



Geophysical measures on a grassland of the high plateaus in the Vercors mountain (French Prealps): analysis of the local and regional hydroclimatic variations

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Territorial administrators (regional parks and reserves, forestry service, national and regional environmental services) look for precise scientific elements to understand, prevent or mitigate the consequences of climate change on the ecosystem and on the socioeconomic activities of the French Prealps. They wish for example especially to improve the environmental mapping of ecologically sensitive areas related to agro-pastoral activities and the management of water resources in the Vercors massif. Geophysical measures at a local scale should allow scientists to validate outputs of regional climate model which are still widely improvable in mountain context.

This study presents an original network of hydrometeorological measuring equipment installed on a grassland (named 'Meadow of Darbounouse', 44°58'N - 5°28'E; about 0.8 km²) and located at 1300 m asl elevation on the high plateau of Vercors. This little stony basin (3,8 km of perimeter) surrounded by forested ridge lines and located into the Biological Reserve, represents at the same time a well known grazing land and a place of huge thermal amplitude (i.e. <-30°C in winter and >32°C in summer). Hydropedological variations are there also significant for this karstic catchment area, modulated by summer droughts and possible partial flooding from spring melting snow. Since 2005, an automatic weather Campbell station was installed in the North of the basin, measuring rainfall, temperatures, wind and global radiation. In 2009 several meteorological data loggers (temperature and relative humidity) were installed in suburb of the basin. In complement 24 soil moisture sensors (10HS, Decagon Devices) were buried below the surface of the ground (5 and 15 cm) to measure the dielectric constant (i.e. the volumetric water content) at 6 representative places of the basin. Finally a groundwater data logger (OTT Orpheus Mini) based on a pressure probe and for the storage of water level and temperature was settled in the well situated in the center of the meadow.

Thanks to these original measures at air-ground interface in Vercors mountain, the goal of this research is to identify local thermal variations as well as relationships between precipitation and evolution of moisture content of the ground. These results will allow us to better understanding of functional relationship between climate, soil and vegetation in French Prealps, and more widely, the seasonal and interannual hydrological balance.