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Effects of clear-cutting of forest on the chemistry of a shallow groundwater aquifer in southern Norway

A. Henriksen[1] and L. A. Kirkhusmo[2]
[1]Norwegian Institute for Water Research, P.O. Box 173 Kjelsås, N–0411 Oslo, Norway
[2]Geological Survey of Norway, Oslo Office, P.O. Box 5348 Majorstua, N-0304 Oslo, Norway
e-mail for corresponding author: arne.henriksen@niva.no

Abstract. As part of the national monitoring programme for long-range transported air pollutants, four groundwater aquifers in southern Norway were monitored for acidification trends during the period 1980 – 1995. For the monitoring station, Langvasslia in south eastern Norway, sampling continued until the end of 1999. This groundwater aquifer is about 3 km north east of the calibrated catchment Lake Langtjern. The catchment of the groundwater aquifer, covered completely by Norway spruce, was clear-cut in September 1986 and was treated with glyphosate in the summer, 1991. The chemical effects on the chemistry of the groundwater are generally similar to those observed in stream-water from clear-cut areas: increases in water runoff, water temperature, concentrations of K, NO_3, and organic carbon (TOC), and decrease in SO_4 concentration. In the groundwater aquifer, inorganic Al and ANC increased more than would have been expected without clear-cutting. By 1999 NO_3 concentrations were nearly the same as prior to clear-cutting, whereas K still was elevated.

Keywords: Groundwater; clear-cutting; water chemistry; monitoring.

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