

Elemental analysis of suspended solid in river water by PIXE

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Abstract

Elemental analysis of suspended solid (SS) in river water was performed at several selected sites along Hinuma River System, Ibaragi Prefecture, during Jun.2001-March.2002.

As the concentration of SS becomes lower, the number of determined elements becomes less. The spatial distributions of 19 elements, each of which has X-rays spectrum analysis error within less than 30 percent, were as follows:

Elemental concentration showed the highest rate of increase among three sampling sites in upper reaches in the main stream. The concentration of Si, Al, K, Ca, Fe and Zn was assumed to be influenced by SS concentration in the main stream. Such elements as Na, Mg, V, Cr, Co and Cu showed a different tendency, which was characteristic of the four tributaries.

In the main stream, the concentration of heavy metals of Cr, Co, Cu, Zn and Pb increased 6 to 24 times compared to that in the upper and middle reaches, and the concentration of Cr, Cu and Zn was increased by the inflow from three tributaries. In the lower reaches, sedimentation of SS decreased the concentration of Zn, Cr and Cu. It was suggested that heavy metals continuously accumulated in the river sediments.

On this investigation, spatial distributions of the elements of SS in river system could be inferred by the use of PIXE analysis, which is a suitable method to analyze heavy metals in SS in river water.