

Effects of storage in field and in laboratory on temperature, light and chemistry of forest water samples

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The chemical composition of solution samples can vary over time due to biological activity in the sample, exchanges and adsorption on the walls of the storage vessel, abiotic particle formation or dissolution. Factors influencing these processes include the initial composition of the sample, e.g. pH, temperature and light conditions, which directly determine the activity of microorganisms such as nitrifiers, storage duration (in the field or the laboratory), cleaning of the storage vessels, and pre-treatment of the samples before analysis (e.g. filtering, acidification).

Precipitation, throughfall and soil water regularly sampled in forest monitoring needs to be protected toward possible alterations. A range of storage experiments have been performed both in forests and in laboratories to check the quality of samples when they are stored under different conditions and situations. The first objective was to examine the change in temperature and light along with possible change in chemistry of soil solution, precipitation and throughfall samples during the period they are collected in the forest and when stockpiled in the laboratory before analysis. The second objective was to recommend methods and storage that diminish possible chemical transformations in solution samples.

Depending on the sampling design, solution samples collected in the forest were to various extents subject to ambient air temperature fluctuations during the day and high light exposure. In the summertime the temperature in samples could get unfavorably high when samples were not protected properly. Our storage experiments showed changes in chemical composition in samples stored for longer periods both in the laboratory and the forest; however, the results suggested that it is most important to reduce the duration of sampling period (i.e. weekly samples instead of bi-weekly or monthly sampling) in the forest.