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# Distribution mechanism of heavy metals revealed by correspondence analysis in the Natori River, Send

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It is important to understand the distribution mechanism of heavy metal elements in environmental systems, because the toxicities of various metals and metalloids significantly affect health risks. The heavy metals concentrations are controlled by a wide of variety environmental factors. This study aims to clarify main influence factors on the heavy metal distribution in the sediment, soil, river in the Natori River, Sendai City.

We firstly produced geochemical maps for heavy metal concentrations (As, Pb and Cr) of river sediment, neighboring soil (bulk component, soluble component in 1N HCl and in pure water) and river water. The heavy metals concentrations in river water increase from upper stream to down stream, whereas heavy metal concentrations in river sediments and soil vary little from upper stream to downstream. There are no anomalous distributions of heavy metals in the studied area, although many anthropogenic materials are found in sediment, soil and river water.

The correspondence analysis was used to investigate relationships of heavy-metal concentrations between sediment, soil (bulk component, soluble component in 1N HCl and in pure water) and river water. The results indicate that the heavy metals (As, Pb and Cr) in sediment, soil and river water are dominantly controlled by natural sedimentary processes, such as denudation and sedimentation. The proposed method could be further applied for other pollutants in various environment systems.

Keywords: geochemical map, heavy metals, factor analysis, risk assessment