Holocene provenance shift of suspended particulate matter in the Amazon River basin

N. HÖPPNER[1*], F. LUCASSEN[1], C.M. CHIESSI[2], A.O. SAWAKUCHI[3], S.A. KASEMANN[1]

[1] MARUM – Center for Marine Environmental Sciences and Faculty of Geosciences, University Bremen, Germany (*correspondence: nhoeppner@marum.de)
[2] School of Arts, Sciences and Humanities, University of São Paulo, Brazil
[3] Institute of Geosciences, University of São Paulo, Brazil

We report strontium (Sr), neodymium (Nd) and lead (Pb) isotope signatures from marine sediments (core GeoB16224-1) deposited off French Guiana under the influence of the Amazon River discharge, spanning 40 to 10 ka BP. The same isotopic systems are presented for modern suspended particulate matter (SPM) of the Amazon River basin (provenance indicator) and Holocene marine core-tops along the transport path of the Amazon SPM to core site GeoB16224-1. Although all three isotopic systems show variations throughout core GeoB16224-1, the down-core data suggests no major compositional changes in the supply of SPM to the core site. However, the modern SPM from the Amazon River mouth has a significantly less radiogenic Sr, Nd and Pb signal compared to the late Pleistocene marine sediments. Furthermore, mid- to late Holocene marine core-tops indicate a gradual shift from GeoB16224-1 values to the modern Amazon mouth SPM. Possible explanations are a small decrease in Guiana and Central Brazil shield components or an increase in Andean material during the Holocene. A forcing mechanism for this is not yet obvious, but multiple natural or anthropogenic possibilities are under investigation. External influences such as Saharan dust or runoff from e.g. Parnaíba River to the core site can be excluded. A comparison of GeoB16224-1 data with the isotopic composition of the Amazon River basin geology and the main tributary SPM (draining Guiana and Central Brazil shield and Andean areas) shows that the Andean tributaries (Solimões and Madeira) are the main sediment supplier since 40 ka BP.