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IPS at Glasgow COP26

Editorial: No wishful thinking: smart solutions are required
IPS at COP26 in Glasgow: What have we done and what has been achieved?
Peat - an important natural resource for food security and climate change mitigation
The oldest extant tropical peatland in the world: a major carbon reservoir for at least 47,000 years
Call for papers for special issue journal: Sustainability of Tropical Peatland Conservation and Restoration
New book: Swamplands - Tundra Beavers, Quaking Bogs, and the Improbable World of Peat
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Wind erosion on UK agricultural peatlands

Wind erosion on UK agricultural peatlands

The East Anglian Fens are a thriving agricultural landscape. They contain ~50% of England's high-grade agricultural land, produce ~33% of England's vegetables and support a food production industry worth £3 billion GBP[1]. However, having been subject to drainage for hundreds of years, these soils are vulnerable to both mineralisation of soil organic matter (SOM) and wind erosion.

My research aims to understand better the processes driving peat loss and how these might be mitigated. Given the high productive value of these soils, farmers have a vested interest in reducing losses and my research is supported by G's Growers, a major producer of salad vegetables in the Fens. Here I report on a program of research aiming to understand and mitigate wind erosion losses.

Mineralisation of SOM changes the physical properties of agricultural peat soils and over time a fine, granular topsoil forms. This contains many small, light particles, which are highly susceptible to wind erosion. Sediment transport rates of 2.3 - 12.8 t ha^{-1} yr^{-1} have been measured at my study site, with erosion exacerbated by periods of high winds and bare soil[2]. Not all this sediment leaves the site; much is deposited in drainage ditches and at field margins. However, soil contamination

Lettuce crop on peat in the East Anglian Fens.
All photos: Benjamin Freeman

The PI-SWERL next to a lettuce crop.

of crops reduces their value and wind erosion is therefore an economic issue for farmers.

In order to help target mitigation measures, it is important to understand spatial/temporal variation in the vulnerability of soil to erosion and how these are influenced by farm management operations. To investigate this, I undertook a field sampling campaign using a PI-SWERL. This device uses a spinning ring inside a chamber to create an erosive force. It then measures the resulting dust concentrations to provide an index of erodibility comparable to full sized wind tunnels. It is highly portable which allowed us to test a range of surfaces across G's farms under real world conditions.

Crop management had a significant effect on dust emissions, with erodibility increasing through the crop management cycle. This indicates that farm operations may physically abrade aggregates, creating finer particles, which are more susceptible to erosion.

After ploughing, higher SOM soils were more vulnerable to erosion than those with lower SOM content. The higher particle density of lower SOM soils appeared to be protective. However, management activities around crop establishment appeared to produce many small, light particles regardless of SOM content. This creates a period of vulnerability when bare soil is exposed between juvenile crop plants.

One surface, which had been subject to heavy harvesting traffic, was highly erodible. More measurements are needed to confirm this finding. However, it indicates that vehicle traffic routes may create erosion hotspots, especially because vehicles also create turbulence and disturb dust. Vehicle routes may therefore represent important targets for mitigation.

IPS' Allan Robertson Grants (€500) are awarded to:

a) young peatland and peat researchers carrying out research or practical work or
b) young professionals in early stages of their career in managing peatlands or peat industry.

The grant reports of 2021 will be published in the 2022 issues of Peatlands International.

Next deadline is **31 January 2022**. More info and an application form can be found at www.peatlands.org/about-us/honoursgrants. Grants are kindly sponsored by the National Committees of Estonia, Ireland, UK, and IPS.


Bare soil between young plants showing surface after PI-SWERL test.

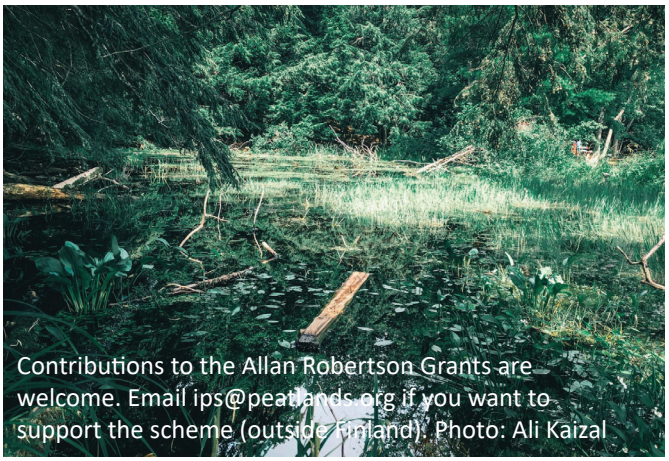

Soil contamination of a lettuce crop.


Salad residue left to shield the soil surface.


Shelterbelt to protect recently ploughed fields.

For electrical safety reasons, measurements could not be made on soil that was still wet from irrigation. However, dust emissions were lower from moister soils in our sample. Irrigation also forms a thin surface crust, and so may offer some temporary protection against erosion at lower wind speeds; as long as the soil remains damp.

G's are implementing a range of erosion mitigation measures on their farms. Winter cover cropping is widespread and salad residues are left on field surfaces. They are also integrating shelterbelts and hedgerows into the landscape and are using companion cereal crops to shield the bare soil between rows of young vegetable crops. We are investigating more options to mitigate wind erosion at times of limited vegetation cover. We hope our findings can help farmers to protect the peat from wind erosion.


Contributions to the Allan Robertson Grants are welcome. Email ips@peatlands.org if you want to support the scheme (outside Finland). Photo: Ali Kaizal

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References

[1] NFU (2019) Delivering for Britain. Food and farming in the Fens. NFU Report.
[2] Cumming (2018) Multi-annual carbon flux at an intensively cultivated lowland peatland in East Anglia, UK. PhD Thesis, University of Leicester.

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