

Evaluation of arsenic contamination of bottom sediments of dam lake

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It has passed over 30 years since many of Japanese dams were constructed. There commonly construct a thermocline for water column especially in summer seasons, and bottom environments are usually in anoxic conditions due to a stratified structure and exhausted dissolved oxygen in the lower part. Recent abandonment of forestry has accelerated soil erosion and transportation of wood of seasoned trees, which may accumulate organic matter in dam lake sediments.

Sedimentary environments of the Ichifusa dam of the Kuma river system and related dams were evaluated using geochemical parameters. As-P₂O₅ and Br-Zn discrimination diagrams were applied to disclose variations in geochemical compositions of dam lake bottom deposits. Arsenic concentrations in Ichifusa dam are greater than in the other sediments, suggesting As adsorption on buried organic matter such as woods and branches of trees transported by probable debris flows. The concentrations of Br and Zn show good correlation in the sediments of the Arase dam, suggesting the abundance of these elements are related to accumulation of algae and preservation in the sediments under reducing conditions.

These elements concentrated in bottom sediments may be released due to decomposition of organic matter, such as methane fermentation, which are triggered by changes in redox condition by stronger eutrophication.