

Distribution of nitrate nitrogen in surface water in Shimosa Upland and its relationship to landuse

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The nitrate nitrogen concentrations in rivers dissecting quaternary uplands are measured and analyzed in relation to landuse. The upland is called Shimosa Upland composed of unconsolidated sand and mud, and main landuse is cropland with some urban area. 109 samples are collected during October to December in 2007, and measured for COD (Chemical Oxygen Demand), NO₂-N, NO₃-N.

About 14% of samples or 15 points exceeds environmental standard, that is 10mg/l for nitrate nitrogen concentration. The official statistics in Chiba Prefecture report that the point which exceeds environmental standard is only two in 2005. The 15 points is far larger than the official statistics. High spatial density of sampling points reveals the actual condition of nitrate nitrogen concentrations in river waters.

Circle buffer zones are generated at the sampling points, and superimposed on the landuse map. The nitrate nitrogen concentrations become large with increasing area of cropland within the buffer. This suggests that fertilizer applied to the cropland contributes the high nitrate nitrogen concentrations in river waters. The area of paddy field, on the other hand, has an effect to decrease nitrate nitrogen concentrations. This may be a purification effect of paddy field.

This study reveals the existence of high nitrate nitrogen concentrations in river waters. We have to consider the meaning of this fact. Even if agriculture is one of the causes of high nitrate nitrogen concentrations, it is a fundamental activity to support human life. The adjustment of environmental quality and human life is necessary to get the sustainable society.