



Tracing Water Mass Fractions in the Deep Western Indian Ocean using Fluorescent Dissolved Organic Matter

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Meridional distributions of fluorescent dissolved organic matter (FDOM) and various chemical and physical water properties were investigated along 67°E of the Western Indian Ocean in July 2017. Three FDOM components were identified by the parallel factor analysis model: two humic-like (FDOM_H) and one protein-like components (FDOM_P). Our result showed that the highest fluorescence of FDOM_H was found in the North Indian Deep Water (NIDW), but relatively lower value in the intruding water masses from the upper layer. The deep FDOM_H was significantly correlated with Apparent Oxygen Utilization (AOU) as previously studies. In particular, the slopes of the regression lines varied with the different water masses and two humic components. Here, to identify the factor inducing the variations, we estimated the relative water fraction of each water mass using a salinity-FDOM_H diagram. The FDOM_H components were positively correlated to the relatively aged water fraction (i.e., NIDW), but negatively correlated with fresher ones. The relationship patterns with water fractions corresponded to those with the ratio of two humic components. The results indicated that the distribution and variation of FDOM_H with AOU is affected by the mixing of various deep-water masses with different production and removal rate of FDOM_H during the global ocean circulation.