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Dissolved iron concentration in rivers throughout Japan and GIS analysis of its geographical factors

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Being an essential element, iron can be a limiting factor for marine production. Iron is abundant in earth's surface but dissolved iron is only bio-available. It has been generally believed that forest is vital as a source of dissolved iron, where iron is complexed with humic substances, but few studies have been reported to demonstrate it. In the present study, we firstly show dissolved iron concentration in rivers throughout Japan on the basis of an existing database of river chemistry and a field survey of ourselves. In addition, the geographical factors that regulate river dissolved iron concentration are analyzed by using GIS. The results showed that a wide range exists in dissolved iron concentration among rivers throughout Japan as much as two orders of magnitude with some regionality. Dissolved iron concentration did not have any relationship with forest area coverage; it appears that forest ecosystem itself does not act as a source of dissolved iron. The level of dissolved iron was adequately explained by soil types of Histosols (peaty) and Gleysols (very wet) in river basin and by the gentleness of land surface. The GIS analyses suggest that an important factor to generate dissolved iron is flat lands, where reductive conditions could prevail.

Keywords: dissolved iron, marine production, forest as a possible iron source, river export, geographical factors, GIS analysis