



## **Consequences of the Erosion of the Andes on the Amazon Rivers from Nd-Sr isotopic compositions of suspended sediments and implications for marine geochemistry**

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The Amazon River ranks number one in terms of global mass transfer from the continents to the oceans. Indeed, the Amazon River supplies 10<sup>12</sup> t of sediment annually. This study reports the Sm-Nd and Rb-Sr isotopic systematics and chemical composition of materials being transported by the Solim es and Madeira rivers, during the year 2004. These data are used to i) constrain the isotopic and chemical nature of the sediments delivered by these two large sub-basins, ii) trace the origin of sediments supplied by the Amazon River and finally iii) give a better estimate of the Sr and Nd fluxes exported to the Atlantic Ocean as well as their global isotopic compositions, these two elements being powerful oceanic tracers.

The Nd isotopic composition of the sediments transported by the Solim es (-8.9 permil to 9.9 permil) is slightly more radiogenic than values recorded for the Madeira (-10.8 permil to -12.1 permil). The <sup>87</sup>Sr/<sup>86</sup>Sr ratios obtained for the Madeira sediment load (0.728 to 0.740) are significantly more radiogenic than the corresponding values (0.713 to 0.717) obtained for the Solim es. Sr and to a lesser extent Nd isotopic compositions vary as a function of time in both rivers. This variation shows that, within the Andean and Subandean zones, the sediment sources change with time

(hydrological season). These isotopic signatures reflect the greater contribution of volcanic products to the sediments coming from the Solimões basin, while the Madeira basin sediments are derived from the input of ancient recycled crust. These data, together with the REE patterns and the different weathering degree of these sediments, suggest that the rocks that have produced by weathering these sediments had different global chemical compositions within the two basins.

During 2004, the Solimões River exported  $289 \times 10^6$  tonnes of suspended sediments. This corresponds to 59,000 tonnes of Sr and 14,000 tonnes of Nd, with  $87\text{Sr}/86\text{Sr} = 0.7149$  and  $\epsilon = -9.36$  permil. During the same period, the Madeira River exported  $294 \times 10^6$  tonnes of suspended sediments, which corresponds to 35,000 tonnes of Sr and 11,900 tonnes of Nd, with  $87\text{Sr}/86\text{Sr} = 0.736$  and  $\epsilon \text{ Nd} = -11.30$  permil. Considering that the Solimões and the Madeira rivers account for 62 and 35