Linking isotopic signatures and magnetic parameters as tracers of erosion in the Bay of Bengal over the last 160 ka

V. ROJAS[1*], L. MEYNADIER[1], J-P VALET[1], F. BASSINOT[2] AND C. COLIN[3]

[1]Institut de Physique du Globe de Paris, Université Paris Diderot, Sorbonne Paris-Cité, UMR 7154 CNRS, 1 rue Jussieu, FR-75238 Paris CEDEX 05 (rojas@ipgp.fr).

[2]Laboratoire des Sciences du Climat et de l'Environnement (CEA-CNRS-UVSQ), Domaine du CNRS, Gif-sur-Yvette.

[3]IDES-Laboratoire des Interactions et Dynamique des Environnements de Surface (UMR 8148) - Département des Sciences de la Terre Université Paris-Sud XI, 91405 Orsay.

Sediments from the Bay of Bengal provide an exceptional record of erosion changes in the Himalayan range at different time scales. This area is located at the exit of the major rivers Ganges, Brahmapoutra and Irrawady, that collect monsoon precipitations and provide a large amount of sedimentary material to the basin. The system fluctuates as a fonction of Indian monsoon variations and presents one of the highest erosion rates in the world.

We studied core MD12-3411 of the northern part of the Bay of Bengal (17°10.98´N; 89°28.92´E), which covers the last 160 ka. We measured Nd isotopes of the carbonate and silicate fraction, which correspond to ε_{Nd} seawater and ε_{Nd} detrital, respectively. Detrital values fluctuate between -10 and -14, while seawater values change between -7 and -12. Both fractions are characterized by more radiogenic Nd values during glacial periods and less radiogenic during interglacials. We also measured $^{87}Sr/^{86}Sr$ values of the detrital fraction, which vary between 0.724 and 0.735, with the lowest values during glacial periods and the highest during the isotopic stages 1 and 5a. The Nd-Sr plot points out a sediment origin from the Himalayan and Indo-Burman ranges.

The ε_{Nd} data are compared with magnetic parameters in order to discriminate between influences of continental erosion and weathering, and possible changes on environmental conditions in the basins during the considered period of time. We found that higher values of magnetic susceptibility correspond to more possitive ε_{Nd} and to smaller $^{87}Sr/^{86}Sr$. Sratio show values that vary from 0.9 to 1, indicating a predominance of low coercivity minerals like magnetite. The lowest values occur during isotopic stage 5. ARM20/*K* follows the $\delta^{18}O$ curve and denotes the presence of finer magnetic grains during interglacial periods.