Geophysical Research Abstracts
Vol. 20, EGU2018-8943, 2018
EGU General Assembly 2018

Comparison of present-day and long-term weathering rates in a small granitic catchment (Strengbach - France): Implication for the critical zone functioning

Francois Chabaux (1), Julien Ackerer (1), Jérôme Van der Woerd (2), Daniel Viville (1), Yann Lucas (1), and Philippe Négrel (3)

(1) CNRS/Université de Strasbourg, LHyGeS, Strasbourg, France (fchabaux@unistra.fr), (2) CNRS/Université de Strasbourg,IPGS, Strasbourg, France., (3) BRGM, Orléans, France

Comparison of current weathering and erosion rates with pre-anthropic values can give interresting information on the impact of human activity on critical zone functionning. Curent alteration rates can be obtained by environmental monitoring, while the characterization of pre-anthropic values is often difficult to recover, especially for systems that do not contain recorders of weathering processes with a sufficiently fine time resolution over the last millennia. Here it is proposed to show how the comparison of current weathering and erosion rates deduced from the analysis of riverine dissolved and solid loads with the long-term values, estimated from geochemical analyses of weathering profiles, can bring relevant information for characterizing the human activity impact on the critical zone functions/functioning. This approach is illustrated with the results of recent works performed on the Strengbach catchment (Viville et al., 2012; Ackerer et al., 2016). The analysis along a weathering profile of in situ 10Be concentration, U-Th-Ra radioactive disequilibria and major element concentrations makes it possible to reconstruct the long-term weathering and erosion history of the watershed at the location of the profile. With such an approach it is therefore possible to estimate the average long-term, i.e. over the last one hundred thousand years, of the weathering rate. The comparison of this value with the values deduced from the hydro-geochemical monitoring of the Strengbach stream at its outlet and of small springs emerging on the watershed point out that the total, as well as the Si weathering fluxes are relatively similar to the long-term ones. Only the cationic weathering flux show significant differences. These results provide the theoretical framework for the use of this approach for the study of other sites.
Ackerer et al., 2016, EPSL 453, 33–43.
Viville et al., 2012 Catena 92, 122–129.