

ROCK RECYCLING AS A CONTROLLING FACTOR OF THE
CO₂-CLIMATE-WEATHERING FEEDBACK

JÉRÔME GAILLARDET¹ AND JULIEN BOUCHEZ¹

¹Institut de Physique du Globe de Paris, gaillardet@ipgp.fr

Thirty years after seminal papers discussed the possible controls of tectonic uplift and climate on silicate weathering of terrestrial rocks and associated CO₂ consumption, a consensus is still not reached. However, we have since discovered significant processes that modulate the role of global weathering on the C cycle. Weathering of silicate minerals by sulfuric acid, weathering of carbonate rocks, oxidation of rock organic carbon, and weathering of shales complicate the simple idea of silicate weathering as regulating the Earth's climate over geological time. The common denominator to all these "recently-(re)discovered" processes is sedimentary recycling. With geological time, the nature of the rocks exposed to the Earth's surface have changed because the residues of chemical weathering have accumulated without having been significantly recycled into the mantle. We will show how sedimentary recycling modifies the role of chemical weathering of the Earth's surface and indicate what the research priorities should be to obtain more accurate description and models for the long-term evolution of the atmosphere+ocean system.