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Response of soil C and N transformations in a Norway spruce stand to logging residue removal

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Increasing demand for bioenergy production has led to interest in forest management which uses logging residue from both clear-cuttings and thinning stands. The aim was to study the long-term effects of logging residue removal on soil microbial processes in C and N cycling and on soil organic matter quality. Samples were taken from the humus layer of a 50-year old Norway spruce stand growing on a relatively fertile site. Logging residue had been either removed or left on the site when the stand was thinned ten years before. Logging residue removal tended to decrease the amount of microbial biomass C and N and the rates of both C mineralization and net N mineralization in the humus layer, although the effects were not always statistically significant. Concentrations of some plant secondary compounds were also measured; most obvious effect of logging residue removal was that the concentration of total phenolics in the humus layer decreased. Altogether, logging residue removal appeared to have long-term effects on soil microbial processes and organic matter.