

Project acronym: BIO-CLIM

Project title: Riverine invertebrates as biological indicators of climate driven changes along environmental gradient within the glacierized Kuray watershed in Altai, Russia

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Discipline: Earth Sciences & Environment

Station(s): Aktru Research Station (Russia)

The significant warming of the Arctic and Alpine regions during the last decades has made a strong impact on glacier-fed stream ecosystems that experience extreme changes in resilience and resistance of their benthic and hyporheic (from interstitial riverbed sediments) biota as they are settled in a relatively narrow cold climate band. Warming and glacier shrinking have a strong impact on river ecosystems of the glacierized watersheds causing shifts in water temperature, alterations in the precipitations, river flow regimes and runoff, oscillations in surface-groundwater exchanges within the riverbed interstitial sediments and riverbed stability.

BIO-CLIM project aims at a) depicting the environmental factors involved in setting the aquatic invertebrates from distinct compartments of a glacier-fed river Aktru within the Kuray basin in the high Altai Mountains; b) detecting the species distribution on longitudinal gradient from the glacier outlet downstream; and c) outlining the responses of communities to changes in environmental settings and to continuous permafrost. We start from the assumption that the biodiversity is based on the 'glacier-heterogeneity-diversity' paradigm, stating that there is high site alpha-diversity at intermediate levels of glacial influence due to the high degree of environmental heterogeneity caused by glacier melting water. This high alpha-diversity results also in high between-site and regional beta- and gamma-diversities.

Understanding the relationships between on the one hand different environmental variables and on the other taxonomic and functional composition of aquatic invertebrate communities from distinct compartments of glacier-fed streams settled in glacierized landscapes could help to predict the changes in the arctic biodiversity in the context of the current alarming climatic shifts (according to the priority list of the 3rd Conference on Arctic Research Planning).