Changes of the Indian summer monsoon recorded in the neodymium isotopes of the Andaman Sea sediments during the last deglaciation

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The dramatic changes from the cold and dry last glacial to warm and wet Holocene period brought changes in the Indian summer monsoon (ISM) and ensuing hydrology and terrestrial erosion in peninsular India. In this study, we determined the seawater neodymium isotopes (ε_{Nd}) using Andaman Sea sediments reflecting such changes in hydrology and erosion of the past 24,000 years. Sediments from the piston core RC12-344, which was retrieved from the lower slope of the northern Andaman Sea, were used for the study. The new ε_{Nd} data were used as a proxy for the terrestrial input into the Andaman Sea by the Irrawaddy-Salween and Sittoung (ISS) rivers.

We identify 4 major changes in neodymium isotopes (ε_{Nd}): (1) a gradual increase in ε_{Nd} during the deglacial period (22 - 18 ka) suggesting a decrease in the ISS discharge, (2) a relatively stable radiogenic seawater ε_{Nd} between 17.2 ka and 8.8 ka, which is explained by a period of reduced outflow, (3) a rapid transition from more to less radiogenic ε_{Nd} during the early-mid Holocene, which is interpreted as the wettest period with the highest ISS discharge, and (4) a decrease with a stable ε_{Nd} values in the mid-late Holocene. One of the interesting findings of our study is the lag between the ε_{Nd} and planktonic foram $\delta^{18}O$ values at the onset of the early Holocene. The Andaman Sea ε_{Nd} data are the first seawater ε_{Nd} with the highest temporal resolution from the northern Indian Ocean. The data suggest dramatic changes in the continental erosion and intensity of the ISM. Our ε_{Nd} data shed further light on the regional changes in Indo-Asian monsoon when compared with other existing decadal to millennial-scale paleo-ISM proxy records from India and northeast China.