



GuMNet - The Guadarrama Monitoring Network initiative (Spain)

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GuMNet is a facility that operates continuous observation of the atmosphere, surface and subsurface at the Sierra de Guadarrama, located 50 km north–northwest of Madrid. It is composed of 10 real-time automatic stations and attempts to promote research on weather, soil thermodynamics, boundary layer physics, impacts of climate change on climate and ecosystems and air pollution in the Sierra de Guadarrama. This infrastructure represents a first step into providing a unique observational network in a high protected environment that can serve a wide range of scientific and educational interests and also management.

The stations are located at heights ranging from 900 m.a.s.l. to 2400 m.a.s.l. Every station has been settled in open areas, except for one that can be found in a forested zone. High altitude sites are focused on periglacial areas, while low elevation sites are placed in pasture environments. The atmospheric instrumentation includes sensors used for the measurement of air temperature, air humidity, 4-component radiation, solid and liquid precipitation, snow depth, wind speed and wind direction. For the subsurface measurements, soil temperature and humidity sensors have been placed in 9 trenches up to 1 m depth and 12 boreholes up to 2 m and 20 m depth. One of the low stations has been equipped with a 3D sonic anemometer that includes a CO₂/H₂O analyzer. Wind profiles and eddy-covariance will be sampled, which is important for energy and water vapor exchanges. A portable station has also been equipped with a 3D sonic anemometer, which will enable the comparison between measurements at both sites. The entire network is connected via general packet radio service (GPRS) to the management software at the central laboratory located at the Campus of Excellence of Moncloa (Madrid, Spain).

The database generated by GuMNet is accessible through request and will allow for developing future studies concerning environmental and climate change in middle and high mountain areas. This valuable source of data aims at generating a space for scientific collaboration with other national and international institutions. The diversity of potential uses of the GuMNet observational network will be very useful in education at every level.

This initiative is supported and developed by the research groups that integrate the GuMNet Consortium from the Complutense and Polytechnical Universities of Madrid (UCM and UPM), the Energy Environmental and Technological Research Centre (CIEMAT), the Spanish National Meteorology Agency (AEMET) and the Sierra de Guadarrama National Park (PNSG).

Web and contact: <http://www.ucm.es/gumnet/>