Geophysical Research Abstracts
Vol. 17, EGU2015-1479, 2015
EGU General Assembly 2015

Variations of the Arabian Sea nitrogen cycle: trend or decadal variability?

Birgit Gaye (1), Rixen Tim (2), Anna Böll (1), and Jerry Wiggert (3)

(1) Institute of Geology, University of Hamburg, Hamburg, Germany (birgit.gaye@zmaw.de), (2) Leibniz-Zentrum für Marine Tropenökologie, Bremen, Germany (tim.rixen@zmt-bremen.de), (3) Department of Marine Science, University of Southern Mississippi, USA (jerry.wiggert@usm.edu)

Warmer periods of the Holocene have been characterized by a northward shift of the intertropical convergence zone (ITCZ), especially in the South Asian Monsoon sector, thereby increasing the strength and northward extension of monsoon rains. Marine sediments record increased monsoonal upwelling in the Arabian Sea during such warming periods associated with increased denitrification in the oxygen minimum zone. A similar increase can be expected due to anthropogenic warming as it may have a strong impact on Central Asia where feed-back mechanisms of stronger summer warming such as melting of glaciers and reduced albedo may increase summer monsoon strength and thus upwelling and productivity in the Arabian Sea. Models have so far had difficulties to simulate the ITCZ fluctuation in the monsoon area and to make reasonable predictions of its response to global warming. Recent data analyses showed a decrease of oxygen and an increase of nitrite concentrations in the northern part of the Arabian Sea during the last 50 years which could be related to a strengthening of the summer monsoon.

To identify whether recent changes in productivity, sea surface temperatures and denitrification are related to decadal fluctuations or global warming trends, we take a comprehensive, multi-disciplinary approach that makes use of the available remote sensing records, nutrient data, and sediment trap as well as high resolution sedimentary records.