Geophysical Research Abstracts, Vol. 7, 02763, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02763
© European Geosciences Union 2005

Chemical weathering and Earth climate

B. Dupré[1], C. Dessert[1,2], P. Oliva[1], J. Viers[1], J.Schott[1], O. Prokovsky[1], Y. Goddéris[1], J.J. Braun[1], J. Gaillardet[3]

[1]LMTG, CNRS, IRD, UPS, OMP, Toulouse, France ; [2]Dept. of Earth Sciences, Cambridge, UK ; [3]IPGP, Paris, France.

dupre@lmtg.obs-mip.fr

Continental chemical weathering is a key process of the Earth global geochemical cycles. At the geological timescale, the CO_2 cycle is essentially driven by two processes: the CO_2 degassing and the CO_2 consumption through weathering of continental silicate rocks and the storage of organic carbon in oceanic sediments. We present here the main results obtained recently by our group [1], describing and quantifying the large-scale chemical weathering of silicate rocks, using both large river systems and small basins draining a single type of rock: granites [2] and basalts [3].

One of the most important results is the confirmation of the temperature effect on the global chemical weathering. This effect has been observed for rivers flowing on basalts but also for the granitic watershed having a high runoff. We thus confirm the regulation of the climate of the Earth by a coupling between climate and weathering, but the negative feedback between climate and granite and basalt weathering might be weaker than previously expected. Furthermore, the temperature is not the only mechanism that controls chemical weathering. Other parameters, like nature and age of the soils, bedrock mineralogy and chemistry (including the presence of highly reactive trace minerals), cristallinity of secondary minerals, runoff, physical weathering, and vegetation play a fundamental role. Finally, we will show how the introduction of new weathering laws, based on the studies of river waters, leads to the implementation of new models of past atmospheric CO_2.

[1] Dupré et al., 2003, *C. R. Geoscience*, **335**, 1141–1160 ; [2] Oliva et al., 2003, *Chem. Geol.* **202**, 225-256 ;[3] Dessert et al., 2003, *Chem. Geol.* **202**, 257-273.