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An analytical procedure for determination of sulphur species and isotopes in boreal acid sulphate soils and sediments

Keywords sulphur species, sulphur isotopes, analytical scheme, acid sulphate soils, sediment,

Abstract

An analytical scheme suitable for boreal acid sulphate (AS) soils and sediments was developed on the basis of existing methods. The presented procedure can be used to quantify and discriminate among acid volatile sulphide, cold chromium reducible sulphur, hot chromium reducible sulphur, elemental sulphur, sulphate sulphur, organic sulphur, total reducible sulphur and total sulphur. The sulphur fractions are recovered as either Ag_2S or BaSO_4 precipitates and can further be used for isotope analysis. Overlaps between sulphur species are common during speciation, and must be minimized. Some of these overlaps are caused by poor sampling and storage, inappropriate conditions during the distillation, or natural variations in the sample (e.g. Fe^{3+} interference and grain size). The procedural impact was determined by conducting tests on both artificial and natural samples containing one or several sulphur species. The method is applied on reduced sediment from an AS soil locality (Överpurmo) and a brackish lake (Larsmo Lake) in western Finland and the results, including S-isotopes, are discussed.

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