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## The effects of fire on sulfidic peat swamp sediments

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Peat swamps contain substantial accumulations of organic matter due to waterlogging and slower decomposition rates. Peat swamps can be underlain by sulfidic sediments where there is abundant iron and sulfate for reduction to form a range of sulfidic minerals, primarily pyrite ( $\text{FeS}_2$ ). Sulfidic sediments can acidify to produce sulfuric acid, similar to acid mine drainage (AMD) and acid sulfate soil (ASS) environments when oxidised, which can occur when water levels drop due to drainage or periods of drought. Discharging surface and shallow groundwater can therefore acidify adjacent lakes and waterways. These swamps can also present significant fire hazards when drying occurs.

This study identified the chemical and mineralogical changes in sulfidic peat swamp sediments along a temperature gradient to simulate the effects of fire. We found that fire induced changes in the Fe-minerals to form a range iron (oxy)hydroxides and iron oxides such as magnetite, mghemite and haematite in increasing crystallinity with increasing temperatures. pH initially decreased on drying a minimum of pH 3.15, before increasing with increasing temperature to 650°C to pH 4.86, which can mobilise environmentally important pH-sensitive metals.

Peat swamps are highly susceptible to the effects of fire when surface- and shallow groundwater levels decrease as a result of extended drought or drainage. Fire can irreversibly alter underlying soil properties to induce changes in soil minerals and potentially impact the surrounding environment.