Role of suspended solids on elemental dynamics in the Selenga River system

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Lake Baikal is one of the cleanest lake in the world. However, there are many sources of pollution such as mining, industry and agriculture in the river basin of the main tributary, Selenga River which is flowing into Lake Baikal. Lake Baikal actually face to severe pollution affected by anthropogenic activities in the watershed. Natural cleaning mechanism can still be functioning to prevent pollutants flow into the Baikal. Since suspended solids (SS) in the Selenga River can play a role as carriers of heavy metals and organic pollutants, their dynamics should be addressed to know the mechanism.

Water and sediment samples were collected in the Russian territory from the Mongolian border to the shore of the Baikal including the Selenga Delta. SS samples were further recovered using a glass fiber filter from the water samples. Surface sediments and SS samples were digested with the mixture of nitric acid and perchloric acid for determination of elements using Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES).

Elemental concentrations were changeable depending on SS concentration along the tributary. Changes in SS concentration can be controlled by flow rate of the tributary. The significant relationship were observed between SS and sesquioxides mainly consisting of Fe and Al. Both of Mn and Cr were also common constituents of the SS oxides despite of their low concentration in SS. In contrast, Zn and Cu have no correlation with SS, indicating that they are specifically accumulated onto SS surface at a point where the two elements were released. The concentration of SS gradually decreased accompanied by decrease in heavy metals in SS in the delta region. On the contrary, those elements in the surface sediments increased to downstream in the delta region. Deposition process of SS in the delta can be occurred due to decrease in flow rate by channel bifurcation of tributaries, back water effect from Lake Baikal and SS trapping by vegetation in the delta. The delta has a potential to trap SS, resulting that water quality in the Lake Baikal has been protected of water quality in Lake Baikal.

Keywords: Lake Baikal, SS deposition, channel bifurcation

