



Project acronym: LISOVECO

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

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Discipline: Earth Sciences & Environment: Other - Earth Sciences

Station(s): Kilpisjärvi Biological Station (Finland), Kevo Subarctic Research Station (Finland)

Water chemistry in headwater catchments and chemical denudation are the effects of an array of factors. The effect of lithology is strongly modified by the thickness of soils and regolith, plant cover, relief, snow cover depth, and water circulation patterns. The relationships between main parameters in headwater areas are not well recognized in subpolar areas, especially links between soil properties, vegetation cover, and chemistry of spring waters. The aim of the proposed research study is 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 hypothesize that the presence of forests and dwarf willow tundra will accelerate chemical denudation in catchments in comparison with catchments in grass or heath tundra areas. Soil properties such as soil solution chemistry, soil thickness, humidity and porosity in catchments will affect spring water chemistry. The effects of soil and vegetation cover on soil water chemistry will depend on the seasons. We selected 33 headwater areas with different plant cover (boreal and birch forest, grass, heath and dwarf willow tundra) in northern Finland. We intend to collect water samples from the investigated springs two times a year: after the snowmelt season and during late summer together with soil samples to note the effects of the investigated factors on water chemistry in humid and dry periods of the year. Water samples from fresh snow, snow patches, and area rainfall will be taken for chemical analysis. Soil profiles will be excavated in all the studied headwater areas. Two to five soil profiles will be excavated in a catena order. The profiles will be sampled by following soil horizons. Plant material will be taken for chemical analysis in all the studied headwater areas. Laboratory work will include the determination of the concentrations of ions in waters and soil solution, soil exchangeable cations, soil physical properties (e.g. texture and porosity) and plant material chemical composition. Morphometric parameters of catchments will be calculated using GIS methods. The presently assumed hypothesis will be tested using statistical methods.