



Biogeochemical features of aquatic plants in the Selenga River delta

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The Selenga River system provides more than a half of the Lake Baikal total inflow. The river collects a significant amount of pollutants (e.g. heavy metals) from the whole basin. These substances are partially deposited within the Selenga delta, and partially are transported further to the lake. A generous amount of aquatic plants grow in the delta area according to its favorable conditions. This vegetation works as a specific biofilter. It accumulates suspended particles and sorbs some heavy metals from the water. The study aimed to reveal the species of macrophytes which could be mostly important for biomonitoring according to their chemical composition.

The field campaign took place in the Selenga River delta in July-August of 2011 (high water period) and in June of 2012 (low water period). 14 species of aquatic plants were collected: water starwort *Callitriche hermaphrodita*, small yellow pond lily *Nuphar pumila*, pondweeds *Potamogeton crispus*, *P. pectinatus*, *P. friesii*, broadleaf cattail *Typha latifolia*, hornwort or coontail *Ceratophyllum demersum*, arrowhead *Sagittaria natans*, flowering rush (or grass rush) *Butomus umbellatus*, reed *Phragmites australis*, parrot's feather *Myriophyllum spicatum*, the common mare's tail *Hippuris vulgaris*, *Batrachium trichophyllum*, canadian waterweed *Elodea canadensis*. The samples were dried, grinded up and digested in a mixture of HNO_3 and H_2O_2 . The chemical composition of the plant material was defined using ICP-MS and ICP-AES methods. Concentrations of Fe, Mn, Cr, Ni, Cu, B, Zn, V, Co, As, Mo, Pb, and U were considered.

The study revealed that *Potamogeton pectinatus* and *Myriophyllum spicatum* concentrate elements during both high and low water periods. Conversely the *Butomus umbellatus* and *Phragmites australis* contain small amount of heavy metals. The reed as true grasses usually accumulates fewer amounts of elements than other macrophytes. To compare biogeochemical specialization of different species we suggest to use concentration ratio relatively *Phragmites australis* as a background content. This factor showed that *Nuphar pumila* and *Ceratophyllum demersum* are acting like concentrators in comparison with the reed. According to this ratio, the mostly accumulated elements in aquatic plants in 2011 were V, Co, As, U, and in 2012 – Cu, As, Bi. Differences in chemical composition are due to different water periods. During the high water period in 2011 a large amount of soil particles after the heavy rains were taken into the flow from the river banks and then deposited within the delta. The transportation of suspended particles during the low water period of 2012 was significantly less.