



## **Snow Drift and Frost Formation – An experimental Study of Soil Temperatures in Subarctic Environment**

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Snow is a good insulator. Wind drifts snow eroding it from one place and accumulating to some other site. Thin snow cover permits cold to penetrate deep in the ground and that can form permafrost in subarctic conditions in Finnish Lapland. Palsas, peat mounds with permafrost core, are formed in those mires where snow cover is decreased by wind. This has been experimentally shown in the field by thinning artificially the snow layer. Minimum air temperature was  $-31.6^{\circ}\text{C}$  and at the mire surface  $-11.8^{\circ}\text{C}$  and in the control point under 25 cm snow at the end of December only  $-2.8^{\circ}\text{C}$ . Snow depth increased to the end of February to 65 cm and temperature on the mire surface rose to  $-2^{\circ}\text{C}$  and towards the end of March to  $0^{\circ}\text{C}$  when the snow depth was already 80 cm. On the experimental site where snow was cleared off several times during three winters the frost penetrated so deep that it stayed 7 years and formed a small palsa. On the slopes of palsas wind accumulates thick layer of snow and then just by the edge of the hummock the ground surface temperature stayed at  $0.1^{\circ}\text{C}$  6.5 months under 1.5 m thick snow cover. On the windswept uncovered peaty surface of the palsa the minimum temperature recorded was  $-23.4^{\circ}\text{C}$ . Wind-drifted snow and ice crystals abrade the peat surface in winter time. It will be demonstrated some brand new palsas formed during the last winters 2001-2004 by strong winds which have thinned the snow cover on the mire surface. Probably this is caused by increased winter storms.