

Impacts of glacially derived organic carbon on downstream microbial community composition in the Canadian Rockies

HF Drapeau^a, M Bhatia^b, and S Tank^a

^a *Biological Sciences, University of Alberta, AB, Canada*

^b *Earth and Atmospheric Science, University of Alberta, AB, Canada*

Due to anthropogenic climate change alpine glaciers are rapidly disappearing. As glaciers are suspected to be important sources of organic carbon to downstream ecosystems, this deglaciation may impact regional carbon cycle budgets and downstream microbial community structure. Organic carbon exported from glaciers may represent a source of carbon dioxide to the atmosphere if respired by downstream microbial communities. Additionally, downstream microbial communities adapted to glacial organic carbon sources may change as these ice masses disappear. Since these communities form the basis of aquatic food webs, changes in their structure may affect broader ecosystem functioning.

My project aims to better understand the type of organic carbon exported from glaciers and how these carbon additions are contributing to downstream microbial community structure. This will be done by: (1) collecting organic carbon and microbial community composition samples in four glacially fed rivers in the Canadian Rockies; (2) conducting an incubation experiment where a downstream microbial community is added to microbe-free glacial meltwater to analyze how carbon composition and microbial communities change over time. Carbon composition will be analyzed utilizing radiocarbon and ultra-violet visible techniques, to assess organic carbon type and age. Microbial community structure will be analyzed using molecular sequencing techniques which will provide identities of microbial species present. This research will yield insight into how microbial communities are utilizing glacially derived organic carbon stores, which will help to answer outstanding questions regarding the contribution of glacial organic carbon to atmospheric carbon dioxide levels and predict how downstream ecosystems will respond to the disappearance of glaciers in the Canadian Rockies.

Corresponding author: hdrapeau@ualberta.ca