



Chloride transport in a “Terra Rossa” soil: Relationship between local-scale and field-scale transport parameters

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Transport processes were studied by means of a field tracer experiment carried out on a soil pedologically classified as Terra Rossa localized in Apulia region (Italy). A plot 40m x 3m, as intake area of a tile-drain 0.5 m deep, was irrigated to steady-state tile drain flow; Chloride was added as a tracer, and irrigation was continued for up to 40 days. Chloride concentration was subsequently measured at the tile-drain with an ECmeter and in unsaturated zone by TDR probes inserted at three depths (0-15cm, 25cm, 40 cm) in 40 locations along a 40 m transect at constant distance 1m apart. The experiment was numerically simulated using generalized transfer function (GTF) embracing both convective-dispersive and stochastic-convective models, as well as any transport processes in between. Calculated solute fluxes leaving the unsaturated zone were used as the input data of the model for transport in the saturated zone. Drain effluent concentration predicted with the coupled unsaturated-saturated transport model was compared to the observed breakthrough curve. Results indicated the presence of preferential flow in the unsaturated zone.