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Stable carbon and nitrogen isotope distribution in the water column and sediments in the Indian Ocean upwelling region off Java and Sumatra, Indonesia

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The monsoon-driven coastal upwelling off southern Indonesia is considered to be a significant factor driving climate variability in the Indian Ocean. However, there has been debate about the relation of upwelling dynamics to climatic phenomena, the so-called Indian Ocean Dipole (IOD) and El Niño Southern Oscillation (ENSO). Investigating the biogeochemical cycling of elements is a prerequisite for understanding the present-day functioning of the upwelling system. Therefore we obtained physicochemical data of water and collected sediment cores from the Indian Ocean south of Indonesia during R/V *Sonne* cruise SO-184 in August and September 2005. Samples were analysed for dissolved nutrients, oxygen, carbon (C, C_{org}) and nitrogen (N) contents and the stable carbon and nitrogen isotope composition ($\delta^{13}C_{org}$, $\delta^{15}N$, $\delta^{15}N\text{-}NO_3^-$).

Vertical DIN (dissolved inorganic nitrogen) profiles are rather similar at all stations except near the Sunda Strait. Maximum C_{org} and N contents were found in the Mentawai Basin west of central Sumatra and around Sumba Island southeast of Java. Preliminary carbon and nitrogen isotope data in sediment and water suggest isotopic fractionation due to enhanced nutrient availability in the euphotic zone of the northern stations off Sumatra where minimum $\delta^{15}N$ values (3.7 per mil-4.2 per mil) were observed in surface sediments. Additionally, decomposition processes in the watercolumn are mirrored in the $\delta^{15}N\text{-}NO_3^-$. It is negatively correlated with oxygen saturation indicating watercolumn denitrification between 100 m and 1500 m water depth. High $\delta^{15}N$-values of surface sediments between 6.4 per mil and 7.1 per mil south of central Java point towards sedimentation of isotopically heavy organic matter (OM) and/or

fractionation processes during bacterial decomposition of OM at the sediment surface. $\delta^{13}C_{org}$ ranges between -22.0 per mil and -19.4 per mil (mean -20.3 per mil and indicates a predominantly marine origin of sedimentary OM.

The continuation of isotope analyses, porewater chemistry and the analysis of labile organic compounds will provide insight in the carbon and nitrogen biogeochemistry of the Indian Ocean upwelling off Java and Sumatra, Indonesia.