

PATH OF THE GANGES–BRAHMAPUTRA RIVERINE Sr ISOTOPIC SIGNAL INTO THE SEA

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The Ganges–Brahmaputra river system (G–B) is considered to be a substantial source for the increase of the sea water $^{87}\text{Sr}/^{86}\text{Sr}$ ratio from 0.7077 to 0.7092 observed during the Cenozoic. The reason is a high average $^{87}\text{Sr}/^{86}\text{Sr}$ ratio (0.7213) in comparison to the global mean of world rivers (0.7119). Model calculations (Krishnaswami et al., 1992) suggested that the G–B system contributed about 30 % to the Sr isotope evolution in sea water during the past 20 Ma. These calculations assume that all riverine Sr contributed to the change of the sea water Sr isotopic composition.

For tracing the Sr input by G–B during the Holocene the core 126 KL taken at the uppermost continental slope south of the G–B delta was analyzed. The Sr isotopic ratios of bulk sedimentary carbonate leached by 2.5 N HCl decreased from 0.7097 at the top to about 0.7094 at a depth of 150 cm which corresponds to a ^{14}C -age of about 12 ka. At depths > 150 cm the Sr isotopic ratios scatter between 0.7093 and 0.7094 (see Fig.). This Sr isotopic variation in the carbonate fraction of the sediment is explained by the increased run-off from the Himalayas since the end of the last Glacial period.

In contrast, the Sr isotopic ratios of the surface dwelling planktonic foraminifera (*Globigerinoides ruber*) separated from the same core (between 0.7091 and 0.7093) do not show any systematic variation with depth. This means that the Sr isotopic composition of the surface sea water has not changed significantly due to the riverine Sr input but most of the Sr transported by G–B apparently has been taken up by plankton and deposited in the near shore sediment. Strontium isotopic ratios of water sampled 100 km south of the coast line yielded present day values (0.70917) which correspond to the value of the sea water standard (Coleman, pers. comm.).

The Sr isotopic composition of bulk sedimentary carbonate in top sections of several cores from the submarine deltafront and shelf confirms this assumption. High $^{87}\text{Sr}/^{86}\text{Sr}$ ratios > 0.7150 are only found in areas directly influenced by the present day river water. Areas with low river water supply or further off the coast line show lower isotopic ratios < 0.7100.

If this sink of riverine Sr is effective, the question arises how Sr brought by the G–B could contribute to the evolution of sea water Sr. One possible explanation may be a transfer of the coastal sediments by turbidity currents into a deep-sea fan, where dissolution of carbonate below the CCD would allow a contribution to the global sea water Sr budget. One sample taken from young turbidites in the active canyon about 400 km south of the coast indeed yielded an elevated isotopic ratio of 0.7130.

