Environmental Monitoring Solutions

SOFTWARE

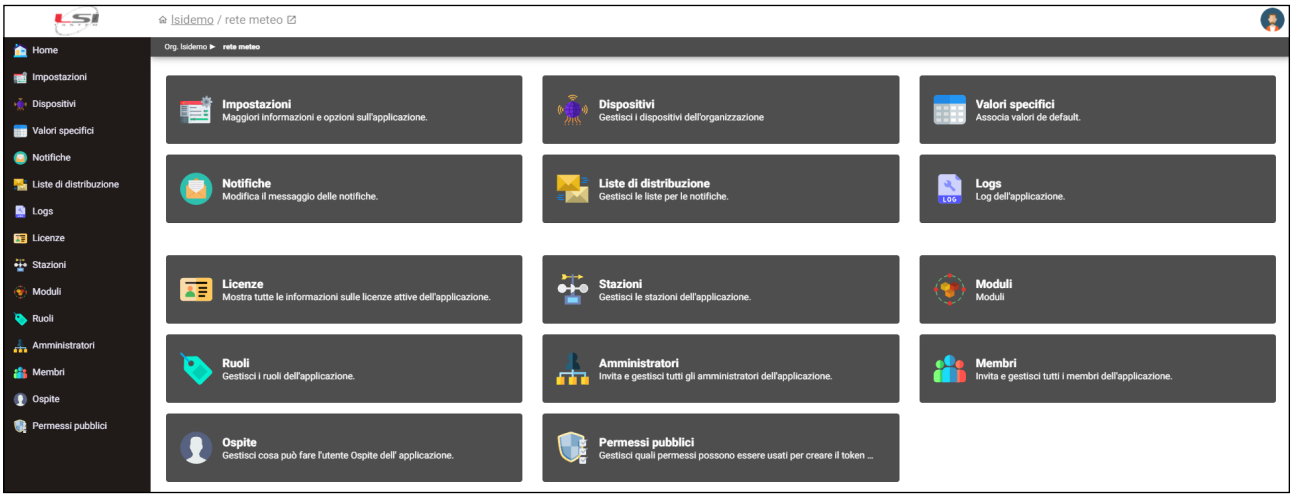
ENVIRO-CUBE
(SWCLA3100)

The Enviro-Cube cloud platform allows to access the data of the meteorological stations through any Internet access point.
This service is offered by subscription by LSI LASTEM.
Enviro-Cube App is widely configurable by the user, it allows the visualization, download and processing of the data collected by the meteorological stations. The website is modular and allows the enabling of different users with different permissions of access to data and various functions.
Optional modules can be added for specific calculations (cumulated precipitations, evapo-transpiration).
Data communication from the data logger to the LSI LASTEM server is performed via GPRS or TCP / IP. For connection via TCP / IP the station must be connected through LAN, or through a modem/router, appropriately configured to send data to the cloud server.

- Wide configurability of the organization (users and roles) and of the weather stations by the user
- Multi-tenant platform open to integration into third-party systems
- Introduction of the concept of "station" detached from the physical device, formed by the logical aggregation of devices
- Measured values of the last 72 hours with dynamic update in graphic format
- Visualization of historical values of different stations in graphical and tabular format
- Data export in text or Excel format
- Configurable aggregation on map of data from different stations
- Configuration of alarms with validity range or thresholds exceeded
- Modules for additional functions
- Data security through authentication and database partitioning

Main features

Wide configurability through the Management App



*The administrator can extensively configure the **platform of his or her organization**, managing settings, devices, stations, modules, licenses, roles, members, etc ...*

Safety and Reliability

Enviro-Cube cloud platform guarantees a **high level of data security** and **high system reliability**:

- Authentication (user / password) with **database partitioning**
- **Multi-tenant platform** with logical or physical separation of data
- Possibility of creating **different access roles** to the platform with different permissions for management
- Permission management at the **user level or at the single station level**
- Horizontal and vertical scalability of instances and nodes **without system downtime**
- High platform security thanks to **third-level URLs**

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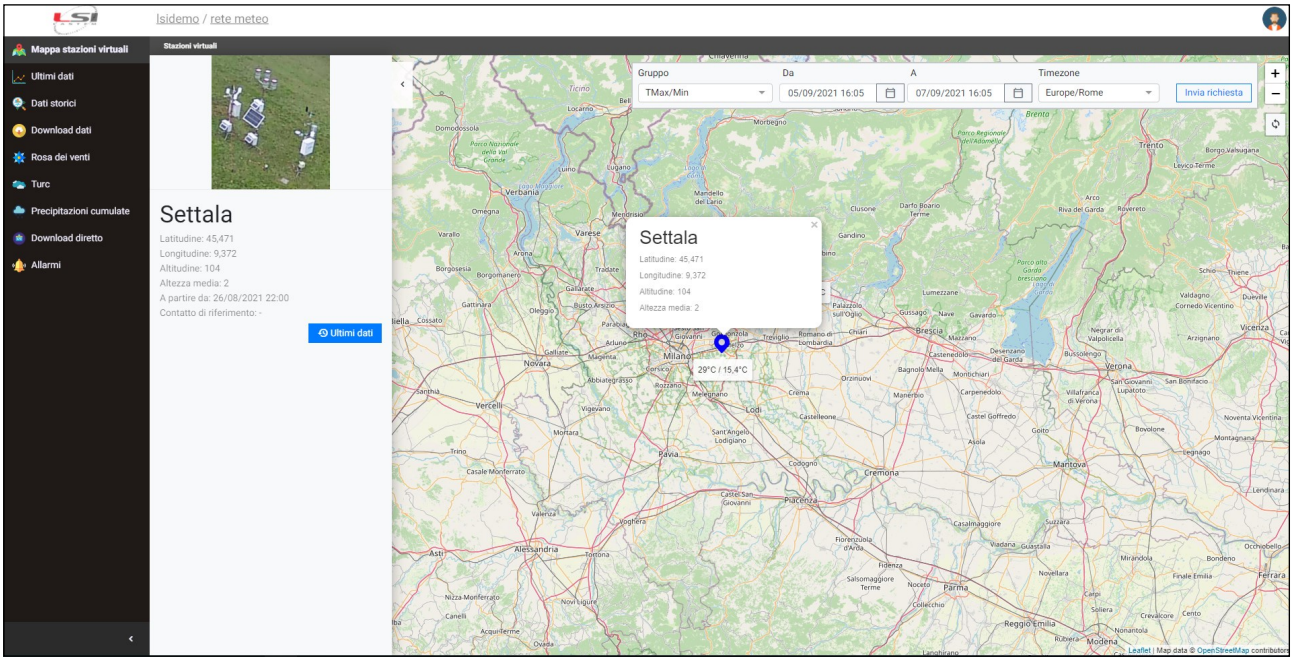
The station

In Enviro-Cube there is no unique correspondence between a station and a device (data logger). The user can configure his station by **logically grouping together the measures**, which can come:

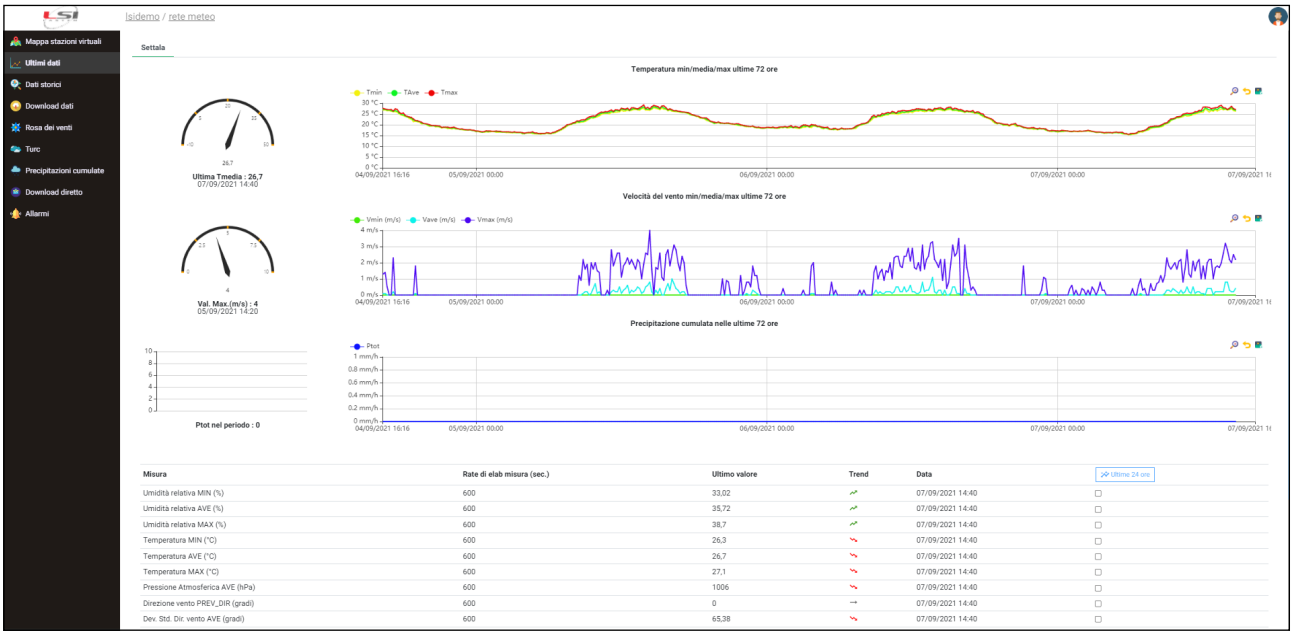
- From a **single device** (eg: weather station with a single data logger)
- From **multiple devices** installed on the **same site** (e.g. weather station with several data loggers)
- From **multiple devices** logically connected to each other but **not installed in the same site** (e.g. different weather stations belonging to a group with characteristics in common)

Geo-localization



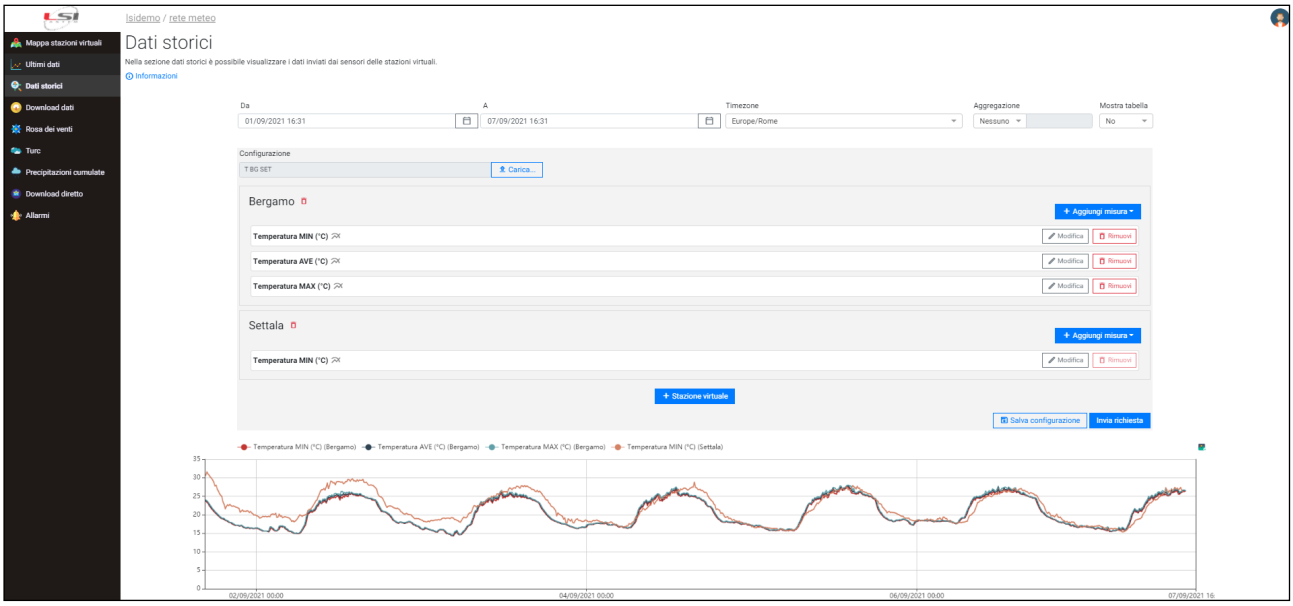
*Map-based visualization of the **station position** with name, description and photo. There is a button to view the latest data.*

Display and analysis of data from the last 72 hours

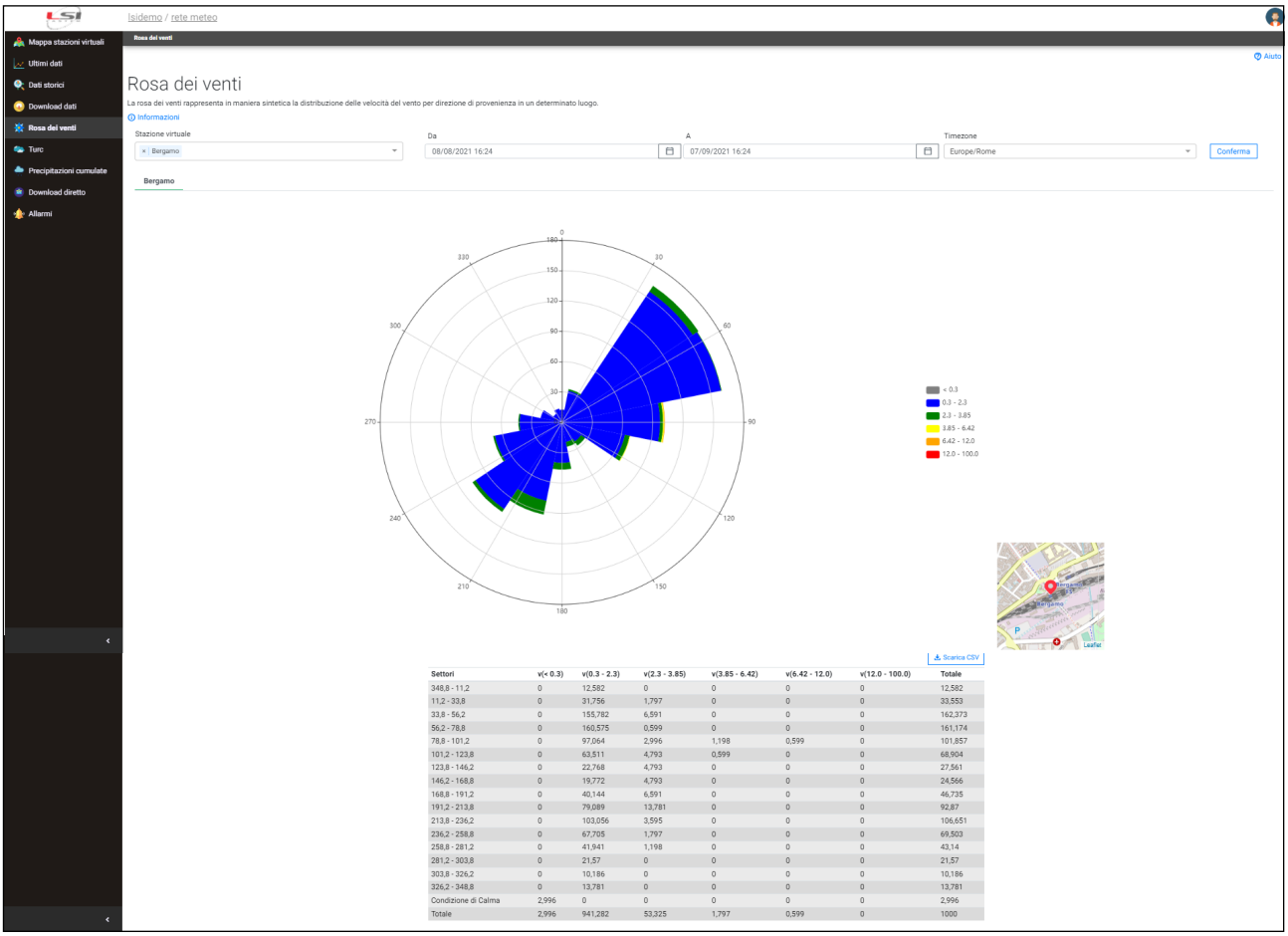


*Display of the **data collected in the 72 hours with graphs and a table** of the station values. The user can configure which measurements to show on this screen. Data from different stations can be displayed in parallel windows.*

Historical data visualization

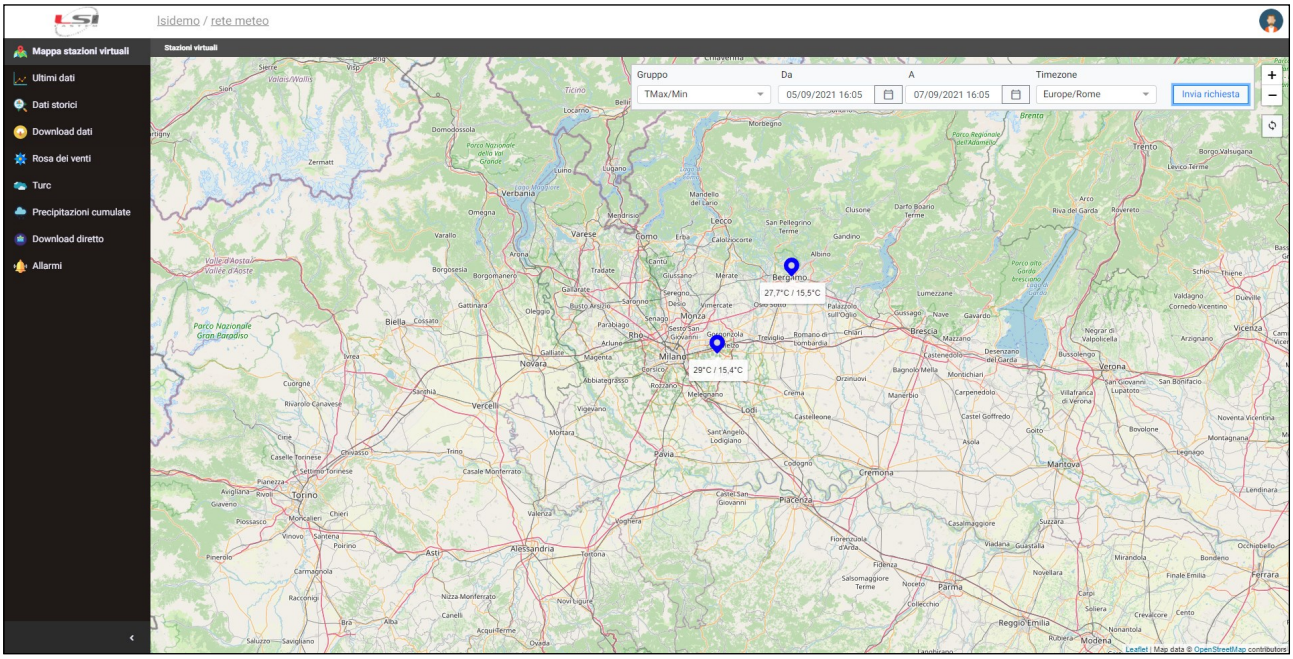


***Graphic and tabular visualization of historical values**. Selection of historical data with different reprocessing options. On the same graph it is possible to display quantities from different stations to make comparisons. The configuration of the choices can be saved and recalled at a later time to repeat the extraction.*



Settori	v(< 0.3)	v(0.3 - 2.3)	v(2.3 - 3.85)	v(3.85 - 6.42)	v(6.42 - 12.0)	v(12.0 - 100.0)	Totale
348,8 - 11,2	0	12,582	0	0	0	0	12,582
11,2 - 33,8	0	31,756	1,797	0	0	0	33,553
33,8 - 56,2	0	155,782	6,591	0	0	0	162,373
56,2 - 78,8	0	160,575	0,599	0	0	0	161,174
78,8 - 101,2	0	97,064	2,996	1,198	0,599	0	101,857
101,2 - 123,8	0	63,511	4,793	0,599	0	0	68,904
123,8 - 146,2	0	22,768	4,793	0	0	0	27,561
146,2 - 168,8	0	19,772	4,793	0	0	0	24,566
168,8 - 191,2	0	40,144	6,591	0	0	0	46,735
191,2 - 213,8	0	79,089	13,781	0	0	0	92,87
213,8 - 236,2	0	103,056	3,595	0	0	0	106,651
236,2 - 258,8	0	67,705	1,797	0	0	0	69,503
258,8 - 281,2	0	41,941	1,198	0	0	0	43,14
281,2 - 303,8	0	21,57	0	0	0	0	21,57
303,8 - 326,2	0	10,186	0	0	0	0	10,186
326,2 - 348,8	0	13,781	0	0	0	0	13,781
Condizione di Calma	2,996	0	0	0	0	0	2,996
Totale	2,996	941,282	53,325	1,797	0,599	0	1000

***Wind rose display**. Wind rose management with tables and graphs of the frequency distribution in the wind speed classes in the single station. Data from different stations can be displayed in parallel windows.*

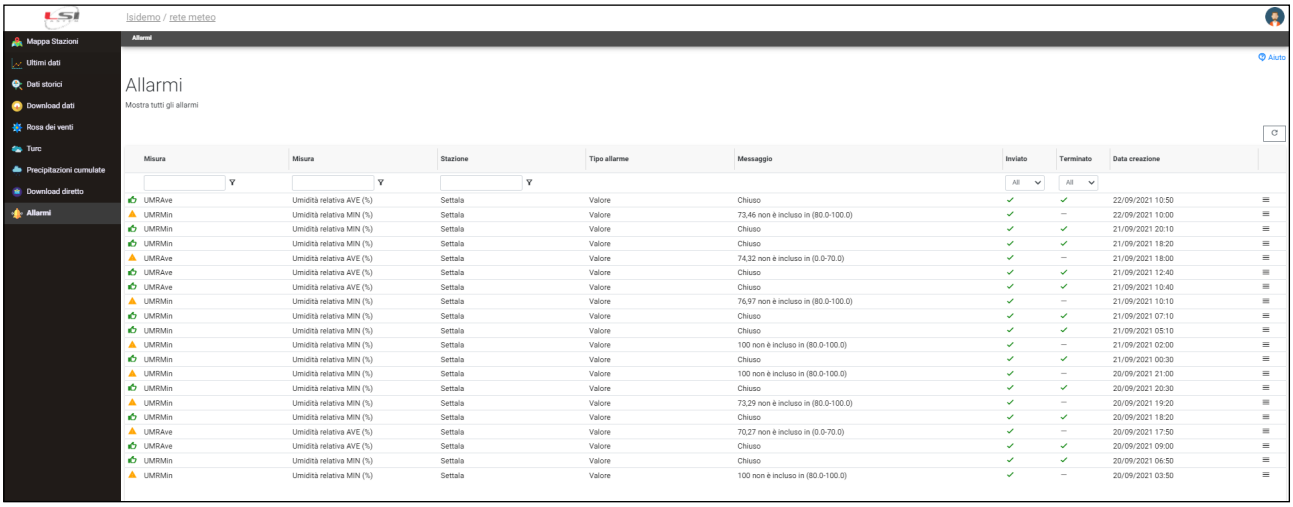


Aggregation of measurements from different stations on map. *The user can configure which quantities to show on the map and with which statistical processing. In Figure Tmax / Tmin for two stations during a selected time period.*

Historical data download

The platform allows an easy download of historical data. The user can download certain **series of measured or calculated quantities** that can be selected from the list of **different stations** for a certain period of time.
The data can be downloaded as raw values or aggregated with **statistical temporal processing**.
The generated files are in **text or Excel format**.
It is possible to save **download configurations** (stations, measured quantities, processing rates) in order to easily repeat the same data export over time.
The platform allows the creation of an **access Token for direct download by the user** (additional module **SWCLA3030**).

Alarms



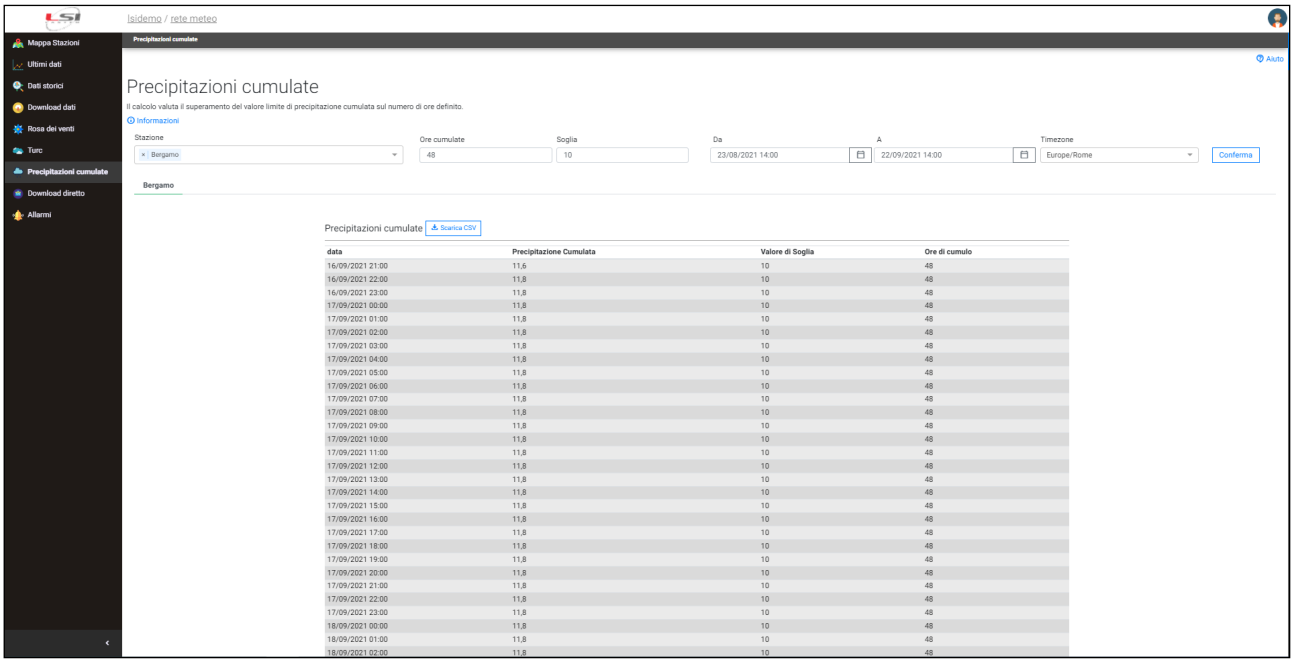
The user can configure ***thresholds on the individual quantities****, measured or calculated by the station, and be alerted when the thresholds are exceeded. In the display console it is possible to view the* ***the alarm history*** *that have occurred, accompanied by some additional information (quantity, value, station, type of alarm, message, status, etc ...)*

Additional modules

Evapotraspiration module TURC (SWCLA3010)

The Turc model *for calculating evapotranspiration is integrated into the platform. Turc's empirical equation (1961) is based on monthly averages of global daily radiation, temperatures and reactive humidity of the air.*

Cumulated rain module (SWCLA3020)



Cumulated precipitation evaluation module. The module allows to calculate if the total rainfall in a given time interval exceeds a limit value set by the user.

Air Quality Model (SWCLA3040)

*Calculation module of the **diffusion of odors or gaseous pollutants** with visualization of the isoconcentrations on cartographic basis. Calculation of the **average concentration** over a selected period with the possibility of displaying the percentage with respect to the maximum value. Calculations based on the **WinDimula** multi-source Gaussian model developed by **ENEA** (National Alternative Energies Body) and recommended by the **ARPA Agency**.*

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