

Roles of glacier microbes in alpine ecosystems of Asian high mountains: effect of cryoconite outflow on soil development in glacier forefields

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The Tien Shan Mountains are one of the major mountain systems in Central Asia, extending over 2000 km, from east Uzbekistan to northeast of the Taklamakan Desert in China. The major Tien Shan peaks rise from over 4000 to 7000 m above sea level (a.s.l.). Glaciers presently exist in mountains mainly above 3500 m a.s.l. and most rivers originating from the Tien Shan glaciers flow down through the steppes and deserts surrounding the mountains. Water from the mountains has sustained the local inhabitants and ecosystems of this arid area. Recent studies revealed that there are diverse microbes living on the Tien Shan glaciers and they produce significant amounts of cryoconite, which is a small granular aggregation of microbial organic matter on the glacier ice. We found abundant cryoconite deposit along a river from glaciers, which is likely to contribute development of organic soil in the glacier forefields. Thus, biological communities living on the glaciers also play a role to maintain the alpine ecosystems and regional environments in the Tien Shan Mountains.

Keywords: cryoconite, glacier forcefields, Tienshan Mountains