



Variation of the Kuroshio nutrient stream in the East China Sea during 1987-2009

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Using in situ data from 88 cruises from 1987 to 2009 in the East China Sea, downstream nutrient transport by the Kuroshio was examined. The absolute geostrophic velocity was first obtained inversely by assuming conservation of mass and salt within five isopycnal layers in an enclosed area. The nutrient flux density (the product of velocity and the nutrient concentration) was then calculated at a section across the Kuroshio. The presence of a maximum nutrient flux density in the middle layer was confirmed for the section across the Kuroshio in the East China Sea. Its temporal variations were further investigated. Seasonal variation in the nutrient flux density was not significant and was much smaller than interannual variations. The change in the magnitude of the Kuroshio's speed and the change in the current structure were major causes for interannual variations in the nutrient flux density. The total downstream nitrate flux transported by the Kuroshio in the East China Sea had a mean value of 170.8 kmol/s. Seasonally, it ranged from ~ 160 to ~ 177 kmol/s and interannually, it varied from ~ 100 to ~ 280 kmol/s. The phosphate flux can be approximately estimated by the ratio (13.64) of nitrate concentration to phosphate concentration.