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# Recovery from acidification in organic soils: sulfur cycling and dissolved organic carbon dynamics

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Organic soils represent an important store of carbon; recent work suggests these stores may be destabilising, with an increase in dissolved organic carbon (DOC) in surface waters over the last few decades. While there have been many hypotheses as to the cause of this phenomenon, little attention has been given to the coincident decline in acid sulfate deposition, despite apparent inverse trends in sulfate and DOC concentrations in some organic soil systems. Here, we describe field and laboratory experiments, which use stable isotope techniques to better understand sulfur biogeochemistry and constrain the relationship between sulfur and DOC cycles in organic soils. Field experiments used $^{34}SO_4$ amendments to trace the physical and geochemical fate of pollutant sulfate in a peatland with high historical acid sulfate inputs. Physical migration of the tracer was limited to the vegetation and organic fraction of the upper peat, by the rapid biological reduction and immobilization of sulfur. Long-term laboratory mesocosms have also been constructed, and are ongoing. Using the same tracer technique, these experiments will independently monitor the effects of changing acid sulfate deposition, acid deposition and ionic strength on sulfur and DOC cycles and their interactions, in peat and podsol soil waters.