Smouldering peat fires in polluted landscapes and their impact on heavy metal mobilisation

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Whilst wildfires are commonly viewed as a threat confined to Southern Europe, Australia, and North America, recognition of wildfire hazard in the UK has been growing in recent years. UK wildfires often occur on heathland vegetation underlain by peat. These areas can contain industrially-derived legacy pollutants, such as mercury, lead, and arsenic. Ignition of the peat can lead to long-term smouldering fires that are difficult to extinguish, leading to large-scale damage. While work on assessing post-fire damage of peatlands has focussed on carbon and nutrient dynamics, there has been little attention on the release of heavy metals following wildfires.

This paper presents initial data from a preliminary study to assess heavy metal release from smouldering peat fires. A homogenised sample of peat from the Peak District National Park, UK was ignited, monitored using thermocouples and an IR camera, and left to smoulder until self-extinguished ($\sim$9 hours). Total mass loss was 61%. Samples of pre- and post-burn peat were analysed for their heavy metal concentrations using XRF, ICP-MS, and CVAFS. Sample analysis is ongoing, but initial data shows that there is a substantial (3x) relative enrichment in heavy metal concentrations in post-fire ash. This has important implications for subsequent mobilisation in the aquatic and terrestrial environments, as well as consequences for human health risk through atmospheric redistribution.