



On the use of meteorological data to assess the evaporation from a bare soil

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The estimate of the evaporation from the soil is a key-point for the assessment of the local recharge to a phreatic aquifer. On this study, we compared different methods to evaluate the evaporation from a bare soil (Bowen Ratio, Penman and Hamon equations). Experimental data were provided by a field campaign carried out for a period of 16 months in the area of Parco Lambro, in Milano (Italy); meteorological data (atmospheric pressure, rainfall, humidity, wind velocity and air temperature, net and incident solar radiation) were collected, together with soil data (volumetric water content, temperature and capillary pressure head). In applying the Bowen Ratio method, we developed an analysis of error propagation to estimate the expected error on the evaporation; in order to avoid possible unphysical results: the samples for which the coefficient of variation on evaporation was greater than an assigned threshold were eliminated from the series. A similar analysis was performed on the Penman results. The evaporation estimates computed by Penman and Bowen Ratio methods were compared with each other in order to verify the consistency with the data measured from an evaporation pan and with the actual soil water content measured by TDR probes. Finally, the comparison between Penman and Hamon method allowed us to develop a statistical model for assigning the real day length, which is one of the parameters necessary to apply the Hamon method. This modified method permitted to obtain good estimates of the potential evaporation using only standard meteorological data.