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Snow algae in an ice core drilled on Grigoriev Ice cap in the Kyrgyz Tien Shen Mountains

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Snow algae are photosynthetic microorganisms and are living on the surfase of glaciers. They grow on melting surface from spring to summer and their biomass and community structure are changed with physical and chemical conditions on glaciers. Ice cores drilled from glaciers also contain snow algae that grew in the past. Studying biomass and community structure of snow algae in ice cores could reveal the temporal variation in snow algae in the past, and also environmental conditions relating propagation of snow algae. In this study, we aim to describe snow algae in an ice core of Grigoriev Ice cap located in eastern Kyrgyzstan of the central Asia.

The samples of ice core collected on the top of the glacier contained three taxa of filamentous cyanobacteria, an unicellular cyanobacterium, and two green algae. The quantitative analyses of the algae in the 25 m deep ice core samples revealed that the algal biomass showed several peaks. Based on the dating by pollen grains, the 25 m core covers 61 years. The results suggest that the snow algae did not grow every year on the top of the ice cap, and their biomass and community structure varied greatly from year to year. The peak of biomass at the depth of 20 m contained significant amounts of the filamentous cyanobacteria that was observed in the lower part of the ice cap. This suggests that the year of the peak was significantly warmer than usual and the entire surface of the ice cap melted.

Keywords: snow algae, ice core