Geophysical Research Abstracts
Vol. 18, EGU2016-9381, 2016
EGU General Assembly 2016
© Author(s) 2016. CC Attribution 3.0 License.

Erosion dynamics in Chile

Sebastien Carretier (1,2), Violeta Tolorza (2), Vincent Regard (1), Rodrigo Riquelme (3), and German Aguilar (4)

(1) Géosciences Environnement Toulouse, OMP, IRD, UPS, CNRS, Université Toulouse, France (sebastien.carretier@get.omp.eu), (2) Department of Geology, FCFM, Universidad de Chile, Santiago, Chile, (3) Facultad de Ingeniería y Ciencias Geológicas, Universidad Católica del Norte, Avenida Angamos 0610, Antofagasta, Chile., (4) AMTC, FCFM, Universidad de Chile, Santiago, Chile

Erosion and sediment transport in arid environments is thought to depend on the frequency of large floods as well as on mean precipitation rate and slope, but their relative impact remains a matter of active debate. The Chilean Andes are elongated along a sharp precipitation rate gradient, offering the possibility to rank these factors over different time spans. We compare suspended load measurements-derived decennial erosion rates and 10Be-derived millennial erosion rates along this gradient. Both parameters follow the same latitudinal trend and peak where the climate is Mediterranean (mean runoff $\sim$0.55 m/m), confirming that slope is the main factor even along this contrasted climate. The comparison of these erosion rates documents the progressive contribution of rare and strong climatic events on the millennial erosion from humid to arid catchments. In the wetter BíoBio catchment, the separation of suspended sediment yield during base and direct flows shows that the dynamics of groundwater circulation controls most of the sediment hysteresis at gauging stations at annual scale. In addition, the mega El Maule earthquake (Mw8.8 in 2010), in front of humid to semi-arid catchments, has not increased the suspended sediment concentration in rivers, excepted in the steepest and driest catchments. Over millennial scales, preliminary 10Be concentrations in individual gravels and cobbles suggest mean river transport rates of several m/yr in an arid canyon of north Chile.