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Roles of hydrological and land weathering intensity changes on the Nd cycle of the South China Sea during the past 35 kyr inferred from neodymium isotopic composition in foraminifera

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We present two past seawater Nd isotopic compositions (εNd) records obtained on mixed planktonic foraminifera species samples from two cores collected at about 1250-1350 m water depth in the southwestern (core MD01-2393) and northeastern (core MD18-3569) South China Sea (SCS) along the basin-scale cyclonic deep circulation resulting from the intrusion of the Pacific Deep-Water (PDW). The aim is to constrain the relative contributions of lithogenic Nd inputs from large Asian rivers (e.g. Mekong River) and hydrological variations at intermediate depth in the SCS. The foraminiferal εNd values of both studied sites (-7.29±0.16 to -5.80 ± 0.15 for core MD18-3569 and -8.11±0.15 to -7.20 ±0.15 for core MD01-2393) indicate strong modifications of the initial Nd isotopic signature of the PDW (εNd of -4) flowing into the SCS by unradiogenic sediments (-13 to -11) from large Asian rivers. Foraminiferal εNd record of core MD01-2393 display significant unradiogenic values during the time interval from 18 to 8 cal kyr BP which are associated to intensification of monsoon rainfall and river input of detrital material characterized by strongly altered minerals (high illite chemical index and kaolinite/illite ratio) deriving from tropical plain soils of the Mekong River basin. We have then hypothesis that pedogenetic minerals from tropical plain soils are more efficient to exchange Nd with the seawater than primary minerals produced by intense physical erosion during glacial time. On the contrary, the seawater εNd record on the northern core MD18-3569 during the time interval between 18 and 12 cal kyr BP is associated to more radiogenic εNd which have been associated to an increased intrusion of radiogenic PDW to the SCS and higher ventilation of water masses (deduce from $\Delta^{14}C$) in the northern deep basin of the SCS compared to the southern one. Overall, our results indicate that the state of chemical weathering of sediment delivered by rivers and ventilation of deep-water masses (time of contact between sediment and seawater) are the main control of past seawater εNd distribution in the marginal sea of the SCS since the last glacial period.