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# Particle flux to the continental slope of the NE Arabian Sea – a comparison of water column and seafloor estimates from the Oxygen Minimum Zone off Pakistan

Hartmut Schulz (1,2), Ulrich von Rad (2), Venugopalan Ittekkot (3), and Helmut Erlenkeuser (4)

(1) Institute for Geosciences, Geobiology, Sigwartstr. 10, 72076 Tübingen, Germany (hartmut.schulz@uni-tuebingen.de), (2) formerly at: Federal Institute for Geosciences (BGR), PF 510153, 30631 Hannover, Germany, (3) Leibniz Center for Tropical Marine Ecology ZMT, Fahrenheitstraße 6, 28359 Bremen, Germany, (4) Leibniz-Laboratory for Radiometric Dating and Isotope Research, Max-Eyth-Str. 11-13, 24118 Kiel, Germany

Due to the lack of bioturbation, the laminated muds from the Oxygen-Minimum Zone (OMZ) off Pakistan provide a unique opportunity to precisely determine the vertical and lateral sediment fluxes in the near shore part of the northeastern Arabian Sea, and to explore the possible effects of the low oxygen conditions on the preservation of organic matter and other particle species.
Coarse fraction and planktonic foraminiferal species and isotopic analyses on a total of 100 sediment surface samples along depth transects show distinct distribution patterns that seem to be controlled by the OMZ and by the distance from the shelf edge and the shore line. In the area of EPT and WPT (Eastern and Western PAKOMIN Traps within the OMZ), thirteen short sediment profiles from water depths between 250 m and 1970 m along a depth transect crossing the OMZ ($\sim$150 to $\sim$1150 m) were correlated on the basis of a 2 cm to 8 cm-thick, light-gray turbidite layer. 210Pb- dating and varve counting yielded a date for this layer of AD 1905 $\pm$ 5 yr. Using this stratigraphic marker, rather precise values for the accumulated sediments can be determined.
The total flux at the sea floor is as high as 4000 mg m 2 d 1 on the rather steep continental margin and agrees remarkably well with flux of bulk material, as well as of individual components (organic carbon, calcium carbonate, lithogenic fraction) measured in the traps. Fluxes of Pakistan are ten to a hundred times higher than further out in the deep Arabian Sea. A strong shift towards low accumulation rates (50 – 30 %) is observed within the depth interval including the lower boundary of the OMZ between 880 and 1170 m. On the one hand, decrease in the accumulation of organic matter at that boundary is exceptional (20 %), challenging enhanced organic matter preservation under the OMZ conditions above, or by the coastal supply of terrigenous matter acting as agents of particle adsorption and rapid sinking (e.g. the ballast effect). On the other hand, it is assumed that particle flux along our core transect is characterized by a pronounced gradient from the high coastal (shallow waters) to the low open (deep waters) oceanic surface water productivity, indicated by the accumulation of the planktic foraminiferal indicator Globigerina bulloides, masking the possible preservational effects of OMZ conditions on marine organic matter.