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Geophysical Research Abstracts,
Vol. 11, EGU2009-6026-1, 2009
EGU General Assembly 2009

A plot scale modelling investigation of infiltration processes in a landslide.

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Hydrological modelling is essential to understand infiltration and recharge processes in landslides located in black marls in South Alps. The high heterogeneity of the marl soil (preferential flows, regolith of marl more or less fragmented) increases the difficulties of investigation and modelling. An artificial rainfall experimentation has been carried on a 100 m2 plot in a landslide located at Draix in the French South Alps. The plot was equipped with 28 piezometers, water content sensors, electric conductivity sensors, water levels sensors. During 72 h, 14.2 m3 (=11mm.h-1) of water enriched in bromide and chloride were injected. In agreement with an usual convection-dispersion process, tracer concentrations decreased with depth and the tracer signal was attenuated downwards which showed the impact of the lateral flow. However, piezometric variation was higher in the deep layers than in surface layers. The water balance and hydrochemical results indicated that 60% of the injected water was due to surface runoff and subsurface lateral flows accounted for 30%. Two hydrologic modelling approaches were carried out to investigate these processes. The first one was a 2D modelling along a flow line with Hydrus 2D (Simunek; 2006). The second was based on the 1D PASTIS model (Lafolie, 2007) and operated in pseudo 3D by juxtaposition of 1D columns interacting simultaneously. We will show the first results of the two approaches and their advantages and limits in this heterogeneous soil.

Simunek, J., M. Sejna et M. T. Van Genuchten (2006). The Hydrus-2D/3D software package for analysis of water flow and solute transport in variably saturated porous media. US Salinity laboratory, Agricultural Reaserch Service, US department of agriculture. Riverside, California.

Lafolie F. 2007. The PASTIS software for simulating 1D water flow, solute transport and heat and gas flux in soils coupled with various biotransformations and crop growth. UMR EMMAH, INRA, Avignon France.