Link between soil chemistry, vegetation cover and springwater chemistry in the crystalline headwater areas in Finnish Lapland

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The research was conducted to examine key relationships between soil properties, soil solution chemistry, vegetation cover, and spring water chemistry in headwater catchments found atop crystalline bedrock in northern Finland. The aim of the proposed research study was to determine the effects of soil properties, soil chemistry, and vegetation cover on spring water chemistry in headwater catchments in a subarctic area in north Finland. We hypothesized that the presence of forests (birch and boreal) will accelerate chemical denudation in catchments in comparison with catchments in heath tundra areas. For this purpose we choose 29 headwater cathments (14 in the Kilpisjarvi area: Malla Nature Reserve and near Saana; and 15 in the Kevo area: Kevo Strict Nature Reserve and Kaldoaivi Wilderness Area). The cathments were chosen to represent different environments (heath tundra wih sparse vegetation cover, heath tundra, birch forest, boreal forest with pine and birch). Two water samples were taken from every spring (one for main ions analyze, one for dissolved organic carbon analyze). Water samples were taken twice (just after snowmelt in June and during late summer in August). Additionally, snow and rain samples were taken. Altogether 60 water samples were taken to analyses. n the field water flow, temperature and conductivity were measured. During the summer season soil samples were taken to determine the relationship between spring water chemistry and soil chemistry and to determine the posibility of water movement in the soils in studied catchements. Soil profiles represents environments specified for examined cathements (vegetation cover and slope position). We dug 25 soil profiles (11 in the Kilpisjarvi area and 14 in the Kevo area). Sol profiles were described according to WRD requirements. 140 soil samples were taken for basic chemical and phisical analyses (texture, humidity, pH, soil organic matter, cation exchange complex) and 40 for water holding properties (bulk density, water and air porosity). Additionally 14 samples of the most frequent plants were taken to determine their chemical composition.