

都市河川の汚染問題

— 東京都旧中川流域河川水・堆積物中の重金属元素汚染に 関する地球化学的研究例 —

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**Pollution Problem on Urban River Water:
An Example of Geochemical Study on Base Metal Pollution
of River Water and Sediments of Old-Nakagawa River, Tokyo**

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Abstract

Old Nakagawa River is located in eastern part of Tokyo, 6.68 km long, and runs along Arakawa River. The river is semi-closed to Arakawa River. River water and sediment samples were collected from 18 and 5 sites from Old Nakagawa River and Arakawa River, respectively. River water samples were analyzed for Na^+ and K^+ by AAS (atomic absorption spectroscopy), anions (Cl^- , SO_4^{2-} , Br^- , NO_3^- , PO_4^{3-}) by ion chromatography, and trace metals (Cd, Cr, Cu, Mo, Ni, Pb, Zn) by ICP-MS (inductively coupled plasma mass spectrometry). River sediments samples were analyzed for mineral identification by XRD (X-ray diffraction), and for trace metals (Cd, Cr, Cu, Mo, Ni, Pb, Zn) by ICP-MS. Cr^{6+} concentrations in river water and sediment samples were analyzed by fixations of Cr^{6+} by CaHPO_4 . Five step extraction method by Hall *et al.* (1996) was used to clarify the proportion of trace metals in each step (extracted solution) for the river sediment samples. *I-geo* (geoaccumulation index) and *EF* (enrichment factor) for the trace metals calculated from analytical data on river sediments samples are very high, indicating that the river sediments are highly polluted. Cr^{6+} in the river water and sediments samples was not detected, although ΣCr in sediments sample is very high, indicating Cr is present as 3+ in the sediments and water, and Cr in sediments is not mobile. Trace metal elements are classified into three groups. They are (A) Cd and Zn which exist mainly as AEC (adsorption- ion exchangeable) and acid soluble (carbonate) fraction, (B) Cu and Pb which exist mainly as amorphous and Fe oxyhydroxide occluded fraction, and (C) Cr and Ni which exist as various fractions.

Key words : base metal pollution, river water, river water sediments, Old Nakagawa River

キーワード : 重金属汚染, 河川水, 河川堆積物, 旧中川

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