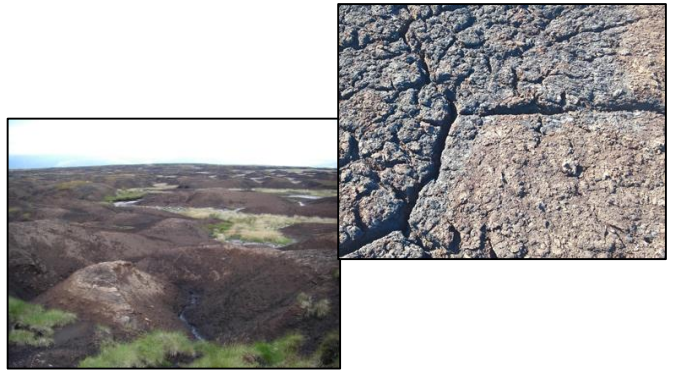
Fred Worrall

Professor of Environmental Chemistry,
University of Durham

Cold humid islands – the scale of potential benefits

- Aim
  - Assuring function for peatland restoration
- Why bother with monitoring peatlands?

  Evans et al (2019) report to BEIS in response to IPCC (2013)
  - UK peatlands currently large net sources of greenhouse gases
  - Could be net saving of greenhouse gases of 23 Mtonnes CO_{2eq}/yr
- Many ongoing restoration projects
  - Restoration funded by UK government and EU, especially EU LIFE projects
  - Who says they have worked?
- Where to target next?
- There may be bad news



Cold humid islands – relating all the potential benefits of restoration

- The land of many uses
  - Multiple ecosystem services
    - Provisioning – water, food, fibre
    - Supporting - biodiversity
    - Regulating – climate mitigation, water quality
    - Cultural – tourist destination
- Our peatlands have more externalities than any other British landscape
  - Few people live there but we all use them
- Underpinned by a functioning peatland
  - A peatlands exist because at some stage in the past they were accumulating organic matter
  - Nobody needs this

Cold humid islands? - Hypothesis

Damaged peatland

Bare burnt peat after Saddleworth Moor fire

Restoration

Functioning peatland

Sphagnum moss is the main peat forming plant

Dark surfaces	→	Green surfaces
Dry surfaces	→	Wet surfaces
Warm surfaces	→	Cool surfaces
Surface recession	→	Aggradation
GHG sources	→	GHG sinks

Cold humid islands – ensuring useful results

Peatland of interest

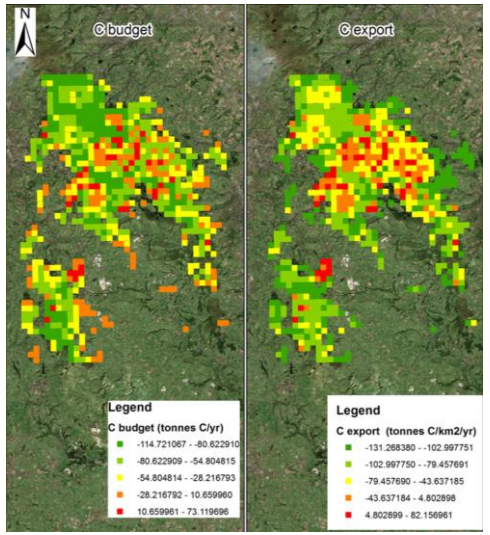
ESA EO data products

Dark surfaces	Albedo & land cover
Dry surfaces	Soil moisture
Warm surfaces	LS temperature
Surface recession	Sentinel 1
GHG sources	Greenhouse gases

Data Analytic Engine

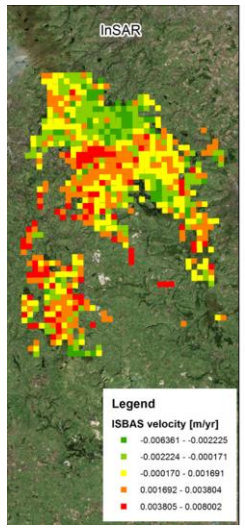
Output to users

- Assurance
- Targeting
- Published

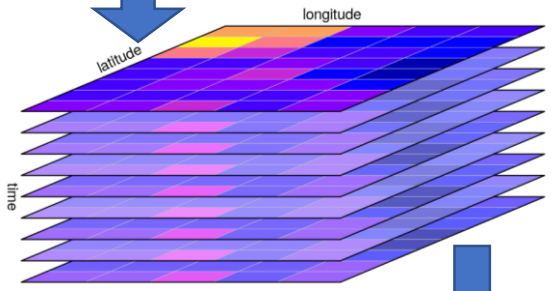


Modelling/Presentation

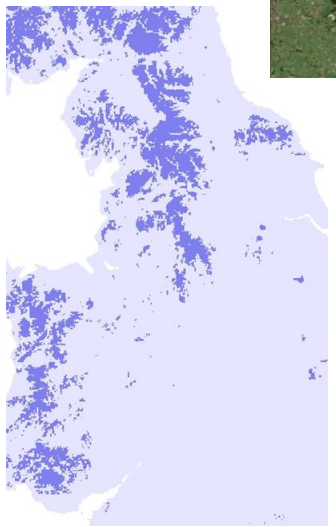
Remote sensing



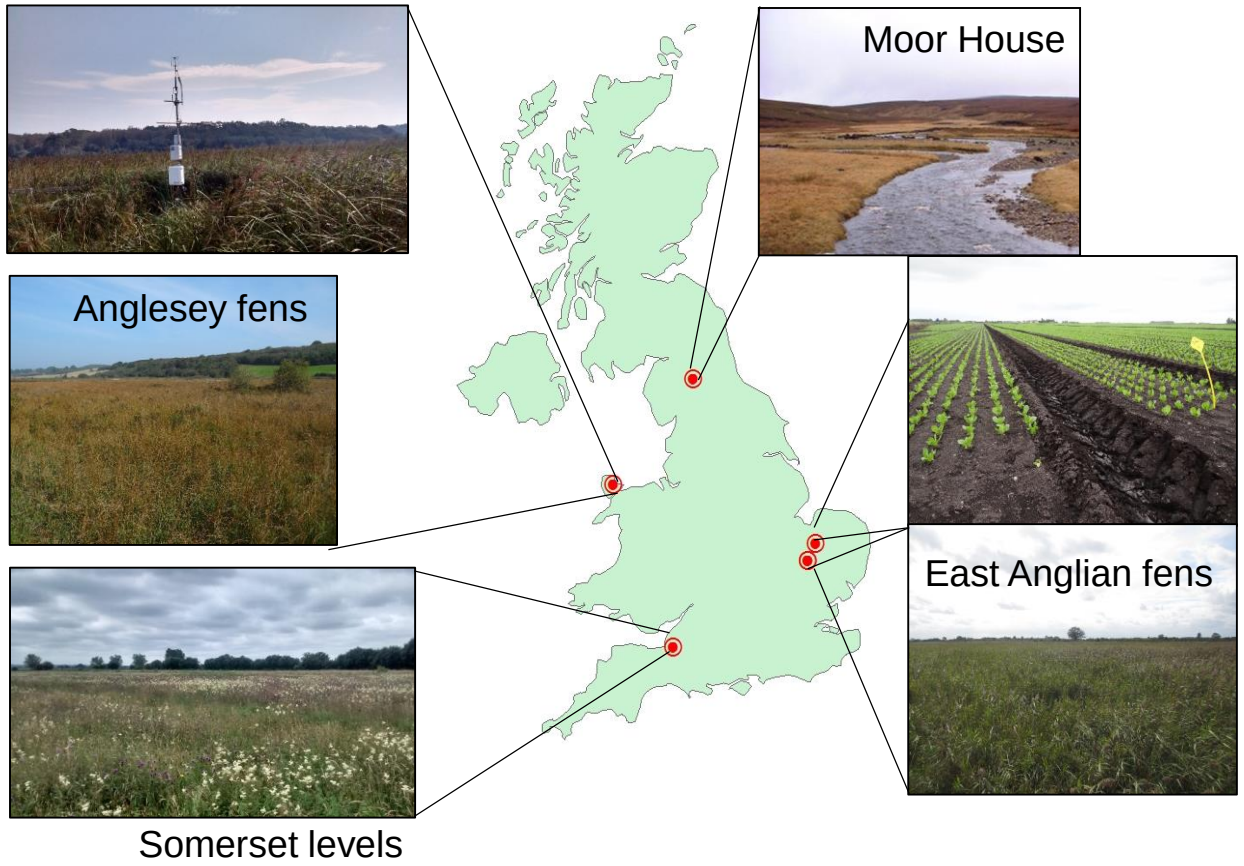
Data cube production



Covariate information



Cold humid islands – ensuring useful results



- Calibration
  - We have multiple sites in a range of conditions
- Control
  - We are experts in the analysis of designed experiments
  - We are experts in Bayesian modelling
  - We need to use controls to assess change

Cold humid islands – which potential users have we spoken with?

Yorkshire Peat Partnership

MOORS FOR THE FUTURE PARTNERSHIP

The James Hutton Institute

NATURAL ENGLAND

NORTH PENNINES Area of Outstanding Natural Beauty

IUCN National Committee United Kingdom

Peatland Programme