

BPT002-02

Room:201B

Time:May 25 08:45-09:00

Geochemistry of sediments from the Ganges and Brahmaputra Rivers

H. M. Zakir Hossain^{1*}, Barry P. Roser², M. Sultan-UI-Islam³

¹Jessore Science and Technology Univ., ²Shimane University, ³Rajshahi University

World-scale big rivers play an important role in the transportation of river water and particles to the ocean. The Ganges and Brahmaputra rivers are especially important for reconstruction of Himalayan monsoon climate. Chemical compositions of the Ganges and Brahmaputra River sediments have been determined to investigate their provenance and source area weathering conditions.

Major and trace element concentrations normalized to upper continental crust (UCC) show the sediments in both rivers are depleted in CaO, K₂O, Na₂O, Sr, MgO, Al₂O₃ - Sc and Fe₂O₃ and enriched in Zr, Th, Ce, SiO₂, Y, TiO₂ and Cr. Silica enrichment is caused by quartz concentration, mineral sorting and/or enhanced compositional maturity during fluvial transportation. Chemical Index of Alteration (CIA) ratios in the river sediments (Ganges, ~64 and Brahmaputra, ~60) are low compared to those of Miocene Sylhet sediments in Bangladesh (mostly ~70-87). CIA ratios are low in the river samples because they mostly contain fresh sandy material within the active channels, while highly weathered fine-grained detritus has been transported by the river waters into the ocean. Major element and trace element ratio plots indicate the sediments in both rivers were derived from felsic continental crust sources. A - CNK - FM relationships further suggest minimal weathering of the modern sediments, major contribution from felsic materials, and minor ferromagnesian mineral content. Chemical similarity of the river sediments, the Sylhet and the equivalent Siwalik sequence sedimentary rocks in Nepal represents homogenization of material derived from the Himalayan source, and no major compositional changes have occurred in the source during the last 20 million years.

Keywords: river, sediments, climate, weathering