

Oceanic iron distribution of the global ocean estimated by data assimilation approach

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Information on the distribution of dissolved iron (*dFe*) concentrations in many parts of the ocean has been provided by recent ocean observation programs. However, a knowledge is still limited concerning the rates of processes that control the concentrations and cycling of *dFe* in the ocean. In this study, we constructed a three-dimensional gridded dataset of oceanic *dFe* concentrations by using both observations and a simple model of the iron cycle. The fluxes of *dFe* from the sea surface associated with the falling aeolian dust and from the dissolution of sediments on the seafloor of the continental shelves were set as the external flux. We used a Green's function approach to integrate the observations and a simple model. The control variables, in addition to model parameters, were the flux of *dFe* from the dissolution of sediments on the seafloor of the continental shelves. The three-dimensional distribution of *dFe* that we obtained was in basic agreement with observations. These estimates imply large differences in the cycling of *dFe* between the two basins that would need to be taken into consideration in projections of future scenarios. Although there is some uncertainty in our estimates, global estimates of iron cycle characteristics based on this approach can be expected to enhance understanding of the iron cycle process in the ocean.

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