What influences the water content of vegetation in heather moorlands?

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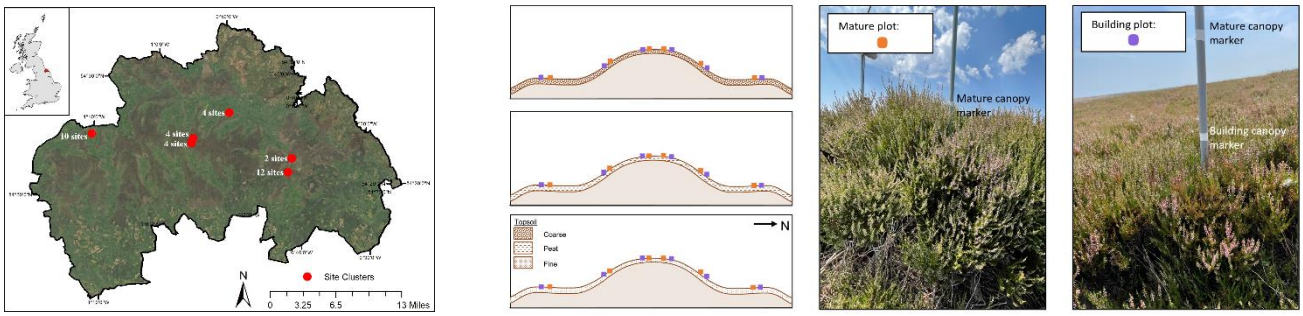
CONTEXT

Wildfire risk is increasing in emerging fire prone regions due to global changes. These include heathlands and peatlands in temperate Europe, which contain important carbon stores. Fuel moisture content describes how dry or wet vegetation is. It therefore affects the availability of vegetation for ignition and fire spread. However, how fuel moisture varies across landscapes hasn´t been quantified, which could help assess wildfire danger in landscapes where small-scale changes in landscape characteristics can be important for wildfires.

Kerryn Little measured the fuel moisture variability of heather (*Calluna vulgaris*) in the North Yorkshire Moors (UK), providing insight into fuel moisture dynamics at the landscape level. This can help develop locally robust fuel models for their input in wildfire danger rating systems.

OUTCOMES



Left: Map showing the location of the measurement plots in the North Yorkshire Moors National Park. Right: Representation of the plots (coloured circles) and landscape factors studied (soil texture, hillslope position and aspect).

In the heather-dominated North Yorkshire Moors:

- Fuel moisture content varies widely across the landscape, creating spatial discontinuity in the availability of fuel for surface fire and susceptibility to underground fire.
- Factors affecting spatial differences in fuel moisture content across a landscape are:
  - Landscape characteristics: soil texture (is the soil coarse, fine, or peaty?), shrub canopy age, and slope aspect (north versus south-facing).
  - To a lesser extent, spatial micrometeorological differences: temperature, relative humidity, vapour pressure deficit, and wind speed.
  - The specific factors that are important show differences between different fuel layers (heather canopy, surface moss/litter, and organic material) and whether the vegetation is live or dead.
  - Seasonal differences in vegetation stage, such as dormancy during winter and late spring green-up, is important and can switch the direction of relationships between fuel moisture and landscape factors.

IMPACT ON WILDFIRE MANAGEMENT

- Cross-landscape fuel moisture variation creates spatial discontinuity in the availability of fuel for ignition, wildfire spread, and fire severity. This is important for deciding where to focus prevention and suppression activities or deciding on suitable managed burn locations.
- Including landscape factors in fuel moisture models can improve fuel moisture estimates.
- Landscape-scale wildfire danger assessments can support regional scale assessments, recognising that fire management tools may require different levels of detail to meet user needs.

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