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Rainfall Nutrient Loading and Its Influence on Phytoplankton in a Coastal Sea

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Abstract

The nutrient concentrations and the changes in pH of rainwater have been monitored for three years in Kagawa prefecture, on Shikoku Island in the western part of Japan. The pH varied between 3.29 - 6.80 with a weighted mean value of 4.86. Weighted mean $NO3^-$ + $NO2^-$, $NH4^+$ and $PO4^{3-}$ concentrations were 22.5, 35.5 and 0.25 μM, respectively. Particularly, the nitrogen concentration of rainwater was higher than that of surface seawater by one to three orders of magnitude, although phosphate concentration was at almost the same level. Furthermore, nutrient loading from precipitation to coastal sea was estimated in Harima-Nada, on Japan's Seto Inland Sea. It was estimated that nitrogen and phosphate loading due to rainfall were 13% and 1.5% of the nitrogen and phosphorus loadings from the land.

Moreover, bioassay were performed for freshly collected seawater. By the addition of rainwater, chlorophyll *a* concentrations in the rainwater added bottles were increased to levels higher than those of bottles where no rainwater was added. These results suggested that nutrient loadings due to rainwater contribute to the enhancement of primary production of surface seawater in a coastal environment.