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Estimation of evaporation from the surface energy balance for soil in a tropical environment.

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Abstract. Nowadays, the estimation of the evaporative flow is a challenge for researchers, given its essential place in the energy and hydrological balance and its implication in the processes of effective and efficient management of water resources. Indeed, the precise quantification of the transfer of energy and mass during the evaporation of water from the soil is essential to improve the understanding of the hydrological cycle and for numerous applications in the fields of environment, agriculture and engineering. Drying of the soil under boundary radiation conditions results in the formation of a dry surface layer, which is accompanied by a shift in the position of a latent heat front from the surface to the subsurface. Thus, detailed study of evaporation dynamics in this near-surface active zone has been mainly limited to modeling, with few measurements available to test the models. The objective of our communication is to estimate the dynamics of the evaporative flow from the energy balance at the surface of an arid soil in the Sahelian zone under different scenarios. The modeling concerns the coupled transfers of liquid water, water vapor and heat is done for a sandy soil with little plant cover. This model is used to evaluate the energy balance at the soil surface and reported by the evaporative flow. This method makes it possible to dispense with very expensive devices for measuring evapotranspiration on agricultural soils such as Eddy covariance. The data used in this study were collected at a measuring station in Saaba, on the outskirts of Ouagadougou, Burkina Faso.

Keywords : evaporative flow, energy balance, soil surface, arid zones, water resources

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