Met European Research OBSservatory

MetEROBS

MetEROBS is one of the few European stations that can accommodate equipment that require continuous care and where long-term hydrological monitoring can be conducted with continuity and reliability. Also this unique record allows investigation of climate parameters in the Apennine zone of Southern Italy through two current projects (TEMS-FAO) and GEWEX-CEOP of the World Climate Research Programme.

Major Current Research Themes at MetEROBS

- Modeling of hydrological extremes and rainfall-runoff erosivity at multiple spatial-and temporal scale;
- Assessing climate change at European and highland remote areas.

Station Name:

Met European Research Observatory (Monte Pino–MetEROBS)

Contact Information:

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Associated Web Sites:

- http://www.fao.org/gtos/tems/tsite_show.jsp?TSITE_ID=3730

Station setting: Monte Pino is a hilly village situated in a rural landscape in the South of peninsular Italy about 50 km to the North-East of the centre of Naples, the capital of Campania Region (Fig. 1).

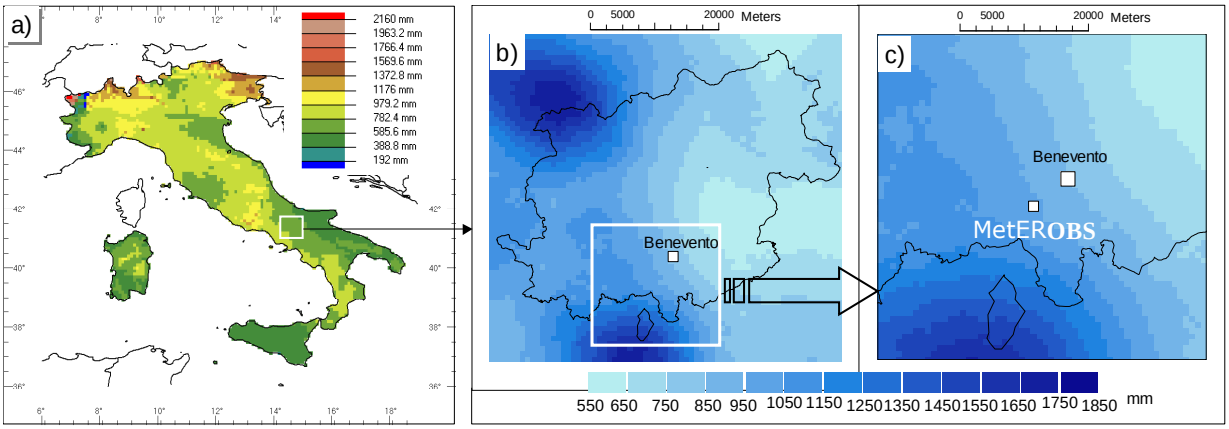

Fig. 1 – Geographic Location and mean annual precipitation (1961-90)-pattern around Monte Pino – site and performed by GISLab-MetEROBS

The coordinates of the Monte Pino–MetEROBS are given by:
41° 06′ 15″ N, and 14° 44′ 25″ E at 184 m elevation.

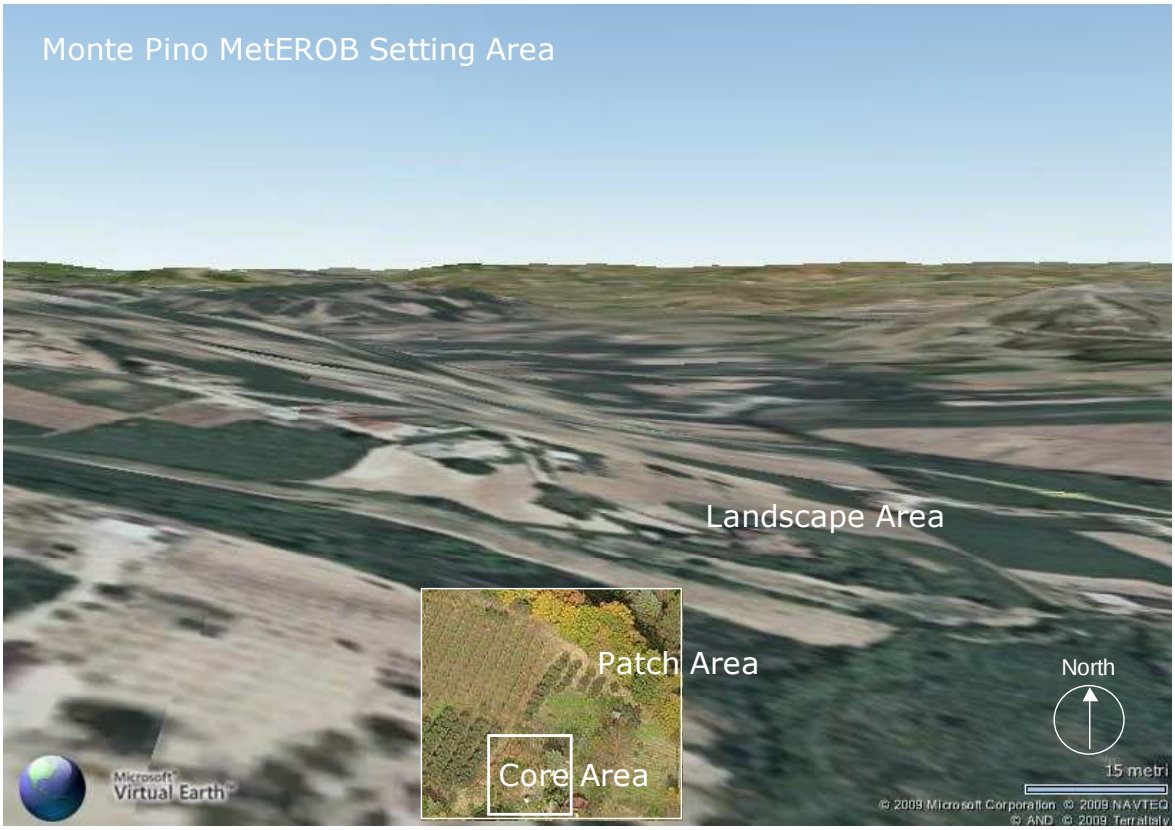

Fig. 2a – Setting Area Map of the MetER**OBS** in the context Benevento landscape's (arranged from Microsoft Virtual Earth)

Landscape Description around MetER**OBS:**

The landscape in the region around Monte Pino hill is formed by undulating surface with height differences above 1000 m towards SW, and 300 m towards NE, over distances of about 20 km (Fig. 2a). The terrain at west of the MetEROBS is more roughness with height differences of 200 m over a distance of about 2 km (Fig. 2b). The core area of the site is sloped and covered by short grass (managed regularly so that the vegetation height is always less then 20 cm), this area is surrounded by grassland and agricultural fields in the immediate vicinity (Olive and fruit tree and copse, see still Figure 2a). The basic installation of the MetEROBS was performed in 1986, and the number of sensors and measurement systems has gradually been complemented over the following years.

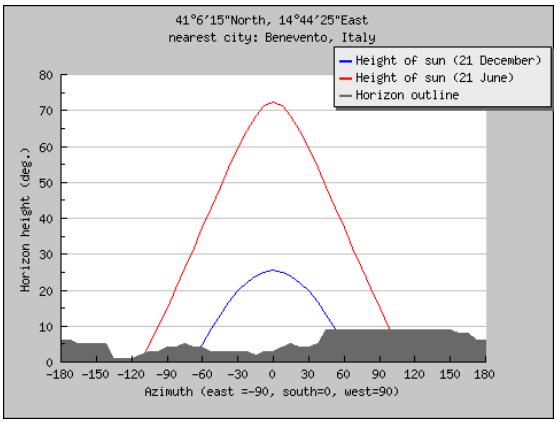

Fig. 2b – Horizon-profile E-W crossing Monte Pino MetEROBS (grey area) with sun-track at solstices (curves)

Station Operator and history:

Observing and modeling data Monte Pino–MetEROBS's are set up according to the World Meteorological Organization guidelines. Its mission is to advance understanding of the Earth's weather and climate interaction, by maintaining its hilly weather station in Calore River Basin – Serretelle watershed since **1986**, as continuing the first records of the close Benevento-historical-station dating back to **1869** (Fig. 3).

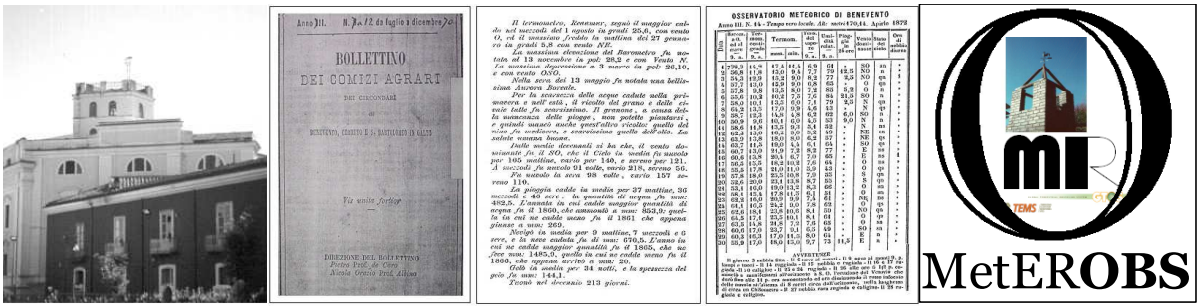

Fig. 3 – Tower and some print of the historical Meteorological Observatory of Benevento

Land-Cover surrounding the station:

For the agricultural fields, olive trees is the dominating cropland, while significant parts of the abandoned farmland are also covered by grass and shrub. The land use classification in the vicinity of the stations depends on the scale considered, a characterisation at different scales is given below.

Land cover within	Monte Pino
10 m	Grass
100 m	Fruit trees and cropland
500 m	Woods and cropland
10 km	grassland / cropland, wood, settlements: 5 %

Seasonal land cover changes:

Grass at the MetER**OBS** site is always kept below about 20 cm vegetation height.

Slope at the site: about 30%

Mean elevation and range of elevations in 1 km pixel: 250 m – 200 m East-West

The soil type distribution in the area around Monte Pino is dominated by Argillous-Marnous.

Climate: Monte Pino represents mild temperate-latitude climate conditions at the transition between marine and continental influences. Monthly mean temperatures (1986-2005) vary between 6 deg C (January) and 22 deg C (July), and the mean annual precipitation sum is 972 mm. The annual precipitation pattern shows different maxima in Autumn and Winter and minima during summertime, with intermediate values in Spring. The Monte Pino MetER**OBS** bioclimogramis shown in Figure 4, where are illustrated water cycle oscillation (precipitation and potential evapotranspiration), and vegetation seasonal pattern.

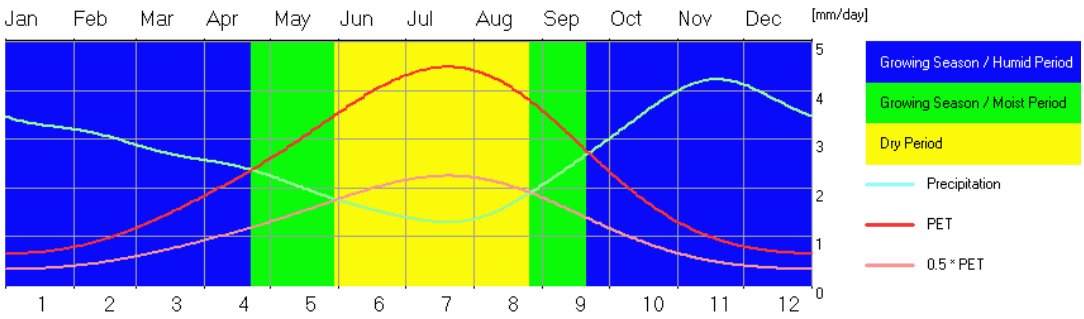

Fig. 4 - Bioclimogram of MetER**OBS** with vegetation seasonal regime (coloured bands), and monthly trend of precipitation (turquoise curve), reference evapotranspiration (red curve) with 0.5 ETo (violet curve), as arranged by New LocClim – FAO software.

MetEROBS Meteorological Parameters Measured and Instrumentation:

SURFACE METEOROLOGY AND RADIATION INSTRUMENTATION AND DESCRIPTION: The meteorological data are measured upon a field opened of about 100 squared-meters (Fig. 5-left). Both the digital and mechanical thermo-hygrometer sensors, plus ordinary instruments (thermometers and psycrometer) are housed in a wooden set-screen free-rain and naturally ventilated at ~ 2 meters from ground (Fig. 5-right). The radiometer, atmometer and rain-gauges are operated around the above set-screen, with high of 2, 1 and 0.5 meters, respectively. In this context, the mechanical measurements are continuosly accompained with the Meteorology Integrate Digital Station (MIDS) to obtain 1-h statistics of surface global radiation, wind speed, wind direction, air temperature and relative humidity and rain-rate. Barometric Pressure is measured in house-laboratory.

Instrumentation technology: Mechanical and digital for conventional meteorological-data; manual for experimental manipulation.

- Station pressure (at 188 meters a.s.l.; Davis)
- Air Temperature (2 m; Davis: Thermistor –40 /+ 70 °C)
- Specific humidity and Dew point (2 m; derived)
- Relative humidity (2 m; Davis)
- Psychrometer (2 m; Hygromat cod 36020)
- Wind speed and direction (6 m; Davis: Wind cups with magnetic switch, and Wind potentiometer, respectively; UPC code 011698 79110 1)
- Precipitation (0.5 m; Davis Pluvio weighing; collector of 400 cm^2 with 0.2 mm resolution)
- Snow depth (Snow stick manual)
- Incoming shortwave radiation (2 m; Davis silicon photodiode sensor 6450)
- ThermoHygrograph Lambrecht (2 m)
- Pluviograph with weakly recording chart (1.5 m; SIAP UM8100)
- Precision thermometers min and max (2 m; SIAP TM7A and TM6A, respectively).

Environmental Data Records at MetEROBS:

Human Observations: Precipitations type, Storm, Snow cover and high, Fog, Ice
Experimental Manipulation: Reference Evapotranspiration; Rainfal erosivity, Soil Erosion,
NDVI arranged from MODIS data (monthly digital database)
Start Date: 1986 for base meteorological-data, except for Solar radiation and water table high; 2001 for Experimental Manipulation**; Current status:** Active
Biome: Mediterranean warm (Agriculture/Arboreous patch and shrub mosaics)

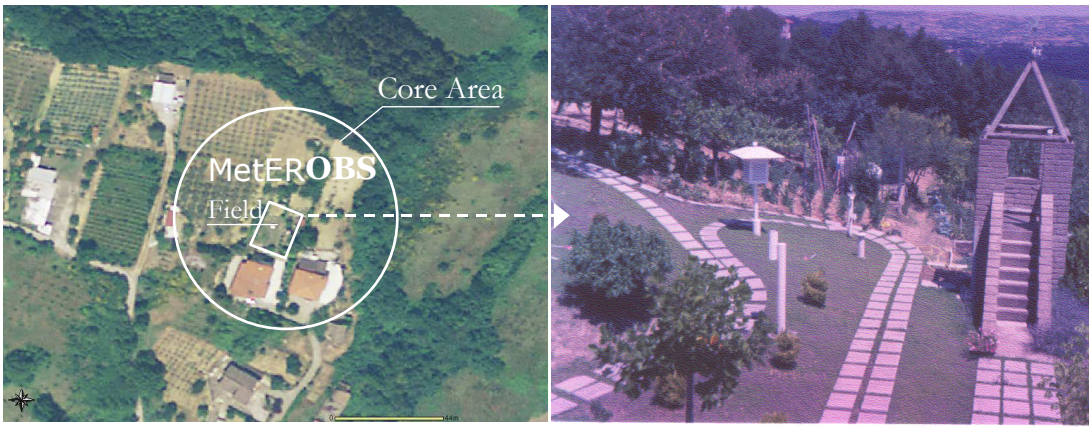

Fig. 5 – Monte Pino MetEROBS core-area satellite image (left) with viewed on the meteorological field (right)

References

1) Diodato N., Bellocchi G., 2010. Storminess and Environmental Changes in the Mediterranean Central Area. **Earth Interaction**. http://journals.ametsoc.org/doi/abs/10.1175/2010EI306.1?journalCode=eint
2) Diodato N., Bellocchi G., 2010. MedREM, a rainfall erosivity model for the Mediterranean region. **Journal of Hydrology** 387, 119–127. doi:10.1016/j.jhydrol.2010.04.003
3) Diodato N., Bellocchi G., 2008. Modelling NDVI responses to climate variability in Mediterranean terrestrial ecosystem. **Environmental Monitoring and Assessment** 44, 147-159.