



Long-term eco-hydrological changes in the pro-glacial river system West-Jökulsá (Iceland)

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In the headwater of the Glacial river West-Jökulsá, which drains the glacier Satújökull (Hofsjökull), Gíslason et al. (2002) investigated the longitudinal changes of macro-invertebrate communities, and hydro-physical and hydro-chemical parameters to detect the glacial influence as a function of distance to the glacier terminus. This investigated river section starts at the glacier terminus and extends 45 km downstream. This dataset obtained in the years 1996 and 1997 offers the unique opportunity to compare and detect the impact of the current glacier retreat on the macro-invertebrate communities, hydro-physical and hydro-chemical parameters in this specific pro-glacial ecosystem over the last 20 years. Since 1999 the lowest altitude of the ice cap Hofsjökull has shown a significant down-wasting with a mean annual lowering of > 5 m/a (Jóhannesson et al. 2013). We assessed the recent glacier retreat to analyze the impact on the macro-invertebrate communities and on the hydro-physical and hydro-chemical properties. At 8 sampling points in the headwater near the glacier and at 4 sampling points along the river to the tributary Austari-Jökulsá water and invertebrate samples were taken in July 2018. We measured in-situ conductivity, pH-value, water temperature (WP1), turbidity and oxygen and chlorophyll-a using a calibrated portable water quality meter (EXO₂, YSI Inc.). Fauna sampling was conducted according to Gíslason et al. (1998). Near the glacier terminus we found no recent invertebrate fauna. We determine 83 individuals according to different life stages of insects (larvae, pupae, imago). Most of the individuals according to the taxa of Chironomidae (non-biting midges), where *Diamesa* spp. is usually present. *Diamesa* species are specifically adopted cold-stenothermal kryal inhabitants. We also found individuals of Simuliidae (black flies), Phoridae (humpbacked flies) and Scathophagidae (dung flies). The most significant long-term change occurred in the increase of the mean discharge along with a higher velocity. Wading through the pro-glacier river is no longer possible, as Gíslason et al. (2002) could still do to sample benthos invertebrates in the mid-1990s. Thus, we hypothesize that due to the increased runoff and due to the glacier retreat the environmental conditions for the macro-invertebrates changed so much that the biodiversity in this pro-glacial aquatic ecosystem is dramatically reduced and only high resilient species can occur.

References

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