

Isoscapes Norway

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Isotope geochemistry, when integrated into isoscapes, is a powerful tool used for fingerprinting the source of pollutants, tracking the fate of elements, and for geolocation of organic remains. Although very useful to many disciplines, these isoscapes are often built using predicted values based on rock types and ages, with only a few control points. In this project, we want to build the isoscapes of Sr-C-H-O isotopes measured in freshwater lake and moss samples collected all over Norway. 1000 freshwater lakes were sampled by the Norwegian Institute for Water Research and analysed for their elemental composition. The concentration of dissolved organic matter has increased in these lakes, leading to a change from clear-water lakes to humic lakes, while already dystrophic lakes turned even more humic. This is mainly due to the decline in acid rain and changes in climate and land-use. However, the contribution by these different governing factors on the increased humic character cannot be distinguished using the present data. Regarding the moss samples, 464 sites were collected by Norwegian Institute for Air Research. Moss grows by absorbing what they need from their leaf surface, and hence their chemical composition represents local atmospheric conditions, including dust particles from local sources. The moss samples were also analysed for their elemental compositions. However, neither the water nor moss samples were analysed for their isotope composition, and hence were not used to their full potential. Indeed, these comprehensive synoptic studies of both water and moss samples provide a unique opportunity to study natural and anthropogenic processes across several climatic zones stretching above and below the polar circle between 58°N and 71°N. In this contribution, we will present the isotope results of a small subset of samples, but our goal is analyse all the samples to produce regional isoscapes. These isoscapes will reveal local, regional and global biogeochemical processes, such as element cycling, governed by climate change and environmental conditions, with applications related to ecology, hydrology, forensics, anthropology, atmospheric chemistry and trade regulations.