



U-Th and ¹⁰Be constraints on sediment recycling in proglacial settings, Lago Buenos Aires, Patagonia

Antoine Coge (1), Frédéric Herman (1), Eric Pelt (2), Kevin Norton (3), Christopher Darvill (4), Marcus Christl (5), Gilles Morvan (2), Thierry Reuschlé (6), and François Chabaux (2)

(1) University of Lausanne, Institut des Dynamiques de la Surface Terrestre, Maudsland, Switzerland (antoine.coge@unil.ch), (2) University of Strasbourg, LhyGeS, Strasbourg, France, (3) Victoria University of Wellington, School of Geography, Environment, and Earth Sciences, Wellington, New Zealand, (4) University of Northern British Columbia, Geography Program and Natural Resources and Environmental, (5) Swiss Federal Institute of Zürich, Ion Beam Physics Laboratory, Zürich, Switzerland, (6) Institut de Physique du Globe de Strasbourg, University of Strasbourg, Strasbourg, France

The sedimentary cycle includes the formation by erosion of rocks, transport and deposition. While erosion and deposition can be documented, the history of sediments between the time it is extracted from the rocks and ultimately deposited into basins remains a major challenge. However, the mechanism of transfer and alteration of the sediments during transport plays a key role in the evolution of basins, feedbacks between erosion and climate, and glacial-interglacial variability of sediment transport and weathering. This is particularly true in proglacial settings because large overdeepenings, in particular, are potential sediment traps for which the efficiency at evacuating those sediments is largely unknown.

The Lago Buenos Aires moraines in Patagonia are particularly interesting because they are imbricated from the older in the outer part to the younger in the inner part of the system. We sampled fine grained sediments from these moraines and measured U-Th isotopes in the 4-50 μm silicate fraction. Deposition ages were refined using ¹⁰Be exposure ages. We show first that the comminution ages model can be improved by measuring also Th isotopes, from which weathering rates can be deduced. Moreover we show from our data that there is a time lag of 300 kyr on average between erosion and deposition in the moraine. This could be attributed to the long residence time of sediments in the lake overdeepening. This conclusion raises perspectives about the transport times and dynamic of the sediments during a whole sedimentary cycle, and the subsequent effect on weathering. This conclusion could also contradict some assumptions commonly made for our erosion rates/sediment fluxes reconstructions based on river sediments analysis, in recently deglaciated catchments.