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The monitoring and control of space-time moisture distribution in unsaturated soil with a sensitive informatic system

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The monitoring an control of the humidity distribution of unsaturated soil in time and space allow forecast of two processes, essential in the management of groundwater resources:
• recharge of aquifers;
• multiphase migration fluid associated with groundwater.

In order to obtain a wide range of information on fluid migration in heterogeneous zones was developed a sensitive informatic system. The main components of the system are:
• rain gauge to measure rainfall in the experiment area;
• batteries of sensors for recording temperature and electrical conductivity of water, suction potential;
• drip irrigation system;
• pressure transducers installed in boreholes made for hydrostatic level monitoring of aquifers
• software and adequate computer system.

The experiment was conducted in an agricultural area, and wishes to use the results to be followed to optimize the irrigation system in terms of global climate change affecting water resources of surfaces and underground.

Making and installing the monitoring system was preceded by the creation of a 3D lithologic model that allows differentiation processes on soil types.

Placing batteries sensors was chosen based on preliminary results of a geophysical exploration that allowed assessment of the initial state of the monitored soil volume. Battery configuration of sensors ensures measurement of temperature, electrical conductivity, moisture and suction potential at various depths and in real time.

The data were integrated in a stochastic model that allows forecasting of fluid dynamic in the unsaturated zone and to assess uncertainties associated with different areas and periods of time.