

Nd isotopic variations of surface seawaters from the eastern Indian Ocean and its adjacent oceanic regions

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The mechanism by which Nd is transported into seawater from continental crustal rocks and mantle derived rocks is not well documented yet. The Nd isotopic ratio of surface seawaters can be a clue to the

source of Nd input to oceanic regions. Only a few data, however, have been reported for surface seawaters. Here, we report twelve Nd isotopic ratios of surface seawaters from eastern Indian

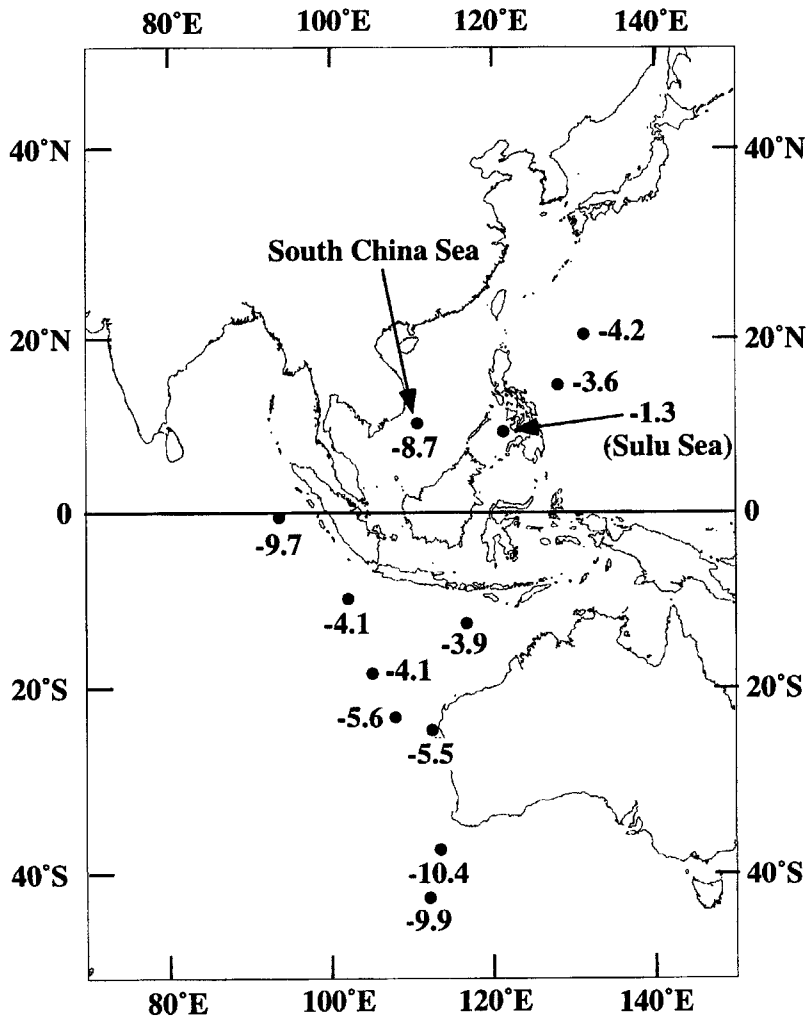


FIG. 1. ϵ_{Nd} distribution of surface seawaters from the eastern Indian Ocean.

Ocean and its adjacent oceanic regions, i.e. the northwestern Pacific Ocean, Sulu Sea and South China Sea.

The samples were collected during KH-96-5 cruise of R.V. Hakuho Maru, Ocean Research Institute, University of Tokyo. Sampling depth was about 5m. Each sample volume was 250–280L.

The data are plotted on a map in epsilon Nd value (Fig. 1). Errors are 0.2 to 0.4 in most cases. The values range from -10.4 to -1.3 , showing the wider stretch than the data on the western Indian Ocean (-7 to -6) by Bertram and Elderfield (1993). The highest Nd isotopic ratio (-1.3) is found in the Sulu Sea. Goldstein and Jacobsen (1987) revealed that the river waters from the Philippines showed positive ϵNd values ($+6$ to $+7$). This fact seems to imply that the Nd input to the Sulu Sea is strongly controlled by Philippine Islands' rocks which were formed by depleted mantle ($\epsilon\text{Nd} > 0$).

The most interesting feature in the map is the latitudinal variations found in the eastern Indian

Ocean. From 10°S to 30°S , the data show relatively uniform values (-5.6 to -3.9). However, one site close to the equator shows a very low value, -9.7 . This site seems to be affected by continental Nd input via the Ganges river. Furthermore, the two southern sites also show low ϵNd values of about -10 . According to Piepgras and Wasserburg (1982), the surface seawater from Drake Passage shows $\epsilon\text{Nd} = -9.1$, which is close to our data. So, this might be indicative of the homogeneity of Nd isotopic composition in the Circumpolar current.

References

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