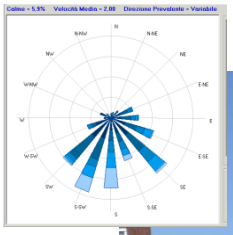
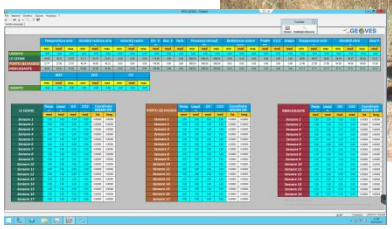
MICROMET3IB – WEATHER STATIONS FOR FOREST FIRE PREVENTION (Rev.3 110121)

MicroMet3IB weather station has been designed to measure climatic conditions which allow to calculate all indeces linked to the determination of forest fire hazard.
Furthermore **MicroMet3IB** station has been used, during the occurence of the forest fire, to evaluate wind conditions and provide a prompt support to put out the fire. For this purpose the station is tipically provided of the following sensors/ measures:

1. Wind speed and direction
2. Air temperature and rel. humidity
3. Rainfall
4. Global solar radiation
5. Temperature and rel. humidity of fuel stick sensor (estimate of the incendiability of the wood litter)
6. Atmospheric pressure
7. Evapotranspiration (calculated with Penman Monteith's method)





The instrumental equipment of the station allows to supply all the input data for the calculation of the following indices:

- Estimation of **water deficit** (depending on rainfall, number of days since the last precipitation and max temperature)
- **Aridity index** (as a function of evapotranspiration and precipitation)
- **Forest fire risk index** (as a function of wind speed, humidity and air temperature aridity index)

All instruments employed in the **MicroMet3IB** stations have bee designed and made in compliance with **WMO** guidelines (World Meteorological Organization – Annex 8) using professional meteorological sensors, made by Geoves and certifiable by the mains calibration laboratories such as **Accredia**, **WMO** and **Measnet** in conformity to the **European** and International norms.

Advantages

- ✓ Instruments **WMO** compliant and **Accredia** certifiable
- ✓ **Low consumption** and possibility of powering with photovoltaic panel
- ✓ **No property communication protocol**
- ✓ **Standard text data format** (CSV format) compatible with Excel, database and the most common softwares available in the market.
- ✓ **No connection charges** (with GPRS wireless transmission and photovoltaic panel power supply)
- ✓ **Critical working conditions** (presence of salinity, ice, sand, corrosive agents, high temperature excursions, etc…)
- ✓ **High accuracy, reliability, long-life** and **minimum requested maintenance**
- ✓ **Fully italian technology**

Fire fighters intervention during a forest fire

Geoves Snc
Via Magg.Piovesana, 155/a 31015 Conegliano (TV) - Italy
C.F. e P.IVA: 04433390269
tel.: +39 0438 22099 fax: +39 0438 420668
E-mail: info@geoves.it http://www.geoves.it

Technical Data

DATALOGGERS	
Model	**mMET3 – Multichannel Datalogger**
I/O Channels	**8 analog inputs** (+ 8 option on Expa8 interface): in voltage or current (typ.0…5Vdc or 4…20mA); **2 insulated digital inputs (pulse counter)** for sensors with "high" frequency up to 50KHz (anemometers, flow gauges, ecc…) and with "low" frequency output (rain gauges), sensors that requires the time counting (sunshine duration, leaf wetness,…), on/off signal (free-contacts); **1 auxiliary input** settable as **analog or digital**
Power supply	10…14.4Vdc (typical 12Vdc); On-board battery charger, input from photovoltaic panel, with battery monitoring (deactivation of the load <10,5Vdc, restart >12Vdc) or power supplier 220Vac/12Vdc
Average autonomy of a weather station with 7 measures	**>15days**: with 12Vdc/7Ah battery, 20W photov. panel, storage: 5' transmission: 60' **>30days**: with 12Vdc/18Ah battery, 30W photov. panel, storage: 5' transmission: 60'
Data communication	via GPRS on FTP area
Alarms transmission	via e-mail using MeteoGraph web software (with GPRS data transmission)
Programming	On site: setting of text file in the SD Card memory By remote: by sending of setting file on FTP area
Settable parameters	Alarm threshold for every measure (settable as rising or falling overflows); Storage rate (5, 10, 15, 30 or 60'); Transmission rate (5, 10, 15, 30 or 60'); Date and time with NTP synchronization (network time protocol)
Elaborations	Min, max (gust), arithmetic average, standard deviation, turbulence; trigonometric average; sum; diagnostic measure for battery voltage. Calculable measurements (if the weather sensors that allow the calculation are present): Evapotranspiration Et0, TD Dew point temperature, TWB wet bulb temperature
Data storage	Backup of 500 days data with circular storage
Conformity	Annex 8 – WMO (World Meteorological Organization)
Working temperature	-30…+70°C
IP65 Enclosure	Plastic material Dim.(LxHxP): 250x350x160mm, key closure and universal brackets for mounting on the pole.

mMET3

Datalogger mounting in the IP65 container

METEOROLOGICAL SENSORS

Model	**mSTAUR – Air temperature-humidity sensor**
Power	9…24Vdc
Typical outputs	0…5Vdc
TEMPERATURE - Range	-40…+60 °C
Transducer	Pt100 with anti-radiation shields
Accuracy	±0.2°C
REL. HUMIDITY - Range	0…100 %
Transducer	Capacitive with anti-radiation shields
Accuracy	±2%

Model	**mWS1 – Wind speed sensor**
Range	0…75m/s
Transducer	Magnetic with sinusoidal AC signal not powered
Typical Output	AC sine wave
Rotation	High performance bearings
Accuracy	±0.1m/s

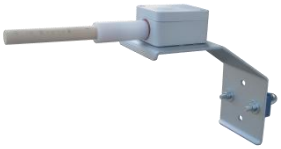
Geoves Snc
Via Magg.Piovesana, 155/a 31015 Conegliano (TV) - Italy
C.F. e P.IVA: 04433390269
tel.: +39 0438 22099 fax: +39 0438 420668
E-mail: info@geoves.it http://www.geoves.it

Model	mWD1 – Wind direction sensor
Range	0…359° (true electric angle 0…352° ±4°)
Transducer	Linear Potentiometer with continuous 360°
Rotation	High performance bearings
Typical output	Resistance changing, nominal 10KOhm
Accuracy	±2°

Model	PIRSC – Silicon cell pyranometer
Measuring range	0…2000 W/m^2
Spectral Range	0.4…1.1µm
Transducer	Silicon cell
Accuracy (typ.)	±4%

Model	RG200 – Rain gauge (available with anti-icing heater)
Range	infinite
Orifice area	200cm^2 (option: 400 cm^2)
Transducer	Double contact (n.o.) tilting bucket
Accuracy	Class B UNI 11452:2012 (class A connected to the Geoves datalogger)
Resolution	0.2 mm/commutation (or 0.1mm 400cm^2 version)
Power supply	Without heater: none; With heater (Vers.-R): 12-24Vdc 60W

Model	SFTH – Fuel moisture temperature sensor for monitoring of forest fires
Output signals	-V 0…5Vdc
Temperature - Range	-40…+60 °C
Transducer	Pt100 with certified ponderosa pine stick
Accuracy	±0.2°C
Rel. Humidity - Range	0…100 %
Transducer	Capacitive with certified ponderosa pine stick
Accuracy	±2%



Model	BAR – Barometer with static port (outdoor applications) mPA – Micro Barometer (indoor applications)
Range (typical)	800…1100 hPa (on request 600…1100 hPa for sites over 1000m above s.l.)
Transducer	Piezoresistive
Accuracy	BAR: ±0.5hPa @ 25°C; mPA: ±0.6hPa @ 25°C
Longterm stability	±0.01hPa / year

OTHER METEOROLOGICAL SENSORS USED FOR FOREST MONITORING APPLICATIONS

Model	STQ – Soil/water temperature probe
Range	-40…+60 °C
Transducer	Pt100 1/3DIN with AISI316 stainless steel head
Accuracy	±0.2°C
Output signals	-N 4 wires Pt100; -V 0…5Vdc; -I 4…20mA

Model	RHT – Soil moisture probe
Typ. Range	0…50% VWC (soil Volumetric Water Content)
Transducer	Dielectric
Accuracy / Resolution	±3% VWC / 0,08% VWC

Geoves Snc
Via Magg.Piovesana, 155/a 31015 Conegliano (TV) - Italy
C.F. e P.IVA: 04433390269
tel.: +39 0438 22099 fax: +39 0438 420668
E-mail: info@geoves.it http://www.geoves.it

MULTIPARAMETRIC SMART SENSOR FOR ALERT IN CASE OF FOREST FIRE

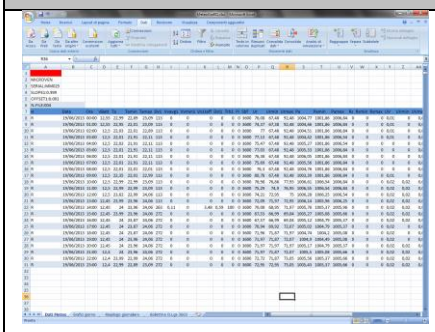
Model	Butterfly-F – Multiparametric sensor "Forest Fire version"		
Description	**Butterfly-F** is a wireless multiparametric sensor for the **forest monitoring and fire alert.** Butterfly can transmit the data with an on-board GPRS modem which sends it in protected internet area (**FTP area**); besides it can send alarms via SMS in real-time to alert the available personnel quickly. The macro-descriptors parameters of a forest fire measured from Butterfly-F are typically: the air temperature and humidity, the carbon dioxide (CO_2). Butterfly-F is positioned at every sensitive point in the forest, it is installed in a simple and fast way, it immediately connects to the GSM / GPRS network to transmit data and alarms. All the main parameters including the alarm thresholds can be programmed remotely.		
Measures		Range	Resolution
	Air Temperature:	-40…+60 °C	±0.01°C
	Air rel. humidity:	0…100% RH	±0.02%
	Carbon dioxide (CO_2):	0…2000ppm	±1% f.s.

Butterfly-F – Model for monitoring and alarm of forest fires

Fix, telescopic and tiltable poles Models:	PF2-55	PF3-55	PTAP10-80	PRBF10-110
Heights (m)	2	3	10 max 2 min	10 max
Raising	None (fix)	telescopic	Telescopic with pump	Balanced tiltable
Diameters (mm)	Base: 55 Top: 55	Base: 55 Top: 50	Base: 80 Top: 40	Base: 170 Top: 70
Weight (kg) guy wires and accessories excluded	6kg	11kg	23kg	170kg
N. of guy wires	none	none	3@120°	none
N. elements	1	1	6	2
Housing material	Galvanized steel	Galvanized steel	Aluminum	Galvanized steel
Required workers for installation	1	1	2	1+truck with crane

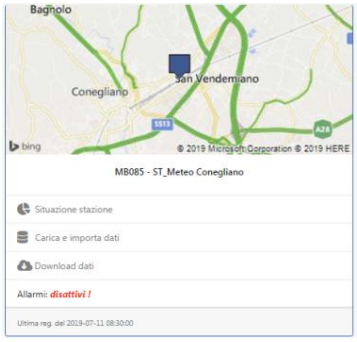
*Other poles are available on request

SOFTWARE

Model	Geodesk & MeteoGraph - Setup software for Geoves datalogger and web service for data management
	**Geodesk** is a basic service software, free supplied with all Geoves datalogger, that can import data recorded (on SD card or sent via GPRS or transmitted by cable from the datalogger) and generate a single data file in Excel format. In this way it's possible to create data aggregation of desired period (eg. Monthly) and then derive the tabular and graphical reports. Besides Geodesk creates the setup configuration for the functioning of Butterfly, Micro3 and LPDL Geoves dataloggers

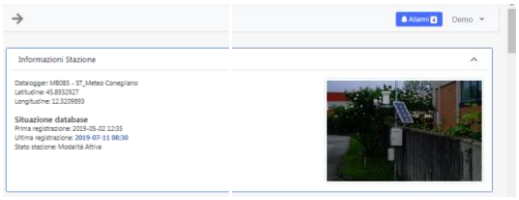
Geoves Snc
Via Magg.Piovesana, 155/a 31015 Conegliano (TV) - Italy
C.F. e P.IVA: 04433390269
tel.: +39 0438 22099 fax: +39 0438 420668
E-mail: info@geoves.it http://www.geoves.it

MeteoGraph is a web application for the numerical and graphic display of data transmitted via GPRS on FTP area from environmental monitoring stations with Geoves datalogger.
The software relies on an FTP Geoves area where data is sent autonomously by the control units at fixed times and are available in **standard text format** with fields separated by commas (**CSV format**).
The data is therefore **always usable** without the need to use proprietary communication protocols or specific programs for data decoding; furthermore, the software **does not require any installation** as Internet access is sufficient and a username and password must be entered to enter the dedicated web page and display the measurements from a PC, tablet or smartphone.
The data in text format are processed by MeteoGraph to obtain on the web page both the measurement in numeric format (eg average minimum maximum trend, etc.) and in graphic format that can be downloaded in jpg bitmap format.



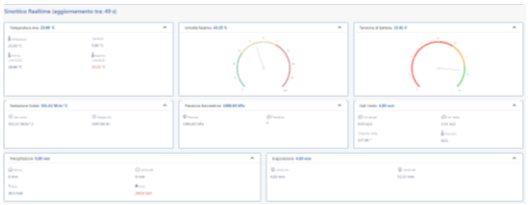
Station dashboard
The available functions are:

- *Station situation*: access to the graphic processing page and to the station's synoptic
- *Load and import data*: the data saved on the datalogger SD card are imported, or on a PC folder (or other support)
- *Data download*: data are downloaded in text format with fields separated by commas for simple backups or subsequent processing with other applications (eg Excel, Access, external databases or other commercially available software)
- *Alarms*: access to the station alarm management menu (optional on request)



Station situation - *Station information*
The parameters displayed are:

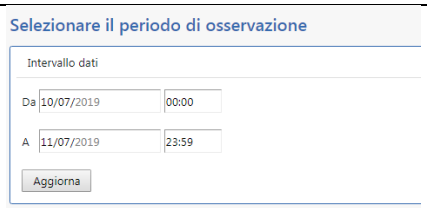
- Station unique identifier (ID)
- Name of the station
- Geographic coordinates (Latitude and Longitude)
- Data base status:
    - Date and time of Start data storage
    - Date and time Last data storage
    - Operation status of the station
- Photos of the station



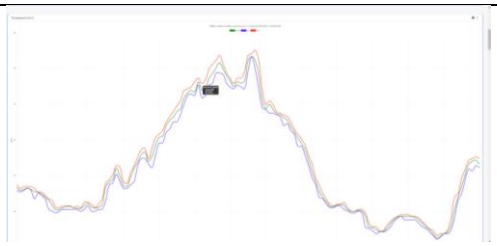
Real-time synoptic of the station
The synoptic is a very useful tool for assessing the situation of the latest measurements taken by the monitoring station and assessing the meteorological or environmental situation of the site. For each measurement it is possible to associate one or more dedicated processes. For example, for the temperature it is possible to indicate the minimum and maximum value and the time in which it occurred in addition to other calculated measures such as the dew point.
The synoptic also shows:

- calculated measures
- Diagnostic data (eg battery voltage)
- Significant data for the interpretation of the measure (eg barometric tendency, wind chill, monthly precipitation, etc.)

Geoves Snc
Via Magg.Piovesana, 155/a 31015 Conegliano (TV) - Italy
C.F. e P.IVA: 04433390269
tel.: +39 0438 22099 fax: +39 0438 420668
E-mail: info@geoves.it http://www.geoves.it

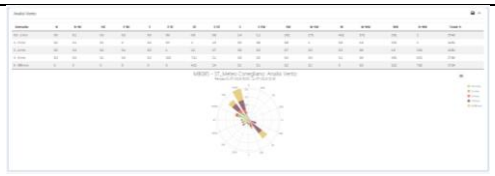


Observation period
It is possible to select the observation period in which to carry out all the elaborations that are displayed by MeteoGraph



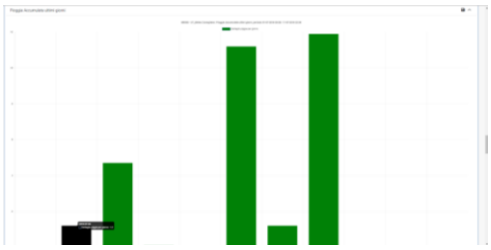
Graphic elaborations

- **Linear multi-line** for measurements where the arithmetic average is applied (eg temperature, humidity, pressure, etc.) with representation of the minimum and maximum value



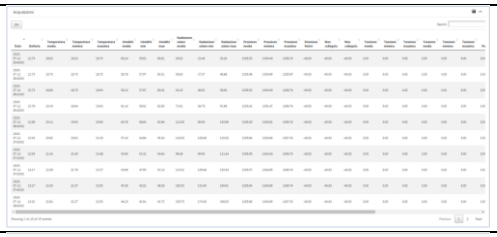
Graphic elaborations

- **Wind-rose** for the anemometer measurements

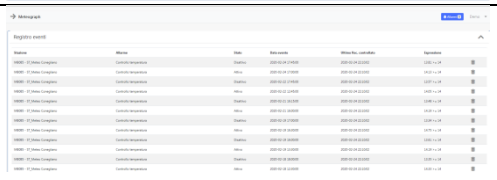


Graphic elaborations for precipitation

- Graph with hourly summation
- Monthly or annual precipitation histogram
- Other graphs are available on request or can be customized with simple filters



Tabular elaborations
Daily data table can be downloaded both in text and in .png image format



Alarm management
To manage alarms, the software allows you to set upward (> value) or downward (<value) intervention thresholds, after which alert emails are sent to the personnel in charge.
The alarms are then represented on the screen with adequate effects and colors to attract the attention of the operator

Geoves Snc
Via Magg.Piovesana, 155/a 31015 Conegliano (TV) - Italy
C.F. e P.IVA: 04433390269
tel.: +39 0438 22099 fax: +39 0438 420668
E-mail: info@geoves.it http://www.geoves.it