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Monitoring and modeling of water flow and solute transport in the soil-plant-atmosphere system of poplar trees to evaluate the effectiveness of phytoremediation techniques.

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This work is part of a series of studies being carried out within the EU-Life+ project ECOREMED (Implementation of eco-compatible protocols for agricultural soil remediation in Litorale Domizio-Agro Aversano NIPS). The project refers to Litorale Domitio-Agro Aversano that has been identified as National Interest Priority Site (NIPS) and includes some polluted agricultural land belonging to more than 61 municipalities in the Naples and Caserta provinces of the Campania Region. The major aim of the project is to define an operating protocol for agriculture-based bioremediation of contaminated agricultural soils, also including the use of plant extracting pollutants to be used as biomasses for renewable energy production.
This contribution specifically address the question of evaluating the effectiveness of phytoremediation actions selected by the project in the pilot area of Trentola-Ducenta and will provide some preliminary results of monitoring and modeling activities. A physical and hydraulic characterization has been carried out in this area where poplar trees were planted. Monitoring of water flow, root water uptake and solute transport in the soil-plant-atmosphere is under way with reference to two trees using capacitance soil moisture and matric potential sensors located at three different soil depths, whereas plant water status and evapotranspiration fluxes are indirectly estimated using fast-responding stem dendrometers.