

Seasonal distribution of dissolved neodymium concentrations and ϵNd in the Bay of Bengal

ZHAOJIE YU¹, CHRISTOPHE COLIN¹, ERIC DOUVILLE², FRANCK BASSINOT²

1. Laboratoire GEOsciences Paris-Sud (GEOPS), UMR 8148, CNRS-Université de Paris-Sud, Université Paris-Saclay, Bâtiment 504, 91405 Orsay Cedex, France
2. Laboratoire des Sciences du Climat et de l'Environnement (LSCE), Bâtiment 12, 91198 Gif-sur-Yvette Cedex, France.

Dissolved neodymium (Nd) concentrations and ϵNd values have been investigated on 90 seawater samples (10-15 litres) collected at 6 stations from $\sim 17^\circ\text{N}$ to $\sim 8^\circ\text{N}$ along the 89°E meridian in the Bay of Bengal (BoB) during the R/V Marion Dufresne MONOPOL Cruise (May 2012) in order to assess the impacts of Ganges-Brahmaputra river systems sediments input on seawater Nd isotopic compositions. Dissolved Nd concentrations and isotopic compositions of seawater were analysed on on-board filtered and acidified samples following the analytical procedures described in detail by Wu et al. (2015).

The Nd concentration in the water column along the 89°E transect of the BoB covers a wide range, from 13.2 to 51.6 pmol/kg. The concentration of Nd in surface waters of the BoB decreases from north to south, while the subsurface value exhibits a minimum at a water depth of around 100 m. ϵNd in the Bay of Bengal displays large variability, from -14.4 to -9.5. Surface and intermediate waters of the northern and central BoB have lower ϵNd compared to waters from similar depths of the southern BoB.

These new results have been compared with those obtained in BoB on nearby water stations but collected in November, 2008 (Singh et al., 2012). This comparison reveals for the first time an important seasonal variability of up to 2 ϵNd units for surface and intermediate water masses of the BoB. The seasonal fluvial sediments discharge variability of the Ganges-Brahmaputra river system contributes and dominates the seasonal changes of dissolved Nd budget of the BoB. We suggest that coastal/shelf sediments release followed by subsequent lateral transport from coastal to offshore regions is the main contributor for Nd to the BoB. The seasonal seawater ϵNd values are probably induced by the release process of a huge quantity of sediment in summer when sediments are transported from river mouth to the deep-sea fan by turbidity currents.