



Analysis and quantification of preferential flow during plot scale infiltration tests on an active mudslide, French Alps.

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Three 1x1m² infiltration experiments were carried out, between 20 and 25 July 2008, in the black marls mudslide of Super-Sauze in the Southern Alps of France. The aim of this experiment was to study the hydrological system in three morphologically different parts of the landslide and preferential flow (especially fissures flow) within those areas. For each plot two periods of 7-8 hours artificial rain was applied in time blocks of 15 min rain and 15 min break with average intensity of approximately 50 mm.h⁻¹. Manual and automatic measurement of groundwater level in the piezometers (5 per plot from 1 m to 3 m deep) was performed to monitor local hydrological response. Cumulative overland and subsurface flows were measured after each time block. Special attention was given to characterise preferential infiltration patterns (through the fissure system). To achieve this, chemical tracers (Br- and Cl-) were used to investigate infiltration processes, to quantify the mixing of rainwater with pre-event water and to assess the travel time of water. For each plot, bromide was applied over the first simulation period and chloride over the next one. Groundwater (in all piezometers) and surface water were sampled after each time block.

The impact of soil surface features was observed with both water level monitoring and hydrochemical data. The infiltration processes were characterized according to the description of the fissures system (apparent length and depth, sediment filling, density) and the hydraulic behavior of macropores (connectivity, mixing with pre-event water). The full results obtained during the three infiltration experiments will be presented and discussed to describe and quantify the role of preferential flow in the highly heterogeneous mudflow of Super-Sauze, France.