

LENSES OF FROZEN GROUND UNDER WHITE SPRUCE GROWING
ON A RIVER TERRACE IN MOUNT MCKINLEY NATIONAL PARK, ALASKA

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White spruce (Picea glauca) were observed to be growing on mounds on a terrace of the McKinley River in Mt. McKinley National Park. The mounds occur in a white spruce-sphagnum type with scattered slow-growing trees associated with low areas of sphagnum mosses and standing water. The substrate

under the stand consists of a heavy impervious material with the following composition: 25 per cent sand, 43 per cent silt, and 32 per cent clay. Frost scars and sorted pockets of rocks are also present, indicating past and present frost action.

The mounds on which the individual spruce are situated have a core of frozen ground in the shape of a lens which is 0.5-1 meter in thickness and 2 meters in diameter. The incorporation of small layers of ice into the substrate as it is frozen has created the mounds and raised the spruce above the surrounding surface level. It is suggested that the cause of these mounds is related to microenvironmental differences created by the presence of the trees and the surrounding moss mat. The frozen lens may be due to the insulating effect of the mosses or to the fact that less snow accumulates under the trees in the winter or to both of these factors.

Breaks in the moss mat created by the pressures of the growing frozen lens cause the lens to melt, in many cases collapsing the mound and tipping and killing the tree. In some cases the trees continue to live with a water filled depression directly beneath them. A cycle of seedling to mound, to tipped and dead tree, to frost scar, and back to seedling may be operating within the stand.

Because of the youth of the terrace (probably less than 300 years old), the stand is considered to be successional. The climax for the site may be a spruce stand, a sphagnum bog, or a cyclic situation as has been described for other river terraces in central Alaska.

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