Geophysical Research Abstracts
Vol. 15, EGU2013-2191, 2013
EGU General Assembly 2013

Increasing chemical weathering in the Himalayan system since the Last Glacial Maximum

Maarten Lupker (1,2), Christian France-Lanord (2), Valier Galy (3), Jérôme Lavé (2), and Hermann Kudrass (4)

(1) ETH Zürich, Institute of Geochemistry and Petrology, Zürich, Switzerland (maarten.lupker@erdw.ethz.ch), (2) Centre de Recherches Pétrographiques et Géochimiques (CRPG), UPR 2300, CNRS-Université de Lorraine, 15 rue Notre Dame des Pauvres, 54501 Vandoeuvre les Nancy, Cedex, France, (3) Woods Hole Oceanographic Institution (WHOI) – Department of Marine Chemistry and Geochemistry, 360 Woods Hole Rd., Woods Hole, MA 02543, USA, (4) MARUM zentrum für Marine Umweltwissenschaften, Bremen, Germany

Continental chemical weathering is central in Earth's surface biogeochemical cycles as it redistributes elements across reservoirs such as the crust and the oceans. However the evolution of weathering through time and its response to external forcing such as changes in climate remain poorly constrained.
In this work, we use the sedimentary record from the Bay of Bengal (BoB) to document the evolution of the weathering intensity in the Himalayan system from the Last Glacial Maximum (LGM) to present. Sediment cores from the BoB record the products of Himalayan erosion after their transport through the Indo-Gangetic floodplain by the Ganga and Brahmaputra Rivers. The physical setting of the G&B basin remained essentially unchanged over the Quaternary so that the effects of changes in climatic forcing can be isolated.
The degree of weathering of the sediments is documented using mobile to immobile ratios such as K/Si and H_2O+/Si as well as detrital calcite. Robust weathering proxies are derived by correcting the chemical composition of sediment for sorting effects that occur during transport and deposition. The BoB record is also further compared to the chemical composition of modern river sediments from the Ganga and Brahmaputra (G&B) basin. Weathering proxies all indicate that the sediments exported by the G&B Rivers became increasingly weathered over the past $\sim$21 kyr. Additionally, Sr, Nd and major elements suggest a constant sediment provenance in the system over the last 21 kyr. These changes in the degree of weathering of the sediments show that the weathering flux exported by the system to the Indian Ocean during the LGM was significantly lower than at present and demonstrate that chemical weathering in continental scale basins such as the G&B, responds to Late Quaternary climate changes.