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Towards a comparative study of unsaturated flow models at different spatial scales: the monitoring activity at the point and plot scales

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The dynamics of water in the unsaturated zone has a key role in the hydrological cycle. The understanding and modelling of the relevant processes are fundamental to face issues related with the integrated planning and management of water resources, especially in irrigated areas.

This contribution presents the first results of a research aimed at the identification of the more effective modelling approaches for the description of the water dynamics in the unsaturated zone at different spatial scales starting from the local, to the field (i.e. tens of hectares), to the farm (i.e. hundreds of hectares) and, finally, to the irrigation basin (i.e. thousands of hectares and more). Two sources of uncertainty are taken into account: the first one related to the modelling approach adopted (i.e. physically based models versus models based on a schematization of processes thorough conceptual elements), the second one due to the model parametrisation (i.e. the assignment of values to the parameters of the model, starting from the available information), with the objective to evaluate the relative importance of the two sources at the increasing of the territorial scale. The geographical context is the irrigated territories of the Padana Plain.

In order to provide data for the research, an intensive field activity has been conducted during the last agricultural season at the local and field scales, at the experimental farm A. Menozzi of the Milan Faculty of Agriculture. In the agricultural season 2007

the investigations will cover the farm and the irrigation basin scales. For the monitoring at the local and plot scales a micrometeorological eddy-correlation based station, several soil moistures probes and tensiometers, heat flux plates and soil temperature for soil heat flux monitoring, standard agro-meteorological sensors, PAR sensors and five piezometer have been installed in an experimental site in a corn field, approximately 10 ha in size. In addition, spatially distributed measures of vegetation growth, soil moisture and perched water table depth have been conducted over the field periodically.

Results of the monitoring activities, together with the first findings of a models intercomparison exercise will be shown and discussed in the presentation.