Seasonal Variation of Particulate Matter Fluxes in the Western of Equatorial Indian Ocean

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Abstract

At present, some studies have found that global warming has led to the enhancement of the southwest monsoon of the Indian Ocean, as well as phytoplankton blooms in the Arab sea, but there was no more information for the productivity in the equatorial of the west Indian Ocean follow this trend. A McLane Mark 7G-21 sediment trap mooring was deployed a year of observations in the western equatorial of the Indian Ocean, with the catcher positioned about 500m above the seabed. The results showed that the particulate flux ranging from 15.68 to 164.86 mg/m^2 d, with an average of 61.62 mg/m^2 d. The particulate matter flux during the periods of January 9th to January 15th, March, November, and December 1st to December 15th are higher than 100 mg/m^2 d, with the highest value occurring during the period from December 1st to December 15th. In contrast, the particulate matter fluxes during the periods of February 1st to February 15th, the entire month of May, and June 15th to August 31st are lower than 40 mg/m^2 d. The particulate organic carbon (POC) content in the sinking particles varied between 0.25% and 15.85%, averaging 8.15%. Lower POC levels were observed in January and August, with the lowest recorded during August 16th to August 31st. The particulate nitrogen (PN) content ranged from 0.02% to 0.91%, averaging 0.56%. Except for the period from August 16th to August 31st, when PN content was merely 0.02%, it remained above 0.3% throughout the rest of the year, peaking during December 1st to December 15th. These findings indicate that during the southwest monsoon season in the Indian Ocean, both the particulate matter flux and organic matter content are relatively low. This suggests that the prevailing southwest monsoon leads to reduced nutrient supply in the upper water column, thereby limiting the development of organisms in the upper layer. With global warming, it is anticipated that the productivity in the equatorial western Indian Ocean region will decrease further.

Keywords

Particulate Matter Fluxes, Particulate Organic Carbon, Seasonal Variation, Equatorial Indian Ocean