Geophysical Research Abstracts
Vol. 16, EGU2014-15947, 2014
EGU General Assembly 2014

Groundwater flow and hydrochemistry in mountain areas affected by DSGSDs

Giovanni B. Crosta, Paolo Frattini, Fredy Pena Reyes, and Federico Riva

Universita' degli Studi di Milano - Bicocca, Earth and Environmental Sciences, Milano, Italy (paolo.frattini@unimib.it, +39 02 6448 2073)

Large slope instabilities such as DSGSD and rockslides locally affect the groundwater flow at the slope scale. These phenomena present morphostructures (scarps, counterscarps and trenches) parallel to the slope direction that control the surface water runoff, directing it transversal to the slope dip and favouring its percolation within the slope through the more conductive materials aligned with the trench . This also affects the slope hydrochemistry, locally controlling the solute transport and circulation. The upper Valtellina (Central European Alps, Northern Italy) is characterize by a high density of DSGSD phenomena, with 29 DSGSDs within an area of about 900 km2 (Crosta et al, 2013). The study area ranges from 1150 to 3500 m in altitude, and shows a clear glacial imprint, which significantly influenced the geomorphology and water distribution in the study area. In order to characterize the groundwater flow and the hydrochemistry of the area, we collected historical data analysis (4070 samples from springs, wells, lakes, rivers and public fountains), and we performed four seasonal campaigns, from summer 2012 to spring 2013, to complete a hydrologic year. During these campaigns, we measured the spring discharge, and we collected samples for chemical (anions and cations) and isotopic (tritium, deuterium and O18) analyses in more almost 40 selected spring located throughout the study area. These springs were selected because representative of main spring clusters, with a particular attention to problems related to the presence of Arsenic in high concentration. In this study, we analyze the effect of DSGSD phenomena on the aquifers of upper Valtellina through the quantitative analysis of hydro-chemical and isotopic data. We show how these phenomena affect the ground water flow also in relation to the presence of geological structures that are associated and locally reactivated by DSGSDs.