

Iron and spring water which have been ignored in material cycles in coastal marine ecosystems

YAMAMOTO, Tamiji^{1*}

¹Grad Sch Biosph Sci, Hiroshima Univ.

Material cycles in coastal areas can be calculated by freshwater and salinity budgets using a standardized method proposed by LOICZ (Land-Ocean Interaction in the Coastal Zones) Working Group if the targetted area is estuaries with an obvious salinity gradient. In the manual, material loads from spring water can be ignored in case no data are available. However, it is assumed that bottom spring water contains higher concentration of dissolved matter particularly minerals than that of river water, because it passes through the underground lithosphere. Eventhough the water volume is smaller than that of river water, it may contribute greatly to the material budget in coastal areas.

In enclosed coastal seas of Japan, the number of red tide occurrence has been decreased and the transparency has also significantly been increased by reduction measures of material loads from land. There are several areas in which the growth of fish and other organisms is depressed by nutrient depletion, which is called "oligotrophication".

Unexpectedly, the anoxic water mass is still formed in the bottom layer of coastal areas whereas the material loads was reduced. This evidenced that the anoxic water mass may be formed not only by decomposition of organic matter but also by chemical oxidation of hydrogen sulfide. This also suggests that depletion of iron which is an essential element for the growth of algae.

The author recently determined the concentration of dissolved iron from the upper area of the Ohta River which flowing into Hiroshima Bay to lower river and seawater of the bay. Iron and nutrient concentrations in a spring in the bay were also investigated. The author hopes the presentation would be a hook to promote material cycle study of coastal seas.

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