



Mineralogical and geochemical sulfur speciation in acid sulfate soils from Luleå, Sweden

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This study provides a mineralogical and geochemical study of four acid sulfate soils locations in the Luleå area, Northern Sweden. Acid sulfate soils form when sulfide-bearing sediments are exposed to oxidic conditions, in case of Northern Europe due to post-glacial uplift. The resulting low pH environment can leach out elements in high concentrations to small water bodies and groundwater, a problematic phenomenon that has been observed all over the world. This work shows results concerning the changing whole-rock geochemistry and sulfur mineralogy of these four profile pairs (each pair contains one oxidized and one waterlogged wetland downstream profile). Preliminary results suggest that sulfur is extensively leached out in the oxidized profiles together with cobalt (Co), nickel (Ni) and zinc (Zn) and that subsequently these elements are transported down to the waterlogged profiles where they accumulate due to sorption and sulfate reduction processes. The mineralogical assessment of polished samples using optical microscope, Raman spectroscopy and SEM-EDS reveal that the visually most abundant sulfur-bearing mineral is framboidal pyrite. However, jarosite and elemental sulfur in form of large (up to 50 μm) euhedral crystals are observed as well.