Climatic control on sediment transport in the Bengal region during the Holocene

JOUSSAIN R.[1,2], LIU Z.[1], COLIN C.[2], BASSINOT F.[3]

[1] State Key Laboratory of Marine Geology, Tongji University, Shanghai 200092, China (correspondence: ronan.joussain@gmail.com; lzhifei@tongji.edu.cn)

[2] Laboratoire GEOPS, UMR 8148 CNRS-Université de Paris-Sud, 91405 Orsay Cedex, France (christophe.colin@u-psud.fr)

[3]Laboratoire des Sciences du Climat et de l'Environnement, LSCE/IPSL, CEA-CNRS-UVSQ, Université Paris-Saclay, F-91191 Gif-sur-Yvette, France (franck.bassinot@lsce.ipsl.fr)

Himalayan ranges and Indo-Gangetic plain are drained by one of the world's largest river system: the Ganga-Brahmaputra Rivers. This system is the first in term of sediment transport flux and thus constitutes an interesting region to establish a relation between erosion and climate. Sediments from the Bay of Bengal indicate that the strength of the summer monsoon rainfall is an important factor driving weathering and erosion of the Himalayas.

The results of a high-resolution clay mineralogy study combined with major elements geochemistry and neodymium-strontium isotope composition analyses are reported for two deep-sea cores collected on the levee of the nowadays active channel in the northern part of the Bay of Bengal.

In this study, Cores MD12-3417 & MD12-3418 cover the last 9,800 kyr BP. These cores reveal a monsoon-controlled chemical weathering and physical erosion history through the Holocene, in the Himalayan ranges and the Ganges-Brahmaputra Basin.

Twenty-four new samples for εNd(0) and $^{87}Sr/^{86}Sr$ analyses were selected for the studied period. These results give us information to determine if variations of the elemental composition are related to change of sources or if they are the result of variations in the dynamic of material transport through time. Himalayan ranges are characterized by $\varepsilon Nd(0) \approx -16$ and $^{87}Sr/^{86}Sr > 0.740$, which are consistent with the results for the studied cores ($\varepsilon Nd(0) \approx -15.6$ and $^{87}Sr/^{86}Sr \approx 0.749$).

Clay mineral assemblages are dominated by illite and smectite, with lesser abundance of chlorite and kaolinite.

Furthermore, changes in the clay assemblage through the Holocene might be related to the variation of materials coming from the highlands of the Himalayas and Tibetan Plateau and materials coming from the Indo-Gangetic plain.

Our results show that the materials come from Ganges-Brahmaputra river system and, in turn, resulting from the Indian summer monsoon intensity.

[1] Contreras-Rosales et al., (2014), *Quaternary Science Reviews*, **102**, 133-148 ; [2] Lupker et al., (2013), *EPSL*, **365**, 243-252 ; [3] Weber et al., (1997), *Geology*, **24**, no 4, 315-318.