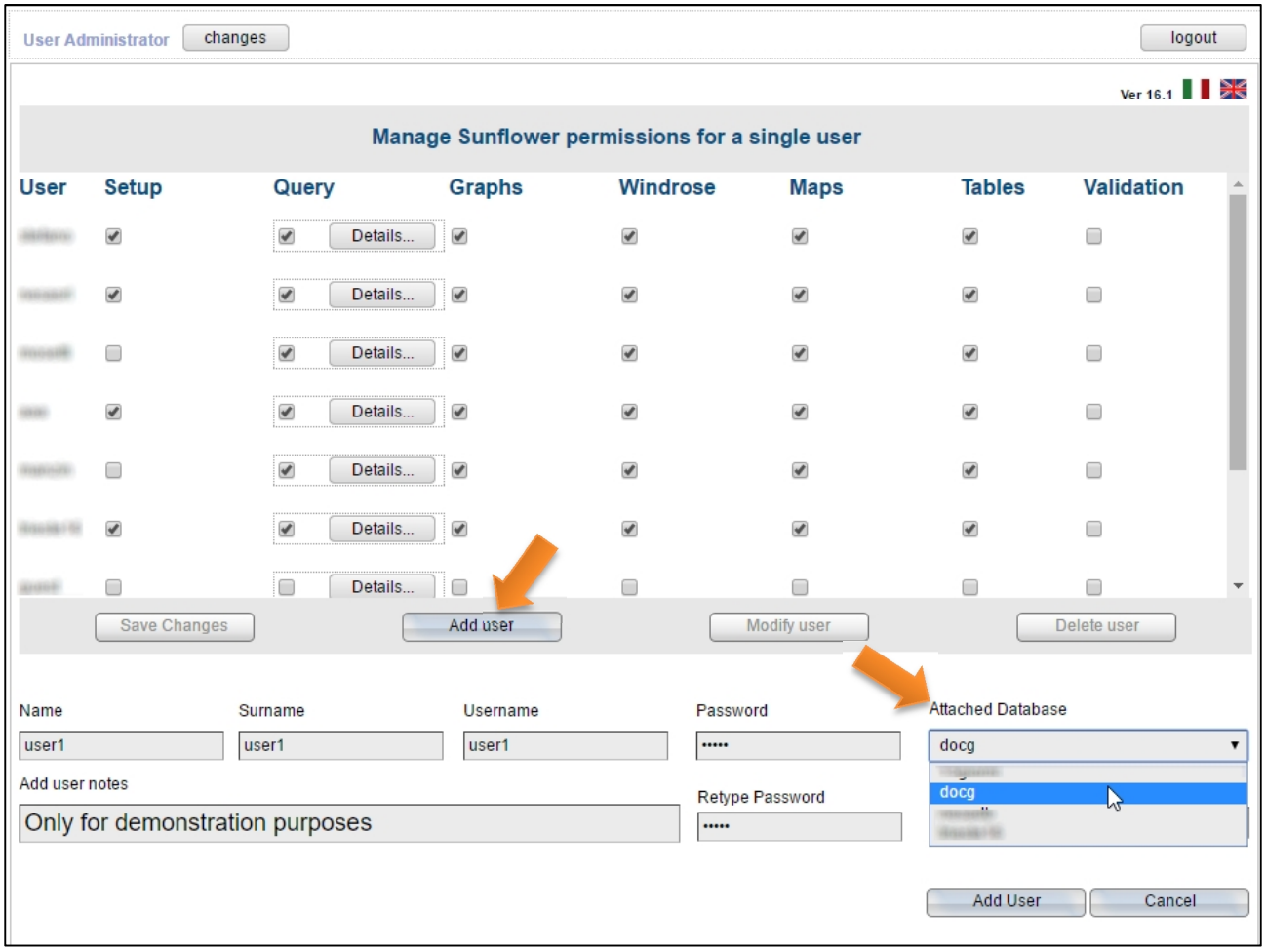


Figure 3. 4 – Users definition

To each user is possible to associate specific databases (if more than one are installed for different networks) and different maps (*Figure 3. 5 – Maps association*). The maps can be from google maps or a custom one. See section 9 for info.

Figure 3. 5 – Maps association

You can modify the permissions of each user and/or delete it simply selecting the user row with a click (it will be evidenced by blue colour) and pressing the relative button.

Each line of the user's table is divided into columns: the first from the left identifies the user and the other represents the corresponding web pages or areas of the application, enabled or disabled for the given user. In this way you can assign **different levels of access for each user**.

When you create a new user, none of the areas or web pages are enabled

The different columns can have sub-functions that allow you to enable access to more advanced options in the user management.

In particular, by selecting the check under the '***Query***' column, you allow the user to access to the specified page of **Data Extraction (QUERY)**. This allows you to automatically or manually export the data from the database by selecting by type, date, measure or station name etc.

Once you have selected the check, the button "Details.." appears next to the check (*Figure 3. 6 – User enabling*) whose function is to limit access to the selected user, to one or more stations, or to all or part database data.

Figure 3. 6 – User enabling

The administrator by clicking on "*Details ...*" activates a down page consisting of two lists, one on the left that lists all stations in the database and one on the right that shows your selections for the specific user (*Figure 3. 7 – Selecting accessible stations to specific user*).

You can then assign to each user a subset of the list of all stations in the database (list on the left). By default, each user just created and enabled to access to the Data Extraction page, has all the existing stations assigned, it is therefore necessary to deselect one or more stations to limit its access.

If the database is empty none station is displayed in the list on the left, because there are no measures stored into database.

At the first run may be that only demo station is present.

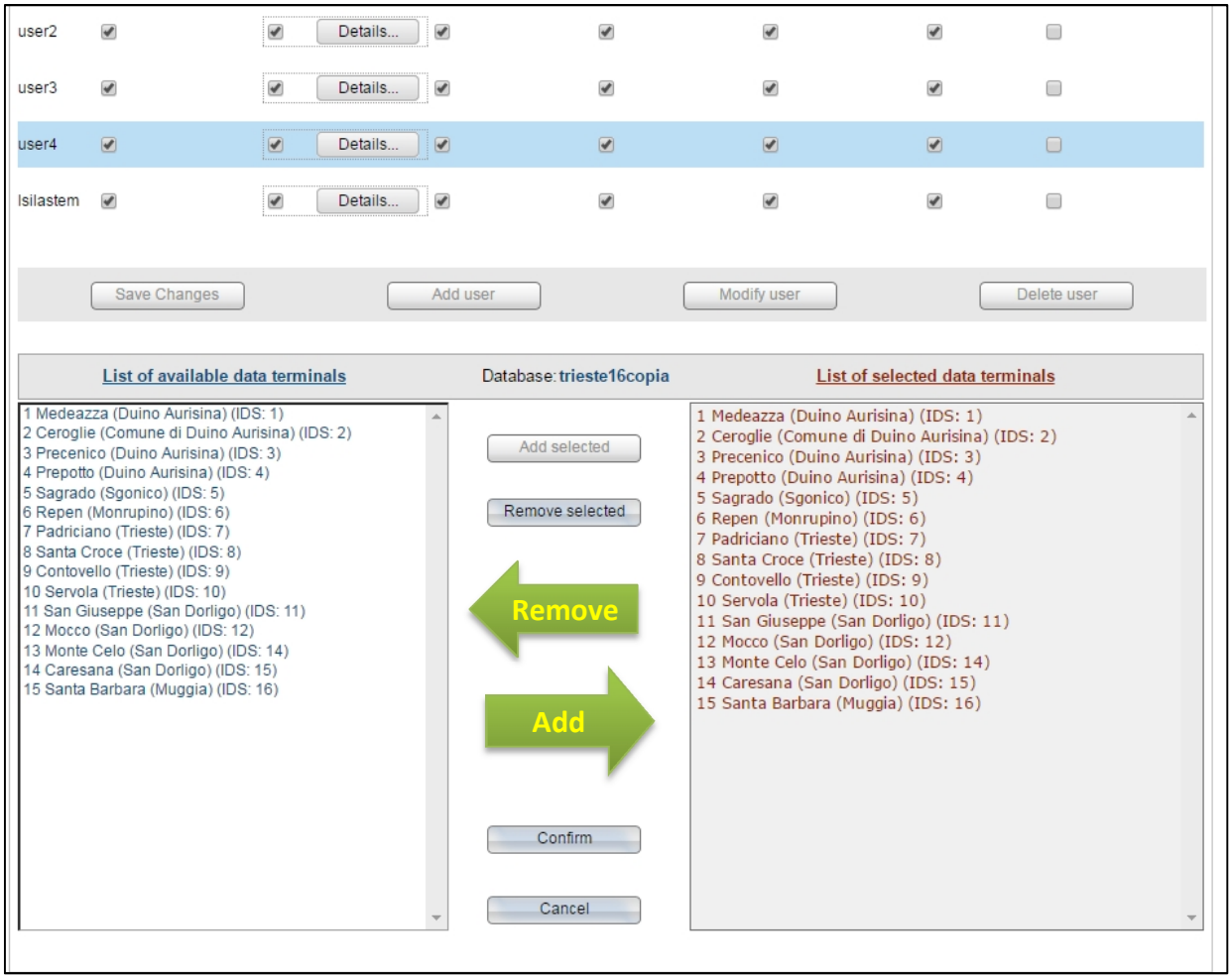


Figure 3. 7 – Selecting accessible stations to specific user

The addition of a station can be done by double-clicking or by pressing "*Add selections*". To add more stations at the same moment, select them together from the list to the left.

To deselect or remove stations (disabling its user's access) follow the same procedure from the list on the right by pressing the "*Remove selected*".

After all the choices, click the ***Confirm*** button to accept. Click ***Cancel*** to discard your changes and keep the previous situation.

Once the stations are assigned to the specific user, click the **Save Changes** button at the top left so that the operations carried out are recorded.

All authorizations for the specific user may be changed at any time.

4 Section SET UP of stations

After creating users or the first access, the application moves to the SETUP page to allow you to complete the definition and identification of monitored stations and their parameters (sensors and measurements).

For each addition of a monitoring station or a new measure in the peripheral stations, SunFlower automatically recognizes the change in the configuration page and has the ability to edit and/or add information to complete the stations.

The recognition of a new station is done by reading a database table common to all the stations present, where each row corresponds to a precise measurement at a given time for each instrument or sensor. In other words, a new station is detected only if there is at least one record of measurement within the table.

Each record is composed of a series of values that identifies the station, the type of measurement, the instant at which the measurement is recorded and the value (or values) of the measure.

The procedure for the detection of new stations can be activated via the **Refresh Registry** button, as shown in *Figure 4. 1 – Set Up Page*. Usually this operation is done only when you add new sensors to all the existing tools or new stations.

Among the information available and editable in the registry there are:

- Station GIS position using WGS84GD coordinates (Latitude and Longitude).
- Alphanumeric name associated with the ID of the station for easy recognition.
- Name of the measures for each station (can be changed by the Administrator user).

The registry is password protected and, to be saved, must be entered the appropriate credentials. By default, these credentials are:

SETUP username: **root1**

SETUP password: **root1**

These credentials can be changed after logging only from this section. In case the user is the Administrator, is not necessary to use these credentials.

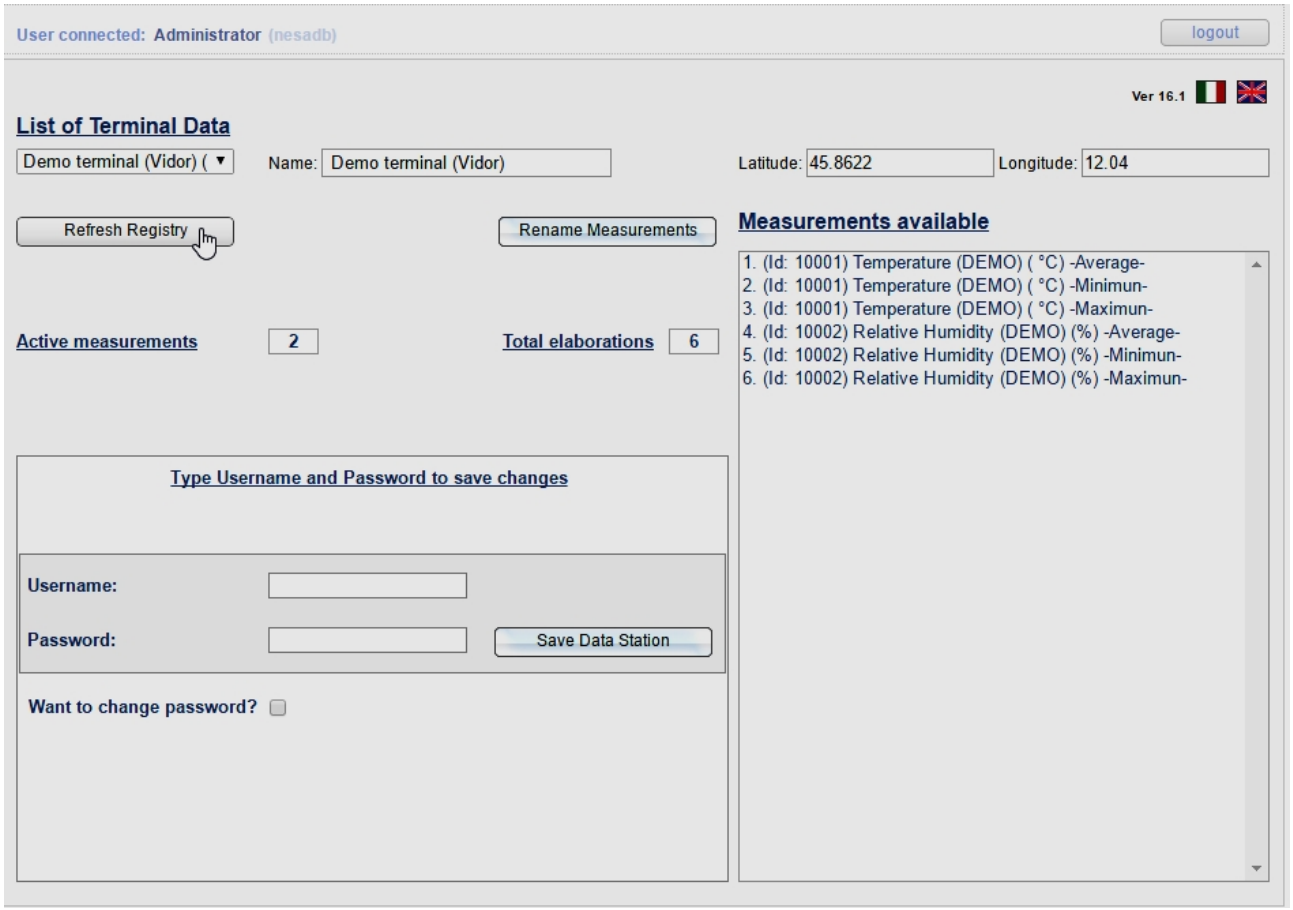


Figure 4. 1 – Set Up Page

The changes entered in the registry are saved in the database and then resumed from all other parts of the software (web pages). In particular:

- the name of station is displayed on every extraction report (Excel files, pdf files, table, wind rose, GIS map etc.)
- If there is a list of measures with custom names, they appear in all reports of extraction, in the tables, the GIS map, validating process (see section 4.4)
- GPS coordinates are used in the GIS map (Google maps). If they are omitted, the map does not show the location of the stations.

Below are detailed described the elements of registry.

4.1 Existing station identification

Clicking ***Update Registry*** and ***OK*** to the confirmation message, the page reloads and displays all the stations in that moment in the archive (*Figure 4. 2 – List of measures' stations*). This operation will require a certain time interval which depends on the amount of data within the database.

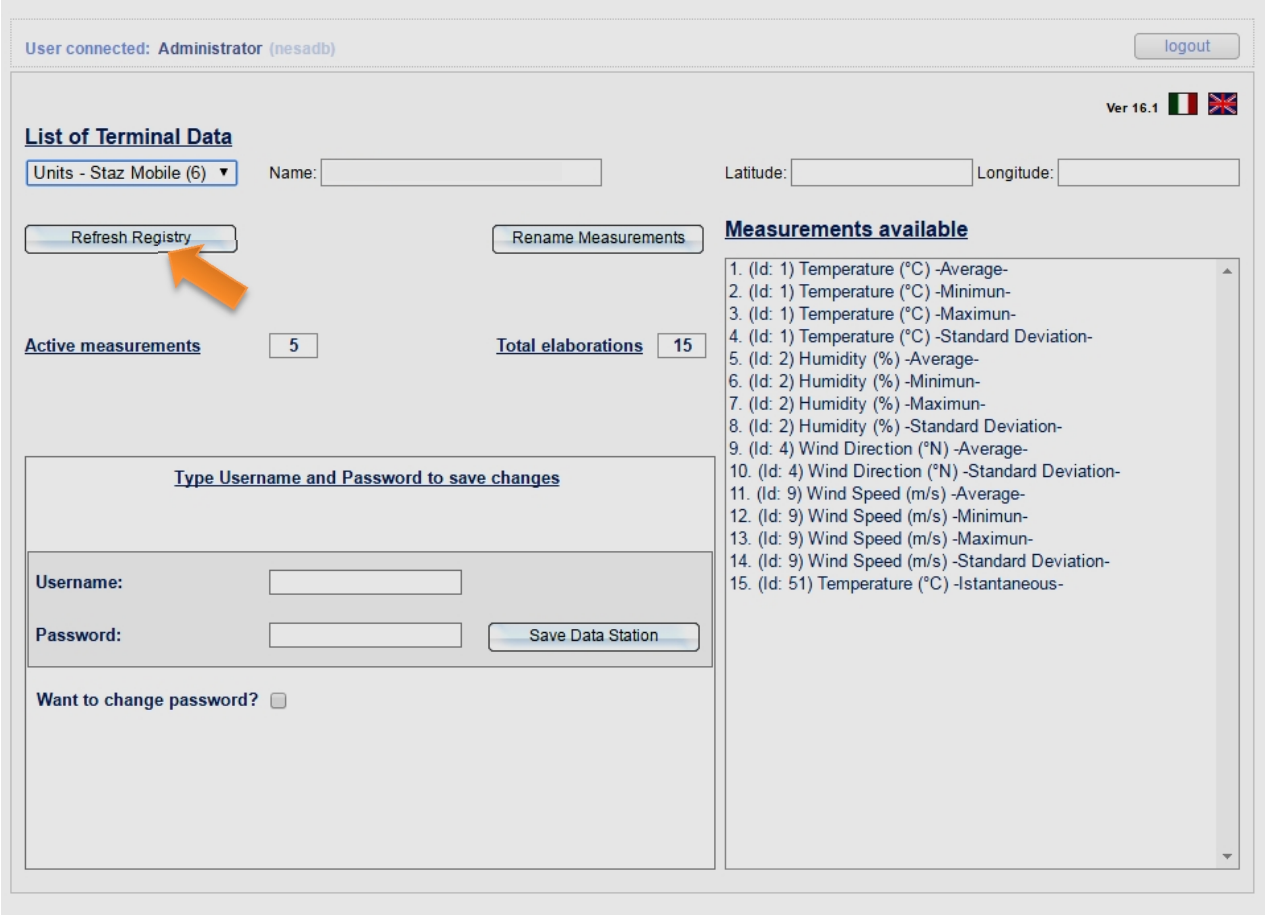


Figure 4. 2 – List of measures' stations

For each new station, in the list at the top left is only displayed the ID (ID number) and the name must be entered manually. In the example shown in the figure above, can be seen the detection of one station, for which there are five measures (ID 1, 2, 4, 9, 51) and fifteen elaborations.

4.2 Registry stations assignment

Before the extraction of the data (which will be done from the page **QUERY**) is required that each station in the database is associated with a name to be identified. The other parameters, not required, as the geographic coordinates, can also be inserted later.

To name a station, select the station ID from the '*Station List*' at the top left and type in the text box '*Name*:' next to it the name that you want to assign (*Figure 4. 2 – List of measures' stations*).

After the identification of each station, click the **Save Data Station** button at the bottom centre of the page, and it will be saved. Saving to registry requires specific authentication with username and password – see Chapter 4 (not necessary if the user is the administrator).

4.3 Password modifying for saving Registry

To change username and password in Registry, proceed as follow:

- enter your already existing username and password (default: root1: root1) in the appropriate fields and tick the check "*Change Password*?"
- If the authentication data are correct, you will see a new form at the bottom of the page, where you can enter the new credentials.
- Once you have filled in the appropriate fields, to save this setup click the **Save Data Station** button at the bottom as shown in *Figure 4. 3 – Saving setup*.

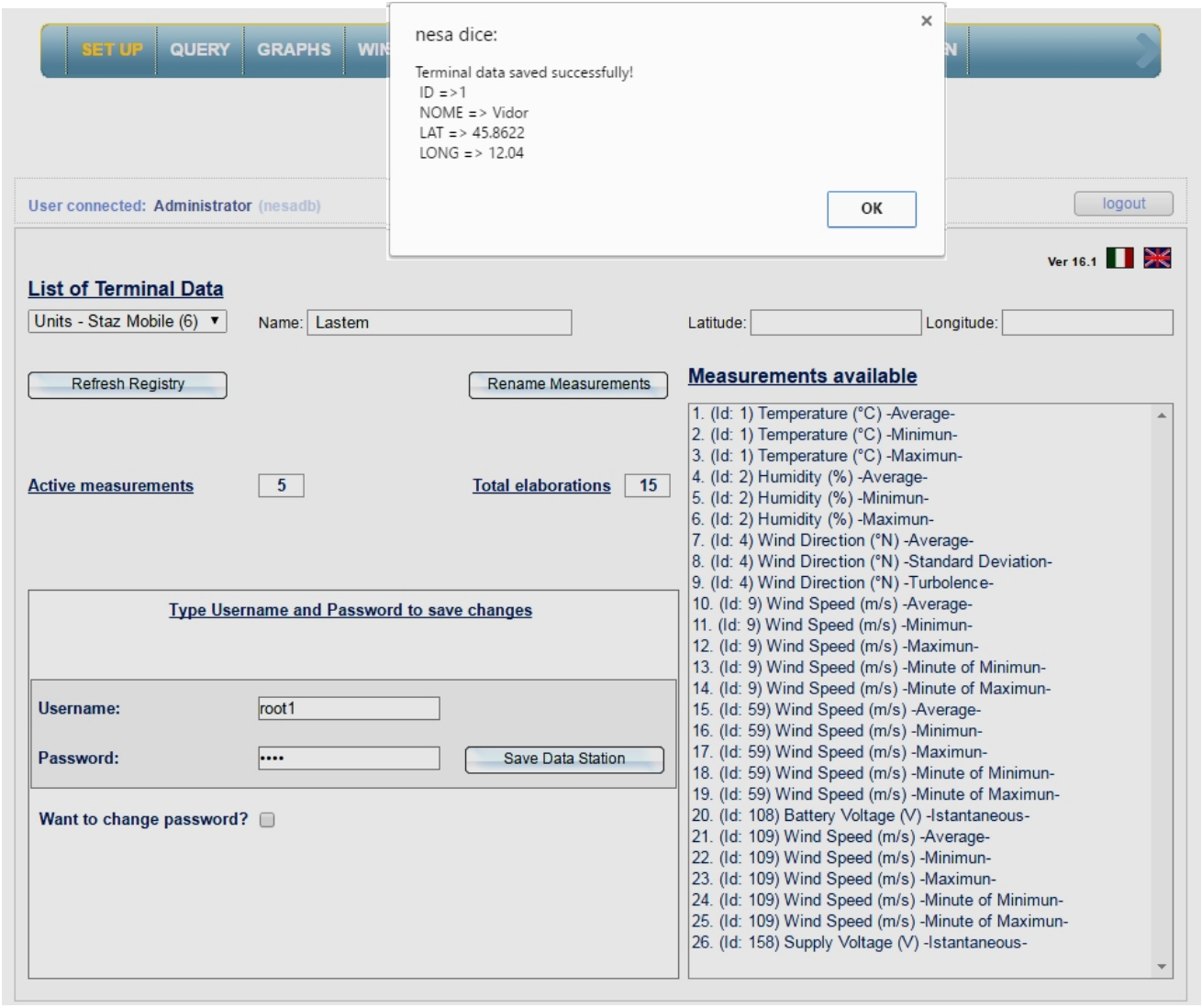
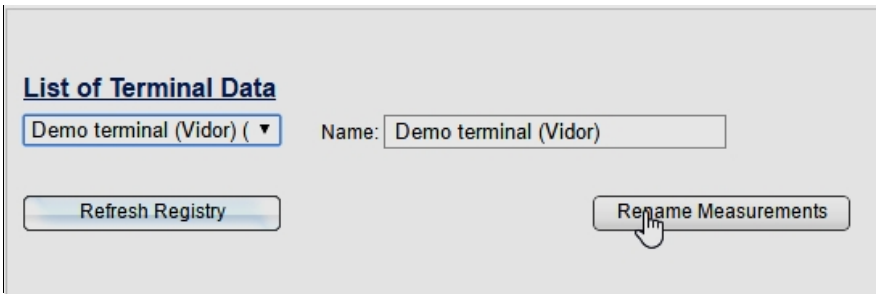


Figure 4. 3 – Saving setup

4.4 Rename and customize the measures

Selecting the appropriate check, you open a window that allows full editing of measures, grouped for same type (i.e. Temperature), or to change item by item - see *Figure 4. 4 – Customizing Names of measures*.



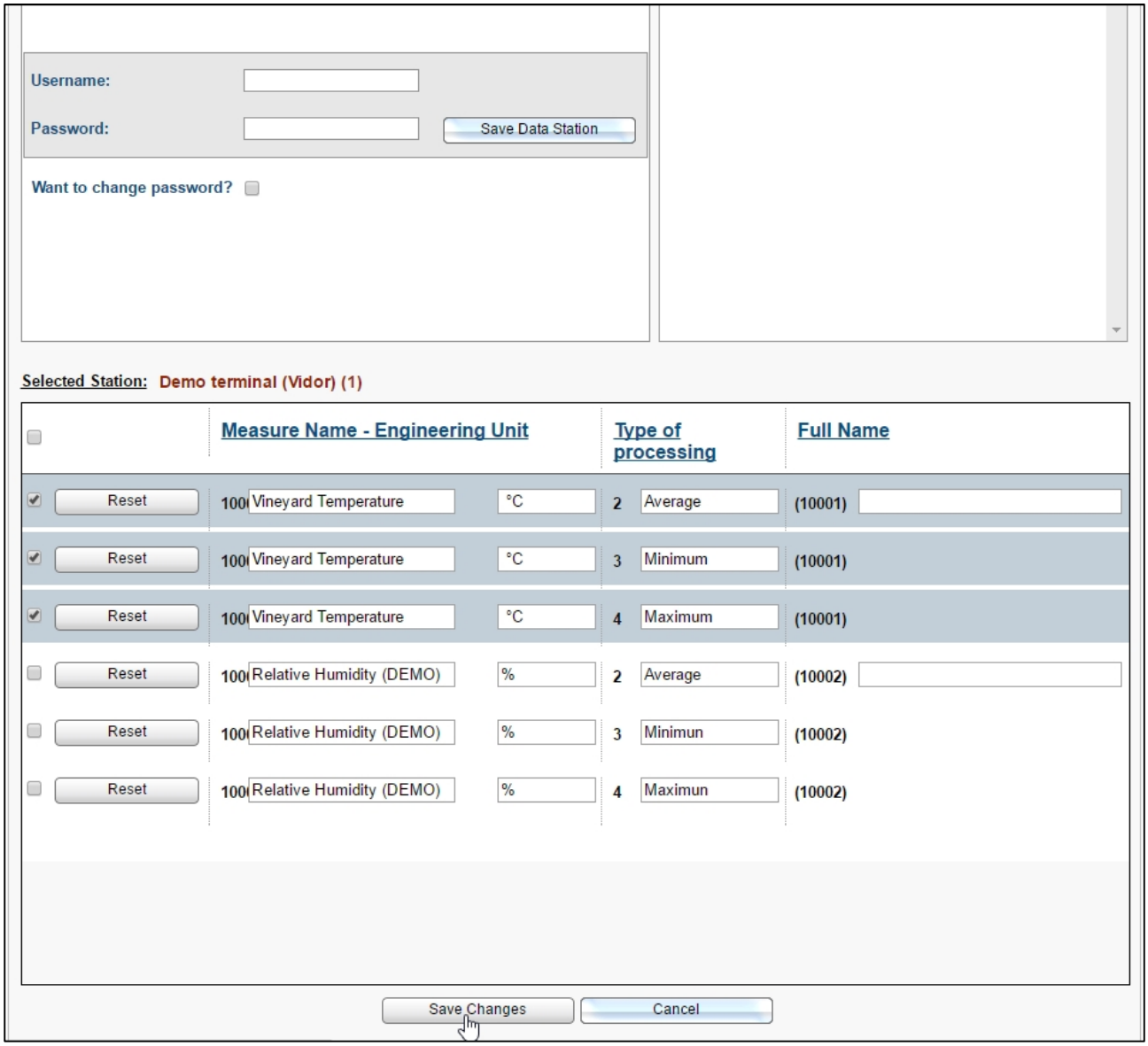


Figure 4. 4 – Customizing Names of measures

To make any change valid, it must be saved (button at the bottom). Saving names can be done by row or by multiple rows (by selecting them together).

Name of the measure, engineering units, type of data processing, can be modified at will, but you need a good knowledge of the characteristics of the input data (raw data provided by the measurement station - see Appendix A) as this may cause the loss of validity of the data itself.

The last column allows you to change the name for groups congruent with the same identification number.

5 Section QUERY for data access

After made all the basic settings described in chapter 3 and 4, you can start surfing in SunFlower moving from page to page (*Figure 3. 1 – SunFlower Menù*). The basic philosophy behind this version of SunFlower, is **to extract data from the database**.

While browsing in web pages is always possible, navigate through the pages to obtain the representation of the desired information is possible only after extracting data from database. The following are the main functions, not limited.

5.1 Data extraction – QUERY page

The **Data Extraction** page **(QUERY)** is the point from which you can extract data from the database of stations' measures defining, by the user, a **structure of data selection** simply called **macro**.

Each macro defines and extracts the data from one set or a subset of stations for a certain time interval, defined **observation time interval** (representing the interval of time for which the user extracts the data). Each macro also defines a number of different options to enable or to set, such as the choice of the time range, stations and measures, tables, the destination where send the collected data, etc.. The different options are divided by areas. Each macro can be saved and recalled later independently or made run automatically in background.

5.1.1 Area for setting the observation time interval

The *'Observation time interval'* allows you to select a time of observation or analysis expressed in dates (start date and end date) or in time, for which is present in the database at least one measurement recorded by at least one station or sensor . It has therefore:

- *selection for date (minimum one day considered from 00:00:00 to 23:59:59)*
- *selection for predefined periods ("Or latest…")*
- *selection for date or time and measure limits ('Expert…' button)*

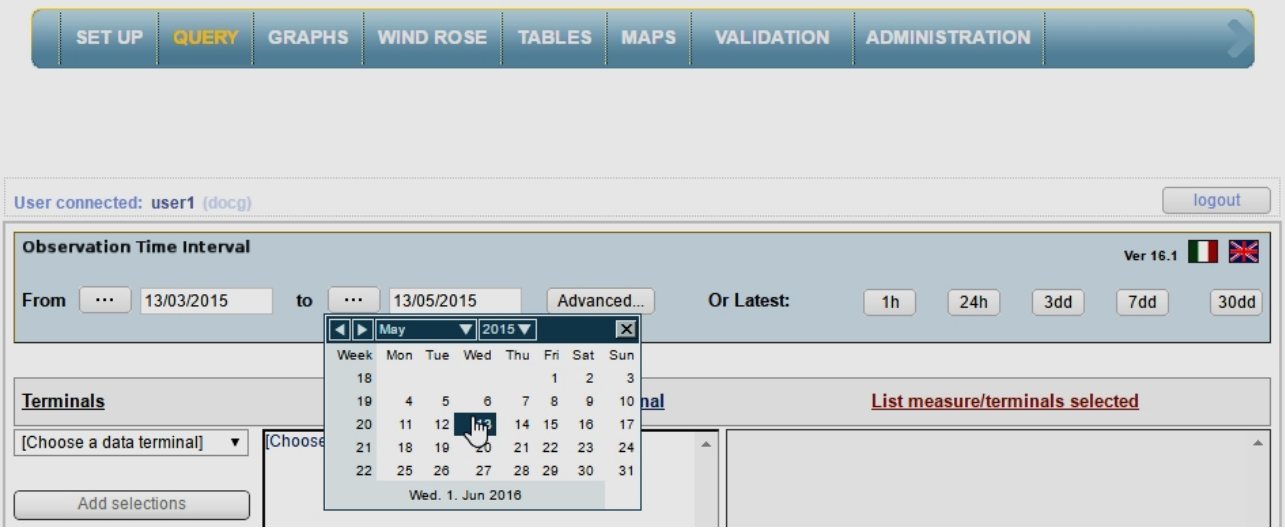


Figure 5. 1 – Query: selection for date

The image in *Figure 5. 1 – Query: selection for date*, shows an example of a "data" selection (from – to) with a time interval of at least one day between 00:00:00 and 23:59:59. For the example you have:

from 13/03/2015 hour 00:00:00 ←---------→ to 13/05/2015 hour 23:59:59

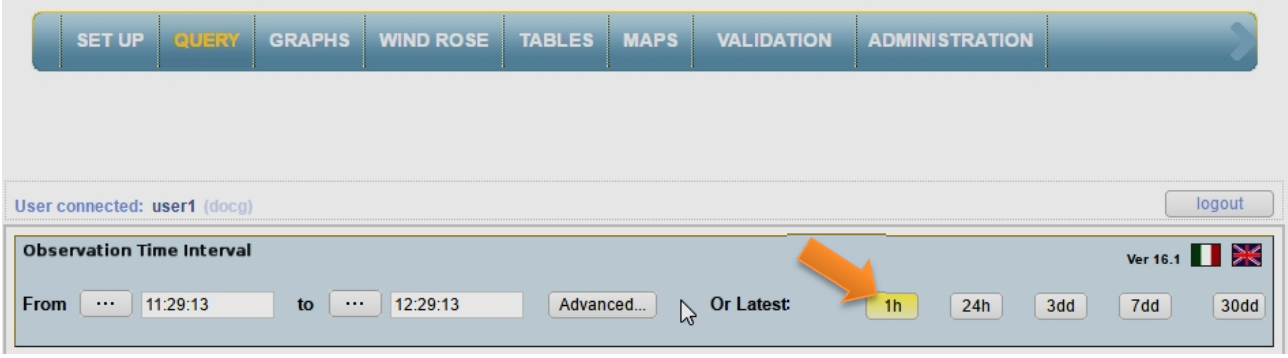


Figure 5. 2 – Query: selection for periods -Latest

In all other cases, (*Figure 5. 2 – Query: selection for periods -Latest*) the start and the end for time interval, in terms of hours/minutes/seconds are the same, and fixed at the moment when you run the macro that you are defining. For example, if you have requested the last 30 days of data and the macro is run on the day 13/03/2012 at 11:29:13, the period of extraction will be:

From 12/02/2012 hour 11:29:13 ←---------→ to 13/03/2012 hour 11:29:13

The same is true if you choose a period as the last hour, 24 hours, 3 days or 7 days.

5.1.2 Area for setting stations and measures

In this area you can define, station by station, the list of measures or sensors for which you require data extraction.

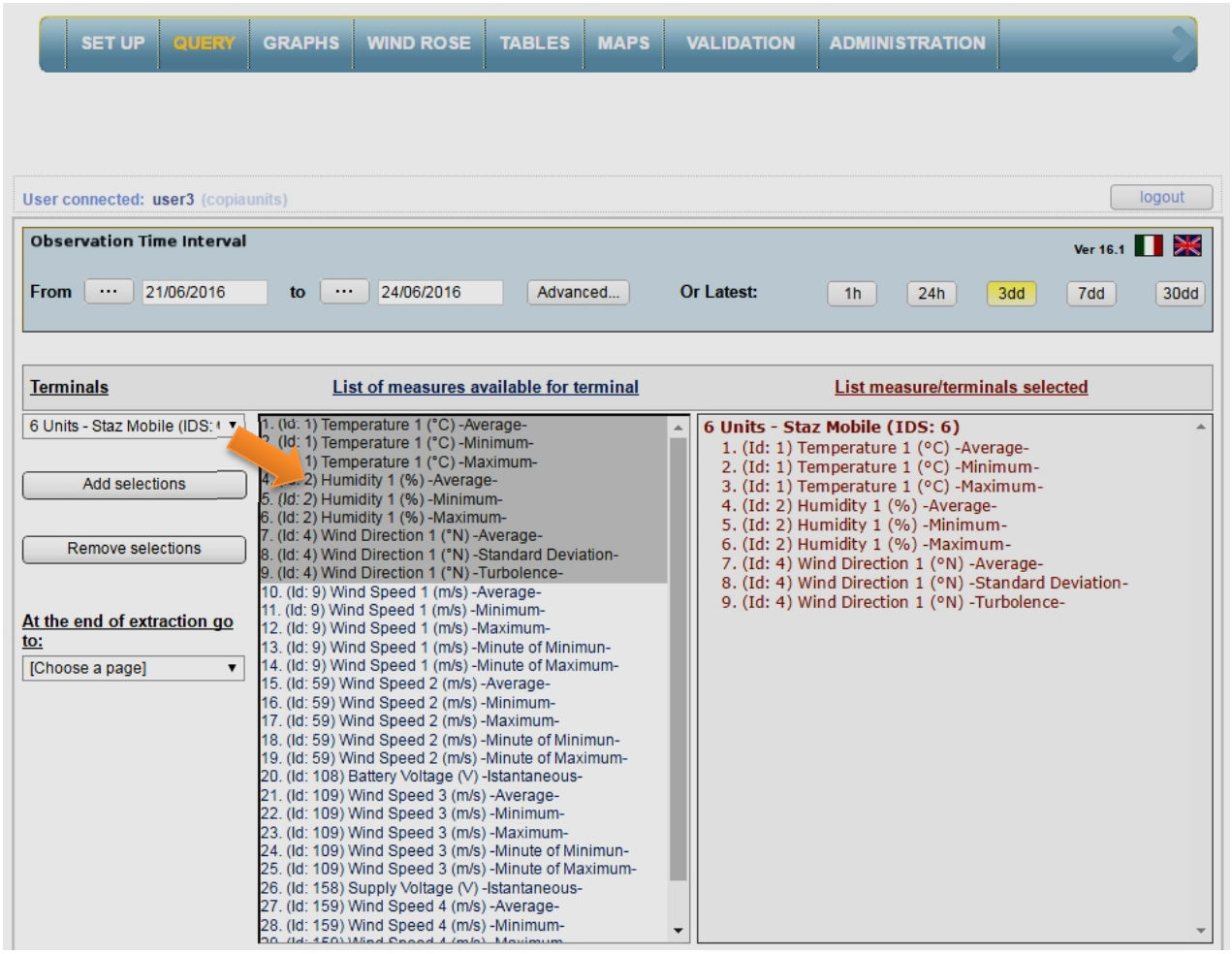


Figure 5. 3 – Query: selection measures and stations

Select the station you want from the drop-down menu in the top left, then, in the central panel, all available measures relating to the specific sensors for that station are shown.

The selection of measures for which extract the data in the period of interest can be made, in the central panel, or by clicking a single measure or selecting more than one

by holding down the left mouse button. Then click ***Add selections*** to move in the right panel the selected measures, as shown in *Figure 5. 3 – Query: selection measures and stations*. In the case of a single measure is possible to speed up the operation by double-clicking directly on the item to add.

Pressing the ***Remove selection*** button, you delete the selected measures copied in the right panel. This operation can be repeated for one or more, or all stations in the database.

5.1.3 Area for setting reports and tables destinations

At the bottom of the **QUERY** page, there is the definition of the type of format in which the extracted data will be made available with the execution of the macro (report) and to which mail addresses will be sent these reports in the form of attachments.

First define the parameters required for sending e-mail messages. Click the information icon *'Mail to'*: a dialog box will appear, fill it with the name of the SMTP server to send e-mail, the service port assigned to the server (usually 25), the connection protocol used when connecting to the server, username and password for the connection, the e-mail sender of each message that will be sent.

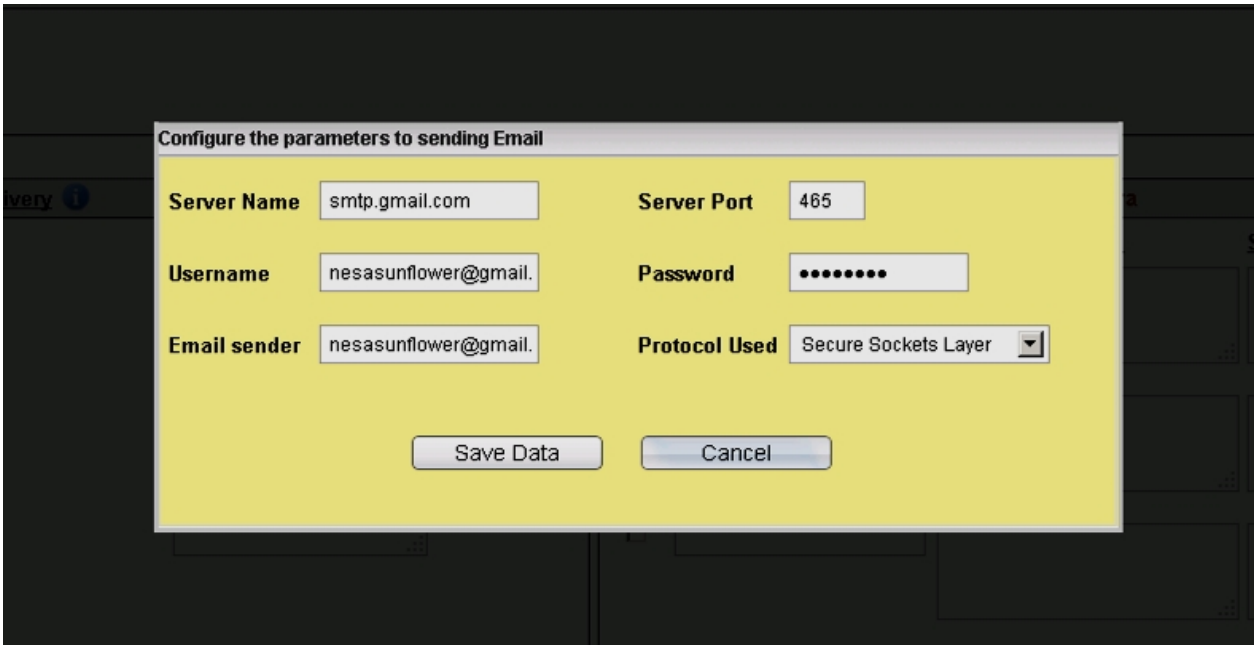


Figure 5. 4 – Query: set mail parameters

Conclude clicking on **Save Data**: the inserted parameters are stored. For any change, repeat the above procedure.

In the absence of data leave the **default settings** that are programmed to send mail using a default address of SunFlower through the free **gmail**.

SMTP: smtp.gmail.com; Protocol: SSL; Porta: 465

Address: nesaSunFlower@gmail.com; name: SunFlower Software

Data extracted and summarized in a report in Excel, PDF or PNG image (chart image that appears after extraction), can now be automatically sent to one or more recipients (*Figure 5. 5 – Query: Selecting reports to be sent by mail*).

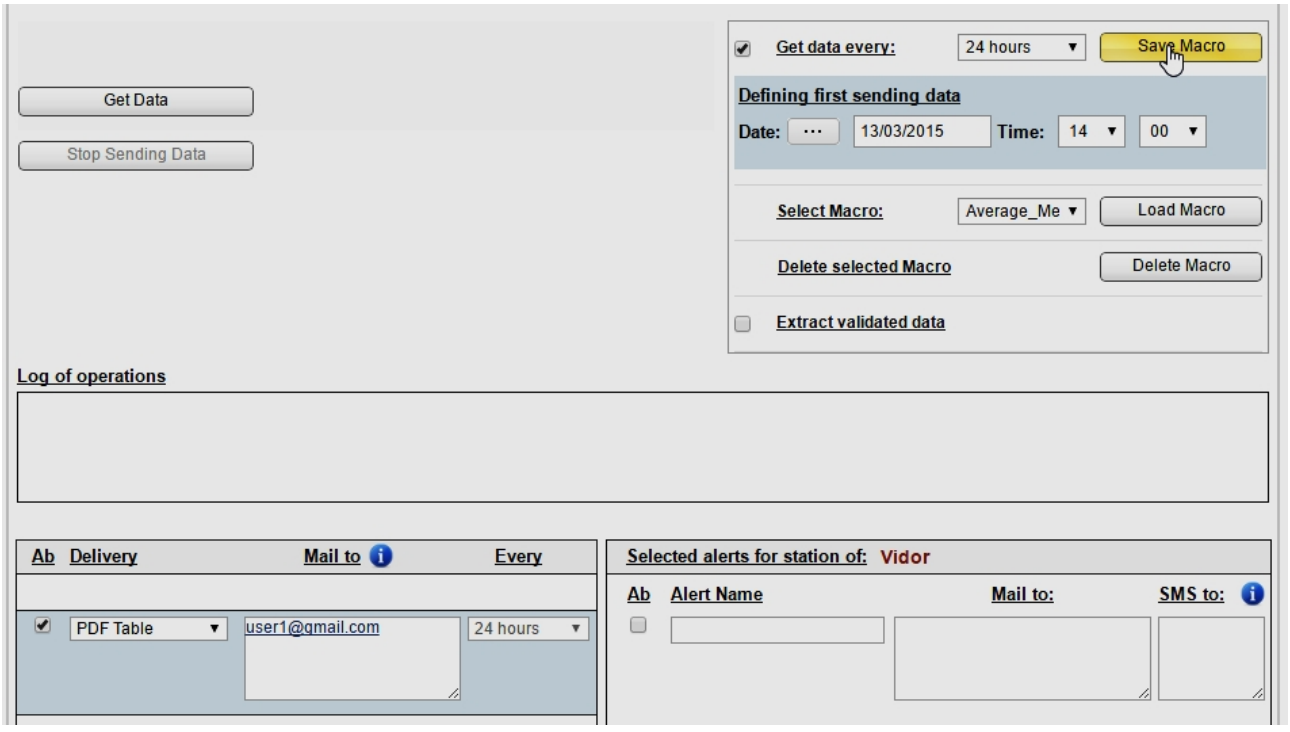


Figure 5. 5 – Query: Selecting reports to be sent by mail

The list of recipients, to whom will be sent the processing result of the macro that you are defining as a report, need to be created by the user. Select and click one of the three boxes corresponding to the column *'Mail to*:' this opens a new window (*Figure 5. 6 – Query: creating list of e-mail addresses*) to enter one or more e-mail addresses. Enter

the new destination address in the text box at the top left (address to adding) and confirm by clicking on ***Add Address***. To delete a destination, just select it in the list on the right and click the ***Remove*** button. Addresses previously used can be selected from the "Saved Emails".

After finishing entering the destinations addresses, click ***Confirm*** to close the dialog box and return to the QUERY.

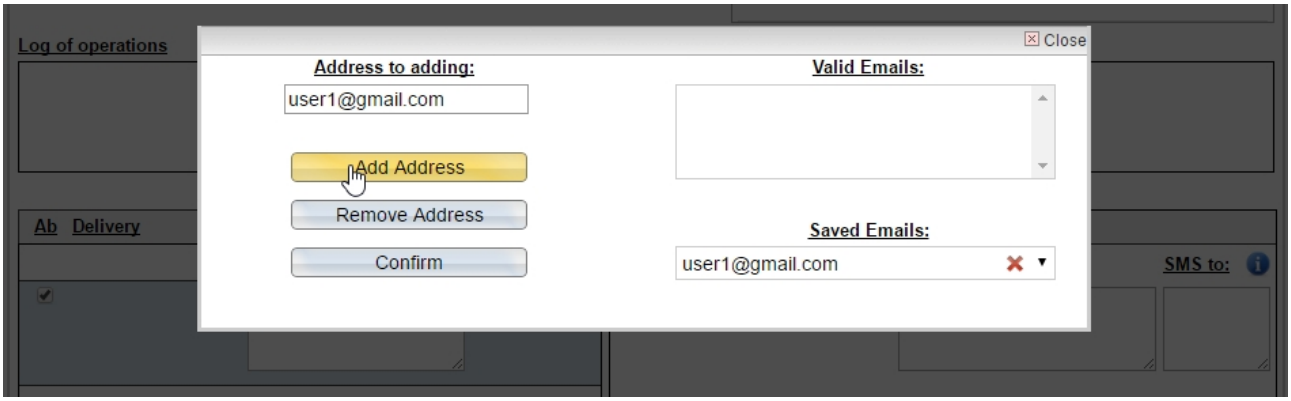


Figure 5. 6 – Query: creating list of e-mail addresses

To change the list of destinations simply repeat the above procedure.

The data obtained from the macro can then be stored in a table Excel, PDF, or displayed in a PNG image. The choice of format is accomplished by selecting the appropriate option from the drop-down menu located under the label '*Enter*' (*Figure 5. 6 – Query: creating list of e-mail addresses*).

- If you select *'Table PDF'* a file is created in PDF format containing one or more tables that show the names and values of the measures with their station name. Each sheet of the table contains up to 5 measurements arranged in chronological order, see the following example.

Result Data Range from 13/03/2015 to 13/05/2015

Date	Hour	(1-Vidor) (1) Temperature Average (°C)	(1-Vidor) (2) Humidity Average (%)	(1-Vidor) (3) Global Solar Radiation Average (W/m2)	(1-Vidor) (4) Wind Direction Average (°N)	(1-Vidor) (9) Wind Speed Average (m/s)	(1-Vidor) (10) Rain Gauge Totalization (mm/h)	(1-Vidor) (13) Pressure Average (hPa)	(1-Vidor) (16) Leaf Wetness Totalization (min)
13/3/2015	00.00.00	3.8	59	-4	102	1.9	0	1004.3	*
13/3/2015	01.00.00	3.2	61	-4	8	1	0	1004.4	*
13/3/2015	02.00.00	2.1	69	-4	246	1.6	0	1004.3	*
13/3/2015	03.00.00	2.3	67	-4	297	0.8	0	1003.8	*
13/3/2015	04.00.00	0.6	76	-4	99	0.6	0	1003.7	*
13/3/2015	05.00.00	0.4	76	-4	89	1	0	1003.6	*
13/3/2015	06.00.00	0.3	75	-4	88	0.7	0	1003.5	*
13/3/2015	07.00.00	0	80	21	241	1	0	1003.4	*
13/3/2015	08.00.00	4.1	67	143	65	1	0	1003.4	*
13/3/2015	09.00.00	9.5	48	307	89	1.4	0	1003	*
13/3/2015	10.00.00	11.3	43	450	118	3	0	1002.5	*
13/3/2015	11.00.00	12.7	41	560	121	4	0	1002.2	*
13/3/2015	12.00.00	13.2	42	624	125	4.3	0	1002	*
13/3/2015	13.00.00	14.5	39	654	139	3.2	0	1001.3	*
13/3/2015	14.00.00	15.2	36	602	148	2.8	0	1000.7	*
13/3/2015	15.00.00	14.4	35	433	115	3	0	1000.5	*
13/3/2015	16.00.00	13.6	37	244	132	2.4	0	1000.5	*
13/3/2015	17.00.00	12.8	44	132	186	2.3	0	1000.6	*
13/3/2015	18.00.00	10.3	56	25	178	2.1	0	1000.9	*
13/3/2015	19.00.00	8.6	59	-4	98	1.5	0	1001.6	*
13/3/2015	20.00.00	6.8	66	-4	51	0.8	0	1002	*
13/3/2015	21.00.00	5.6	72	-4	299	1.6	0	1002.4	*
13/3/2015	22.00.00	4.6	75	-4	273	1.5	0	1002.8	*
13/3/2015	23.00.00	4.3	76	-3	351	1.8	0	1003.1	*
14/3/2015	00.00.00	2.8	84	-4	237	0.9	0	1003.3	*
14/3/2015	01.00.00	2.6	85	-4	324	1.2	0	1003.5	*
14/3/2015	02.00.00	1.8	87	-4	115	0.7	0	1003.6	*
14/3/2015	03.00.00	1.5	88	-4	92	1	0	1003.6	*
14/3/2015	04.00.00	1.3	89	-3	8	1.3	0	1003.7	*
14/3/2015	05.00.00	0.4	90	-4	262	1.2	0	1003.7	*
Values on time interval		6.2	64	138	157	1.7	0	1,002.7	*

- If you select *'Table Excel'*, data are stored in a Microsoft Excel spreadsheet. Each record of the table, shows all measures referenced to a specific instant of the time interval selected for the macro, see the following example.

Dati_02_06_2016 (2).csv - LibreOffice Calc

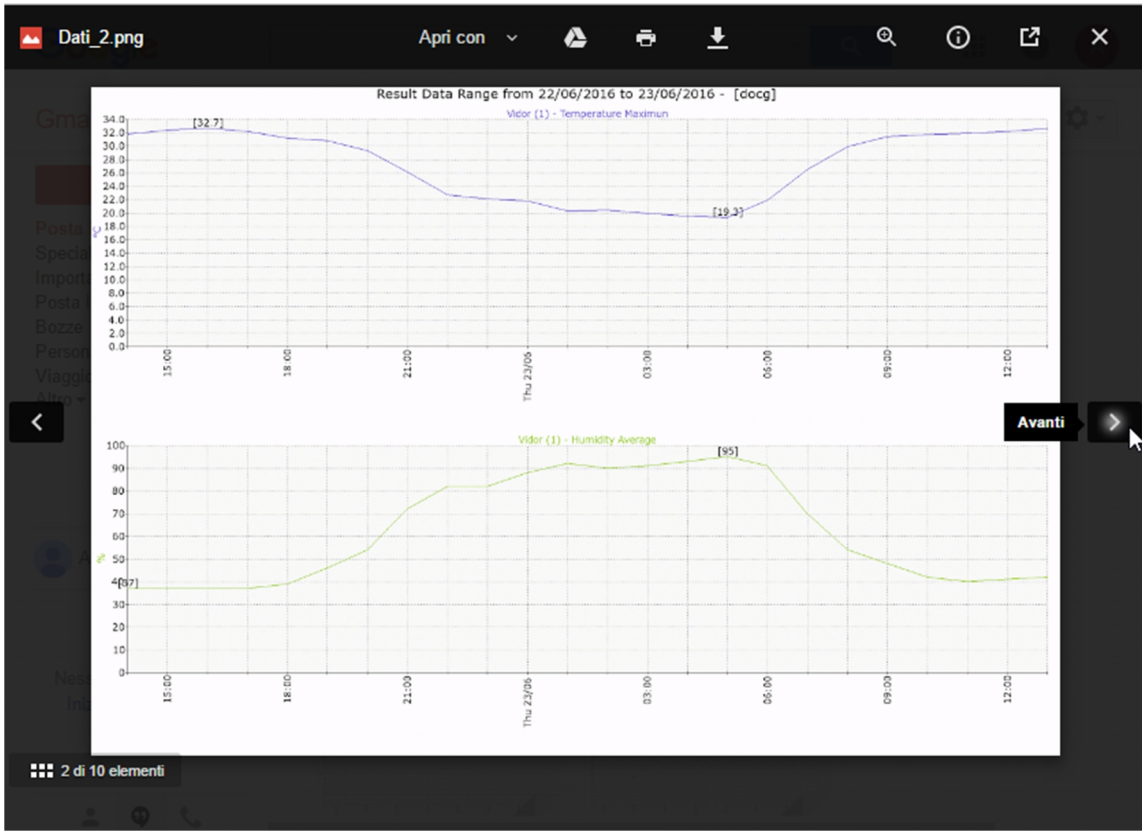
File Modifica Visualizza Inserisci Formato Strumenti Dati Finestra ?

Liberation Sans 10

A1 Meteo Data

	A	B	C	D
1	Meteo Data	From: 13/03/2015	to: 13/05/2015	
2	Date	Hour	(1-Vidor) (1) Temperature Average - °C	(1-Vidor) (2) Humidity Average - %
3	13-3-2015	00.00.00	3,8	59
4	13-3-2015	01.00.00	3,2	61
5	13-3-2015	02.00.00	2,1	69
6	13-3-2015	03.00.00	2,3	67
7	13-3-2015	04.00.00	0,6	76
8	13-3-2015	05.00.00	0,4	76
9	13-3-2015	06.00.00	0,3	75
10	13-3-2015	07.00.00	0	80
11	13-3-2015	08.00.00	4,1	67
12	13-3-2015	09.00.00	9,5	48
13	13-3-2015	10.00.00	11,3	43
14	13-3-2015	11.00.00	12,7	41
15	13-3-2015	12.00.00	13,2	42
16	13-3-2015	13.00.00	14,5	39
17	13-3-2015	14.00.00	15,2	36
18	13-3-2015	15.00.00	14,4	35
19	13-3-2015	16.00.00	13,6	37
20	13-3-2015	17.00.00	12,8	44
21	13-3-2015	18.00.00	10,3	56
22	13-3-2015	19.00.00	8,6	59
23	13-3-2015	20.00.00	6,8	66
24	13-3-2015	21.00.00	5,6	72
25	13-3-2015	22.00.00	4,6	75
26	13-3-2015	23.00.00	4,3	76
27	14-3-2015	00.00.00	2,8	84

- The format *'Image PNG'* generates, after processing, an image in PNG format with a chart of measures in the time interval, that is obtained automatically after macro execution, see the following example.



In the column labelled 'Every' (*Figure 5. 5 – Query: Selecting reports to be sent by mail*), you can see the time intervals after which, the data obtained from processing of the macro, are automatically sent as an email attachment to the recipients defined (*once* means on time). Also enable the "*Ab.*" check to define which report must be sent. If you run the macro for extraction process only one time, the email will be sent at the end of the process, instead if you run an automatic cyclic macro, the mail will be sent periodically at the timing you've selected.

Then you can save the macro, run it immediately or set other functionality.

5.1.4 Performing data extraction

There are **two ways to perform** the instructions defined within **each macro**.

The first (recommended) plans to use **macros saved in memory** by defining a name. Saving a new created macro, associating a name and pressing the "*Save Macro*" button, it may be recalled at any time by selecting it from the drop-down menu labelled *'Select Macro'*.

Selected a macro and loaded on the QUERY page with the button ***Load Macro***, it shows all the main settings and is ready to be executed.

In the **second** mode instead, called "**run time**", the macro just defined is performed without being saved: in this way, however, when the user changes page or logs-out the specifications of macros are lost. Finally, to extract the data through the processing of a current macro loaded on your system, with one of the two methods described above, click the ***Get Data*** button on the left side of the screen (*Figure 5. 5 – Query: Selecting reports to be sent by mail*).

The duration of the extraction is variable as a function of the period chosen and the amount of data in the database. Just before processing, a message shows a time estimate of the duration of the macro. During this time, the operation can be cancelled by clicking the ***Cancel*** button, as shown in *Figure 5. 7 – Query: Starting a macro*.

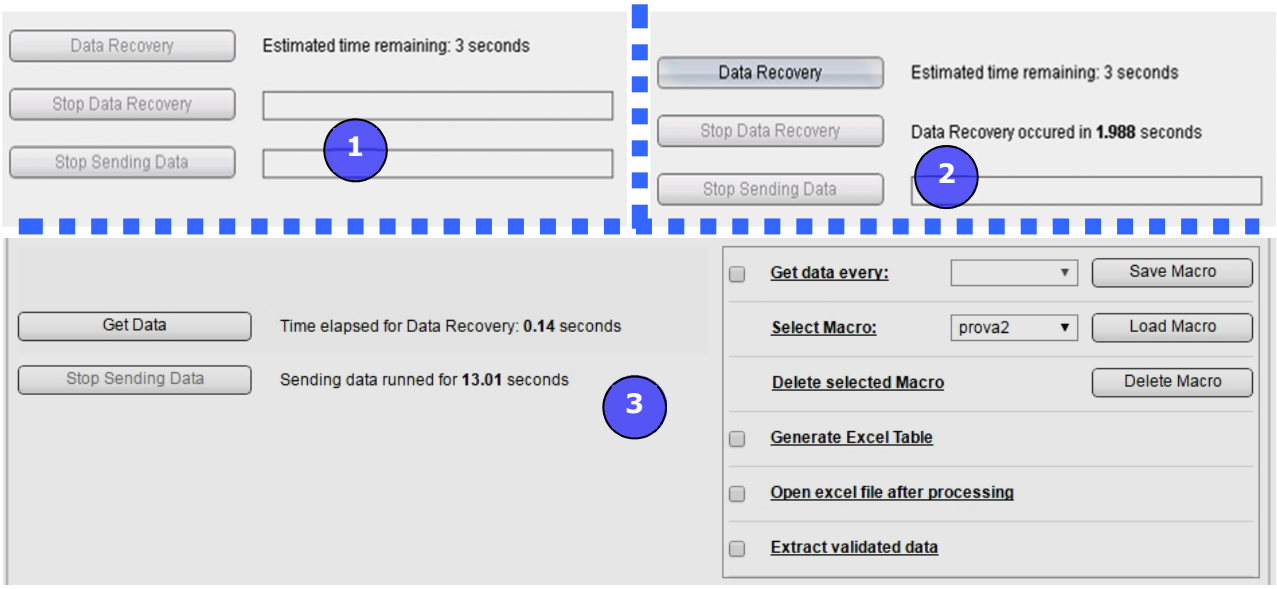


Figure 5. 7 – Query: Starting a macro

The progression of the extraction data is viewable through a progress bar. At any time you can stop the macro running by clicking ***Stop extraction***. If you activate the function to send reports by e-mail to its recipients, it visualizes a second bar describing the progress of the sending. This transfer can be interrupted by clicking on **Stop Sending Data**.

At the end of each data extraction, on the bottom, the log of operations displays the outcome of the macro's implementation with a message: the blue colour indicates the successful processing, while the red warning indicates that there are errors. Among the errors that appear in the log, there are parameters for sending the e-mail incorrect or missing connection from the system to the network.

5.1.5 Option at the end of extraction

From the dropdown menu *'At the end of extraction go to:*', you can choose a page (Graphs, Wind Rose, Table or alarms) that will be automatically displayed via a pop-up at the end of each run of the selected macro. All pages in the list, with the exception of **ALARMS**, can also be reached from the main menu.

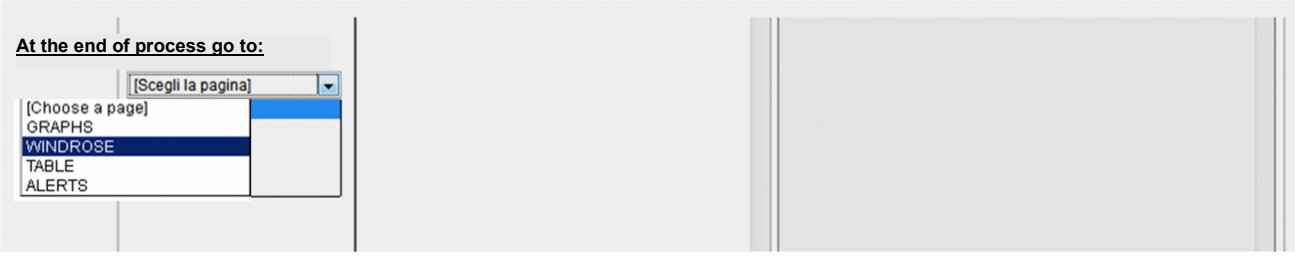


Figure 5. 8 – Query: Option at the end of extraction (on the left)

To display this feature, you must allow your browser to open the pop-up.

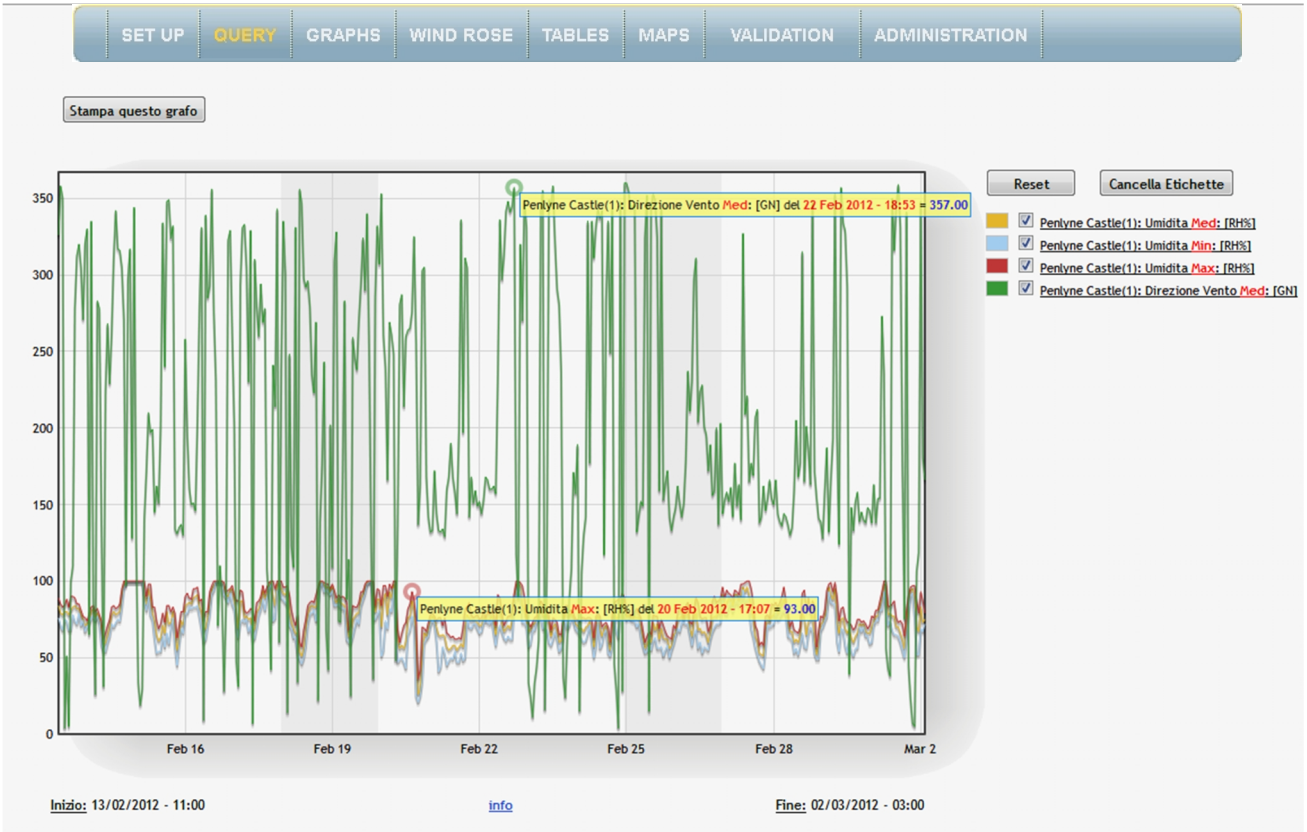


Figure 5. 9 – GRAPH page automatically generated by the macro

In figure *Figure 5. 9 – GRAPH page automatically generated by the macro*, is shown an example of a GRAPHS page displayed at the end of execution of a macro.

5.2 Customization Options

The area, located in the left panel in the middle of the page, is dedicated to setting the automation and functions of each macro, or options.

For each macro defined, the user can activate a number of options in order to manage, in a customized way, the result of data extraction processing . Some are on the QUERY page, others appear according to the settings in the same query.

5.2.1 Periodic and automatic macro execution

There is the possibility to create periodic automatic macros for data extraction and sending (*Figure 5. 10 – Query: Macro's*).

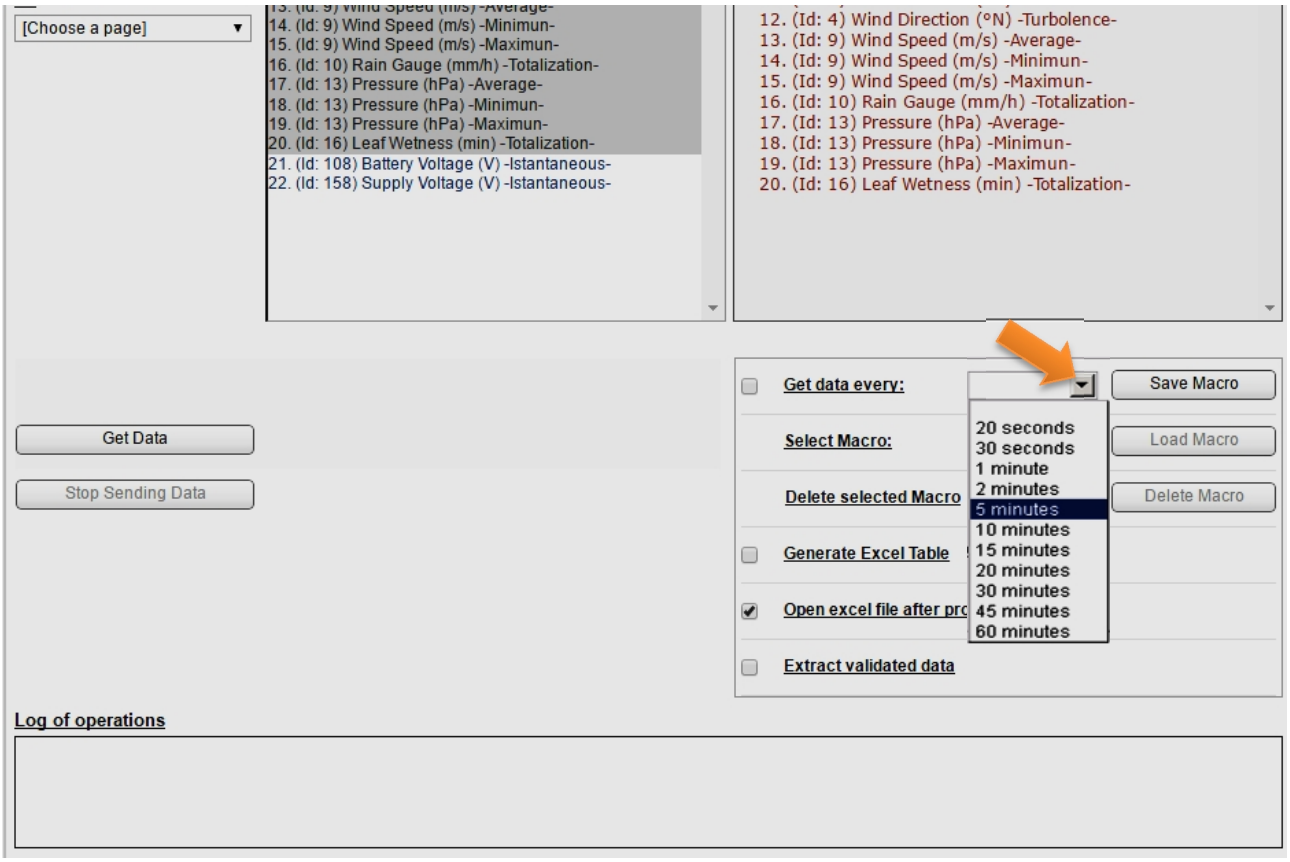


Figure 5. 10 – Query: Macro's set up

The selection of this time interval is possible from the menu '*Get Data every:*'. To activate this function, you need also to check the specific control. In *Figure 5. 10 – Query: Macro's set up*, an example: in this case, the macro will be executed every 5 minute.

You have also to choose when you want to start the macro (periodicity) defining date and time (see *Figure 5. 11 – Periodic macro*). The macro starts to run in background so you can also close your browser with SunFlower.

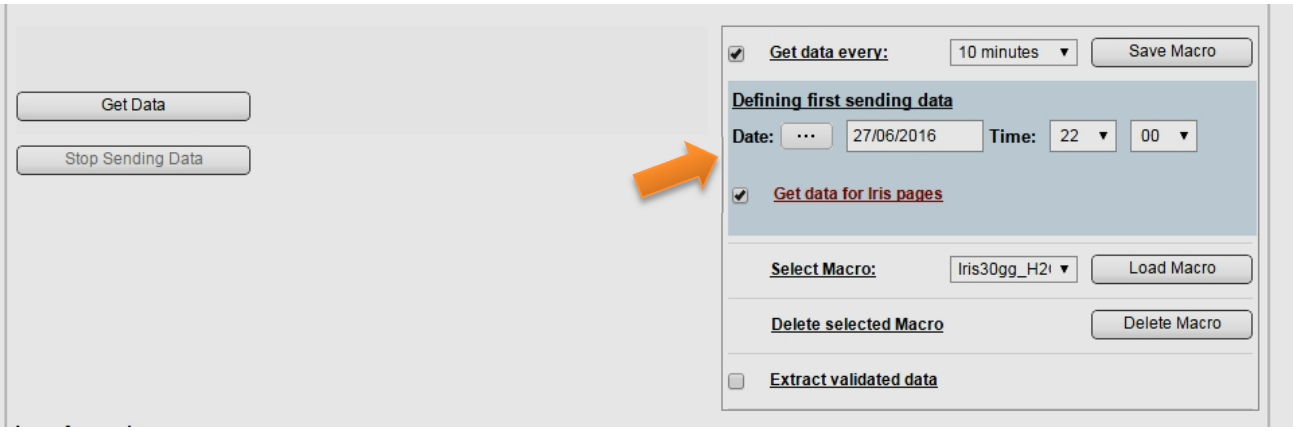


Figure 5. 11 – Periodic macro

Here you can also choose if this macro generates data for Iris pages, see section 12

It's possible to run more than one macro in background, the limit depends on the calculation power of the server. If there is one macro running in background a button named "***Stop selected Macro***" appears and pressing it is possible to stop macro execution, moreover the name of the in running periodic macros appears in **bold and red** in the list of name.

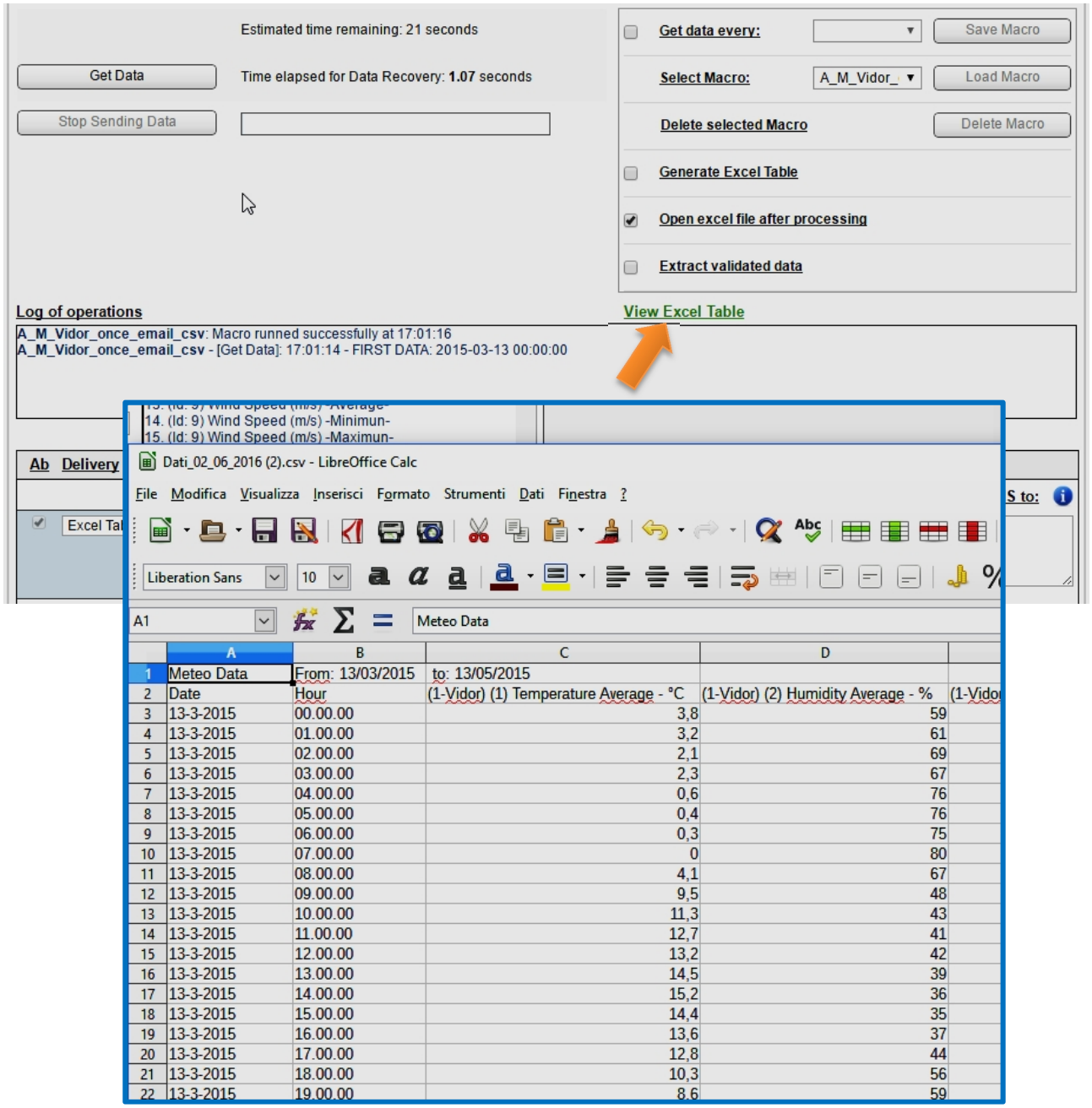
5.2.2 Option generate and/open Excel file after processing

If you activate the recording function onto Excel table to report the extracted data from macro (see section 5.1.3) or if the check "*Generate Excel table*" is selected, you can automatically open a copy of the file.xls after execution.

This option is enabled by checking the control labelled *'Open Excel file after processing*' in the middle of the screen.

The *Figure 5. 12 – Query Option for viewing an Excel table*, shows the link to open the archived Excel file, and appears at the end of macro processing.

It requires that in the PC from which you access to SunFlower is installed copy of Excel® to have a correct view, otherwise the file is opened as a normal text file.



	A	B	C	D
1	Meteo Data	From: 13/03/2015	to: 13/05/2015	
2	Date	Hour	(1-Vidor) (1) Temperature Average - °C	(1-Vidor) (2) Humidity Average - %
3	13-3-2015	00.00.00	3,8	59
4	13-3-2015	01.00.00	3,2	61
5	13-3-2015	02.00.00	2,1	69
6	13-3-2015	03.00.00	2,3	67
7	13-3-2015	04.00.00	0,6	76
8	13-3-2015	05.00.00	0,4	76
9	13-3-2015	06.00.00	0,3	75
10	13-3-2015	07.00.00	0	80
11	13-3-2015	08.00.00	4,1	67
12	13-3-2015	09.00.00	9,5	48
13	13-3-2015	10.00.00	11,3	43
14	13-3-2015	11.00.00	12,7	41
15	13-3-2015	12.00.00	13,2	42
16	13-3-2015	13.00.00	14,5	39
17	13-3-2015	14.00.00	15,2	36
18	13-3-2015	15.00.00	14,4	35
19	13-3-2015	16.00.00	13,6	37
20	13-3-2015	17.00.00	12,8	44
21	13-3-2015	18.00.00	10,3	56
22	13-3-2015	19.00.00	8,6	59

Figure 5. 12 – Query Option for viewing an Excel table

5.2.3 Option "Extract Validated Data "

If SunFlower is installed with the validation data (page "VALIDATION"), you can use this option to **extract, from the database, only the validated data** instead of all the data for the selected macro. After extraction, you will create two Excel tables, one containing the validated data and one for invalidated data

To enable this option, simply select the appropriate check in the section on saving macro (*Figure 5.13 – Query to extract validated data*).

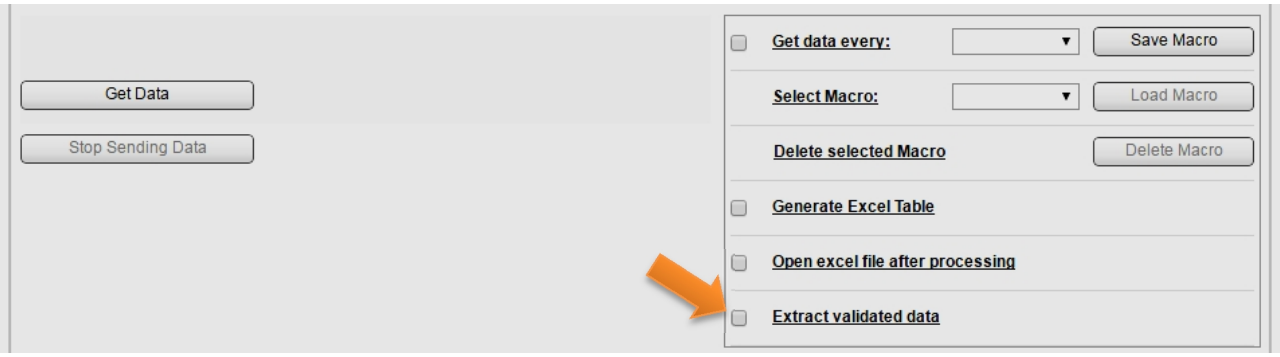


Figure 5.13 – Query to extract validated data

5.3 'Advanced' extraction Options

The option is located in the section *'Observation time interval'* (see 5.1.1) at the top of the screen and can be reached by clicking the "***Advanced...***" button, as shown in *Figure 5.14 – Query: Advanced extraction options*.

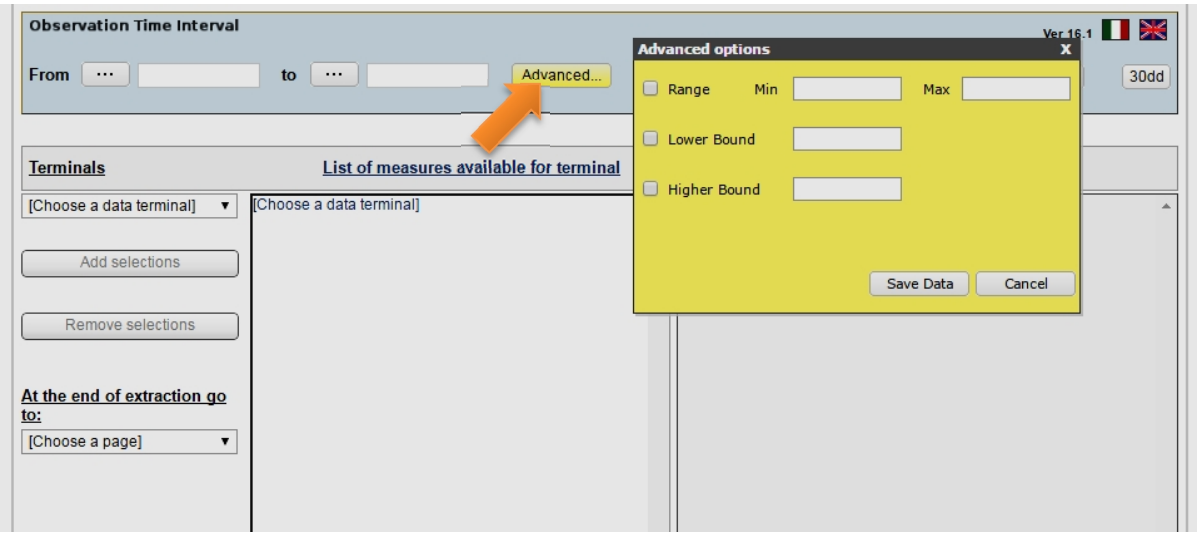


Figure 5.14 – Query: Advanced extraction options

The form that opens allows you to set a maximum or minimum value or a range of values which will be compared with measurements extracted from the macro. Running the macro, will be extracted only the values respectively higher or lower or content into the set. The activation of this option becomes significant when the macro should extract values belonging to the same type (for example for all temperatures or wind speed measures, etc..) It is a simple first level of filtering data in database.

6 Section GRAPHS

Once extracted the data with a query in a "stand alone" way, or with an automatic cycle (see section 5.1.4), you can navigate through the pages to view and access at different pages as GRAPHS, WIND ROSE, TABLES, MAP etc.

Selecting GRAPS page, SunFlower displays the graphical presentation of the measures extracted from the database for the selected query and for the type of stations selected in the specified period (*Figure 6. 1 – Graphs page*).

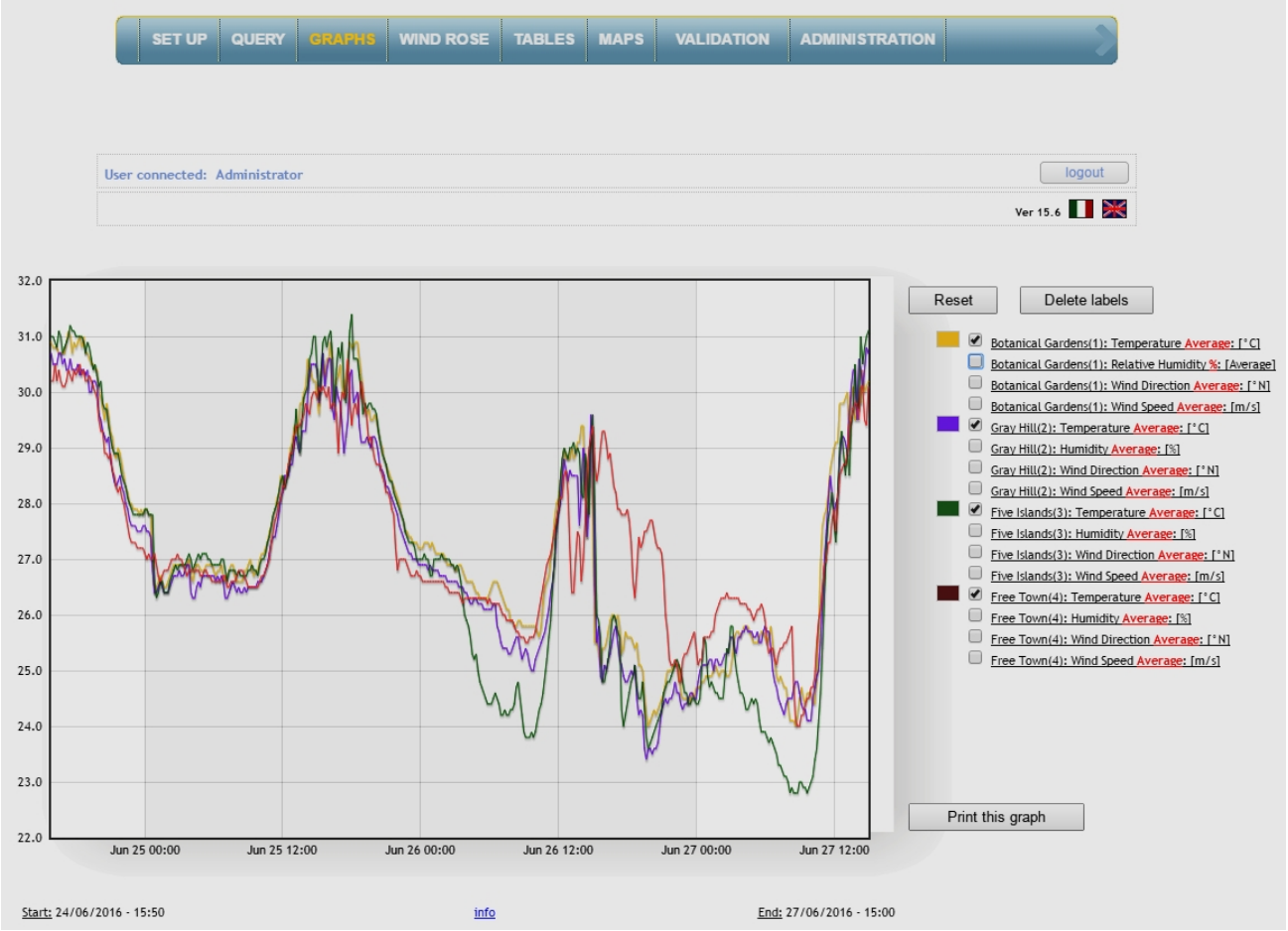


Figure 6. 1 – Graphs page

The graph shows in the ordinate axis (vertical axis) the scale for the selected measure or, in the case of multiple measures, the greater scale among the measures; in the abscissas axis (horizontal) is present the time scale whose beginning and end correspond to the period of data extraction only in case that data are present all over the chosen period, otherwise, this scale will be related only to the period in which the measures are present.

It is a dynamic chart whose use is quite simple.

On the right side, descending from above, there is a list of the measures listed by station name (station ID), measure name (ID value), type of data processed (minimum, average, maximum, storage, etc..) and units, according to the settings in the stations in telemetry.

When you open the page, all the measures are enabled (or alternatively only the first), for adding or removing to the graph the measures listed, simply remove or put the check in the appropriate box (*Figure 6. 2 – Choosing the measure to view*).

Figure 6. 2 – Choosing the measure to view

Once you have selected the measures, is possible to use some functions in the graph as:

- *zoom on area*
- display of the *measurement points*
- Assign a label to *specific measurement points* for printing

To get the *zoom on area* is enough to select a point and, holding down the mouse left button, drag to create a rectangle that covers the area selected for zooming (*Figure 6. 3 – Zoom by selection*).

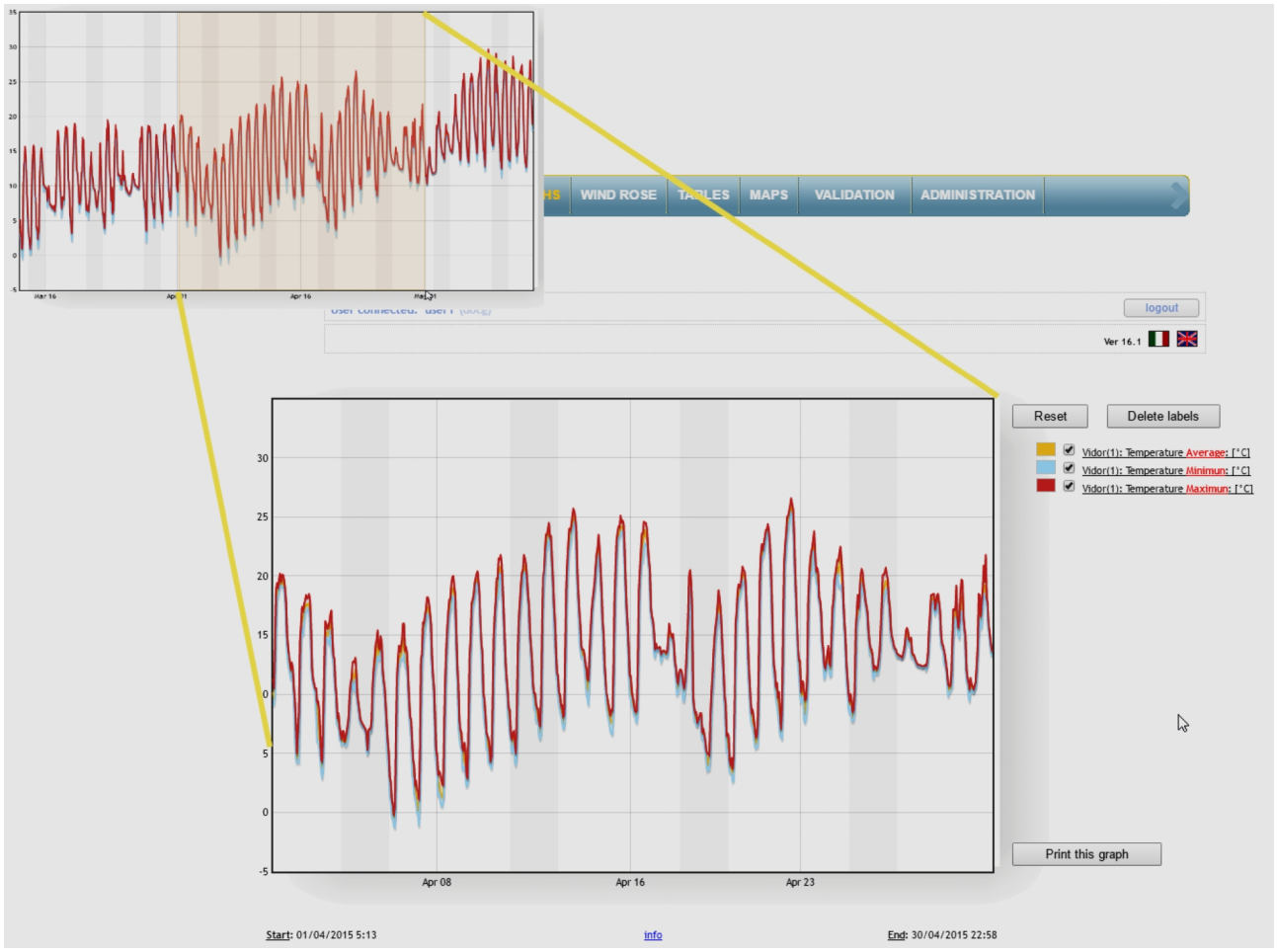
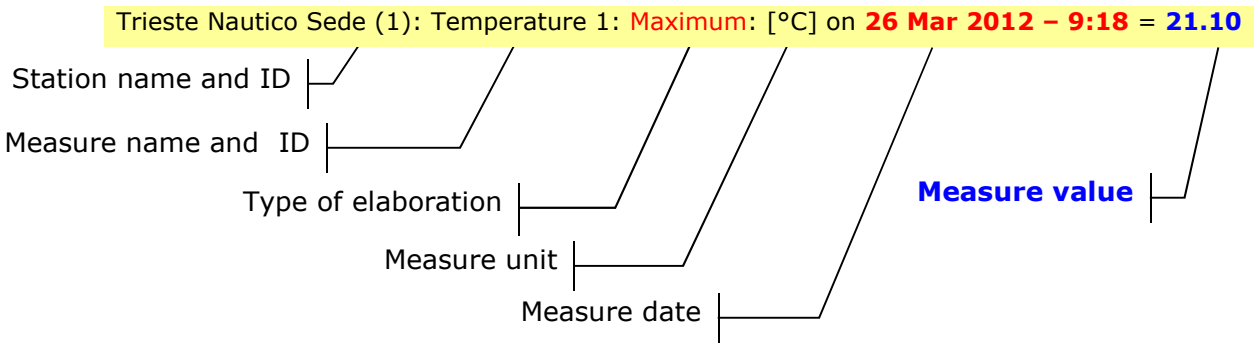


Figure 6. 3 – Zoom by selection

To view the *measurement points* just follow a line of graph with the mouse. On the measures, the points are represented with a circle of the same colour of the graph line and, stopping on, an information is displayed on the point.

In the example shown in *Figure 6. 4 – Display measurement points*, the label is:



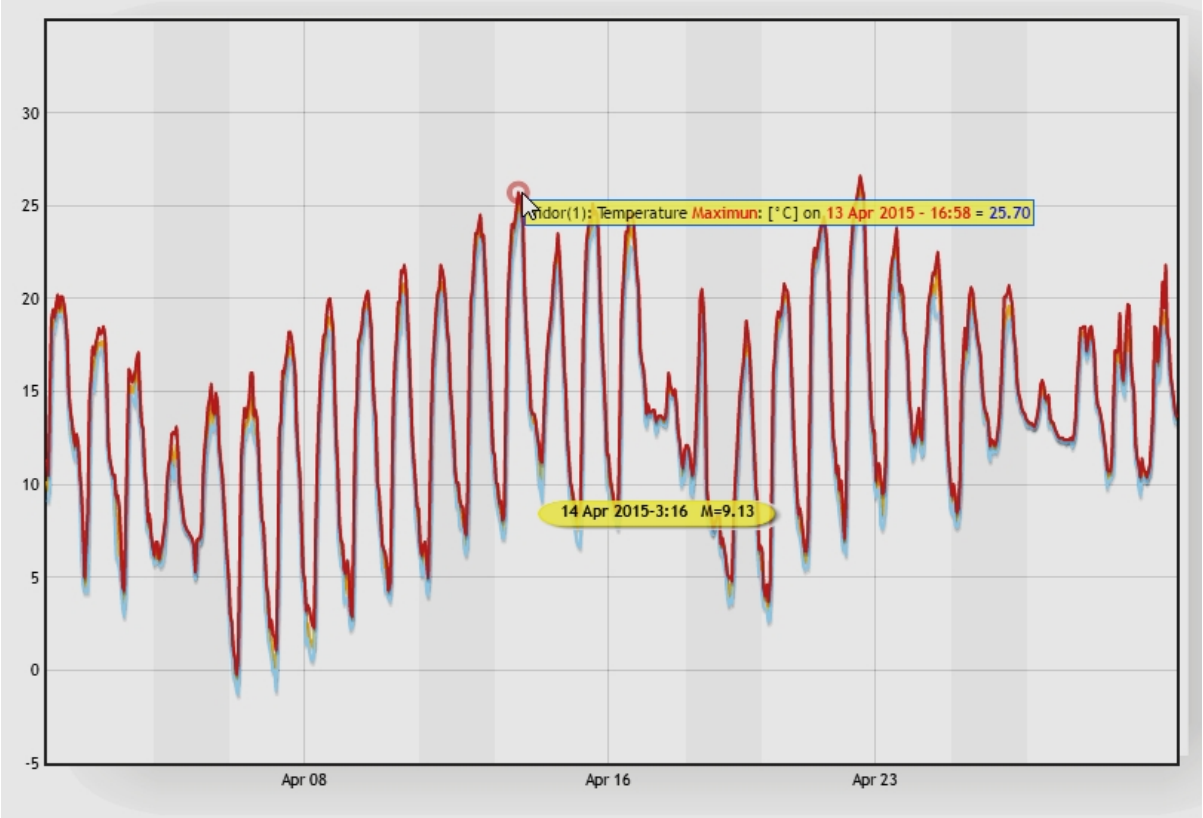


Figure 6. 4 – Display measurement points

In similar way, to "stop" the measurement value at a specific point assigning a label useful for printing or to highlight points, just click with the left mouse button on the point itself (*Figure 6. 5 – Assigning label measurement points*).

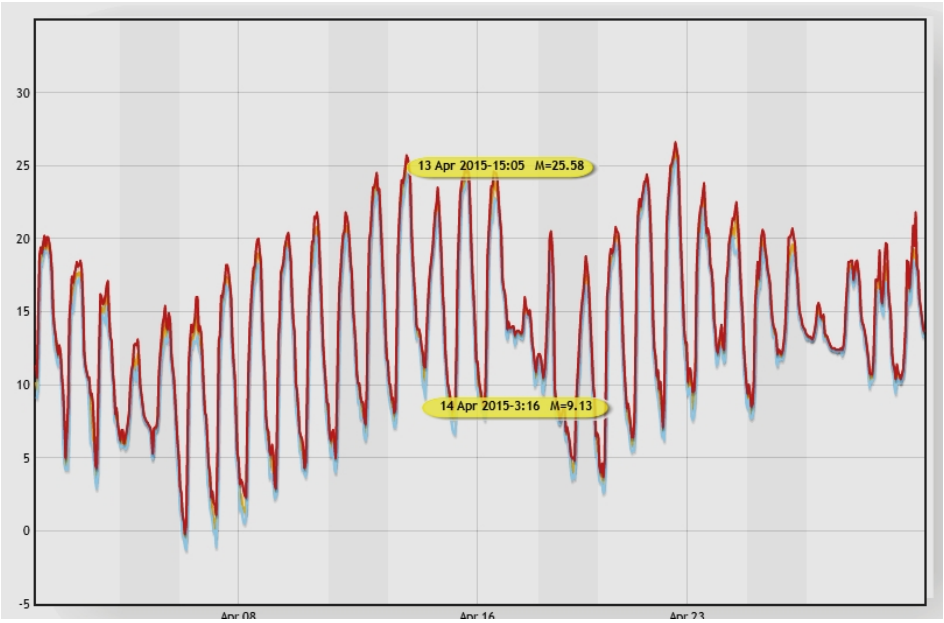


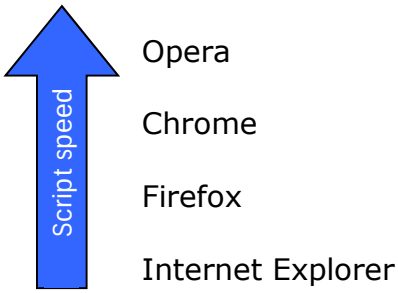
Figure 6. 5 – Assigning label measurement points

To remove all labels from the graph, press "***Remove label***".

To restore the graph to its original condition (no zoom), press the "***Reset***" button.

To print the graph, press "***Print this graph***".

The speed of drawing a chart or updating it, depends both on the computing power and on the browser being used. At the time of writing this manual, among all browsers compatibles, faster ones are:



In a similar way, some functions (such as printing) may give slightly different results depending on the browser used.

The update rate of the various existing browsers does not define uniquely the functional characteristics, that can so improve significantly, also with the release of new versions of the browsers.

It's possible to show maximum 10 measures per graph.

The presented functions on the GRAPHS are also described in the online help linked to the "***info***" in the centre of the page, below the graph (*Figure 6. 6 – Link "info" for on line help*).

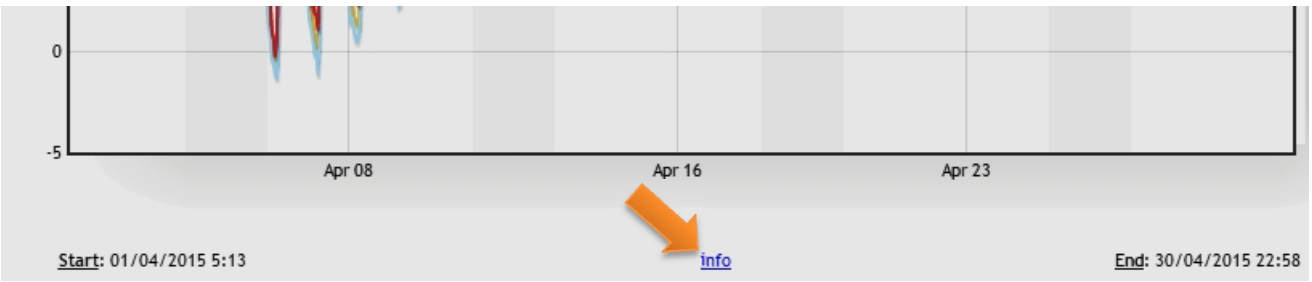


Figure 6. 6 – Link "info" for on line help

7 Section WIND ROSE

Once extracted the data with a query in a "stand alone" way, or with an automatic cycle (see section 5.1.4), you can navigate through the pages to view and access at WIND ROSE page.

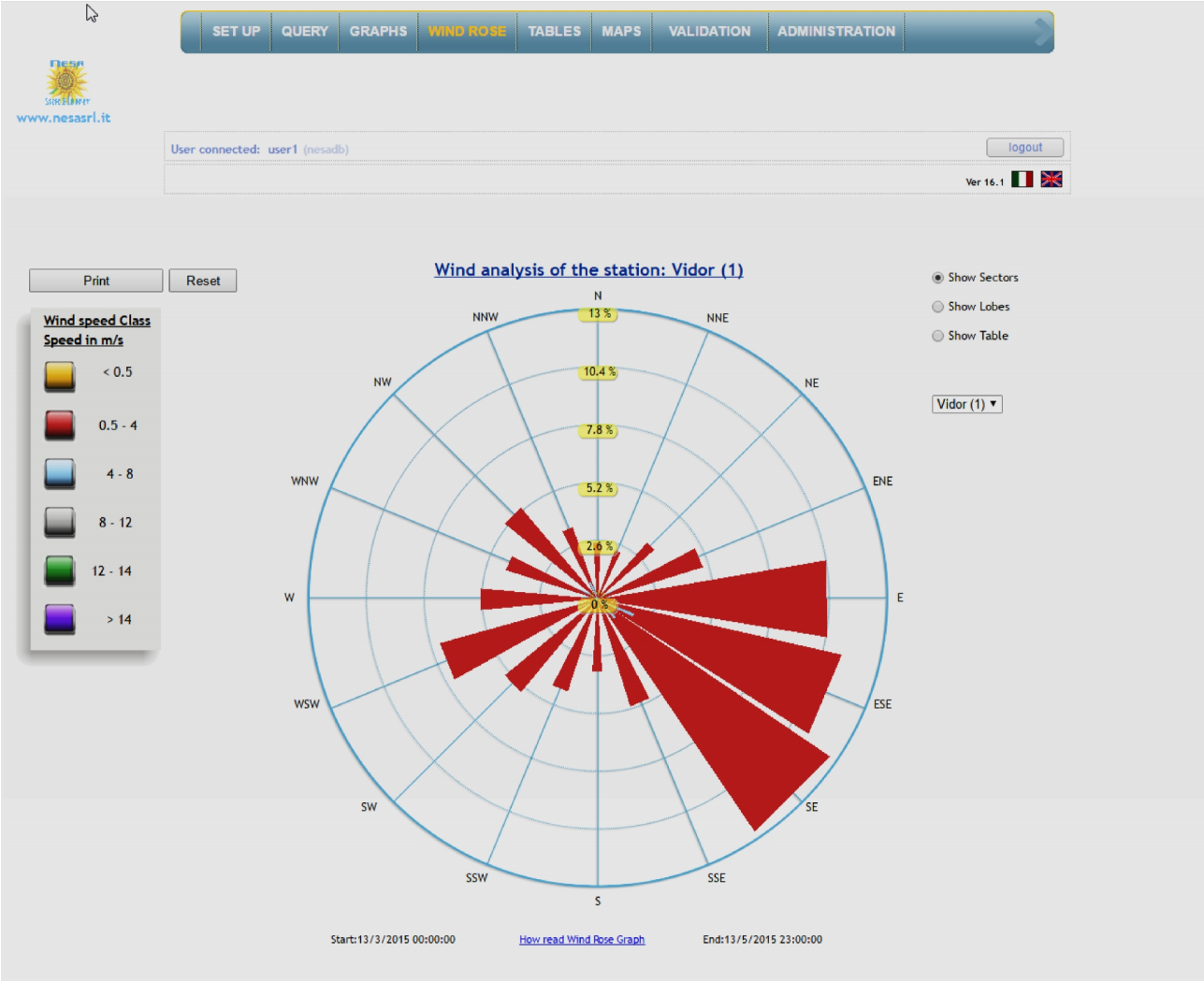


Figure 7. 1 – Wind ROSE page

The Wind Rose is displayed **only for those stations** on which, in the Query extraction, have been **selected the measures of wind direction and speed** in combined mode (same recording time), see *Figure 7. 2 – Extraction data for wind rose*.

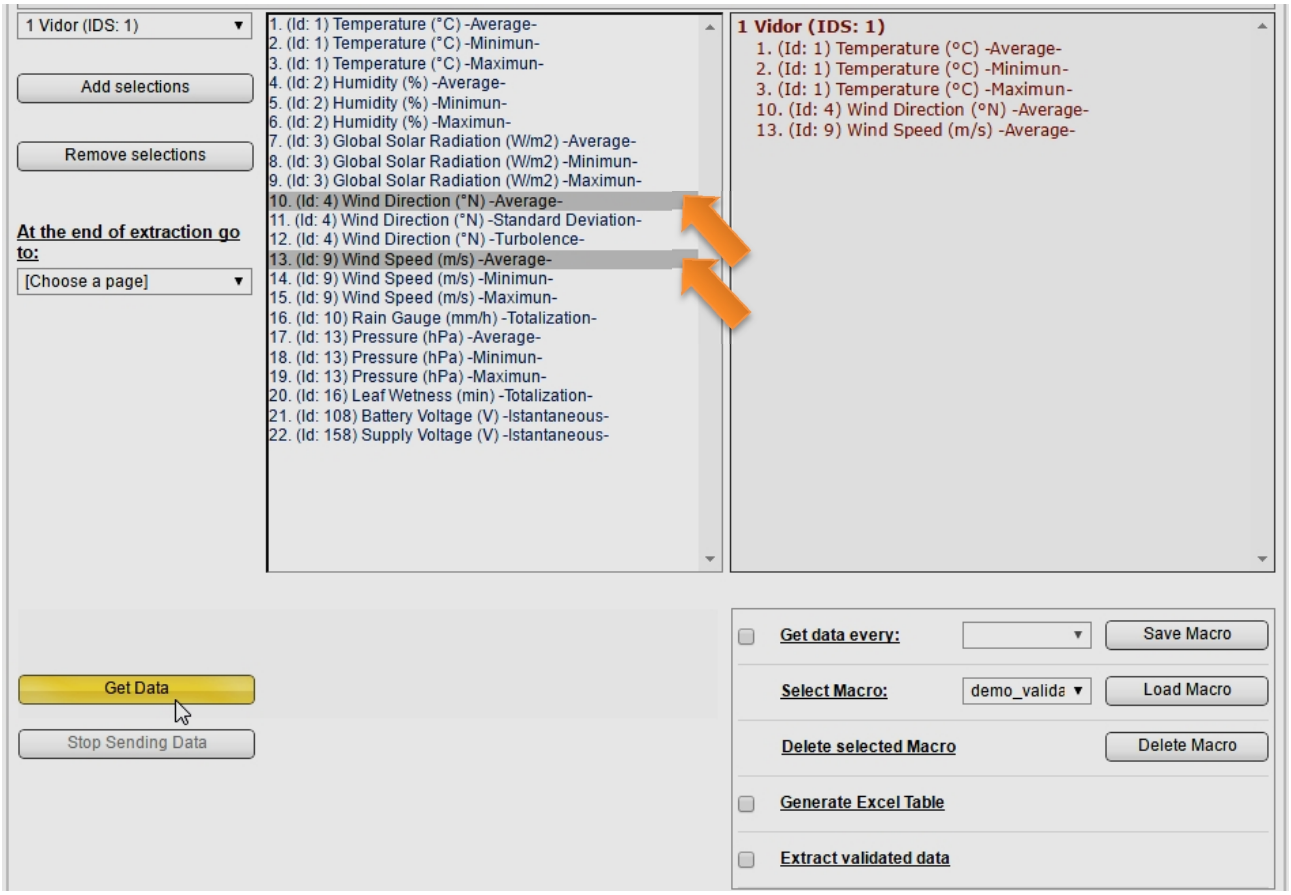


Figure 7. 2 – Extraction data for wind rose

The wind rose is a necessary and useful tool to identify the direction of the prevailing winds and their intensity. SunFlower integrates a representation of 16 sectors in both graphical and tabular format in accordance with the regulations 1999/30/EC and 2000/69/EC. In particular, through the representation of the wind rose, you can:

- Identify at a glance the prevailing wind direction within one of the sectors mentioned (the relative sector is shown in the outer circle). The **wind blows from the direction indicated**.
- Check the **class of wind** speed (Color field).
- Associate the **intensity of the winds according to the percentage indicated** (the percentage value associated to the various circumferences indicates the amount of wind that, in the time interval considered, has blown in that direction).

On the page there are several possible options for representation. Is possible to have a representation in sectors, lobes or as a table. The choice between the first two has only an aesthetic function that shows in a different way the winds in various colours depending on the class. (*Figure 7. 3 – Display sectors (left) and lobes (right)*)

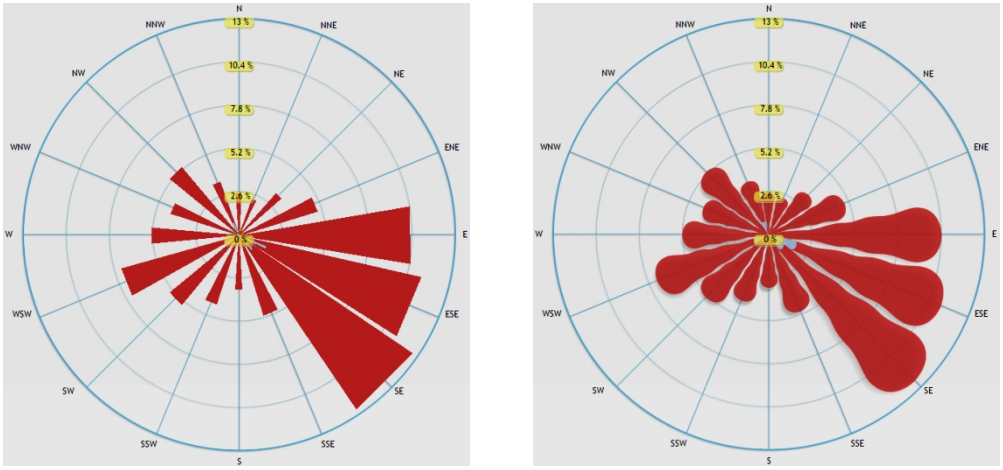


Figure 7. 3 – Display sectors (left) and lobes (right)

The tabular view, however, allows an exact description of the classes of wind in the 16 sectors, expressed in thousandths. Very useful tool for statistical purposes (*Figure 7. 4 – Table view*).

Data frequency table of the wind (thousandths) for station: Vidor (1) Download Excel Table

Sectors(°N)Class(m/s)	Class 1 (Calm) (0-0,5)m/s	Class 2 (Breeze) (0,5-4)m/s	Class 3 (Light Wind) (4-8)m/s	Class 4 (Middle Wind) (8-12)m/s	Class 5 (Strong Wind) (12-14)m/s	Class 6 (Storm) (>14)m/s	Total
1: 348,75 ... 11,25°N	2.02 ‰	25.57 ‰	0.67 ‰	0 ‰	0 ‰	0 ‰	28.26‰
2: 11,25 ... 33,75°N	2.02 ‰	23.55 ‰	0 ‰	0 ‰	0 ‰	0 ‰	25.57‰
3: 33,75 ... 56,25°N	0.67 ‰	33.65 ‰	0 ‰	0 ‰	0 ‰	0 ‰	34.32‰
4: 56,25 ... 78,75°N	2.02 ‰	49.13 ‰	0.67 ‰	0 ‰	0 ‰	0 ‰	51.82‰
5: 78,75 ... 101,25°N	2.02 ‰	103.63 ‰	7.4 ‰	0 ‰	0 ‰	0 ‰	113.05‰
6: 101,25 ... 123,75°N	4.71 ‰	111.71 ‰	17.5 ‰	0 ‰	0 ‰	0 ‰	133.92 ‰
7: 123,75 ... 146,25°N	4.04 ‰	125.17 ‰	11.44 ‰	0 ‰	0 ‰	0 ‰	140.65‰
8: 146,25 ... 168,75°N	1.35 ‰	49.8 ‰	0 ‰	0 ‰	0 ‰	0 ‰	51.15‰
9: 168,75 ... 191,25°N	3.36 ‰	32.3 ‰	0 ‰	0 ‰	0 ‰	0 ‰	35.66‰
10: 191,25 ... 213,75°N	2.69 ‰	43.07 ‰	0 ‰	0 ‰	0 ‰	0 ‰	45.76‰
11: 213,75 ... 236,25°N	0.67 ‰	53.16 ‰	2.02 ‰	0 ‰	0 ‰	0 ‰	55.85‰
12: 236,25 ... 258,75°N	1.35 ‰	72.68 ‰	9.42 ‰	0 ‰	0 ‰	0 ‰	83.45‰
13: 258,75 ... 281,25°N	2.69 ‰	51.82 ‰	4.04 ‰	0 ‰	0 ‰	0 ‰	58.55‰
14: 281,25 ... 303,75°N	1.35 ‰	42.4 ‰	0.67 ‰	0 ‰	0 ‰	0 ‰	44.42‰
15: 303,75 ... 326,25°N	0 ‰	53.16 ‰	1.35 ‰	0 ‰	0 ‰	0 ‰	54.51‰
16: 326,25 ... 348,75°N	0.67 ‰	34.32 ‰	8.08 ‰	0 ‰	0 ‰	0 ‰	43.07‰
Total Calm	31.63‰						

Figure 7. 4 – Table view

This table can be saved also in Excel format by clicking the link above, in the title.

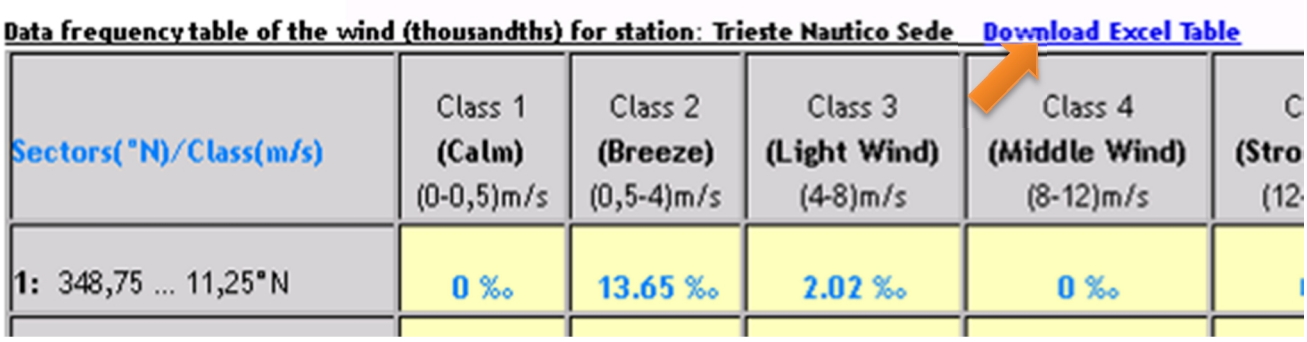


Figure 7. 5 – Link for downloading Excel table

If in the *Query extraction from database* have been chosen more stations, each with the combined measurement of wind speed and direction, you can see the wind rose regardless station by station, selecting it from the drop-down menu at the top right (*Figure 7. 6 – Choose the station with anemometer*).

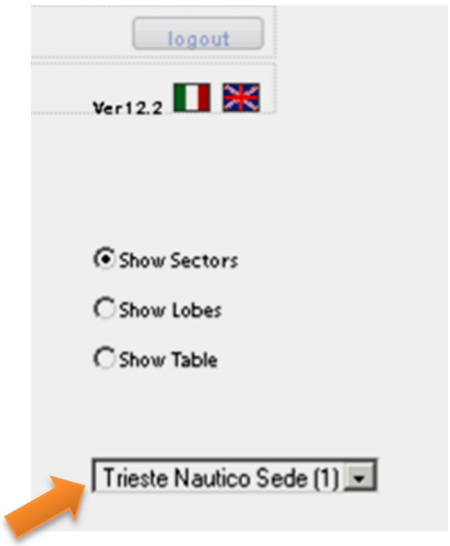


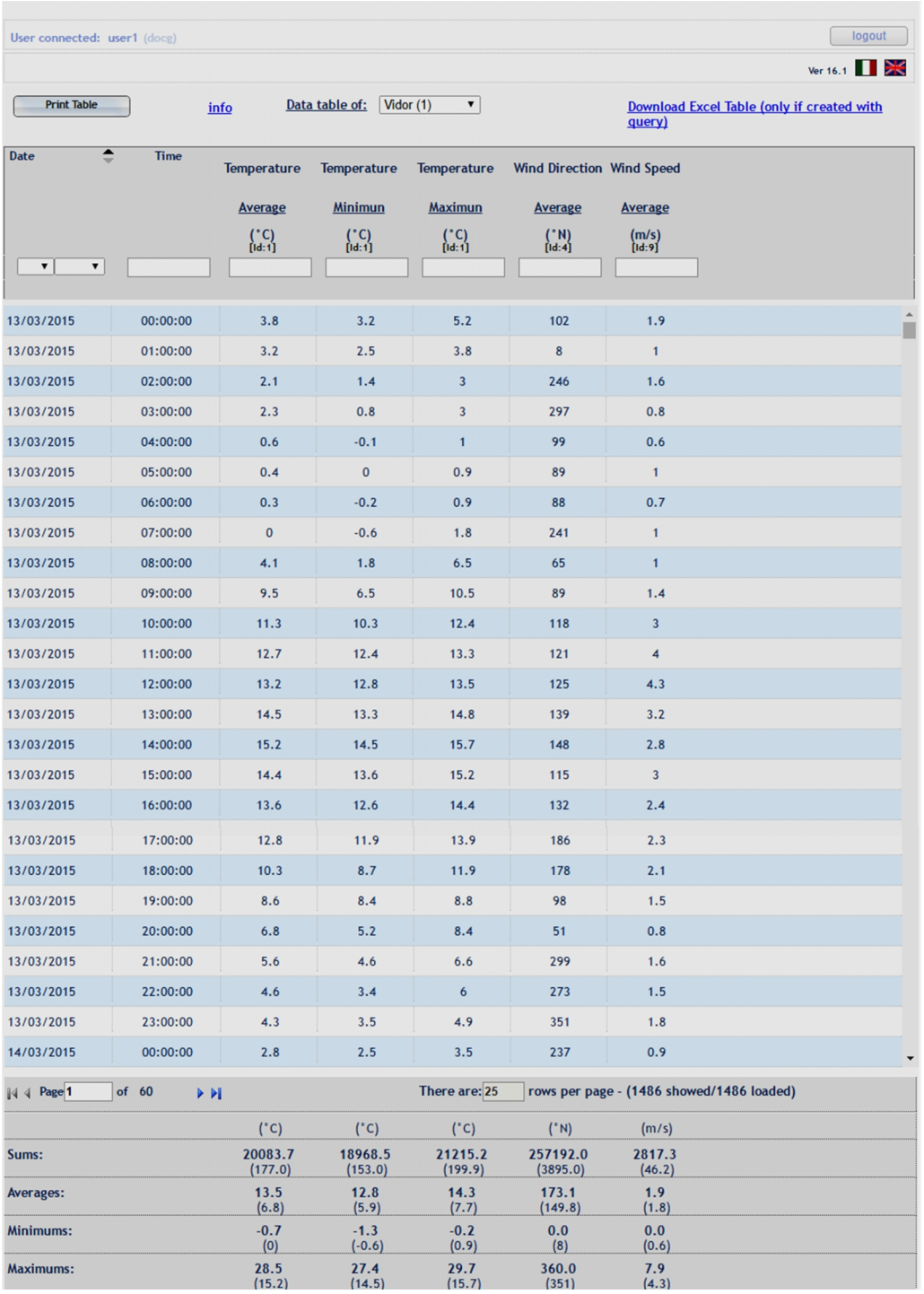
Figure 7. 6 – Choose the station with anemometer

If in the same station there are several combined measures of wind speed and direction, and these were all extracted in the same query, only the first pair is considered in the representation of wind rose. You must perform several queries by opening several pages "WIND ROSE" in order to have a comparison of the measures.

Like the GRAPHS page, at the bottom centre of the WIND ROSE page there is a link to the online help "***How to read Wind Rose***", which describes the main features.

8 Section TABLES

Once extracted the data with a query in a "stand alone" way, or with an automatic cycle (see section 5.1.4), you can navigate through the pages to view and access at TABLES page.



Date	Time	Temperature Average (°C) [Id:1]	Temperature Minimun (°C) [Id:1]	Temperature Maximun (°C) [Id:1]	Wind Direction Average (°N) [Id:4]	Wind Speed Average (m/s) [Id:9]
13/03/2015	00:00:00	3.8	3.2	5.2	102	1.9
13/03/2015	01:00:00	3.2	2.5	3.8	8	1
13/03/2015	02:00:00	2.1	1.4	3	246	1.6
13/03/2015	03:00:00	2.3	0.8	3	297	0.8
13/03/2015	04:00:00	0.6	-0.1	1	99	0.6
13/03/2015	05:00:00	0.4	0	0.9	89	1
13/03/2015	06:00:00	0.3	-0.2	0.9	88	0.7
13/03/2015	07:00:00	0	-0.6	1.8	241	1
13/03/2015	08:00:00	4.1	1.8	6.5	65	1
13/03/2015	09:00:00	9.5	6.5	10.5	89	1.4
13/03/2015	10:00:00	11.3	10.3	12.4	118	3
13/03/2015	11:00:00	12.7	12.4	13.3	121	4
13/03/2015	12:00:00	13.2	12.8	13.5	125	4.3
13/03/2015	13:00:00	14.5	13.3	14.8	139	3.2
13/03/2015	14:00:00	15.2	14.5	15.7	148	2.8
13/03/2015	15:00:00	14.4	13.6	15.2	115	3
13/03/2015	16:00:00	13.6	12.6	14.4	132	2.4
13/03/2015	17:00:00	12.8	11.9	13.9	186	2.3
13/03/2015	18:00:00	10.3	8.7	11.9	178	2.1
13/03/2015	19:00:00	8.6	8.4	8.8	98	1.5
13/03/2015	20:00:00	6.8	5.2	8.4	51	0.8
13/03/2015	21:00:00	5.6	4.6	6.6	299	1.6
13/03/2015	22:00:00	4.6	3.4	6	273	1.5
13/03/2015	23:00:00	4.3	3.5	4.9	351	1.8
14/03/2015	00:00:00	2.8	2.5	3.5	237	0.9
		(°C)	(°C)	(°C)	(°N)	(m/s)
Sums:		20083.7 (177.0)	18968.5 (153.0)	21215.2 (199.9)	257192.0 (3895.0)	2817.3 (46.2)
Averages:		13.5 (6.8)	12.8 (5.9)	14.3 (7.7)	173.1 (149.8)	1.9 (1.8)
Minimums:		-0.7 (0)	-1.3 (-0.6)	-0.2 (0.9)	0.0 (8)	0.0 (0.6)
Maximums:		28.5 (15.2)	27.4 (14.5)	29.7 (15.7)	360.0 (351)	7.9 (4.3)

Figure 8. 1 – Table of data extracted from Query

Data which come out from a Query, are available directly in the table divided by page as shown in *Figure 8. 1 – Table of data extracted from Query*. It is an easy table to read, whose data are broken down by date and time (rows of different colours) and type of data (columns) as shown in *Figure 8. 2 – Subdivision of data*

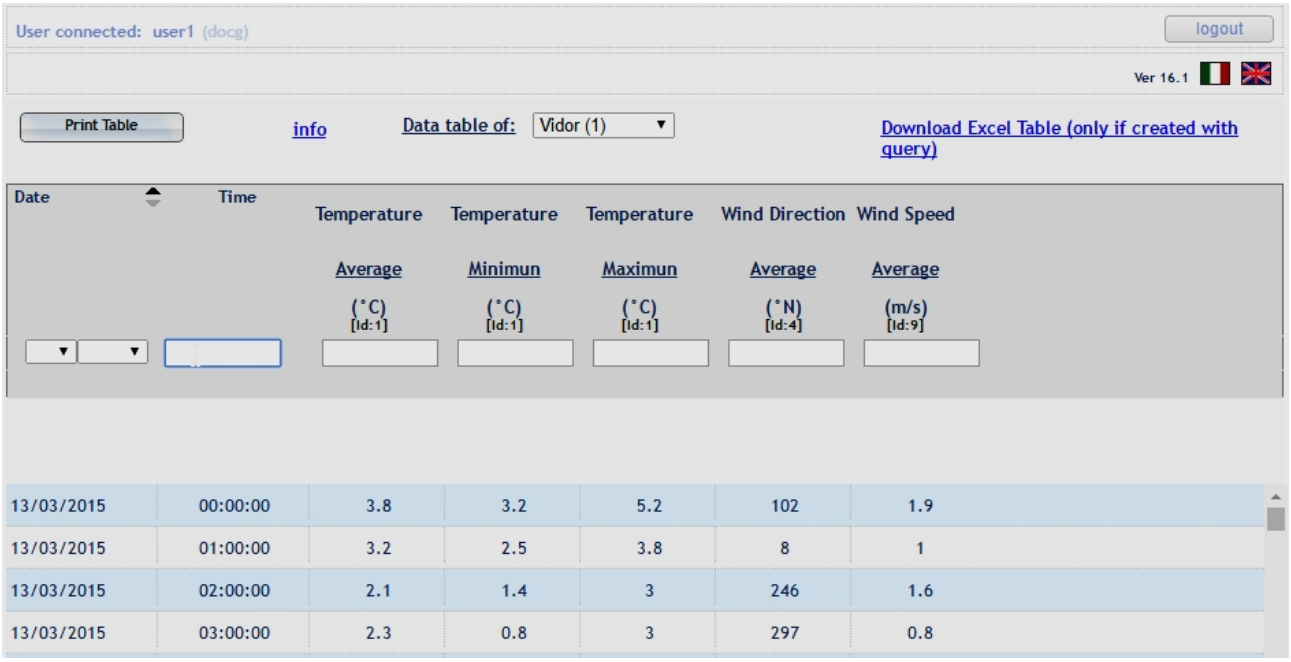


Figure 8. 2 – Subdivision of data

The table is divided into three sections along the vertical:

- - In the **upper** part the selection of area and filters
- - In the **center** the data section
- - In **lower** part the statistics

At ***the top***, you can select station by station the data, if in the selection query you have defined it has more than one station. You can also download the same table in Excel format by following the specific link, and immediately above the columns of data you can filter the table by entering the appropriate value in the specific fields.

For example, if you wanted to select all the data at midnight, you would simply enter in the field above the column "TIME", the string **00:00:00** (corresponding to midnight time) as shown in *Figure 8. 3 – Filter data to midnight*. Or, you can filter the data values such as "**> 100**" (then pressing the *Enter key*).

Similarly, for other fields.

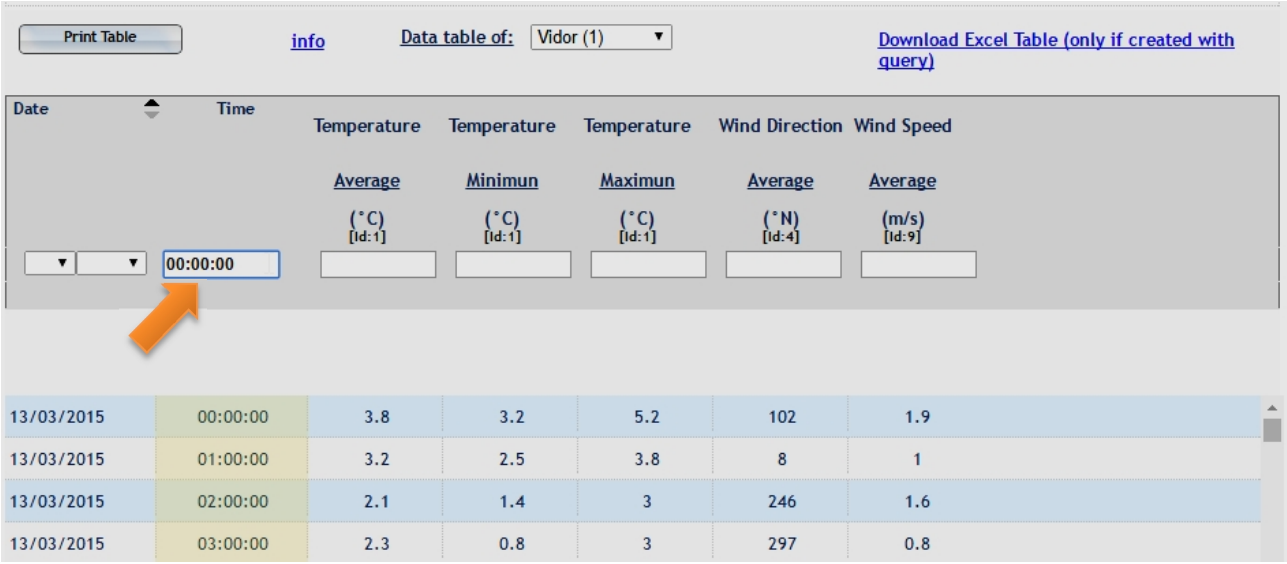


Figure 8. 3 – Filter data to midnight

Other functions are available at the link "***Click here***" and serve to highlight the data in a column for example for printing (press "***Print Table***").

The data presented in the ***middle area***, line by line, cannot be changed.

The ***lower part*** of the table contains the statistics for the displayed page and for all of the data in the table:

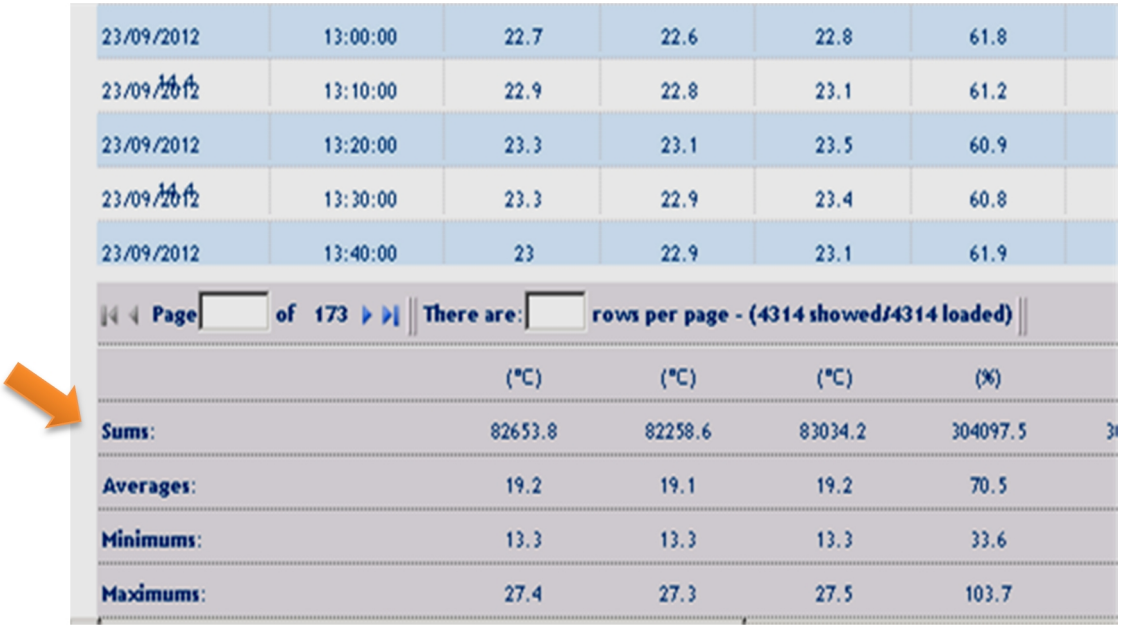


Figure 8. 4 – Statistics

In particular, for each column in the table, are shown the **minimum, maximum, averages and sums or accumulation** (integral) for all the pages and, **in brackets**, for the page showed in the table.

It also shows how many pages make up the table (173 pagg in *Figure 8. 4 – Statistics*) and how many are the extracted data in total (number of rows).

Applying one of the filters described above (for example, all the data at midnight), the statistics are displayed only on filtered data.

Even in this case, as for the other section pages, you can open more than one table with data from different stations or obtained from different Queries.

If the table includes a lot of data, a specific message box will appear informing you:

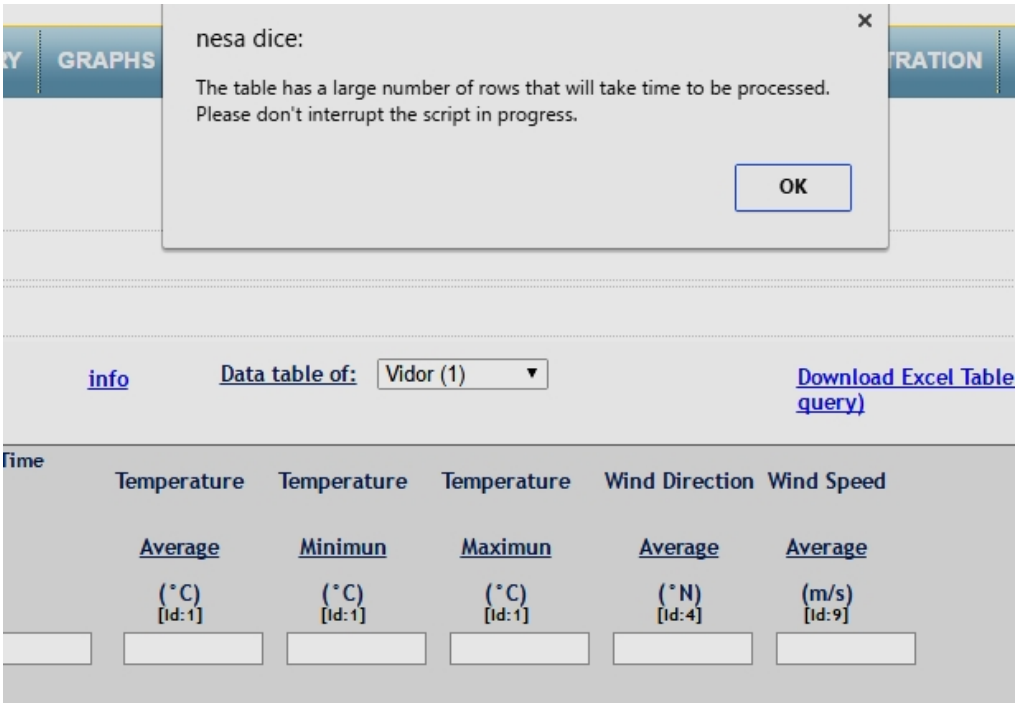


Figure 8. 5 – info box for table

9 Section MAP

Once extracted the data with a query in a "stand alone" way, or with an automatic cycle (see section 5.1.4), you can navigate through the pages to view and access at MAP page.

The map depends on the user and the association user-map (see section 3) and if no maps are associate to the user a specific message appears.

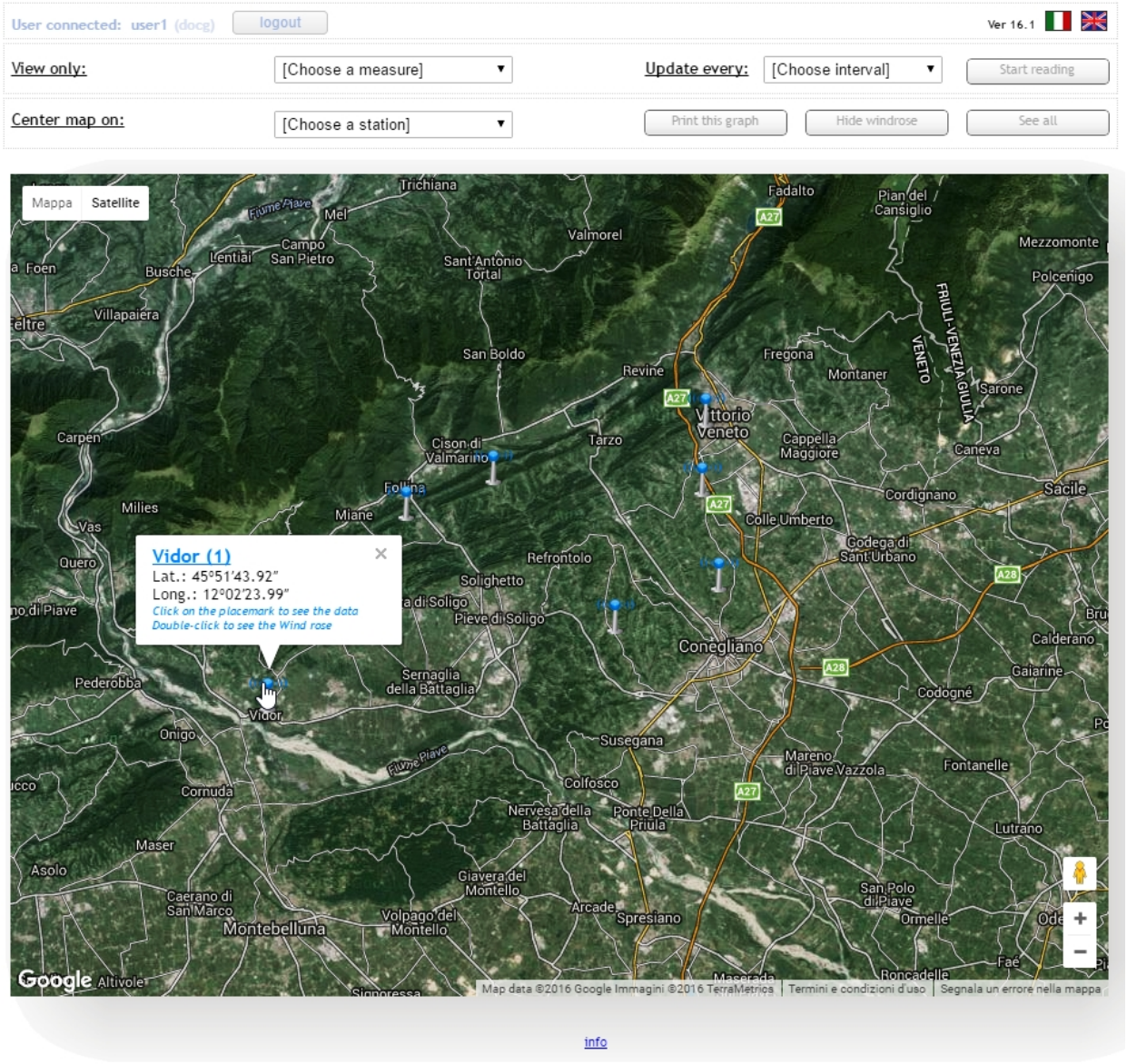


Figure 9. 1 – MAP

There are two kind of maps that are available to each user, one as a PNG customizable image and one as GIS image.

9.1 PNG map

Under the folder *../SunFlower/images/,* is possible to put and find the images available for users to whom the administrator can associate the user following the procedure described at section 3.

If you choose demo.png you can overwrite it with your own. Please consider to use PNG images at 920x620 pixels. Normal the image is prepared by Nesa, because on it is possible to represent the stations as icons.

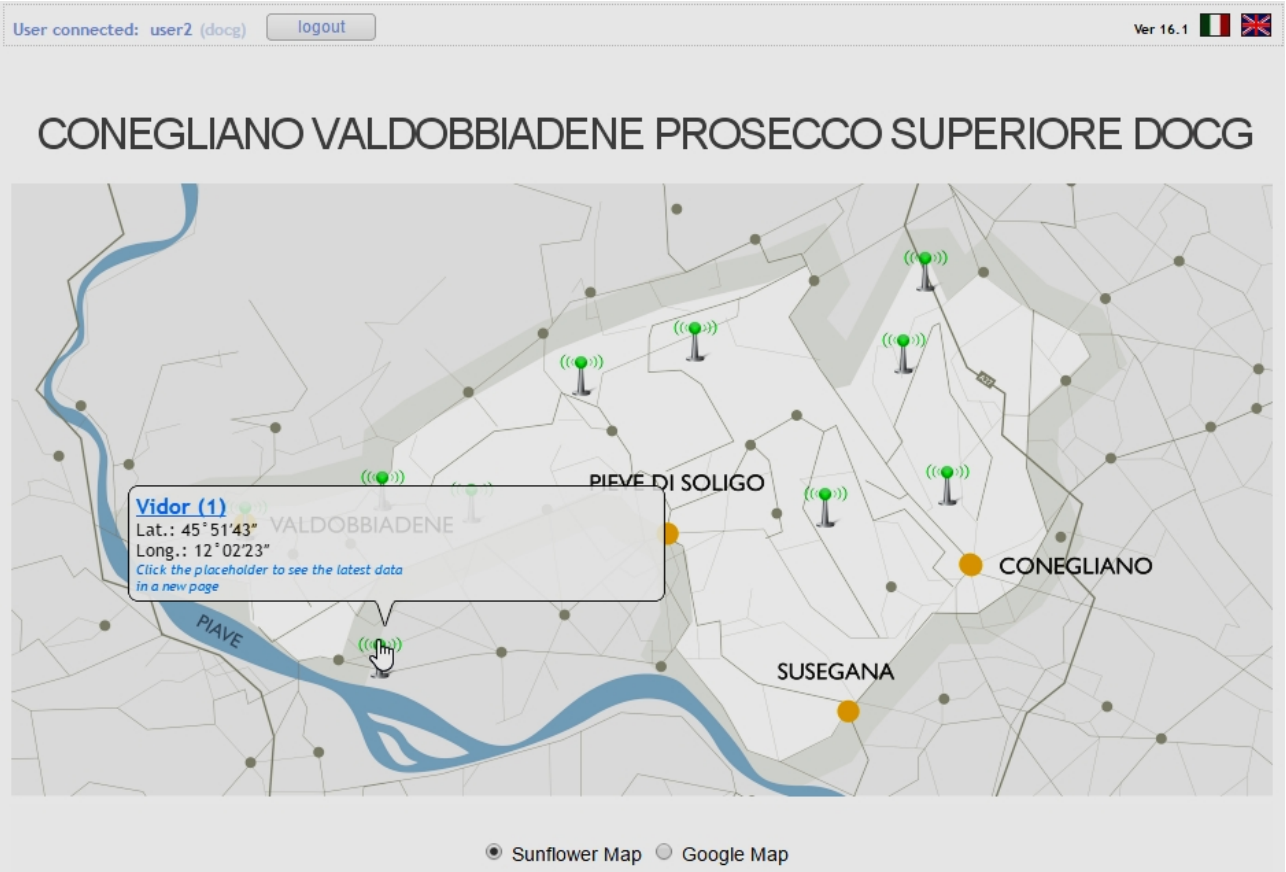


Figure 9. 2 – PNG images for a map

Moving the mouse over a flag (green icons in the above figure), is possible to see basic info about the station, as name, coordinates etc.

Clicking over you will be readdressed to the IRIS section that represent a specific dedicated and customizable page of each station, see section 12.1.2.

Note: this is the only way to access from a map to the Iris section.

9.2 GIS map

On the bottom of the page there are two selection points to commutate between PNG and GIS maps see *Figure 9. 3 – selection points for maps*. Select Google map to go on GIS representation.

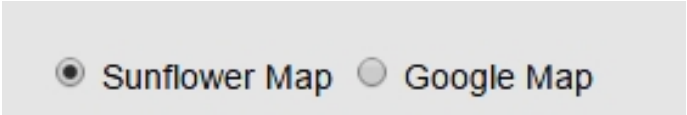


Figure 9. 3 – selection points for maps

It is a representation of the stations on GIS maps like GoogleMaps® and therefore has all the features of zoom and pan from the Google library and with the ability to change the layout from satellite to ground or road map. The stations are represented by blue icons like small antennas (*Figure 9. 1 – MAP*).

Each station has associated functions:

- Display **name and location** of the station
- Display the last **data, instantaneous or averages**
- Display **Wind Rose** orientated as the map

Move your mouse over each station, a display opens, that shows the coordinates of the site (WGS84GD format) as shown in *Figure 9. 4 – Display the maker station*.

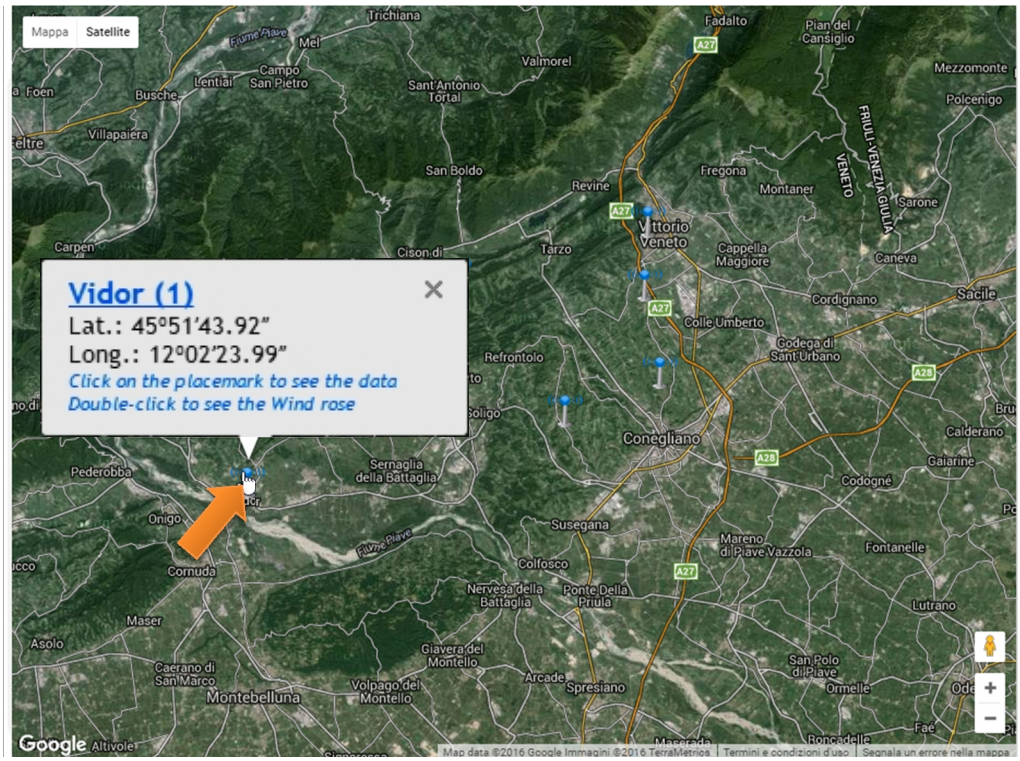


Figure 9. 4 – Display the maker station

In addition to the name and coordinates, are shown information about two other functions related to the station's icon.

By pressing the left mouse button on the icon of the station, the display is updated with the latest instantaneous data (or averages) loaded (only if the station is transmitting them) as shown in *Figure 9. 5 – Display with last instantaneous data*.

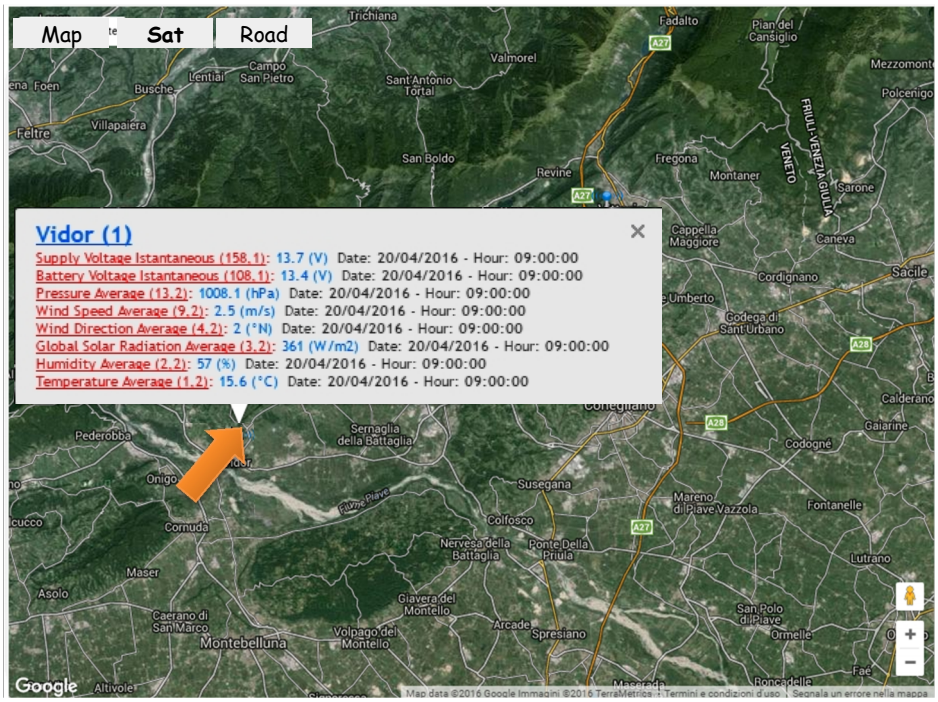


Figure 9. 5 – Display with last instantaneous data

With a double click on the station, opens instead the Wind Rose which overlaps in transparency on the station, centred on the map and oriented as it, with North at the top, as shown in *Figure 9. 6 – Wind Rose on the MAP*.

This feature is particularly interesting because it allows an immediate correlation of the wind on the territory, connected to the morphology of the same and/or to the living areas, industrial areas etc.

You can apply the representation of wind rose only to those stations that have, among their measures, the wind speed and direction combined.

To delete the representation of the Wind Rose, click on "*Hide Rosa*".

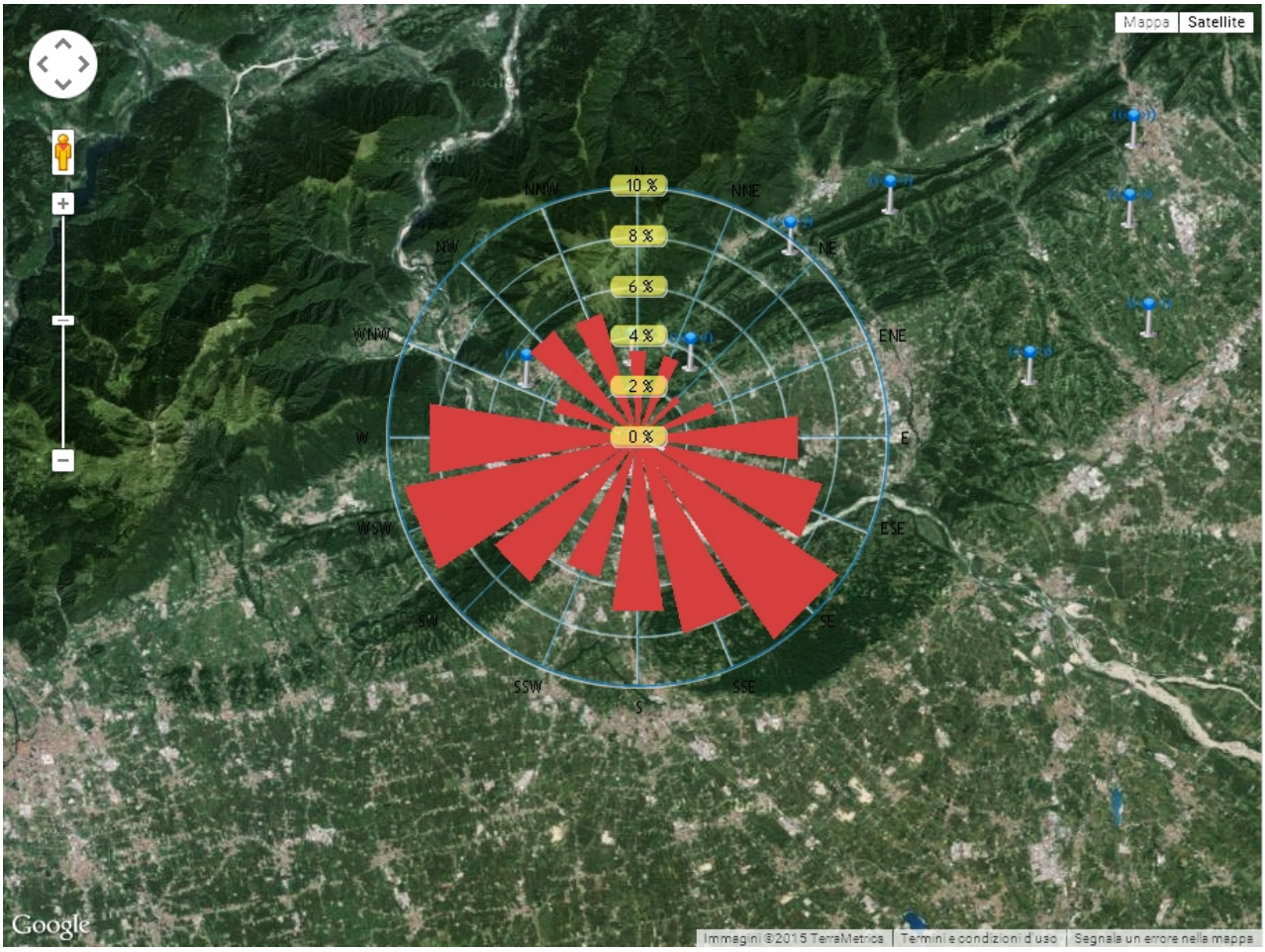


Figure 9. 6 – Wind Rose on the MAP

On the top of the page, there are other features such as automatic zoom on a particular selected station from the list "*Center map on*" and the cyclic display of a specific measure for all the stations that have that measure.

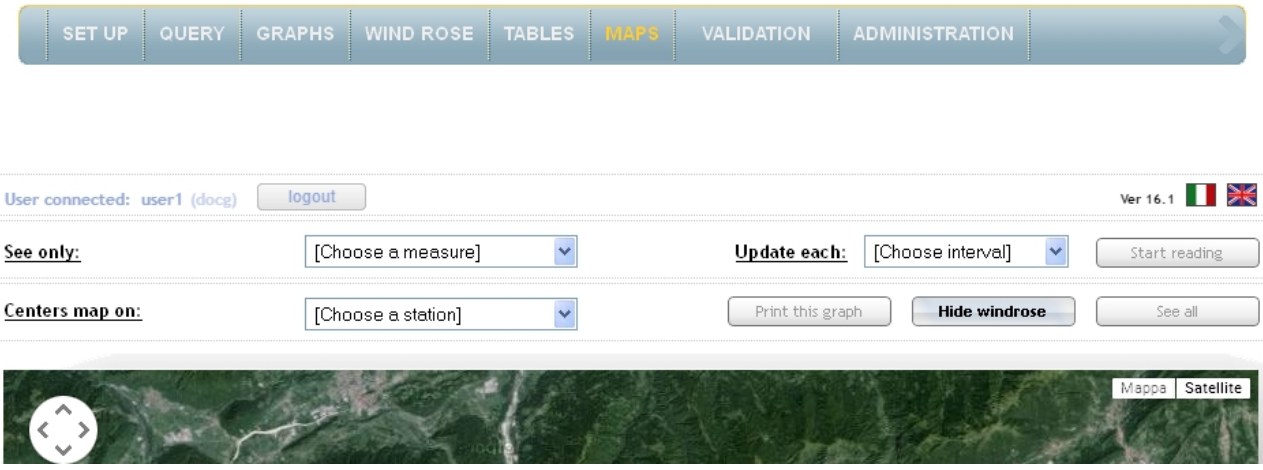


Figure 9. 7 – Options for MAP

In *Figure 9. 7 – Options for MAP*, choosing on the left side from one of the available measures in "***See only:***" and on the right a "***Update each:***" for refreshing, is possible to start an automatic cycle (by pressing *Start Reading*) that, alternating among all stations that have that measure, shows automatically the values on video, or the wind rose, station by station.

In other words, "*See only:*" contains the list of all instantaneous measurements (or averages or rain) available for all stations in the database, while, by running on the read cycle at pre-set intervals, the display of station's icons changes, showing only those where the value of the measure is present, as you can see in *Figure 9. 8 – Cyclic view of the instantaneous values for the chosen measure*.

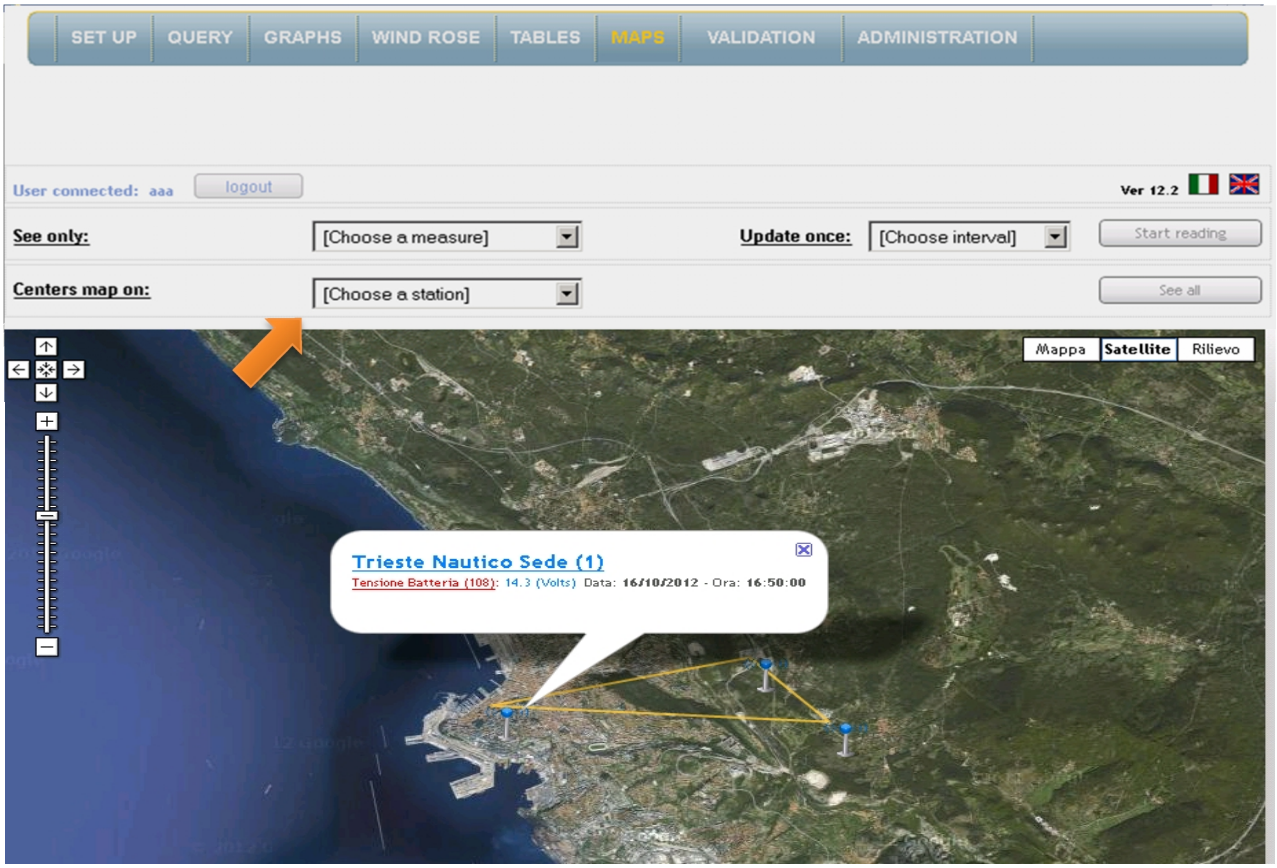


Figure 9. 8 – Cyclic view of the instantaneous values for the chosen measures

A similar feature is useful when you intend to periodically check the value of a measure of different sites, for example the level of rivers, rain etc..

On the bottom of the page is, as in all the other, the link "***Info***" , who provides a simple, on-line help.

10 Section VALIDATION

Data validation is a complex process and requires specific expertise in data processing. All data stored in the database are "original data" in the sense that they come directly from the stations in telemetry and have not been treated in any way.

SunFlower keeps the data intact, and does not change in any way the original database: every action of editing/validation will be made on a copy of the Database (only if the VALIDATION option is present in the software).

If VALIDATION is active, there will be two copies of database:

- **The original data not validated**
- **Validated Data**

The extraction of data from databases may, in any case, still be made either from the first or from the second database, in other words, from original data or from those validated as explained in section 5.2.3

In general, validation is an irreversible process and, although protected by steps that restrict the operations, it is recommended to be performed by a user with sufficient competences in the specific field of data evaluation.

The validation process is always a manual process, in some cases guided by procedures that can be automated, but the final choice is always left to the user.

With reference to *Figure 10. 1 – Access to VALIDATION section*, to access here, is necessary to put the mouse over the relevant item in the menu ("VALIDATION") and make a choice:

Figure 10. 1 – Access to VALIDATION section

The validation involves two different procedures: **manual validation** and validation through the definition of **automatic validation rules**, called semi-automatic validation.

10.1 Manual Validation

If you select "***Manual Validation***", a page opens, initially empty, from which you can retrieve the data from the original database with a Query already specified and saved. The Query is selected from the menu on the right bottom (

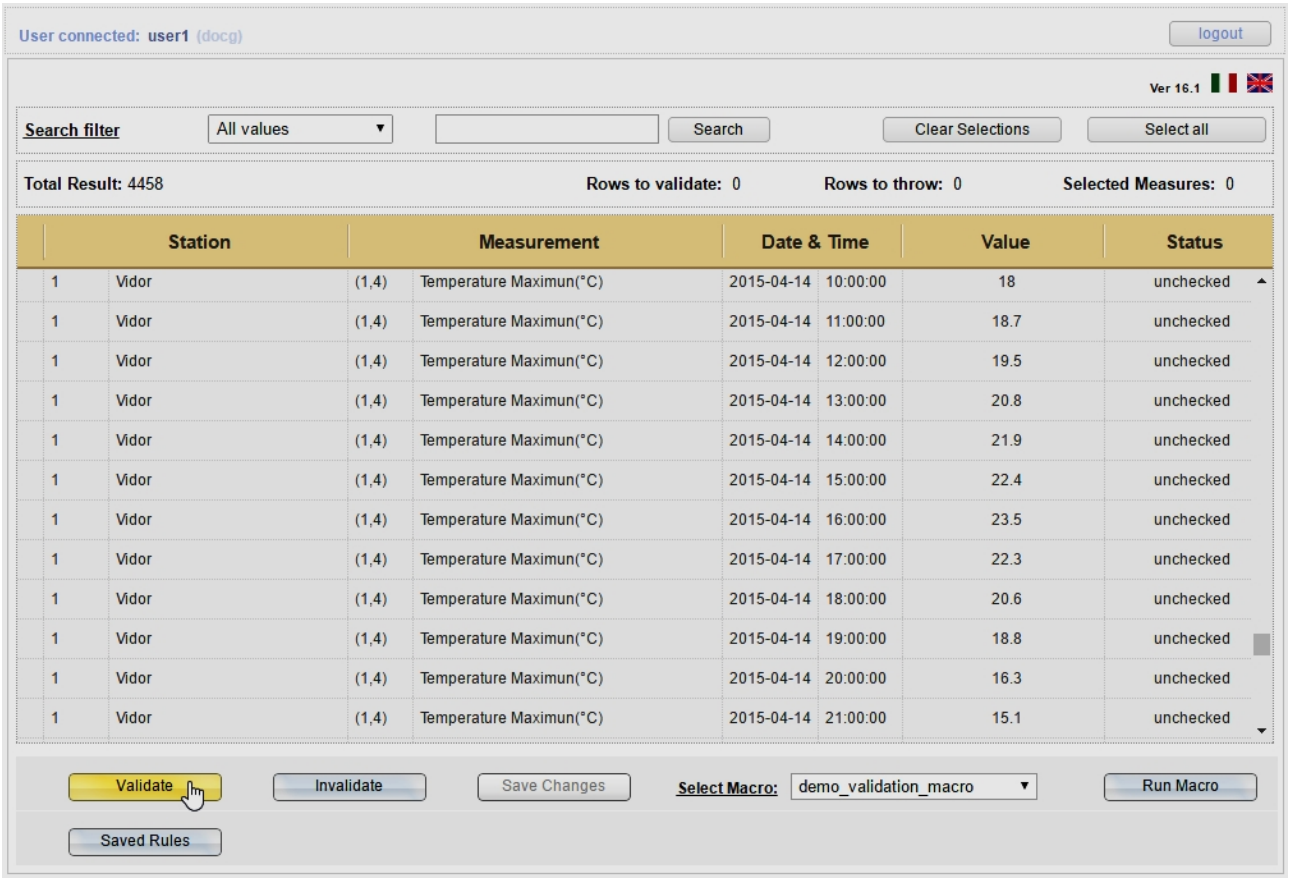
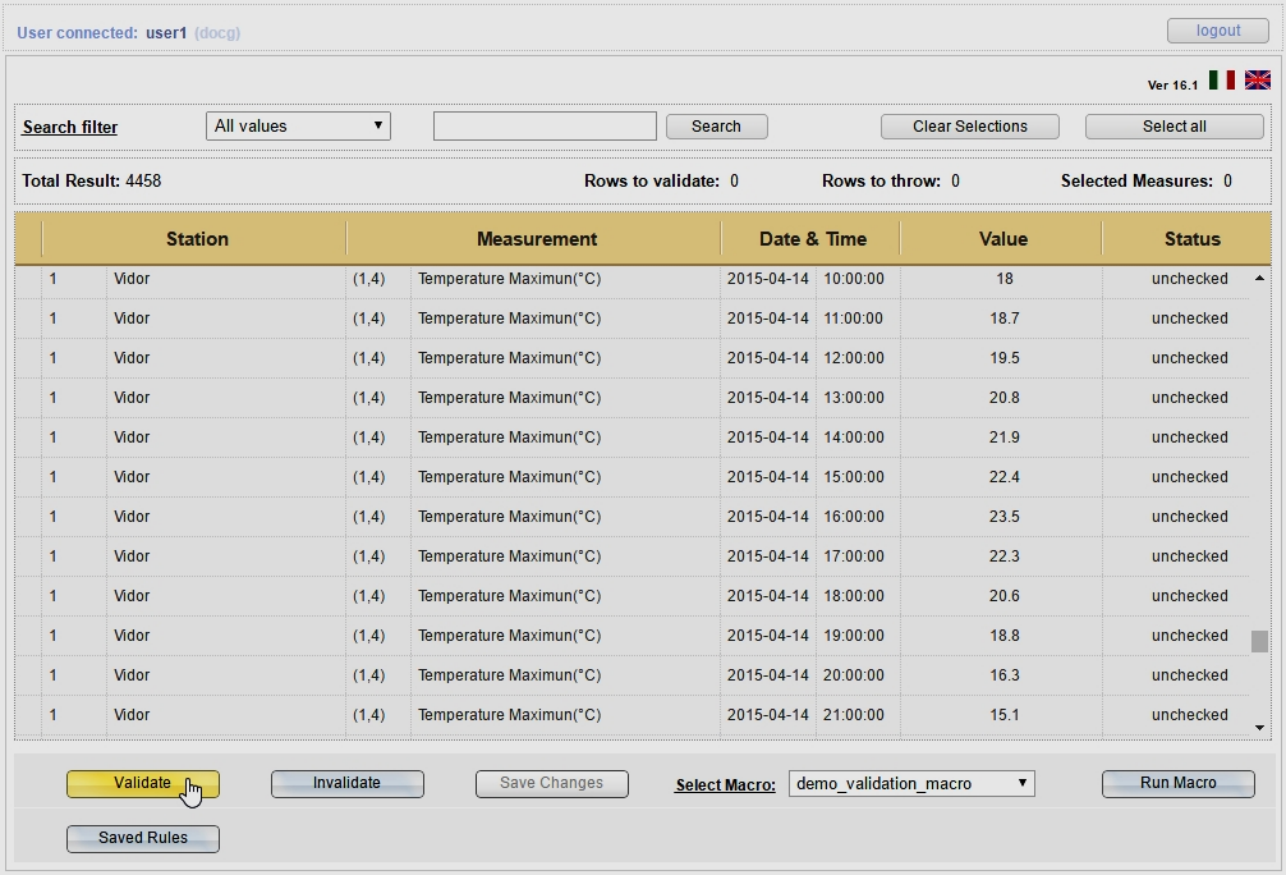


Figure 10. 2 – Manual validation- choice of macro to run).



After you run it ("***Run Macro***" button on the right bottom), the table will be filled with all the extracted data for that query, from the original database, showing on the right the corresponding validation status for each row.

Note: We recommend you to always work for small amounts of data, the validation operation is not so simple and with large amounts of data can overload the system.

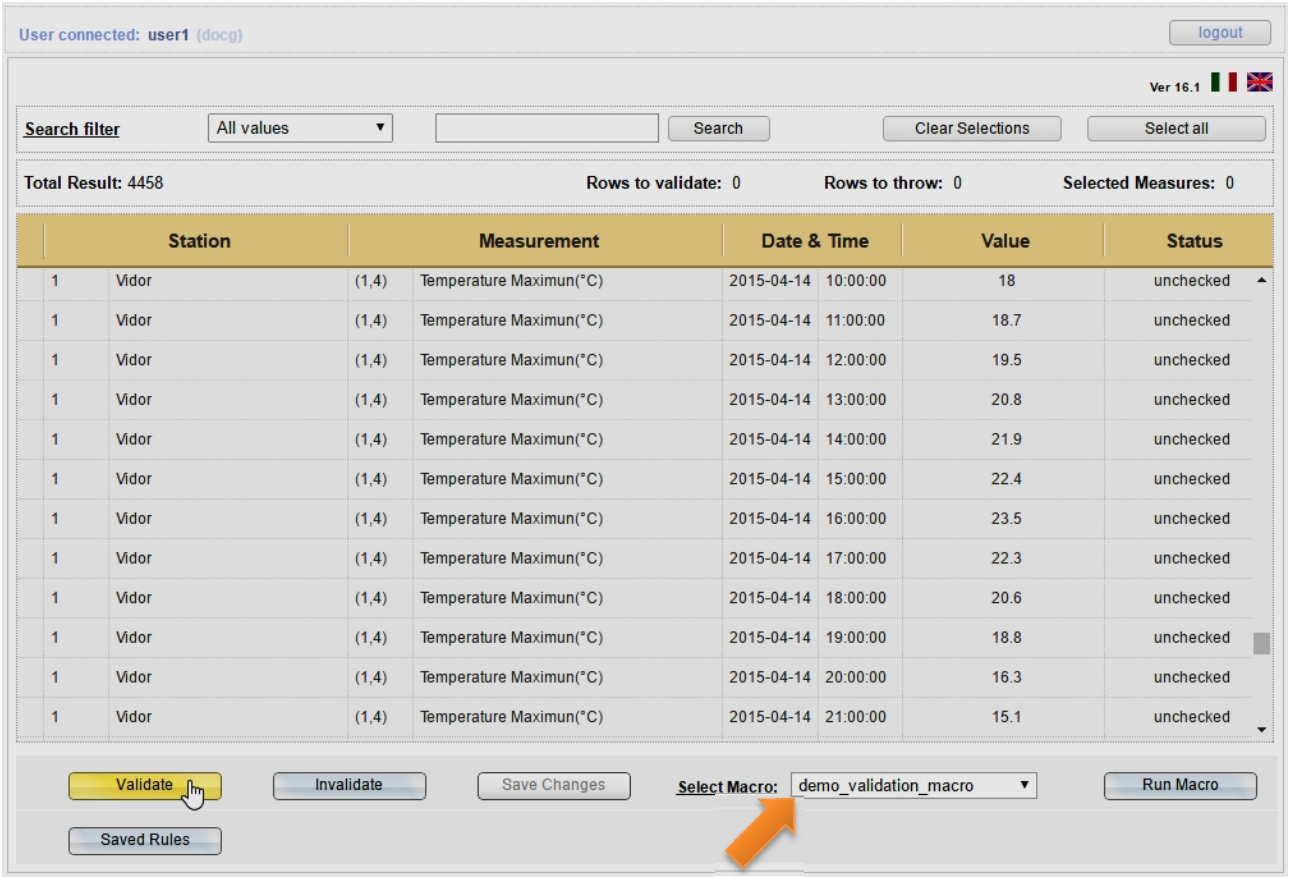


Figure 10. 2 – Manual validation- choice of macro to run

You can have three states:

unchecked **invalidated** **validated**

for data that have already undergone a previous validation or invalidation (state is red or green), there are no longer possible changes, but is possible for the others.

If necessary, you can apply some sort of filter to the table by choosing from the dropdown menu in the upper left corner "***Search filter:***" **All values; Terminal ID; Terminal Name; ID Measure; Name; Size; Date; Time; Value**, entering the name or the value in the field "*Search*" on the right (*Figure 10. 3 – Selecting data to be validated* - top left).

Select for first the button with the operation you want, ('*Validate'* or '*Invalidate'*), then, with the mouse, select one or more rows to validate: the selected rows change colour to blue (*Figure 10. 3 – Selecting data to be validated*).

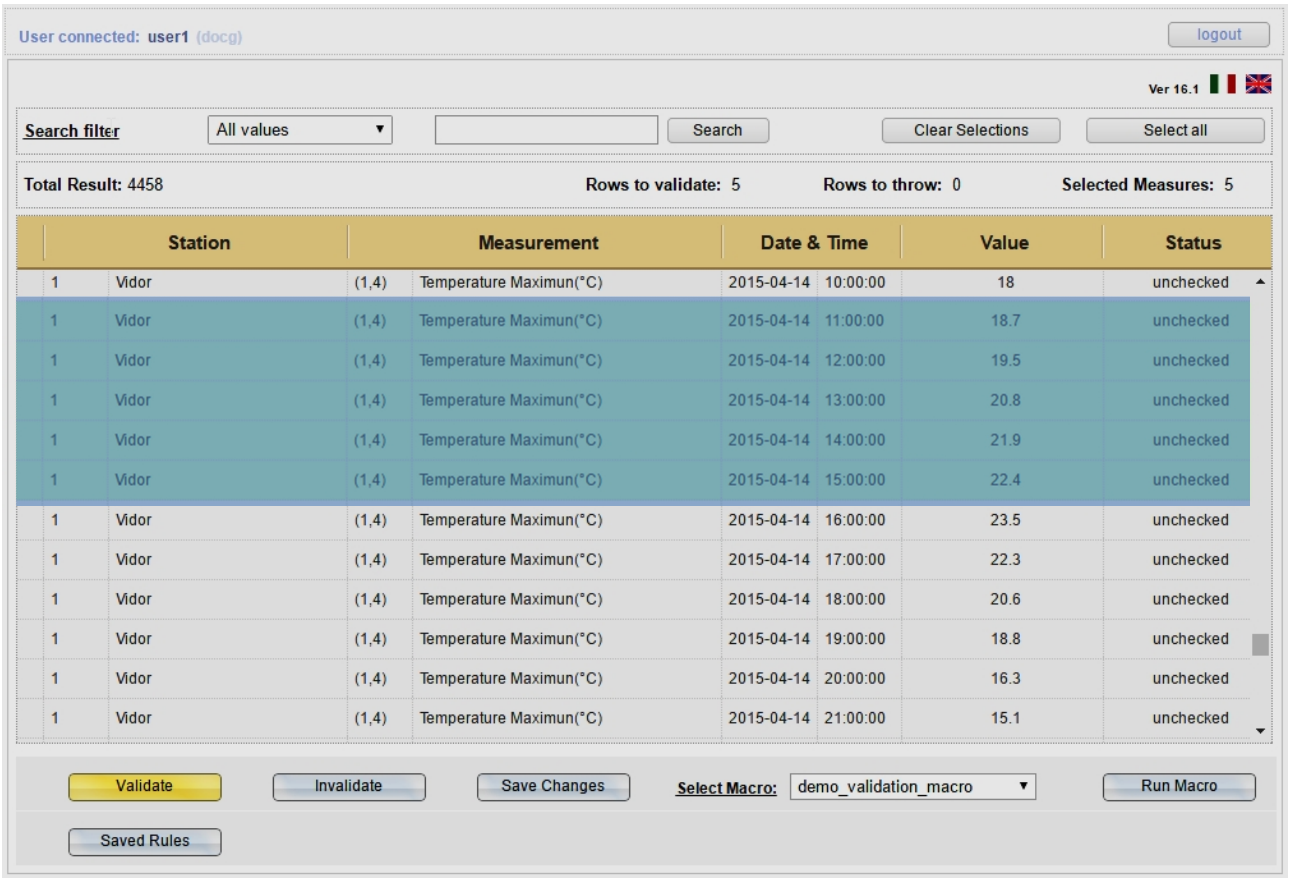


Figure 10. 3 – Selecting data to be validated

For the validation or invalidation, simply press the corresponding buttons on the bottom left, while the change of a value is done by clicking on the value itself, changing it and then pressing ***Enter*** (*Figure 10. 4 – Changing values*). The save of new value into database takes place only after pressing "***Validate***". With a double click on the value you can use the "***Copy and Paste***" to repeat the same for other rows.

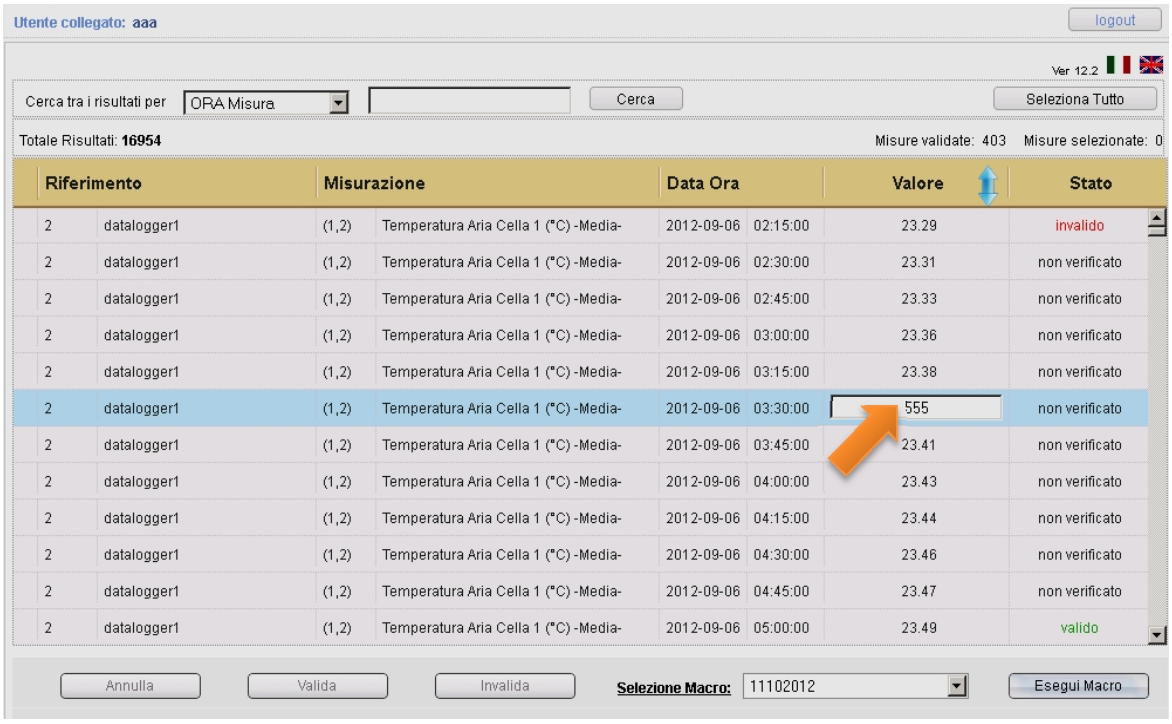


Figure 10. 4 – Changing values

The completion of the validation process passes through a double-level control (double confirmation) to avoid erroneous validations (*Figure 10. 5 – Confirm validation process*).

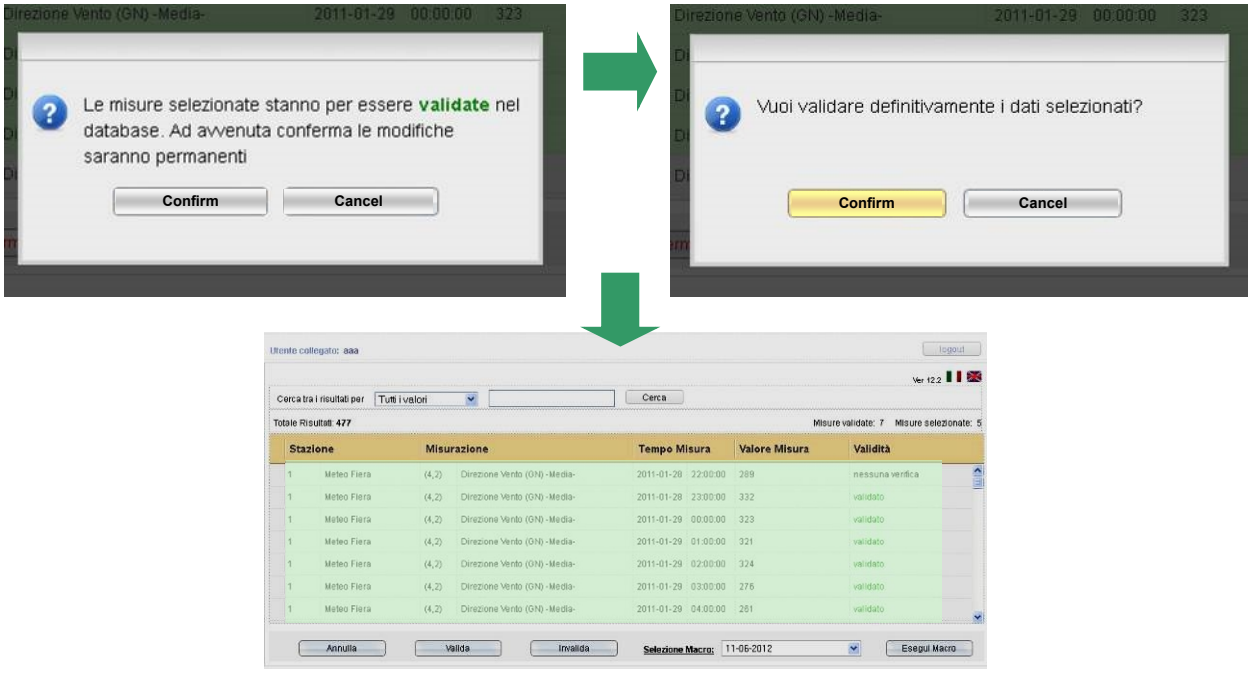


Figure 10. 5 – Confirm validation process

A similar procedure is required for data invalidation.

10.2 Advanced Validation – automatic rules

In the bottom left of the page, there is the "***Saved rules***" button that, when pressed, allows you to select between one of the applicable rules established in accordance with the procedure described in section 10.3.

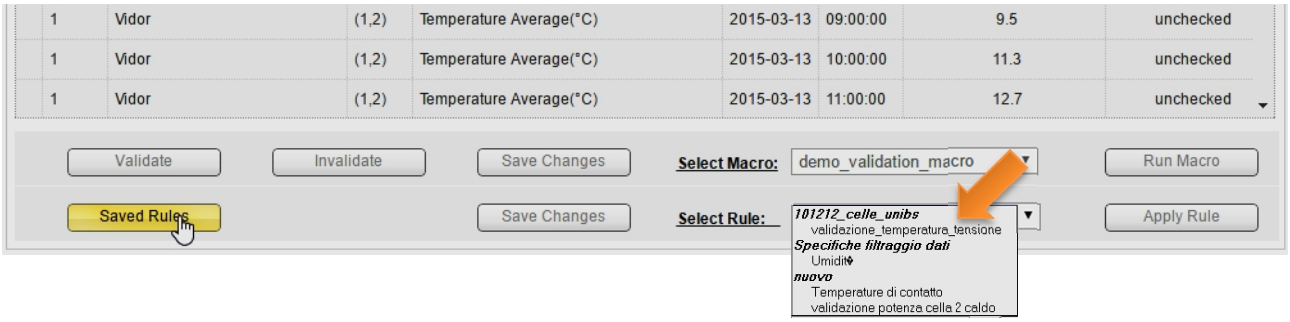


Figure 10. 6 – Application validation rule

Saved rules are divided into groups for an easy selection. Once you have selected the rule (*Figure 10. 7 – Choose a validation rule*) is enough applying it pressing "***Apply rule***" and "***Show Rows***", to get the results of the validation, and if they are accepted, by pressing the "***Save changes*** ", they will become real and permanent in the database of validated data.

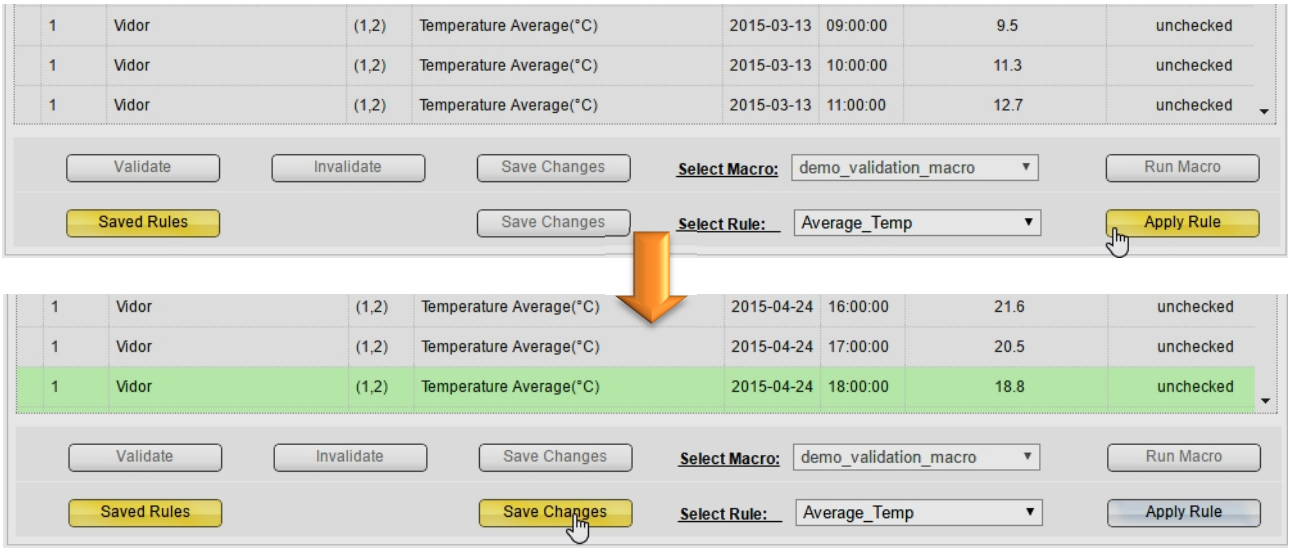


Figure 10. 7 – Choose a validation rule

10.3 How to define Validation Rules

Selecting from the main menu (*Figure 10. 1 – Access to VALIDATION section*) the "***Validation Rules***", you access the Definition of the Rules area. In order to clearly explain how to compose a rule, we do **an example,** a complex one. Suppose we want to validate two measures, **the temperature (the maximum value)** and **the solar radiation (the maximum value)**.

The rule to be applied is the following:

The condition for the **validation of the temperature** is such that we consider **valid the maximum value of the temperature only in this case**:

the square of the maximum value of the temperature is > 100°C and, simultaneously, the maximum of the solar radiation is > 200W/m^2.

If this condition is true, we want that the **value stored in the validated database, is not the max but its cosine (cosine of the maximum temperature)**. This is obviously an example devoid of significance.

For **solar radiation**, we apply the same rule, but **invalidate the maximum value** if the rule (the same rule as for temperature) is checked.

It is therefore a complex rule.

The process of defining a rule, is guided step by step. There are 3 **steps** distributed as follows:

1. **Definition** of **input** parameters involved in the validation process and math functions that may be associated to them.
2. **Definition** of the **logic functions** associated with the validation process with the input parameters.
3. **Identification** of the measures to be validated by the rule and eventual post-processing.

In the **first step** you need to choose what are the parameters involved in the rule or what are the "measures" or conditions that will determine the validation (*Figure 10. 9 – Validation's rule - Threshold*). Measures can be added individually or in groups. After the selection, pressing the "***Add measures***" they will appear in the window below, where, besides the name, there are other fields that you can fill in the next step.

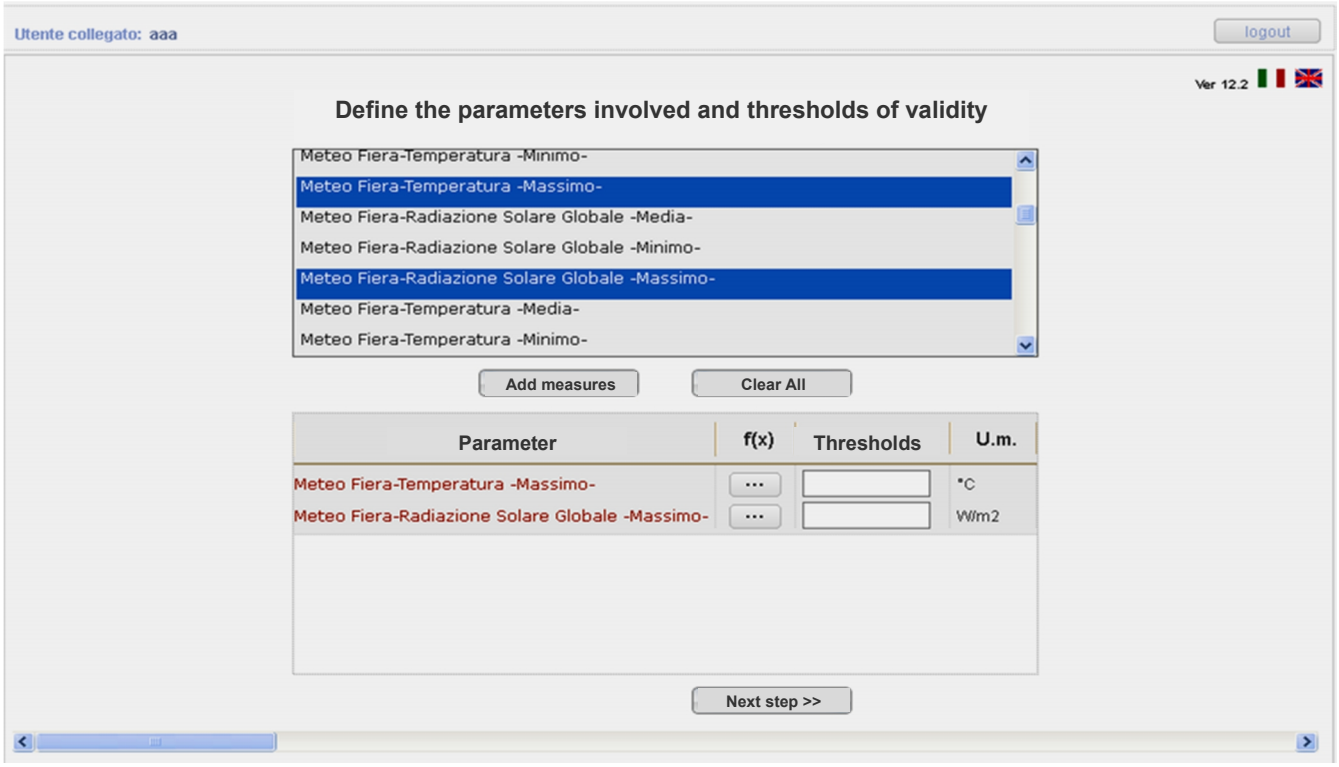


Figure 10. 8 – Step 1 – Rule for validation

How the rule we've defined asks, we have selected the two measures (temperature - maximum and solar radiation - maximum) as input parameters.

We must now define the thresholds for validation: 100°C for temperature and 200W/m^2, so in the "Threshold" we will put the appropriate value for each parameter (*Figure 10. 9 – Validation's rule - Threshold*).

Under the column f(x) there is a button that invokes a sort of calculator for the definition of any mathematical function associated to the parameters.

In our example, the rule calls for "*the square of the maximum temperature is> 100°C*", so if we call "x" the maximum temperature, our function to be set will be:

$$f(x) = X^2$$

Once you press the button [...] simply using the keys on the calculator, you define the desired function, as shown in *Figure 10. 10 – Validation's rule – Mathematical functions*.

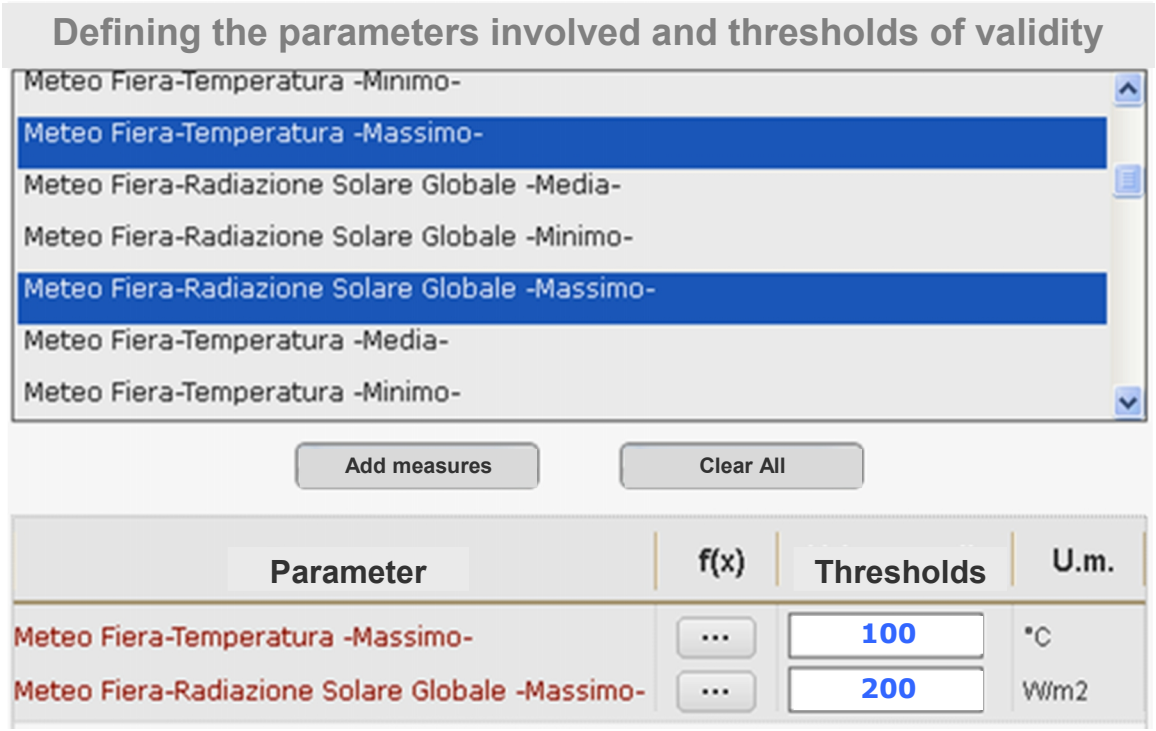


Figure 10. 9 – Validation's rule - Threshold

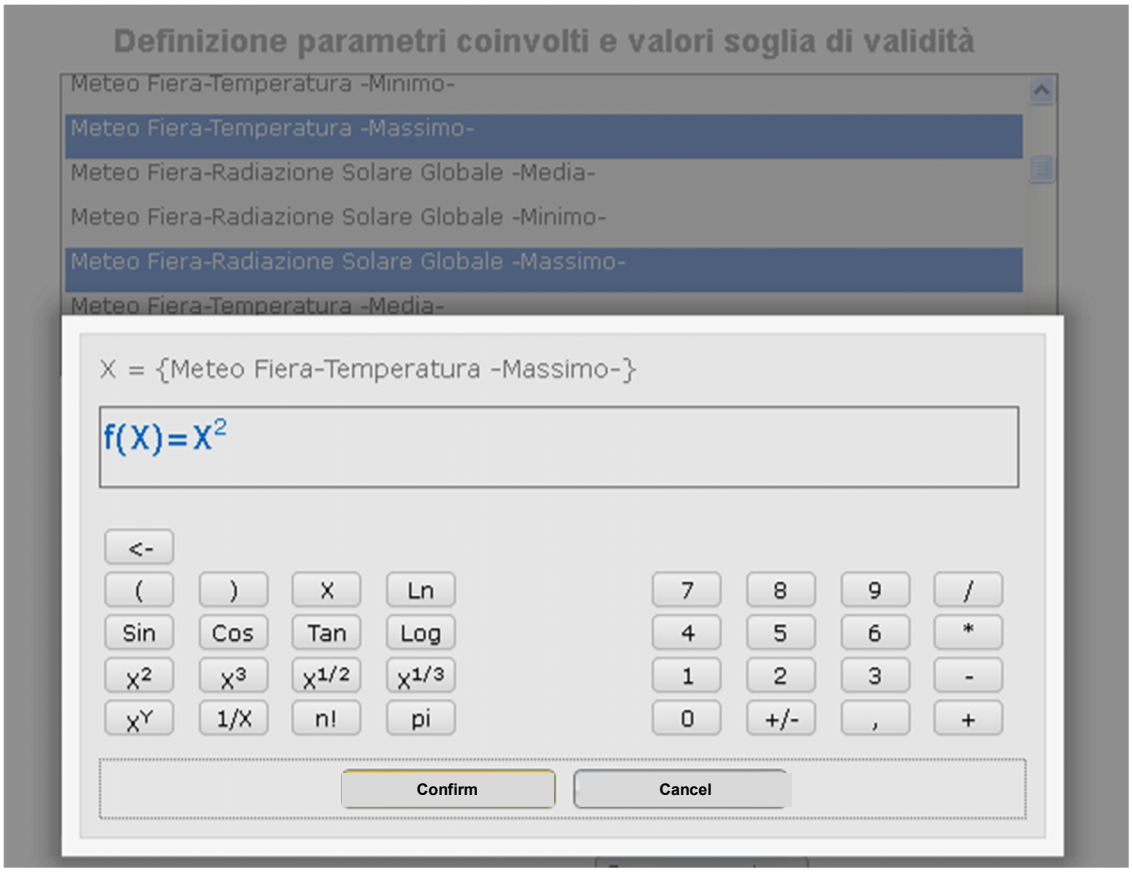


Figure 10. 10 – Validation's rule – Mathematical functions

In the **second step** (press "***next step >>***") are defined the logic functions that correlate the previous functions one with each other.

In our rule, "the square of the maximum value of the temperature is >100°C and, **simultaneously**, the maximum of the solar radiation is >200W/m^2", the word **simultaneously** must be interpreted as a logical **AND**, in other words, as the simultaneous occurrence of both conditions of entry (*Figure 10. 11 – Validation's rule – Logical functions*).

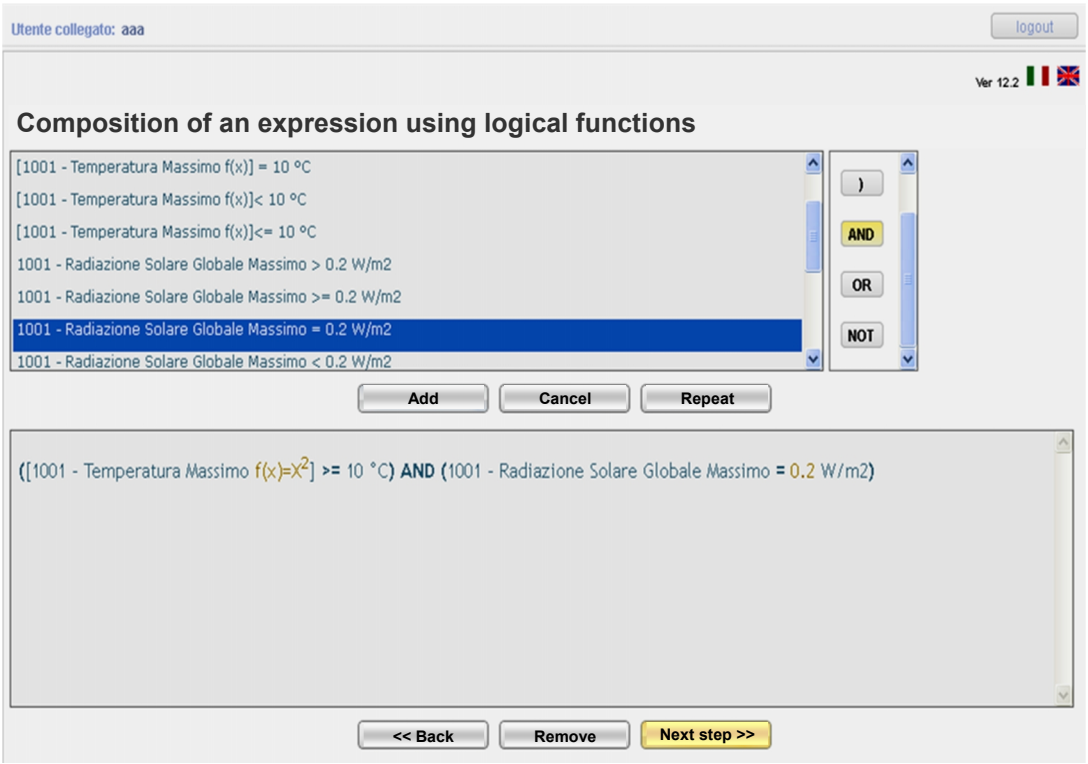


Figure 10. 11 – Validation's rule – Logical functions

The operation to create the function is quite simple, just selecting one item at a time between the possible expressions based on thresholds set (>, <, =, <=,> =, etc..) and then applying logic function required (column right).

When finished, you can go to the next step.

In the **third step** (press the "***next step >>***") remains only to choose at which measures of the database apply the rule created. Returning to the example, we determined that the maximum temperature is maintained if the rule is satisfied (valid), and, in the same condition, the maximum value of solar radiation is invalidated (invalid), *Figure 10. 12 – Validation's rule – parameters to validate*.

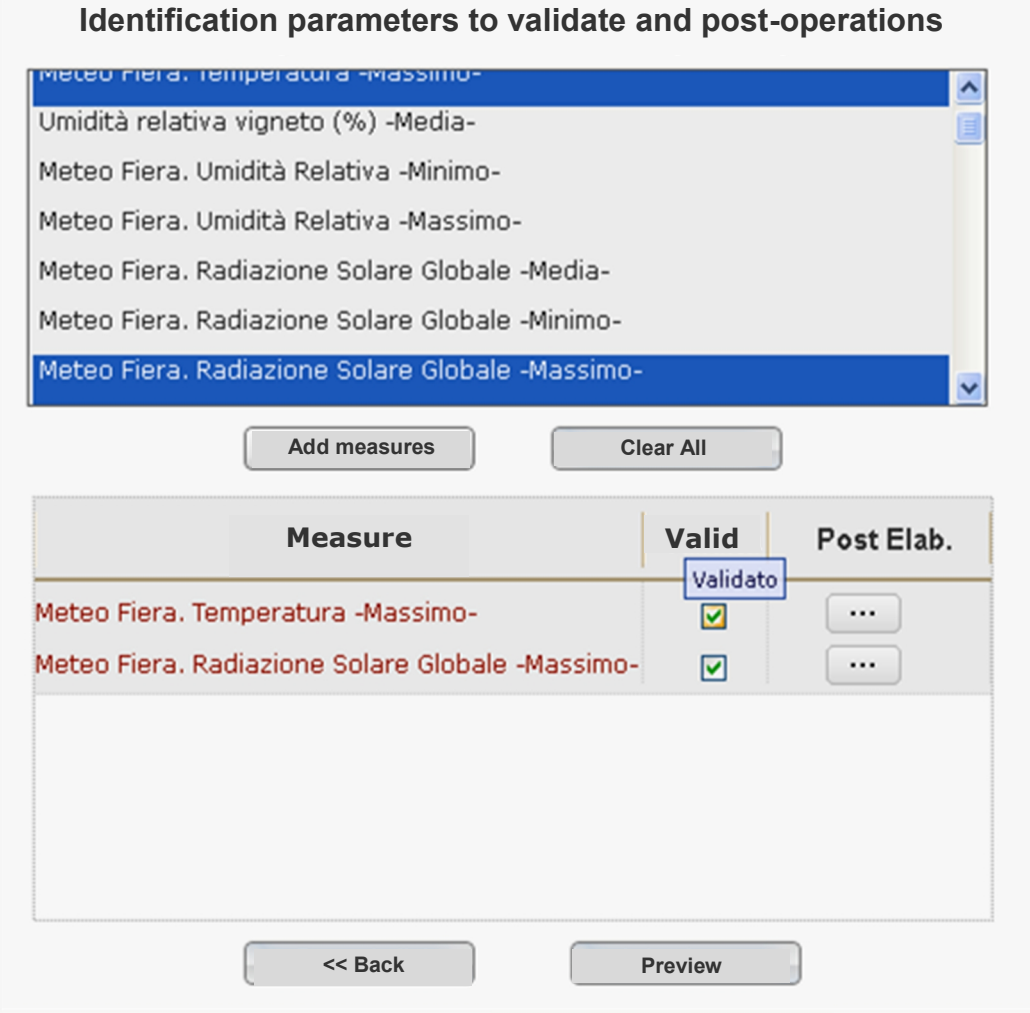


Figure 10. 12 – Validation's rule – parameters to validate

In the section above, choose the measures subject to the rule. In our example, the maximum of temperature and solar radiation - maximum. Pressing the "***Add***" button, the parameters are outlined in the section below and, by default, are selected with validation checked, in other words to all the default parameter, rules are applied for validation. To comply with the rule of the example, we will remove the check from solar radiation, as invalidation of the measure.

Under the column *Post Elab*. by pressing the button ... you access, in the same way as explained in the first step, to a calculator where you define any mathematical function that represent the post-processing of the measurement as a result of validation rule. In our example we will select the function (*Figure 10. 13 – Validation's rule – post processing functions*):

f(x) = cos(x)

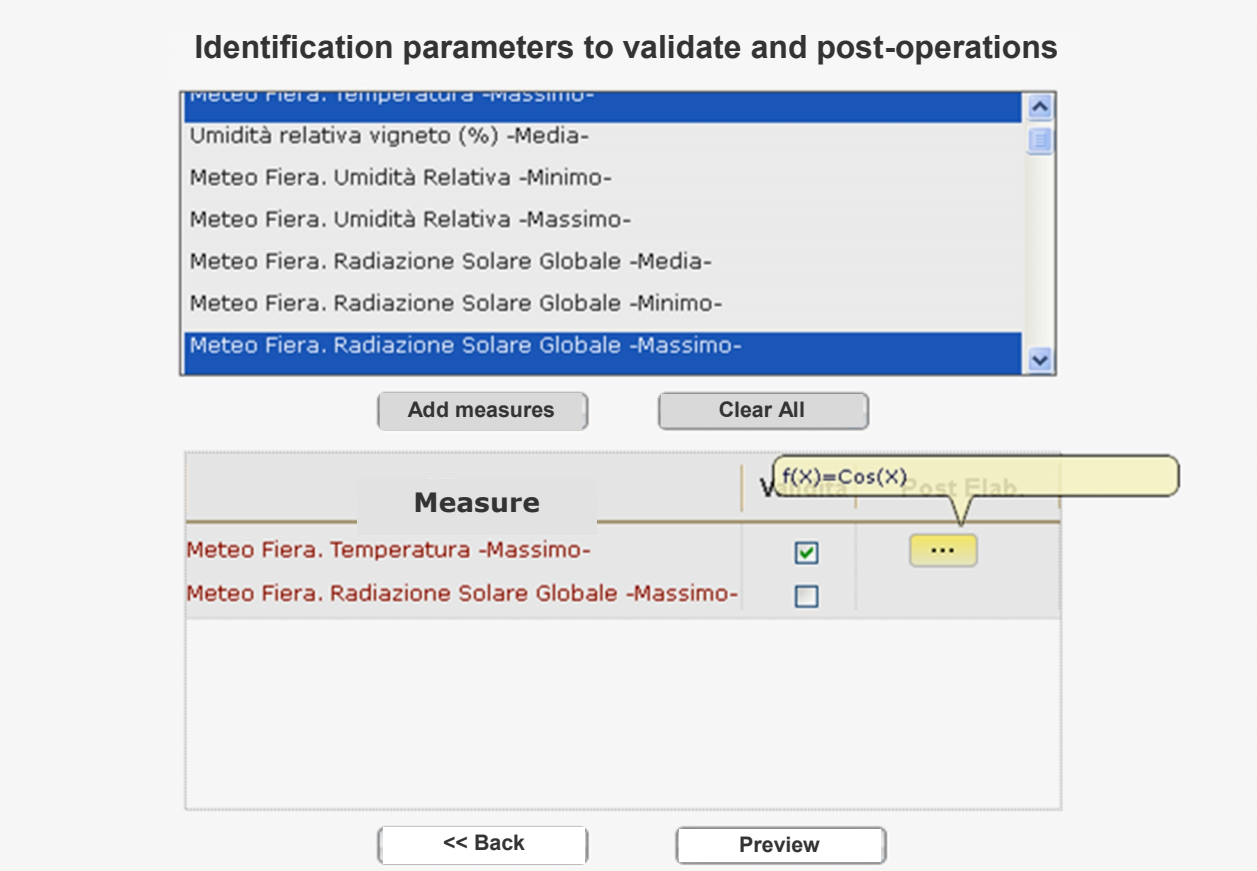


Figure 10. 13 – Validation's rule – post processing functions

After this last step, you can have a preview of the rule just created by pressing the "***Preview >>***" (*Figure 10. 14 – Validation's rule - Preview*)

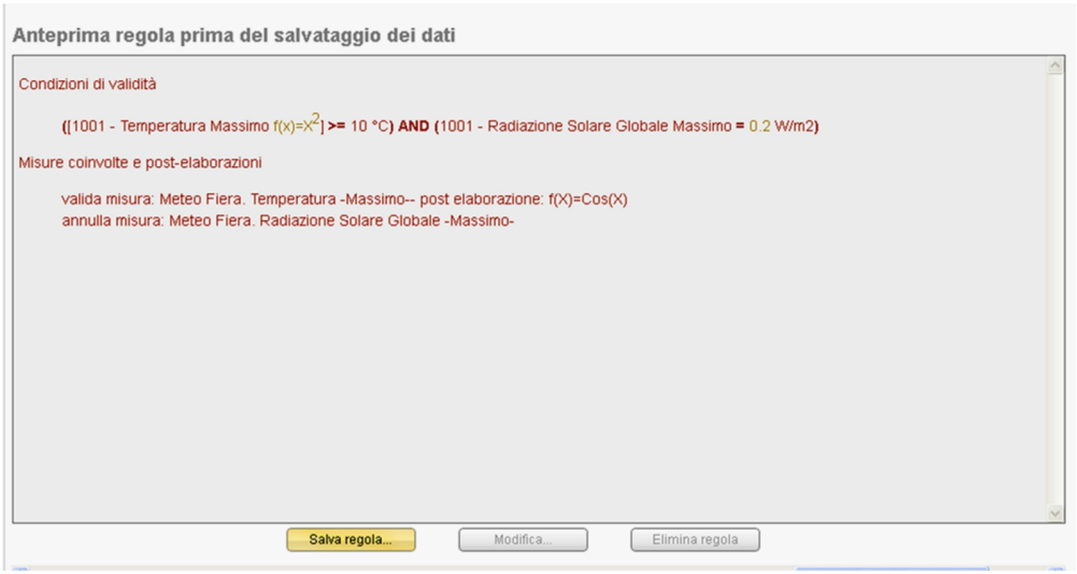


Figure 10. 14 – Validation's rule - Preview

The preview gives you a summary of the newly created function and permits to evaluate its correspondence with expectations.

The creation of the validation rule has finished, you can now decide whether to keep it or change (*Figure 10. 15 – Save the Validation rule*).

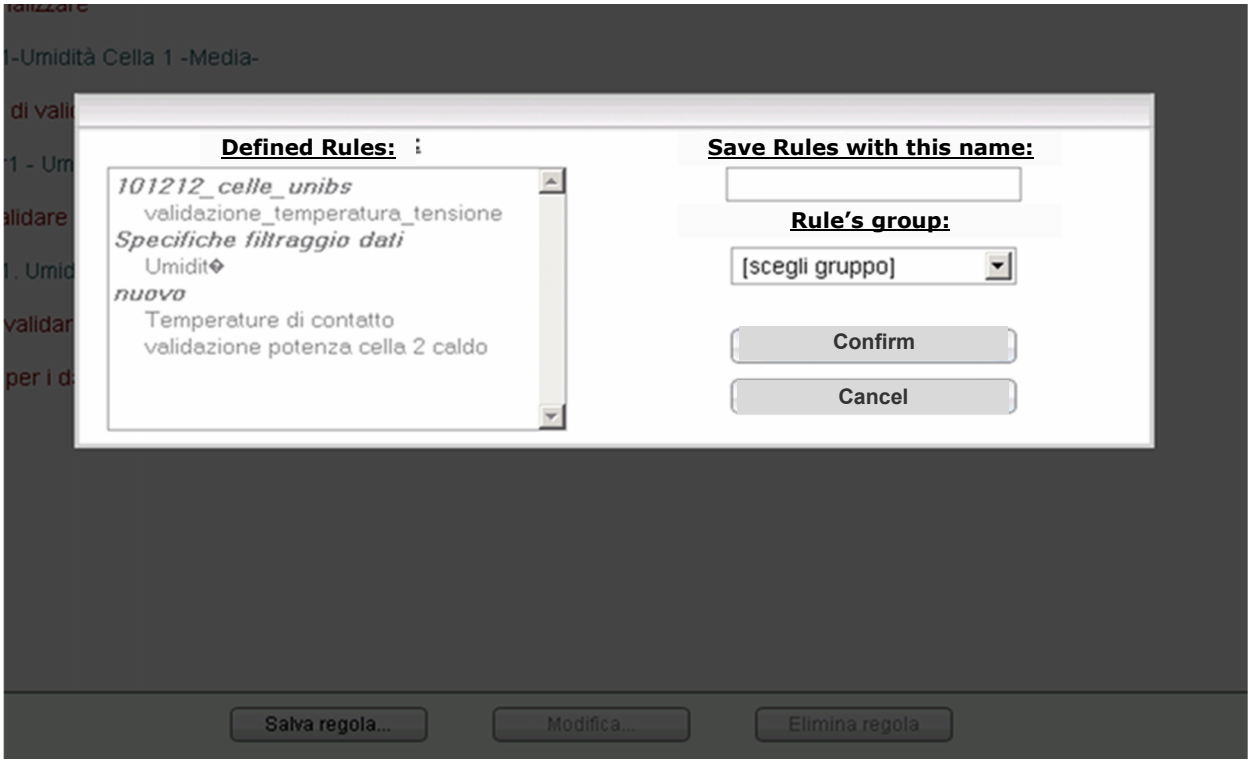


Figure 10. 15 – Save the Validation rule

In addition to the name of the rule, you can associate or create a group to which it belongs in order to facilitate the memorization for the user.

The rule thus created is now available for advanced or semi-automatic validation as described in section 10.2.

11 Backup Database

SunFlower has a powerful feature that can make a **security backup** of the database or part of it. The operation must be done manually following the link "DATA AREA", thus in the main menu a special area for managing database appears, see *Figure 11. 1 – Database managing*:

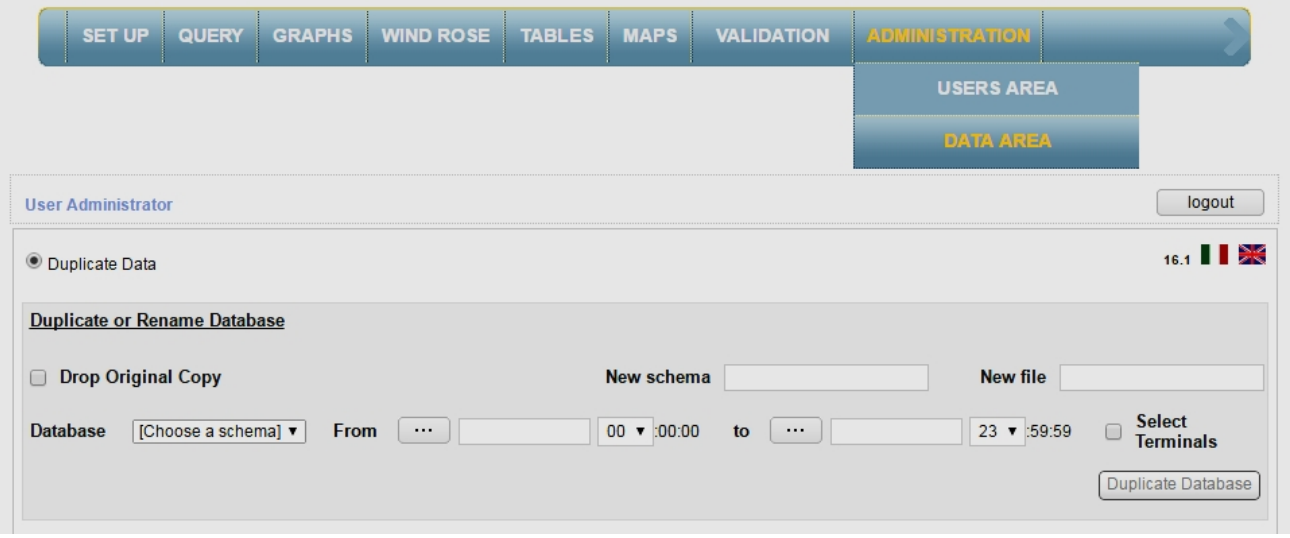


Figure 11. 1 – Database managing

Several options are available:

11.1 Backup of an existing Database

To duplicate an existing database or back it up, it's enough to select for first the database you want to back it up, then select "***Duplicate data***" and type the new name in *New Schema* field, pressing after the button "***Duplicate Database***", see *Figure 11. 2 – Backup Copy of the existing database*. Do not select the "***Drop Original copy***" that is necessary instead for next option – *Rename database*

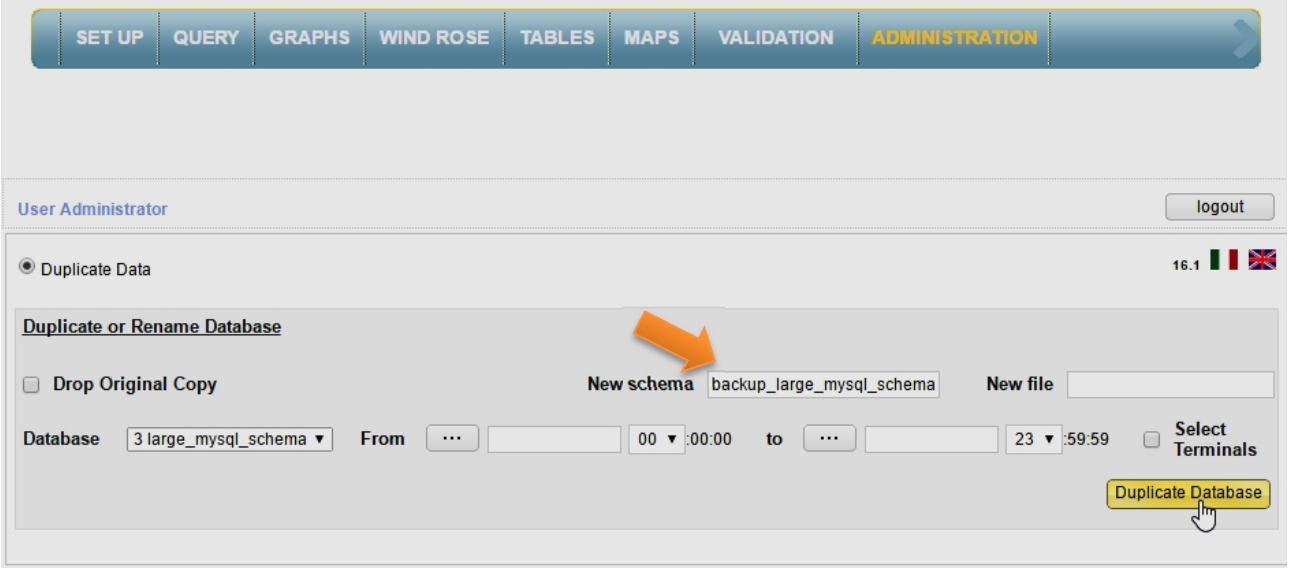


Figure 11. 2 – Backup Copy of the existing database

11.2 Rename an existing Database

First select the database to rename.

Choosing "***Duplicate data***" and also "***Drop Original Copy***", typing the new name of the database in *New Schema* field, you can rename the existing database pressing the relative button "***Duplicate Database***". A specific message will appear informing you on the process and asking you to confirm it, see *Figure 11. 3 – Rename a database*

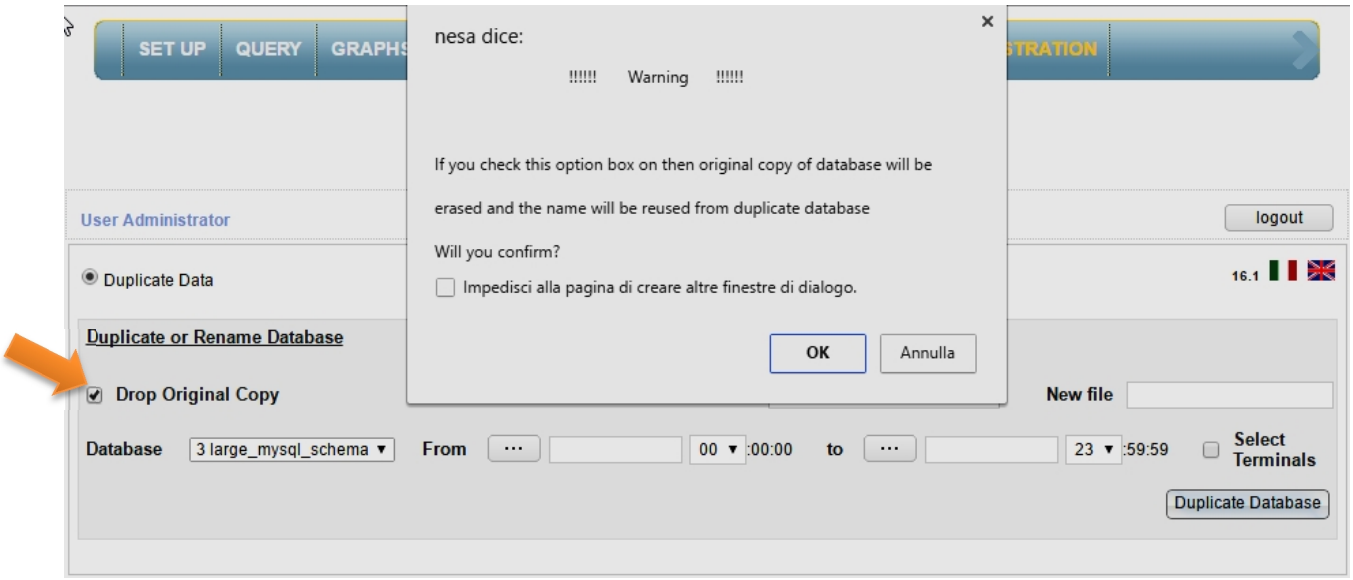


Figure 11. 3 – Rename a database

11.3 Backup part of an existing database

First select the database.

Choose "***Drop Original Copy***", typing the new name of the extracted part of database in *New File* field, choose the time interval (date and hour) and press the button "***Duplicate Database***", see *Figure 11. 4 – Copy part of database*

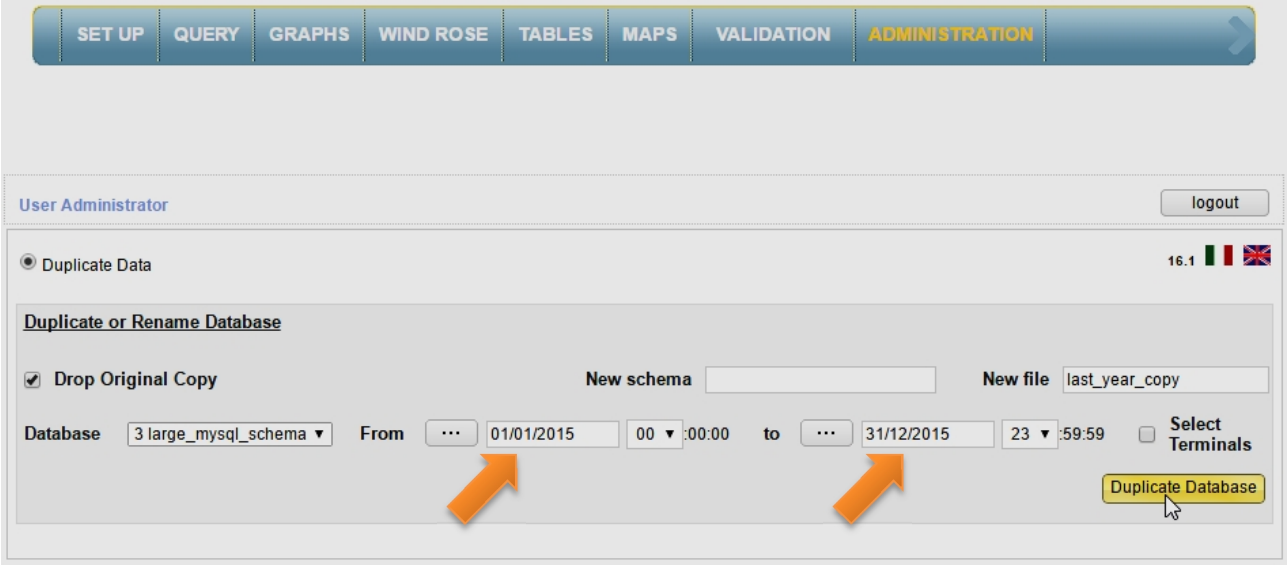


Figure 11. 4 – Copy part of database

11.4 Backup part of an existing database selecting only some stations

First select the database.

Choose "***Drop Original Copy***", type the new name of the extracted part of database in *New File* field, choose the time interval (date and hour).

Then, selecting "***Select Terminal***", a new dialog box appears below, with the stations' name configured into the existing database. You have to choose the name of the stations from the left part and add them to right part pressing "***Add selected"*** button. These are the stations for which you want to create a backup. Press "***Confirm***" and then the button "***Duplicate Database***", see *Figure 11. 5 – Backup of specific stations' data*, to create your personal copy of the data.

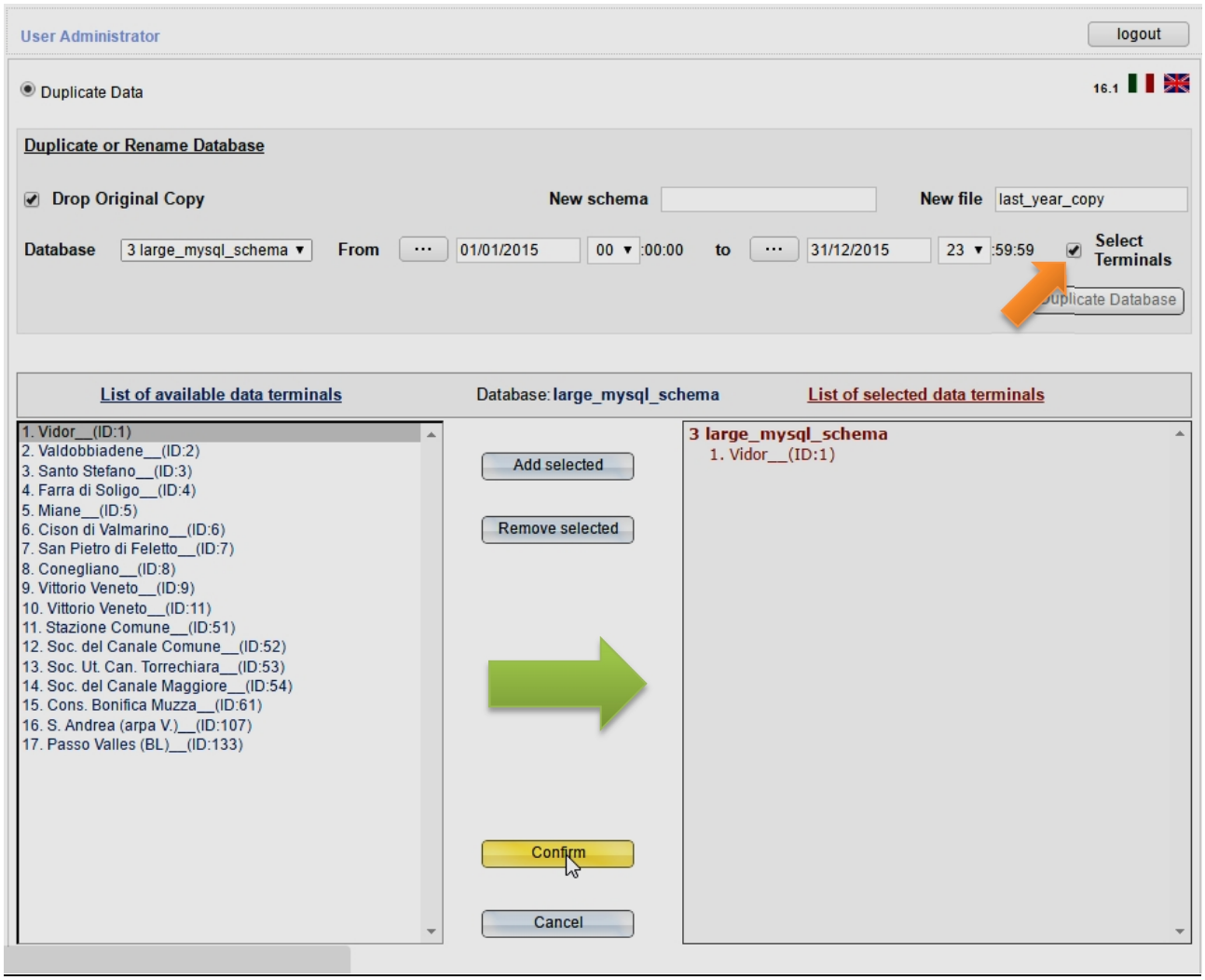


Figure 11. 5 – Backup of specific stations' data

Backup is allowed only for Administrator user

12 IRIS Functionality

From version 14.5 of SunFlower, an important plug-in has been added. It's a software packet called **Iris**. Iris is a customizable double language software.

The main feature of this plug-in is the possibility to prepare **specific web pages dedicated to one or more stations** (one by one) **or user,** in which are shown data in graphic and numerical format, customized for each user. In these web pages, is also possible to see statistic data and download the Excel table of collected and stored data up to a month.

It's an important feature that permits to create easily and quickly a specific "web site" dedicated to users/customers, using their logos, text etc.

An example of this web site is shown below.

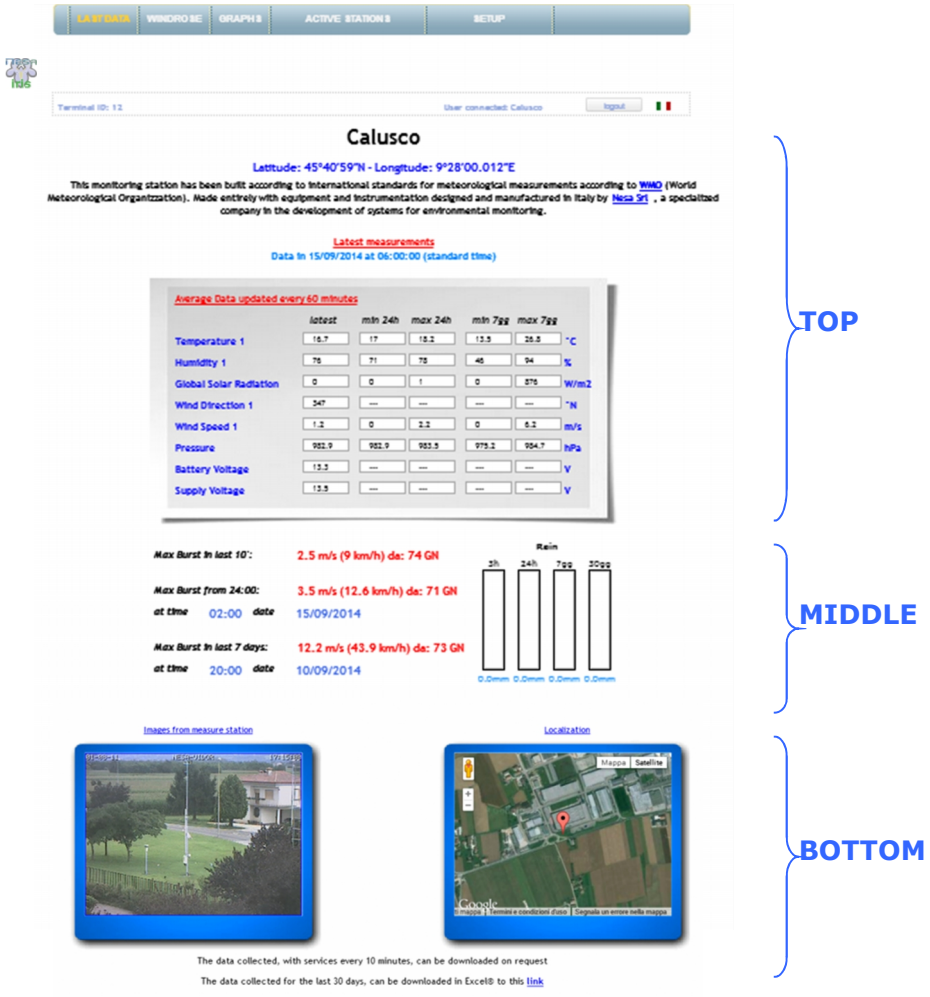


Figure 12. 1 – First web page of Iris with data

The first page, called "Last Data", represents the latest data sent from a remote station to the database. This page is automatically updated each 60 minutes, or manually. It is divided in three section.

On the top there is, after some info about the station (name, coordinates etc.), a table with the latest data (first column) and statistic info (min and max) for the last 24 hours and 7 days, easy to read. Each text on the top can be customized, and logos added on the right and/or on the left. Measure numbers and names can be personalized.

On the middle there are information on wind burst and rain. In particular the wind gusts in the latest 10 minutes, from midnight and 7 days, on the left, total rain in the last 3h, 24h, 7days and 30 days on the right.

Depending on the sensors connected to the remote station (or on the measures activated), this part of the page can include or not these info.

On the bottom there are one or two pictures. On the left, if it's present on the remote station, there is the image from the camera connected to the datalogger, a static picture of the station otherwise; on the right there is a map (Google map) indicating the position of the remote station. Below the picture there is also a link for downloading an Excel table with latest 30 days of full data incoming from remote station.

By clicking on **WINDROSE** section on the tool bar, you can go to the second page of Iris.

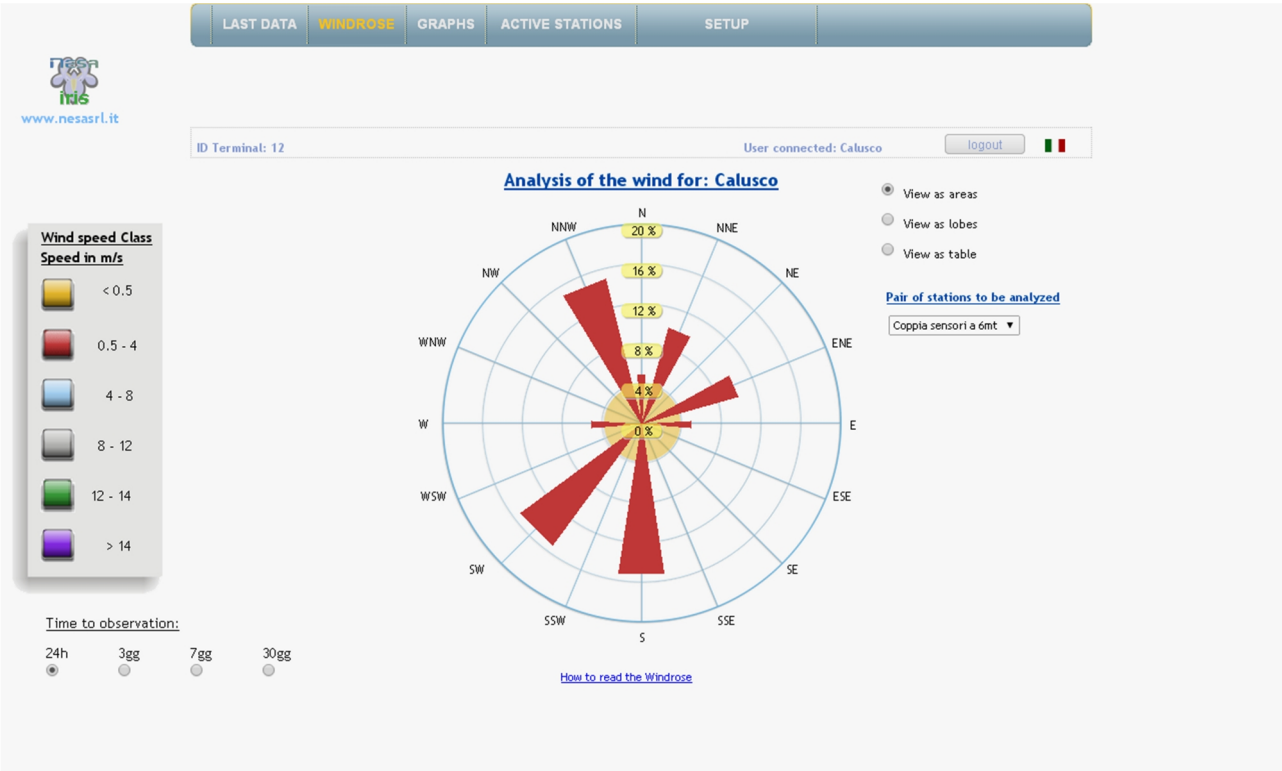


Figure 12. 2 – Second web page of Iris with Wind-Rose

This page represents the Wind Rose for latest 24 hours, 3-7-30 days in the remote station. This is a dynamic Wind Rose, you can choose to view areas, lobes and the **data frequency table of the wind (thousandths), used especially for pollution propagation** (the table can be also downloaded in Excel format). On the left a legend help the user to classify the wind class.

Wind rose will be shown only if sensors of wind speed and direction are present on the remote station. If there is more than a pair of this sensors is possible to choose the chart of wind rose for each couple (customizable).

By clicking on **GRAPHS** section on the tool bar, you can go to the third page of Iris.

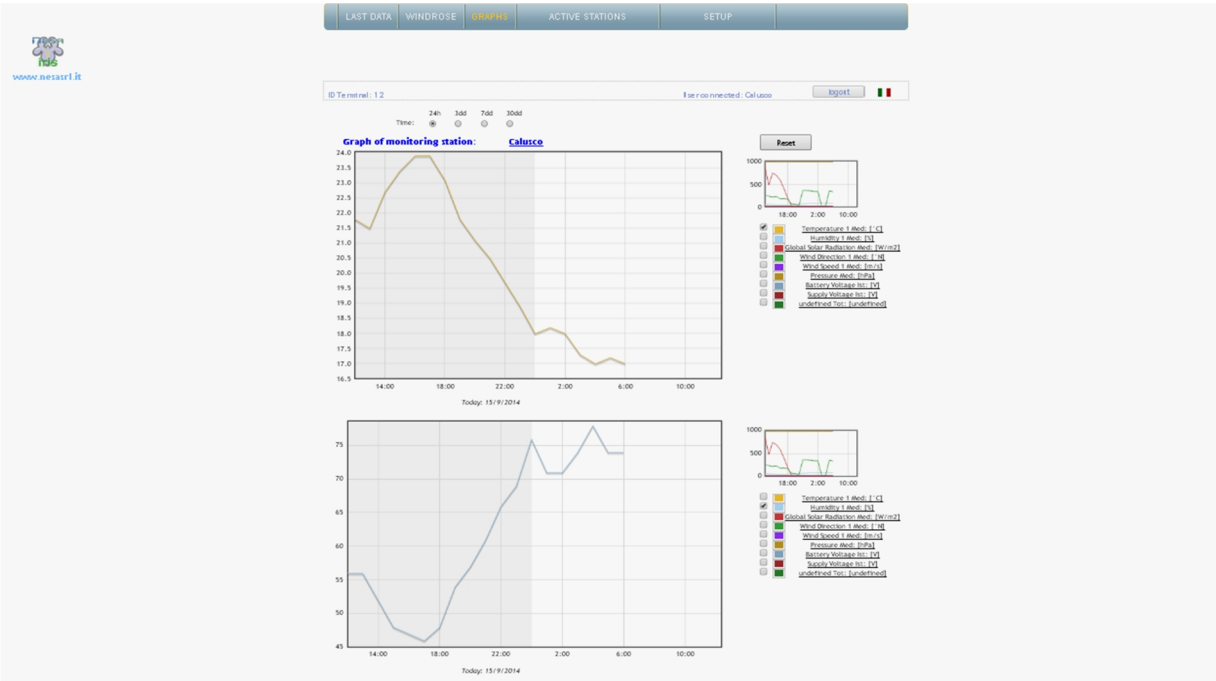


Figure 12. 3 – Third web page of Iris with Charts

This page permits to see data of the remote station in graphic format. On the top you can choose the observation time, from 24h, 3-7-30 days.

On the right there is a legend which permits to add/remove data from the chart.

There are three charts from the top to the bottom, to permit an easy comparison of data on the same or on different graphs.

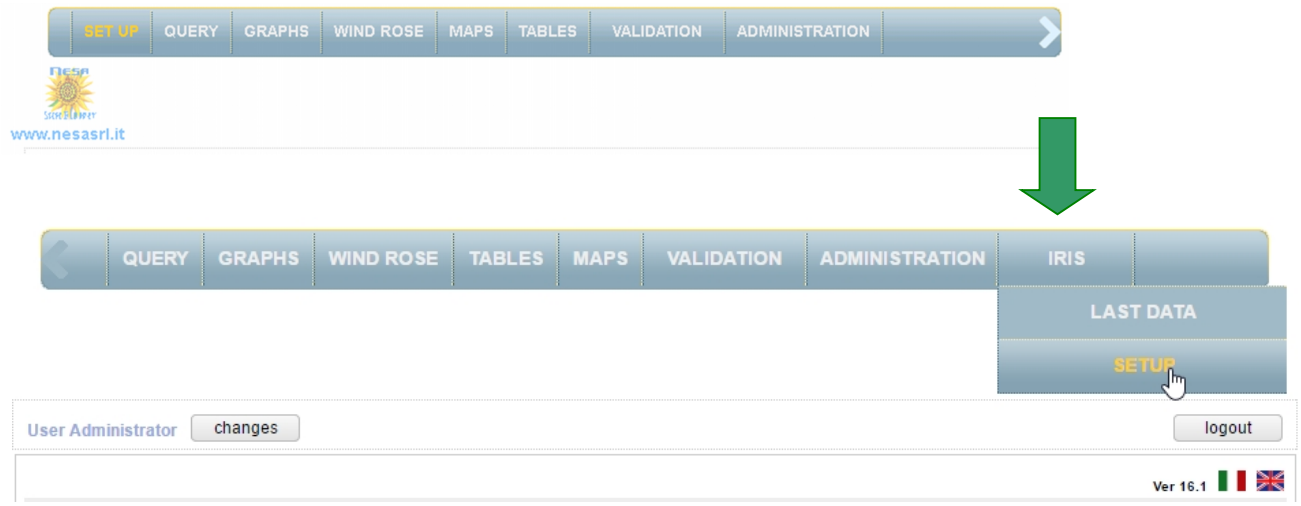
Using the mouse, drag and zoom functions are available.

12.1 How configure Iris

Before using Iris, it needs to be configured. Only the **SunFlower's administrator** can configure it (that is also Iris's administrator).

- **ONLY the administrator** can define the Iris's users and customize its web pages (configure Iris), but he cannot access to Iris as a user.
- Any user, depending on the configuration, can only access to Iris, or both Iris and SunFlower, but none configuration.

There is only one Administrator, both for Iris and SunFlower. In any moment, the administrator can configure Iris plug-in, clicking on the right arrow on SunFlower's menu toolbar: a new selection named Iris appears, click on SETUP voice.



You will be redirected to the main page of Iris where is possible to handle Iris on users.

As you can see on *Figure 12. 4 – Iris user and configuration list*, there are several row, one for each user, with **name, surname, group and Iris terminals** (Stations) associated.

Group indicate if the user is only a Iris's user or also SunFlower's user. The difference is that an Iris user can see only the customized pages of Iris and none in SunFlower, the SunFlower user can see SunFlower's pages and Iris also.

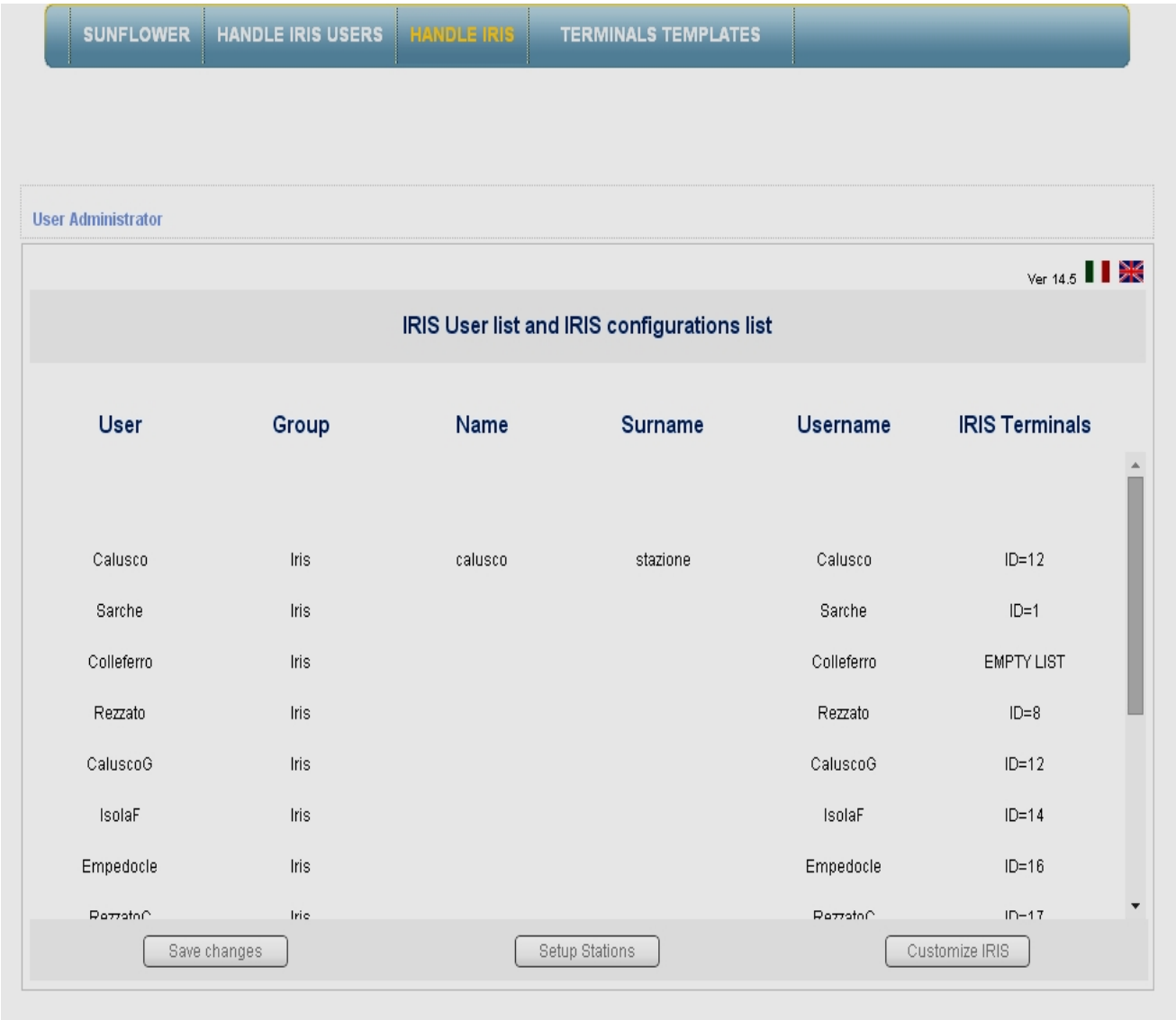


Figure 12. 4 – Iris user and configuration list

Iris Terminals represent the list of station's IDs enabled for the users, each station has its specific Iris, customized for the user. For example, in the figure above, the user Calusco has only one station (ID=12) and can see only Iris associated to this station; other users can have more than one station, there are no limits.

If you want to add or remove users, see section 12.3

To customize the stations associated to an user, click on the name of user, than the button "***Setup Station***" and "***Customize Iris***" will be activated.

12.1.1 Associate IRIS's stations to each user

First step is to associate one or more stations to the user especially if user has an empty list. Clicking on "*Setup Station*" button, at the bottom of the page, will appear on the left a list of all the stations configured into SunFlower 's Database.

You can **add to the right one or more stations** (or delete from the right). The stations you've chosen are those the user can see in Iris, as show in *Figure 12. 5 – Associate stations to users*.

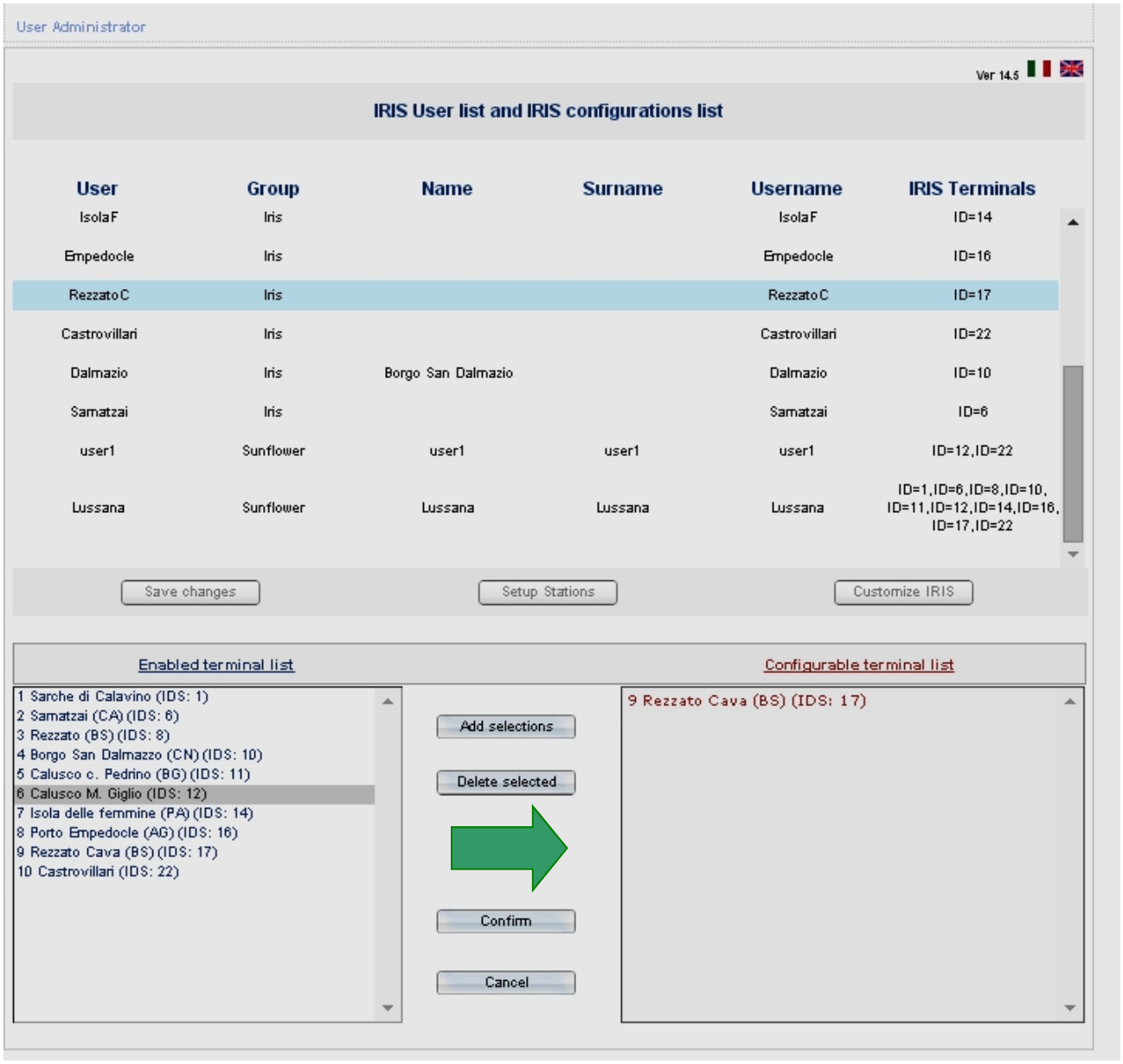


Figure 12. 5 – Associate stations to users

After chosen the stations, press *Confirm* to return at list of users. Before leaving the page, remember to press "***Save changes***". A message on the top of the page will inform you if the process is ok.

Now is possible to customize Iris for each station and for each user. Iris can be different for users and for stations.

Select the user name clicking on it, and press the button *"Customize Iris"*

12.1.2 Customize IRIS's web pages per user or station

Second step is to personalize Iris web pages for users and/or for stations.

Pressing "***Customize Iris***" after selected a user, you will be redirect to *Active Stations* (Terminal Templates) page. This is a page, **specific for the user chosen**, that permits to customize Iris only for the **stations associated to him**. The list of these stations is shown on the menu toolbar (Demo terminale (Vidor) in the below figure).

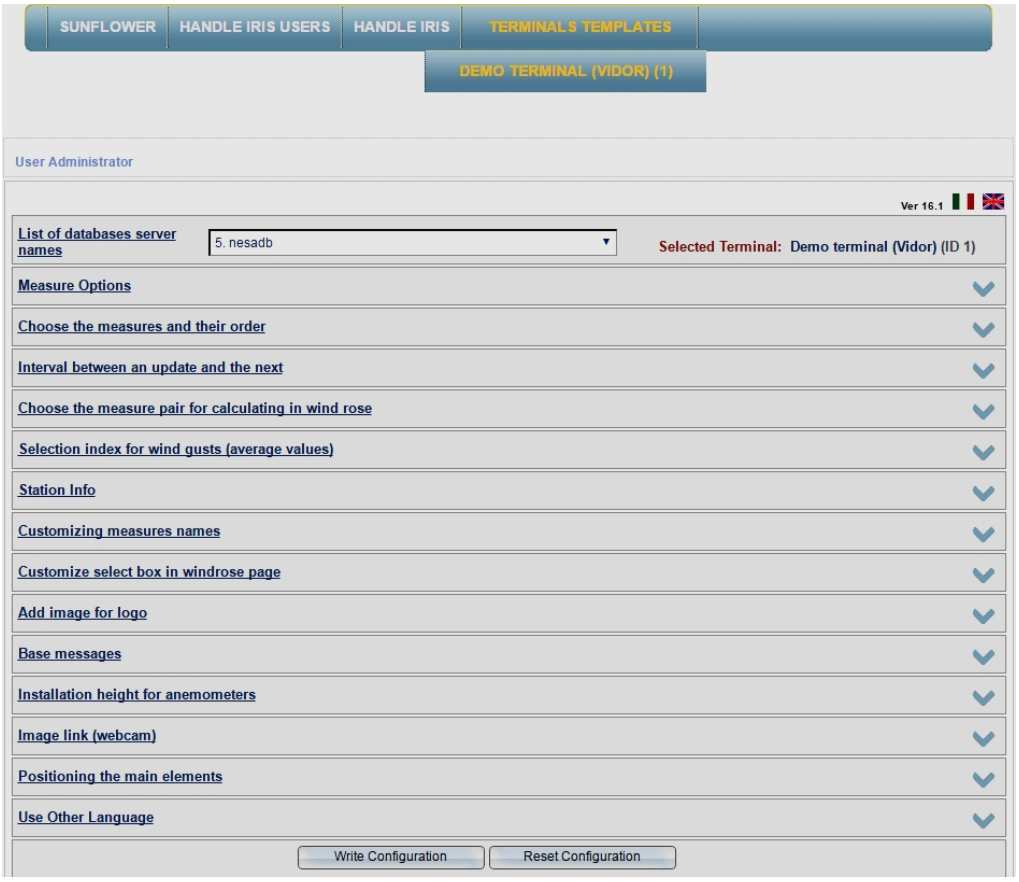


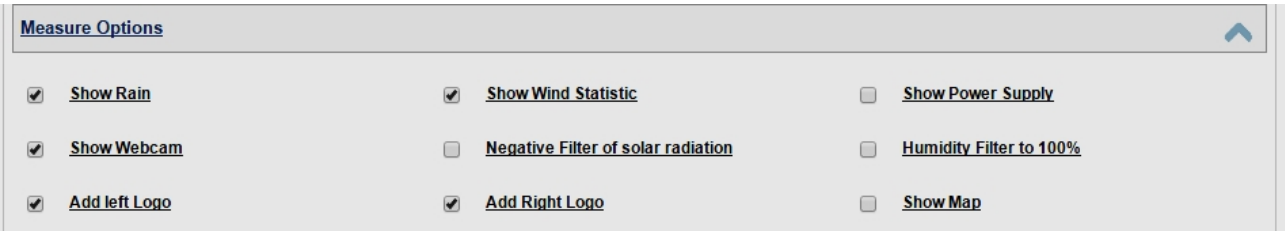
Figure 12. 6 – Page for customizing Iris by Administrator

In the example on *Figure 12. 6 – Page for customizing Iris by Administrator*, for the selected user one stations has been enabled, Vidor (station's name).

Following these steps you can customize Iris for selected station:

TERMINAL LIST: chose the template's name you need to customize (see section 12.4).

Measure option: clicking over appear:



Where:

Show Rain: shows in the middle section on first page of Iris, the statistics of Rain (Blue bars), *enable it only if the station include a rain measure.*

Show wind Statistic: shows in the middle section on first page of Iris, the statistics of wind Burst, *enable it only if the station include a wind measure.*

Show Power Supply: shows on top section on first page of Iris, into the grey table, the values of power supply (main and aux if present). *Select it if you want to see these info.*

Show WebCam: shows on the bottom of first page of Iris the picture with the images captured from webcam or a static picture. The link of these images will be defined later. *Select it if you have these images.*

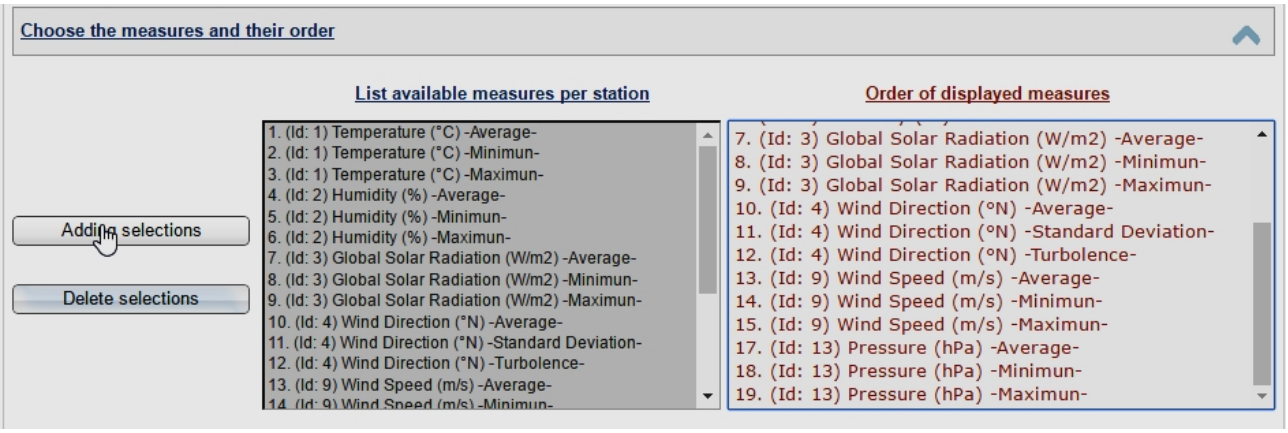
Negative filter for solar radiation: some users don't like to see the negative values (during the night) of solar radiation sensors. Normally is a confirmation of the quality of sensor, but someone don't like to see it, so *select this option if you want to limit at zero the lowest value of radiation*.

Humidity filter to 100%: several humidity sensors go over 100%Rh as value measured. It is due to electrical conversion, not a physic problem. Some users don't like to see it, *so select this option if you want to limit it at 100%Rh.*

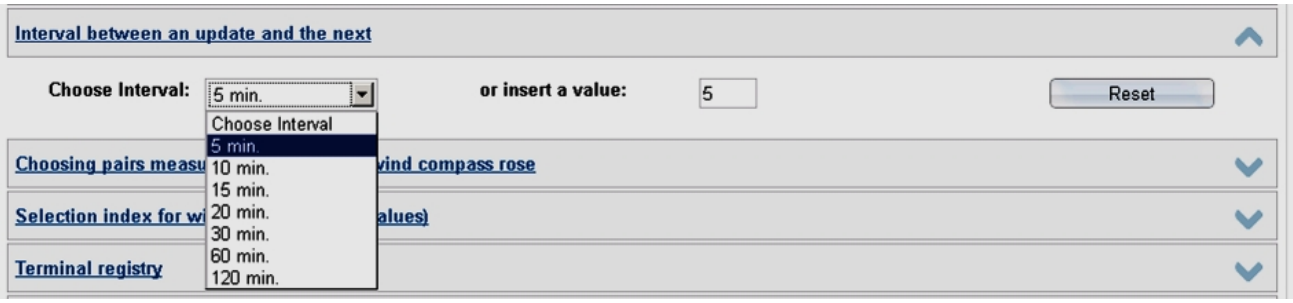
Add left/right logo: *select this option if you want to add a user's logo* to the left and/or to the right on first web page of Iris. See later for selecting logos.

Show Map: *select this option if you want to add a google map* to the bottom right on first web page of Iris.

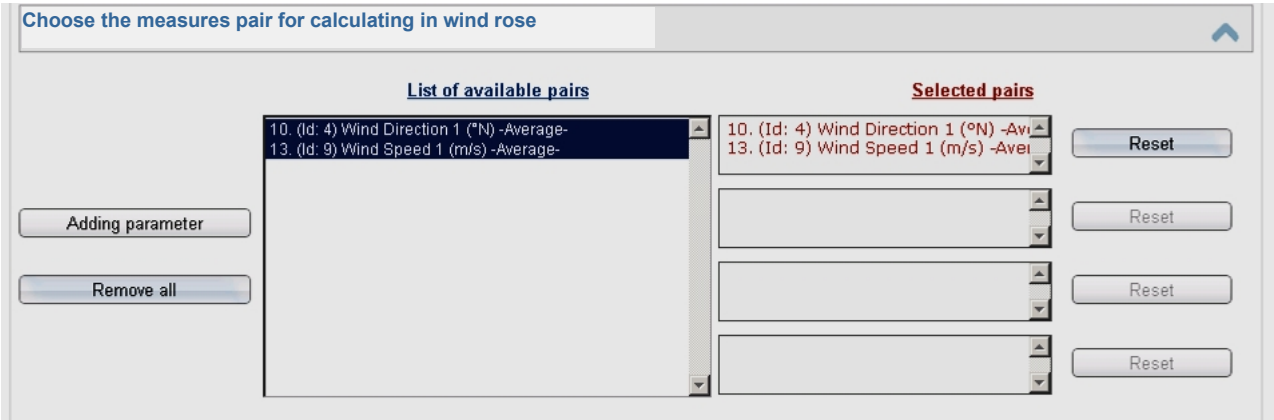
Choose the measure and their order: On the left side, will appear a list of all the measures available for this station (data incoming from remote station to the database). Select the measures you want to appear in Iris. Only selected measures, in the same order selected will be present on Iris.



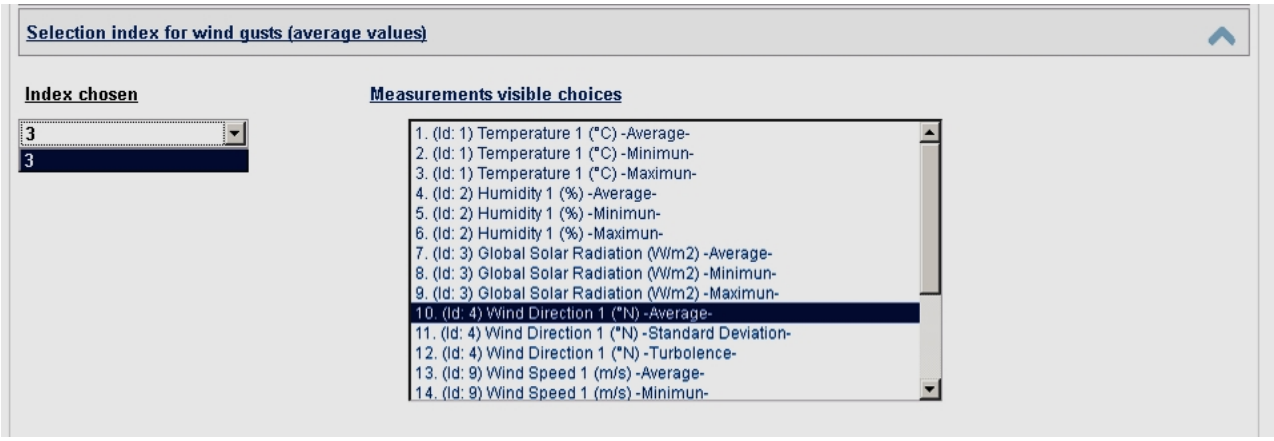
Interval between an update and the next: depend on the configuration of data transmission in remote station, if you don't know exactly, choose 10 minutes.



Choose the measures pair for calculating in Wind Rose: as described previously, for calculating wind rose is necessary to have the wind measurement in the remote station (speed and direction). In this case you can select the pair of sensors that have to be used for this calculation (in case the remote station has more than a pair of this sensors, you can choose more pairs). Is possible to select up to maximum four pairs.



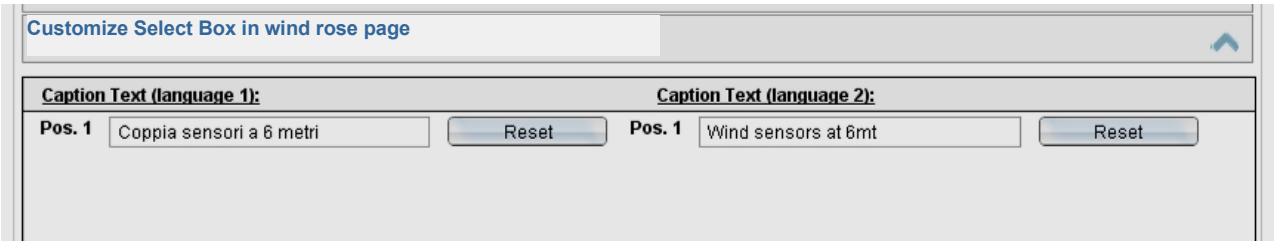
Selection index for wind gusts (average values): for calculating the wind burst direction in the first page of Iris, is possible to choose the measure of wind direction that you want to consider, especially if there are more wind directions available.



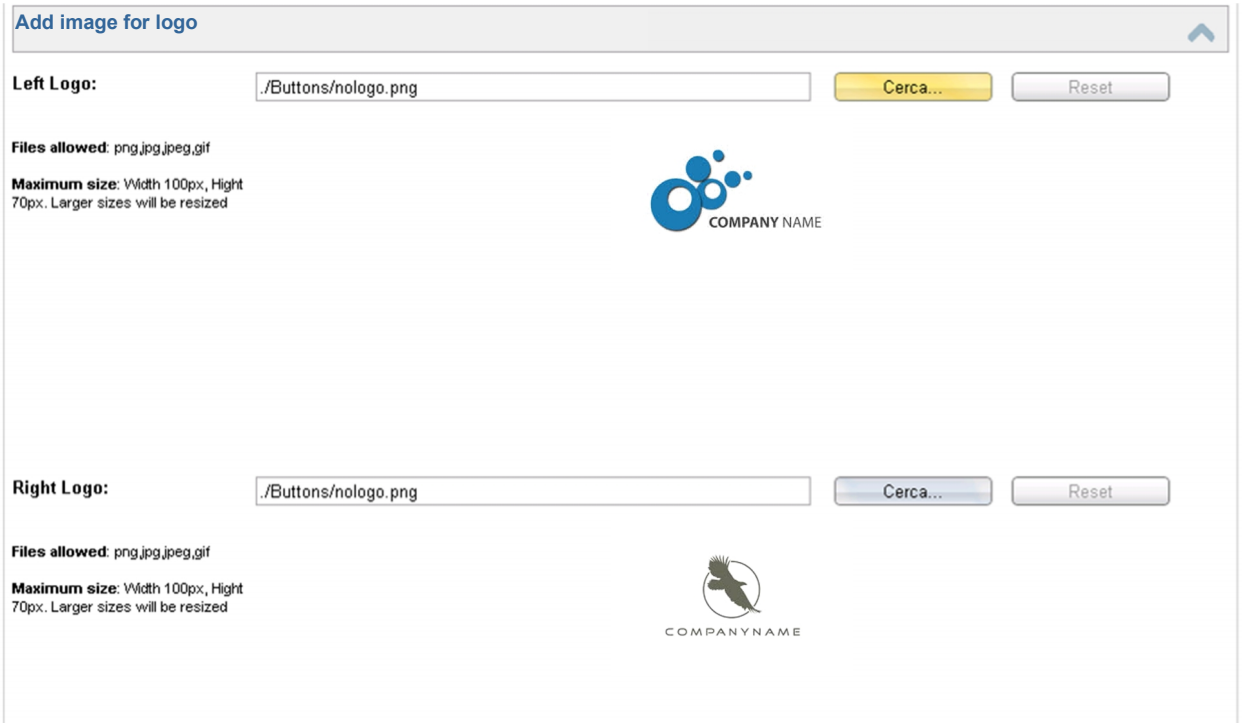
Station Info: in this area you can define the detailed info of station, as the coordinates in WGS84 format, name, identification code and identification number. Coordinates are necessary for the map positioning in the first page of Iris (Google map).

Customizing measures names: this is an important section because permits to define the name and unit for each measure in Iris, both for first page, data section, and for graphics. You can define the name in two different languages (left and right position). Is possible to associate a specific measure as first data represented on the chart in the *Graphs page* (see Section 12). There are three charts, so is possible to associate three different data for each one. Select the option in the centre "Ab. Graphs".

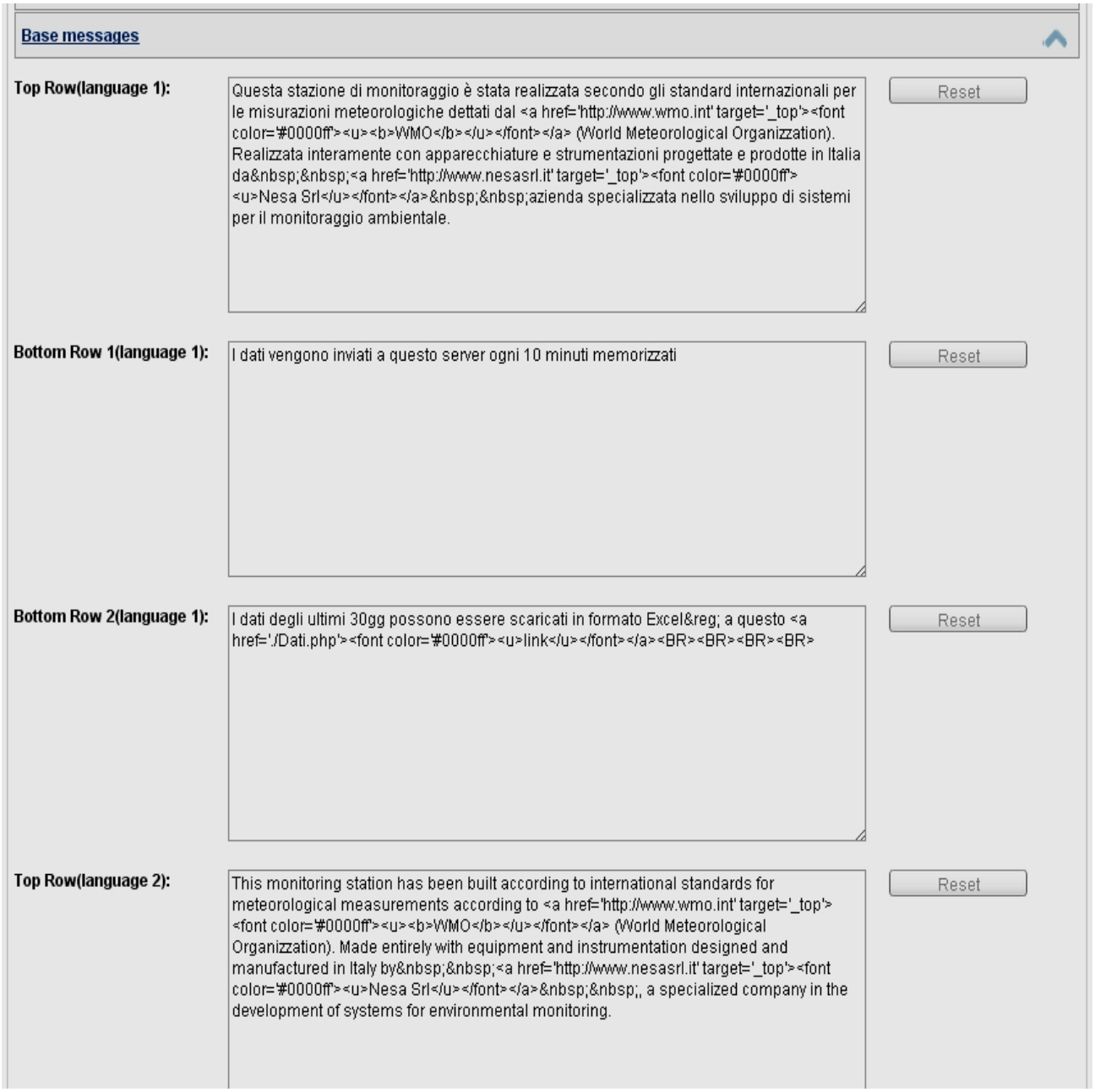
Customize "select box" in wind rose page: as described previously, if remote station has more than a pair of wind sensors at different heights, is possible to calculate wind rose, for all pairs. Here is possible to define the name of these pairs and their height, in two languages.



Add image for logo: here you choose the images for logos that will appear on the first page of Iris (on the top section). Only formats PNG, JPG, JPEV, GIF are accepted. Maximum size 100x70px.

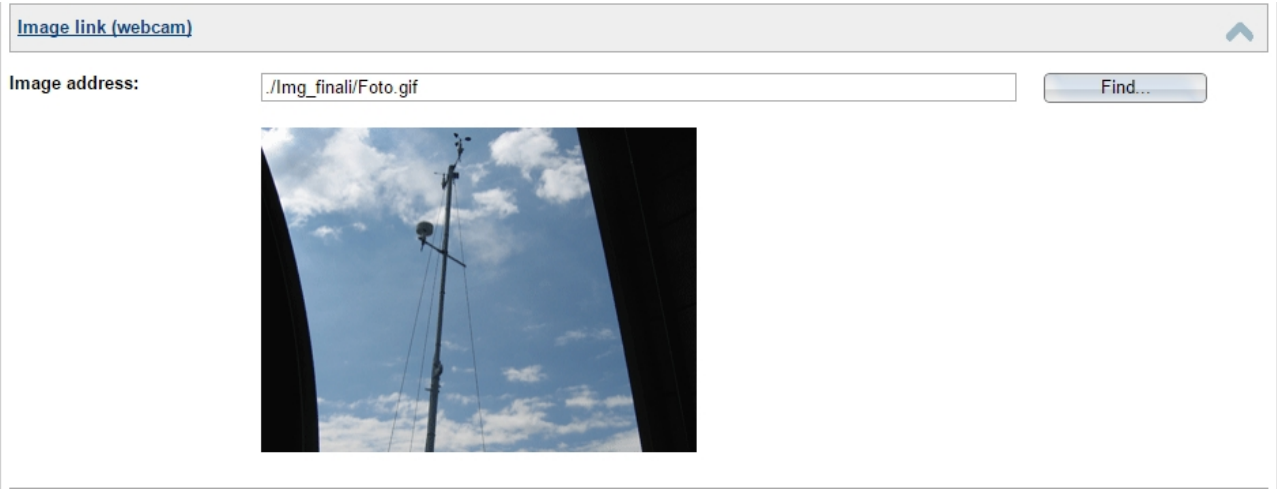


Base messages: this section represents the messages that appear on the top and on the bottom of the first page in Iris. There are three messages that you can customize in two different language. Following the below example, you can also include links to external web sites.



Installation height for anemometers: it is a redundant info, necessary only for the text. You cannot choose anything.

Image link: here you define the static image that appears to the bottom of first page of Iris, or the link for images that come from a camera. In the first case choose the file into a folder in a computer, in the second case fill in the form with the address of camera's image, example: http://meteoravanel.altervista.org/webcam/cam.jpg



Positioning of the main elements: is possible to move the objects in the first page of Iris in the position you prefer. Click with the mouse over the object and drag it.

Use other language: here is possible to add the second language. The flag image is automatically uploaded.

Now the customization is finished. Press "***Write configuration***" button to save.

A message as in *Figure 12. 7 – Preview of Iris* will appear.

Figure 12. 7 – Preview of Iris

Following the link "**this page**" you will be redirect to the first page of Iris just configured.

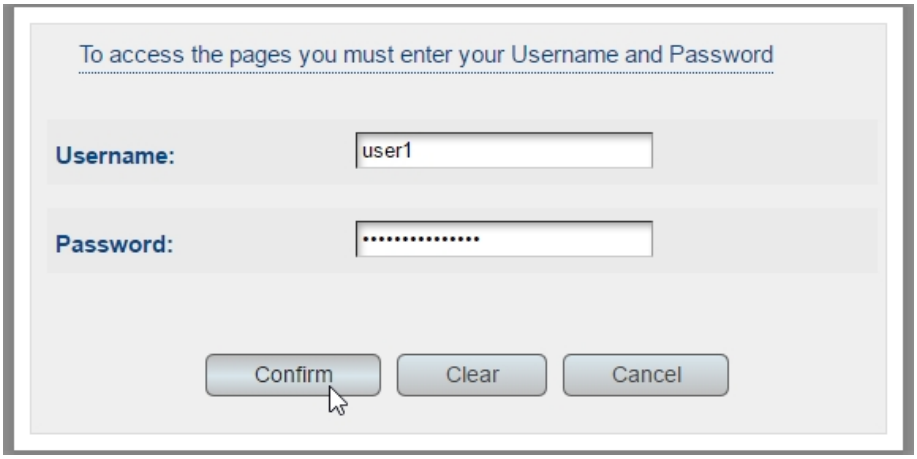
http://.../iris/login.php

Take note of this link, is the one you can give to the user for seeing the customized Iris.

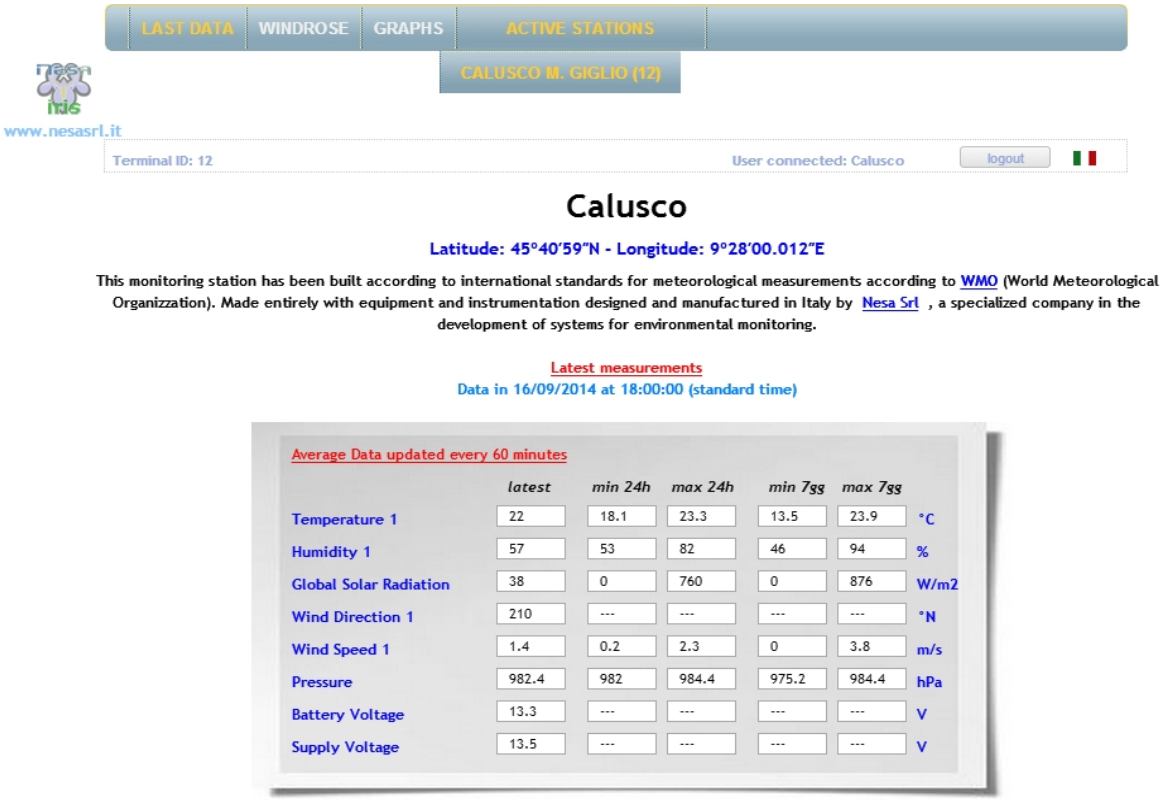
If you click on this link, a login page will appear in which you can enter only as user and not as administrator.

12.2 Access to Iris as an user

When a user tries to access at Iris link http://*server-address*/iris/login.php a page as the following appears:

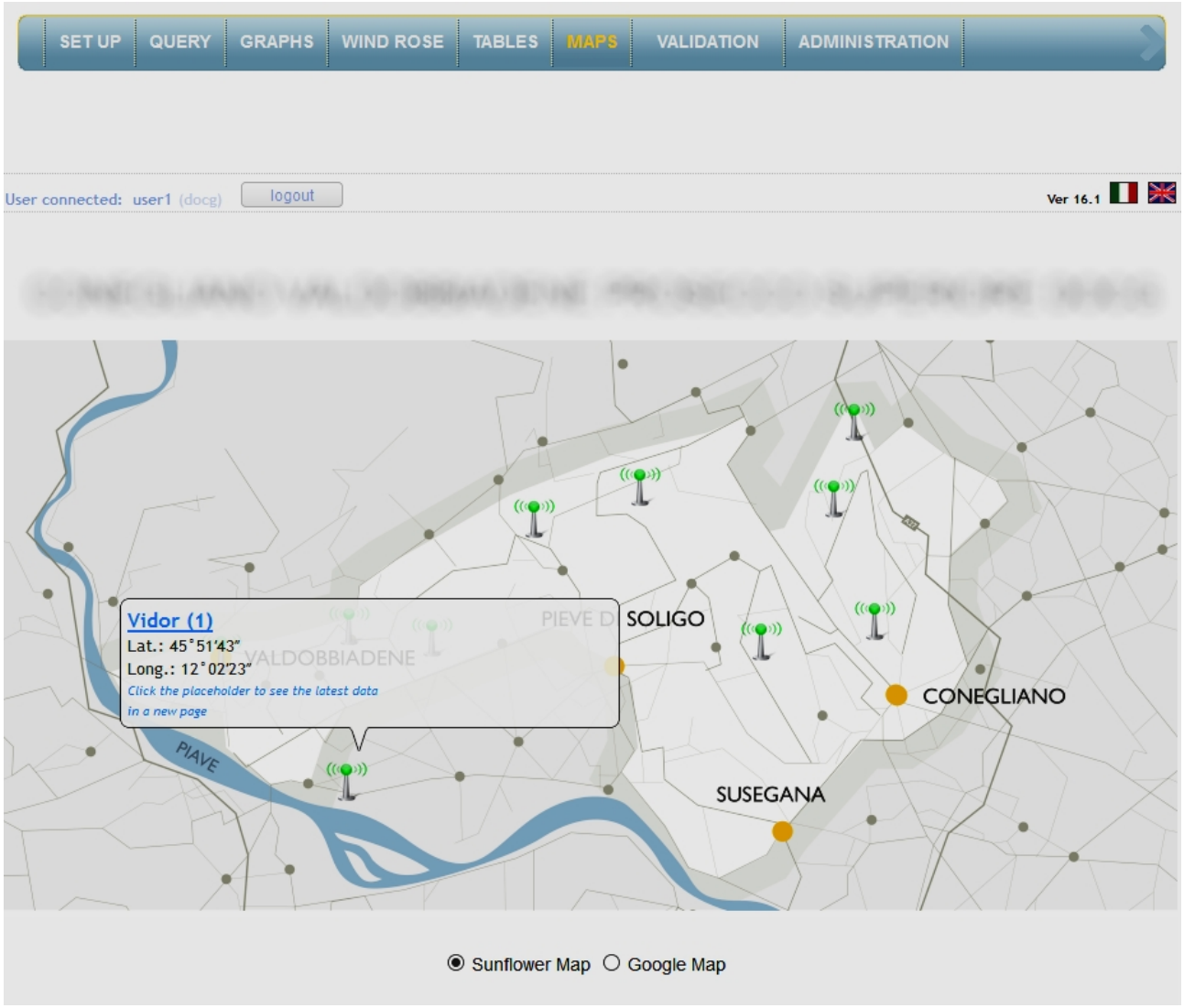


Then he will be redirected to personal dedicated page in which the user can see data ONLY for stations for him configured.



From this moment the user can navigate among the Iris's pages, but only for the stations at him dedicated. In no way he can enter in other Iris pages or in SunFlower (if it is not also a SunFlower 's user).

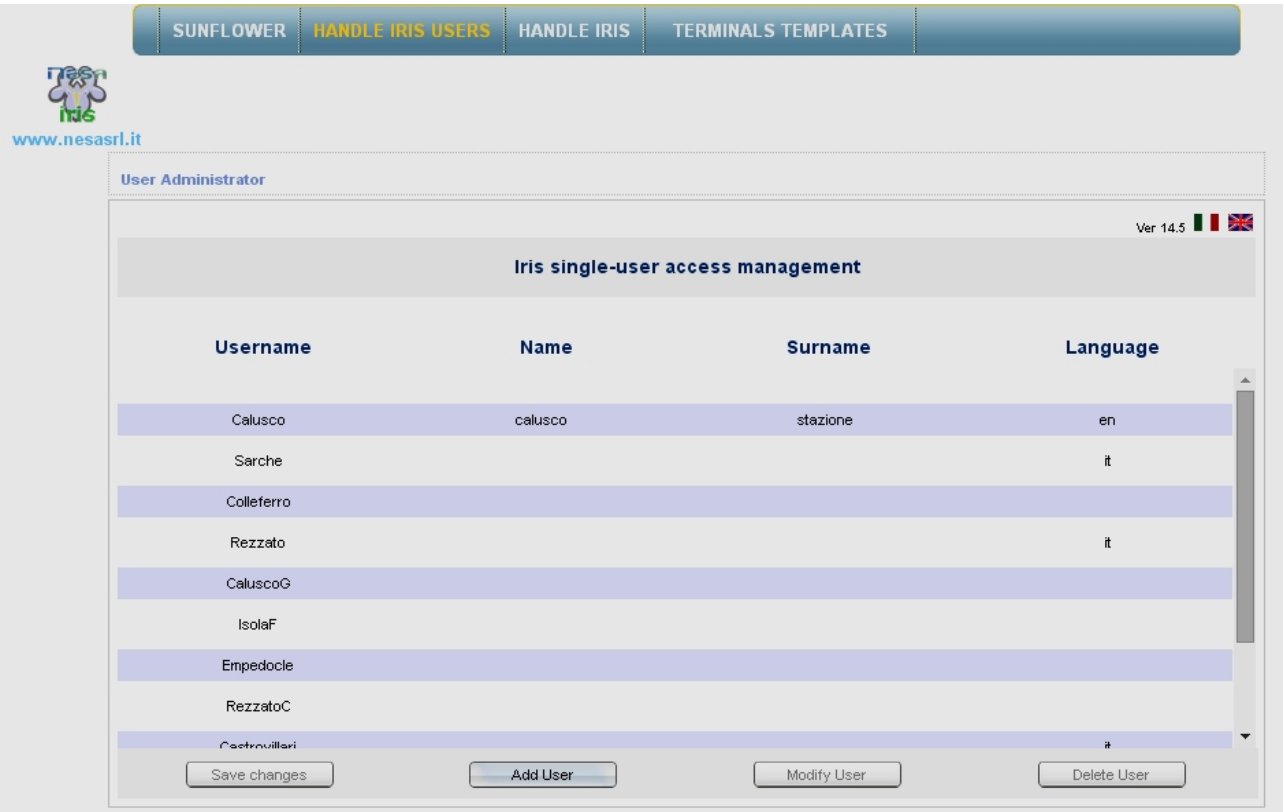
In the same way the users can reach Iris pages clicking on the icons on the SunFlower map. See below.



12.3 How to add or remove users from Iris

Only SunFlower administrator can add or remove users from Iris, in the same way described for SunFlower.

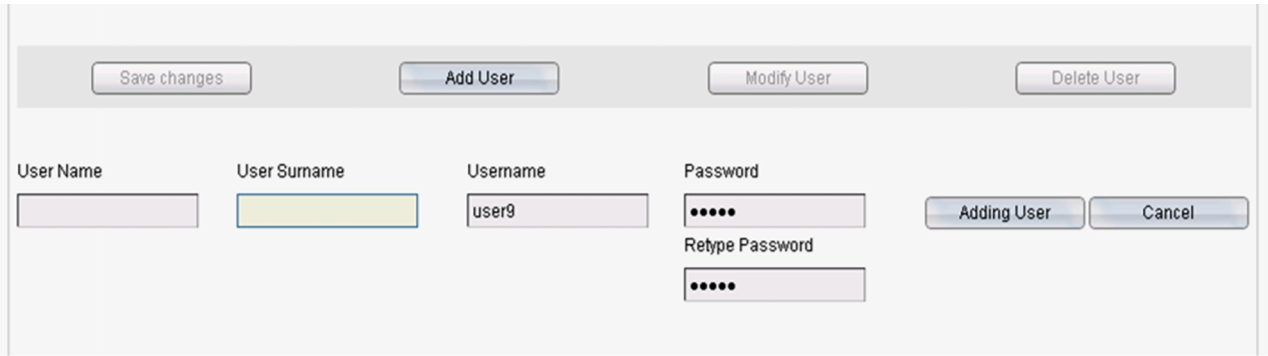
After entered in Iris area following the procedure described at section 12.1, click on "HANDLE IRIS USERS" on the toolbar.



The list that appears represents ONLY Iris's users, in other words the users enabled to access only to Iris and not to SunFlower.

Here the administrator can add, modify or delete an user, only for Iris access.

Add an User: Press "***Add User***" button, above the same will appear a form that need to be filled to create the user.



Password and username can be chosen by the Administrator and not modified by user.

All passwords are stored into the database in encrypted mode.

If the procedure is correct, pressing "***Adding User***" button, a message on the top of the page informs of the new adding.

Modify User: Select an user and press "***Modify User***" button, above the same will appear a form that needs to be filled to modify the user. All forms can be modified.

Delete an User: Select an user and press "***Delete User***" button.

12.4 Templates

For helping the Administrator in configuration of Iris, there is a possibility to create templates of stations. These templates can be utilized in the customization of Iris for specific user, uploading it from a list during the procedure as in section 12.1.2 and as shown in *Figure 12. 6 – Page for customizing Iris by Administrator*.

Select "TERMINAL TEMPLATES" on the menu toolbar and follow the same steps as described at 12.1.2 section. At the end, when you click on "***Write configuration***" button a template will be created and it will be ready to use.

13 Section ALLARMS (not available in this manual)

14 Annex A: File data record for NESA's station

The TMF series data logger stores or transmits a text file in ASCII format which, in its minimal form, has a structure defined as follows:

S, ID_SENS, ORA, DATA, ID_MIS1, Tipo_ELAB_MIS1, DATO, ID_MIS1, Tipo_ELAB_MIS2, DATO, … , ID_MIS1, Tipo_ELAB_MISn, DATO, … , ID_MISm, Tipo_ELAB_MISn, DATO, #

The various fields of the plot have the following definitions:

ID_SENS: this is an entire long and is unique for each data logger terminal/station manufactured by Nesa srl

ORA: time of the record in hh,mm,ss format

DATA: date of the record in gg,mm,aa format

ID_MISm: ID of the same measurement associated with the station/sensor.

Example:
1 = Temperature
2 = Humidity
3 = Pressure
4 = Wind direction
5 = Wind speed
6 = …..

Tipo_ELAB_MISn: ID of the same process provided by the switchboard associated with the same measurement acquired.

Example:
1 = Instant
2 = Average
3 = Minimum
4 = Maximum
5 = Min. Minimum
6 = Min. Maximum
7 = …..

DATO: data associated with the same process provided by the switchboard associated with the same measurement acquired. The nature of the data and the relative formatting depend on the type of signal acquired. The record ends with # .

If in the same file **several records are present**, they are **stored on different lines**, therefore at the end of each line the characters CR (0xA) and LF (0xD) are present.

If there are **several measurements of the same type**, the identifier of the second measurement will be inserted with an **offset of 50** (fifty) added to the identifier of the previous one: for example, if there are three temperatures in a configuration and the first identifier is 1, the second will be 51 and the third will be 101.

In storing the data, if there are **measurements outside of the interval** of acquisition, a ***** (**asterisk**) will be inserted in the plot instead of the data.

Example:

S,000001,00,05,00,12,03,2006,1,1,16.8,1,2,16.8,#
S,000001,00,10,00,12,03,2006,1,1,16.8,1,2,16.9,#

In the above example, you will notice that the file is made up of two records from different times, coming from TMF terminal No. 0000001: two temperature data were sent, instant and average.

14.1 Table of measurements and processes

Measurements

ID	Measurement	Unit of measurement
1	Temperature	°C
2	Humidity	RH%
3	Global solar radiation	W/m^2
4	Wind direction	GN
5	Evaporation	mm
6	Hydrometric Level	cm
7	Phreatic Level	cm
8	Battery Voltage	Volt
9	Wind speed	m/s
10	Precipitation	mm
11	Net solar radiation	W/m^2
12	Snow Depth	cm
13	Pressure	hPa
14	Voltage	mV
15	Evapotranspiration	mm
16	Leaf Soaking	min
17	pH	pH
18	Conductivity	uS
19	Counter (digital)	pulses
20	Crack Gauge	mm
21	Slope Gauge	Degrees
22	Load Cell	KN
23	Redox	mV
24	Oxygen released	%
25	Turbidity	NTU
26	Strain Gauge	mm
27	Linear displacement	mm
28	Frequency	Hz
29	CH4	ppm
30	THC	ppm
31	NMHC	ppm
32	Current	mA
33	Capacity	m^3/s
34	CO	ppm
35	NO	ppb
36	NO_X	ppb
37	NO_2	ppb
38	O_3	ppb
39	SO_2	ppb
40	Energy	KJ/m^2

Processes

ID	Process
1	Instant
2	Average
3	Minimum
4	Maximum
5	Min. Minimum
6	Min. Maximum
7	Accumulation
8	Standard Deviation
9	Root-Mean-Square Deviation
10	Delta M1-M2 relative to T1-T2
11	Daily Average
12	Daily Minimum
13	Daily Maximum
14	Status 0=OK 1=Pre 2=All
15	Status Measurement Value

These tables can be updated at any time. Please ask to Nesa the latest update

15 Annex B: Custom Installation of SunFlower

The installation of the entire software package is simple and follows the following guidelines.

15.1 Installation of an FTP Server (i.e. FileZilla Server)

This installation must be done in the same sever that collects data.

1. If there is already an FTP Server, go to step 4.
2. Install an FTP Server (downloadable from internet) and configure it so that it starts as a service, leaving the default port 14147 and leave it on for all users.
3. At first start set / leave the server address: **127.0.0.1** (always verify that the check *Connection to the same server* is active).
4. Create a new user eg. Us: ***Nesa*** and associate it to a folder in the root naming ***C://NesaFTP*** and a subfolder of ***C://NesaFTP/Dati*** to associate with the newly created user. This folder is the destination of the data sent from the ECU (station) to the server. The password must be **N2s1FTP**. Create a second folder named ***C://NesaFTP/Backup*** next to the ***Dati*** folder, it will contain a copy of all the original input data. Give all the reading/writing permissions to these folders.

If the server is physical (not hosted on internet) his FTP address should be congruent to the one of the stations connected to it via cable. Otherwise, you should open the firewall ports so that is possible to access it remotely.

15.2 Installation of SUNFLOWER web pages

Run **SetupSunFlower.exe**, allowing the program to be installed in the directory *C:/Program Files/Nesa/SunFlower*. Press the ***Next*** button.

Install the entire software package (Apache, PHP Service, SunFlower, MySQL Service, etc.) with the exception of the application *MySQL Gui_tools* for Windows versions other than XP. Continue with the installation.

15.3 Installation of APACHE web server

Fill in the form *Server Information* as here described:

Network Domain: **localdomain**

Server Domain: **localhost.localdomain**

Administrator Email: **root@localhost.localdomain**

Enable with a check mark the check labeled *For all users, port 80* and continue with the installation.

Follow the form *Setup Type*: select the Default type (or Custom without any change) and be sure that the application is installed in the main installation root directory (i.e. *"C:\Program Files\Apache2.2"*).

15.4 Installation of PHP Service Interpreter

Allow the installation of PHP in the default directory.

In *WebServer Setup* select **Apache 2.2x Module** and set ***C:\Program Files\Apache2.2\conf*** for *Apache configuration directory.*

15.5 Installation of MySQL SERVER Database V.5.1

You should choose the default installation mode (or Custom without bringing any change) and activate the control "Configure the MySQL Server now" selecting it.

Successively we propose the installation of MySQL Workbench: continue choosing the default mode (or Custom without bringing any change) by disabling the check from "Automatic start" and selecting the "inactive" option.

Then the *Winzard* form appears to help with the setting of the configuration file. Select *Detail Configuration* → *Server Machine* → *Multifunctional Database*.

Now you should create a folder called "*Data*" in the directory "***C:\Programmi\Nesa***" so that it can be assigned as the destination of the DataFile "***C:\Programmi\Nesa\Dati***" under "InnoDB Telespace Setting".

Select from the form "Manual Setting" the value 15 and activate it with a tick in the checkbox "Add firewall exception for this part", while the remaining settings can be left unchanged.

In the form "Manual Selected Default Set / Collection" select from "Character Set" the character encoding "UTF8" and continue confirming "Install As Windows Service".

Follows "Modify Security Settings": in the text box "New root pwd:" digit "nesarsrl" and check the "Enable root access from remote machines" and continue till the end of the installation.

15.6 Installation of MySQL Connector

Perform the default installation (or Custom without bringing any change), confirming by clicking on "***Install***".

15.7 Installation of Quicktime

You can avoid the installation of this application stopping the operation. (Required only for alarm management).

15.8 Installation of Nesa Service

Create a new folder in ***C:\Program Files\Nesa*** and rename it "NesaService."

Set the "Path installation" as "**C:\Program Files\Nesa\NesaService**", enable the "All Users". Continue and complete the installation.

15.9 Installation of NOTEPAD++ (optional)

NotePad ++ is easily downloaded from internet. Once the download is finished, continue the installation following the onscreen instructions.

We recommend that all operations for the installation are be carried out by a specialized technician.

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