

Reconstruction of depositional environment at upstream of Potanin Glacier, Mongolian Altai using pollen analysis

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This study analyzed pollen in snow pits dug in September of 2008 and 2009 at upstream of Potanin glacier in Mongolian Altai to investigate the environment of recent snow deposits. The snow pit observations in both years were carried out at site 0 and 4 of 3752 m and 3890 m above sea level, respectively. In the 2008 observation, the pollen analysis revealed that the pit at site 0 included the deposition from summer of 2007 to autumn of 2008, while that at site 4 included the deposition between the autumns of 2007 to 2008. On the other hand, the pollen analysis in the 2009 observation showed the snow pit at site 0 contained the deposition between the autumns of 2007 to 2009, while the pit of site 4 covered the deposition from the winter of 2008/2009. In the layers of 2007 and 2008, concentration peaks of pollen taxon that scattered from spring to summer seasons were found at the same depths. This indicated that the summer melt reached the spring layer being previous season. Accordingly, pollen grains in the melted layer concentrated at the summer melt surface, causing pollen peaks. In contrast, each concentration peak of pollen taxon that scatters in different seasons appeared at the different depth of the 2009 layer. This suggested the degree of melting was weaker than that in 2007 and 2008. The interpretation was supported by summer temperature data (June-August) in this region. The anomalies of monthly air temperatures in summer during 1990 and 2009 remained negative in 2009, while they remained positive in 2007 and 2008. Annual depositions were estimated by *Artemisia* pollen concentration peak that was used as a marker of autumn season in this study. The annual snow depositions at site 0 were 1.18 m (0.61 m water equivalent) and 1.69 m (0.69 m water equivalent) for the autumns of 2007 to 2008 and the autumns of 2008 to 2009, respectively. Also, the respective snow depositions for the same periods at site 4 were 2.44 m (1.04 m water equivalent) and more than 3.34 m (1.38 m water equivalent).

Keywords: glacier, pollen analysis, Altai, Mongol, snow deposition, Potanin glacier