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Hotspots within the Transboundary Selenga River Basin

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Gathering the efficient information on water pollution of transboundary river systems remains the crucial task in international water management, environmental pollution control and prevention health problems. Countries, located in the low parts of the river basins, depend on the water strategy and water use in the adjacent countries, located upstream. Surface water pollution is considered to be the most serious problem, facing the above-mentioned countries. Large efforts in terms of field measurement campaigns and (numerical) transport modeling are then typically needed for relevant pollution prediction and prevention.
Russian rivers take inflow from 8 neighboring countries. Among them there are 2 developing economies - People Republic of China and Mongolia, which are located in water-scarce areas and thus solve their water-related problems through the consumption of international water. Negative change of water runoff and water quality in the foreign part of transboundary river is appeared inside Russian territory with more or less delay. The transboundary river system of Selenga is particularly challenging, being the biggest tributary of Lake Baikal which is the largest freshwater reservoir in the world. Selenga River contributes about 50 % of the total inflow into Baikal. It originates in the mountainous part of Mongolia and then drains into Russia. There are numerous industries and agricultural activities within the Selenga drainage basin that affect the water quality of the river system.
Absence of the single monitoring system and predictive tools for pollutants transport in river system requires large efforts in understanding sources of water pollution and implemented data on the relevant numerical systems for the pollution prediction and prevention. Special investigations in the Selenga river basin (Mongolia and Russia) were done to assess hot spots and understand state-of-the art in sediment load, water chemistry and hydrobiology of transboundary systems. Hot spot assessment included 100 gauge stations in the river basin with discharge measurement by ADCP, turbidity (T) and suspended sediment concentration (SSC), bed load by bed load traps, composition of salt, biochemical oxidation, nitrogen and phosphorous content in water, pH, redox and conductivity values, and also content of heavy metals in water, suspended matter and sediments.
The study revealed rather high levels of dissolved Fe, Al, Mn, Zn, Cu, and Mo in the Selenga River water which often are higher than MPC for water fishery. Most contrast distribution is characteristic for W and Mo, which is caused by mineral deposits in the Selenga basin. The most severe pollution of aquatic systems in the basin caused by mining activities is characteristic for a small river Modonkul, which flows into Dzhida River (left tributary of Selenga).