Geophysical Research Abstracts
Vol. 14, EGU2012-12621, 2012
EGU General Assembly 2012

Soil moisture monitoring in Candelaro basin, Southern Italy

C. Campana (1,2), V. Gigante (1), and V. Iacobellis (2)

(1) Autorità di Bacino della Puglia, Bari, Italy (claudia.campana@adb.puglia.it), (2) Dipartimento di Ingegneria delle Acque e di Chimica, Politecnico di Bari, Bari, Italy (v.iacobellis@poliba.it)

The signature of the hydrologic regime can be investigated, in principle, by recognizing the main mechanisms of runoff generation that take place in the basin and affect the seasonal behavior or the rainfall-driven events. In this framework, besides the implementation of hydrological models, a crucial role should be played by direct observation of key state variables such as soil moisture at different depths and different distances from the river network. In fact, understanding hydrological systems is often limited by the frequency and spatial distribution of observations. Experimental catchments, which are field laboratories with long-term measurements of hydrological variables, are not only sources of data but also sources of knowledge.
Wireless distributed sensing platforms are a key technology to address the need for overcoming field limitations such as conflicts between soil use and cable connections.
A stand-alone wireless network system has been installed for continuous monitoring of soil water contents at multiple depths along a transect located in Celone basin (sub-basin of Candelaro basin in Puglia, Southern Italy). The transect consists of five verticals, each one having three soil water content sensors at multiple depths: 0,05 m, 0,6 m and 1,2 m below the ground level. The total length of the transect is 307 m and the average distance between the verticals is 77 m. The main elements of the instrumental system installed are: fifteen Decagon 10HS Soil Moisture Sensors, five Decagon Em50R Wireless Radio Data Loggers, one Rain gauge, one Decagon Data Station and one Campbell CR1000 Data Logger.
Main advantages of the system as described and presented in this work are that installation of the wireless network system is fast and easy to use, data retrieval and monitoring information over large spatial scales can be obtained in (near) real-time mode and finally other type of sensors can be connected to the system, also offering wide potentials for future applications.
First records of the wireless underground network system indicate the presence of interesting patterns in space-time variability of volumetric soil moisture content, that provide evidence of the combined process of vertical infiltration and lateral flow.

ACKNOWLEDGEMENT
The research in this work is supported by the MIRAGE FP7 project (Grant agreement n. 211732).