1980年代から2000年代にかけての硝酸態窒素濃度の上昇要因の解析:日本海側および九州西部の一級河川を対象に

Statistical analysis in nitrate concentrations of the rivers facing the Sea of Japan and the East China Sea: a comparison of 1980s and 2000s

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Transboundary air pollutants from the East Asia to Japan are serious environmental issue. In particular, atmospheric nitrogen deposition onto the forested watershed facing the Sea of Japan and the East China Sea is provoking nitrogen saturation of forest ecosystems. However, the reports concerning the increase of NO_3^- concentration in these areas are limited to only a few rivers. Possible reason of this poor repots may be due to the complexity and heterogeneity of the watersheds. To elucidate the overviews of the trends of riverine NO_3^- concentrations in these areas, we have compared NO_3^- concentrations at the downsite of 39 rivers in the last two decades (1980s and 2000s). As a result, significant increases of NO_3^- concentrations were found from 15 rivers. Secondary, in order to identify important factors that affect an increase of NO_3^- concentration, we have constructed the generalized linear model. Best model showed that paddy field, altitude and catchment area are presumed to be negative factors, but population density and atmospheric N deposition are positive ones. This model means that paddy fields play role in not a source but a sink, possibly due to denitrification within the paddy. Additional principal component analysis and cluster analysis revealed features of each river. In rivers with large catchment area, the increase of NO_3^- concentration due to atmospheric N deposition may be suppressed by decrease of population density and paddy fields. On the contrary, atmospheric N deposition onto the river with small catchment area are likely to stimulate an increase of NO_3^- concentration.