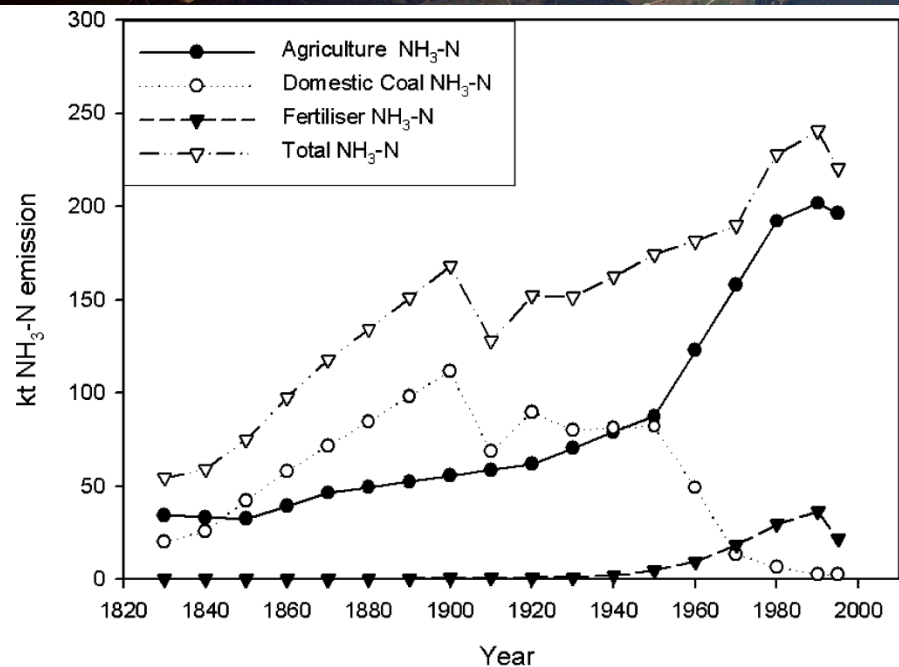
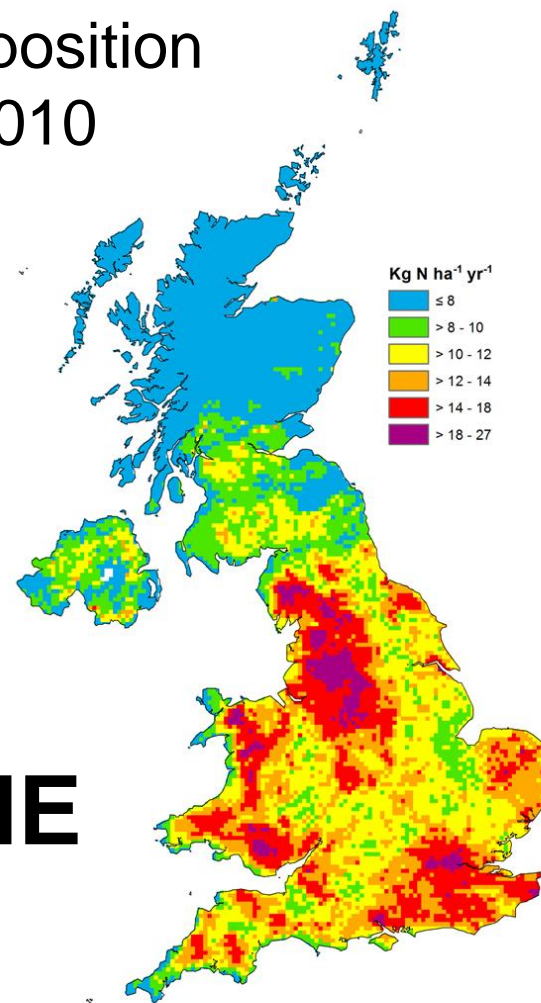


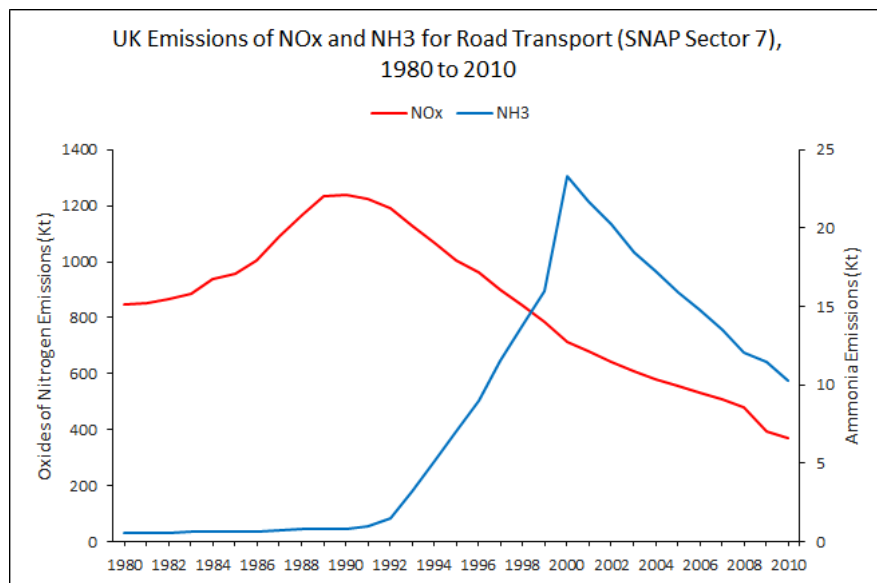
# Atmospheric deposition modelling



N deposition  
2010

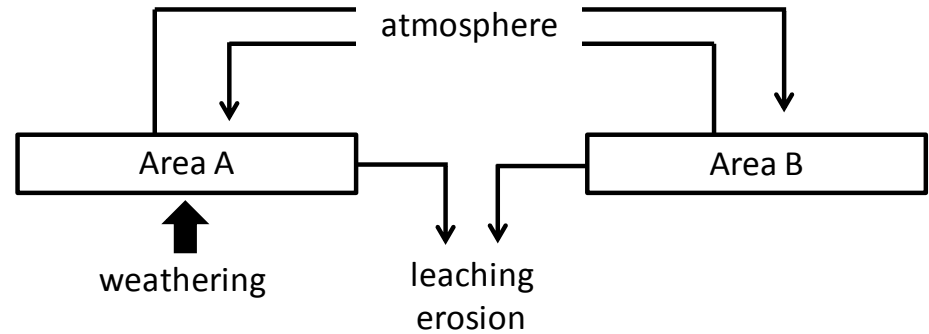


**FRAME**



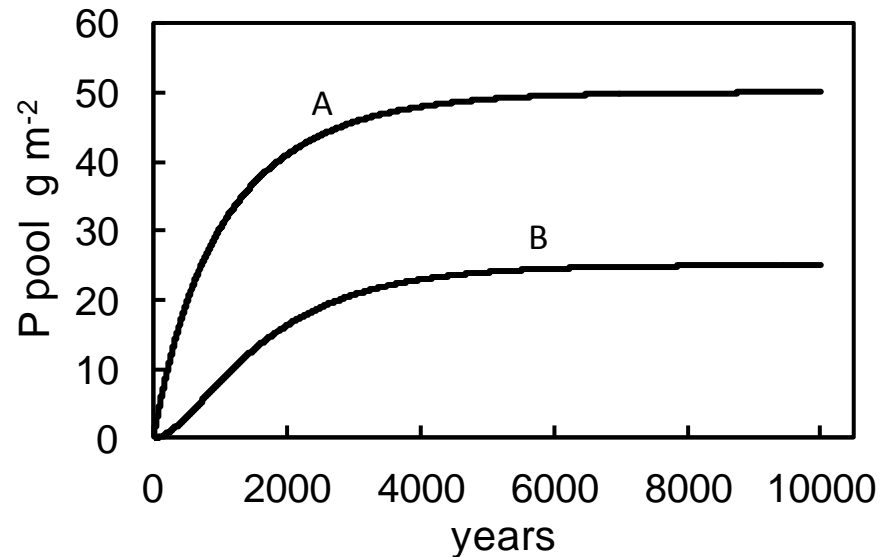
U Dragosits, E Carnell, S Tomlinson

Global average  
deposition rate of TP  
= **0.027** g m<sup>-2</sup> a<sup>-1</sup>



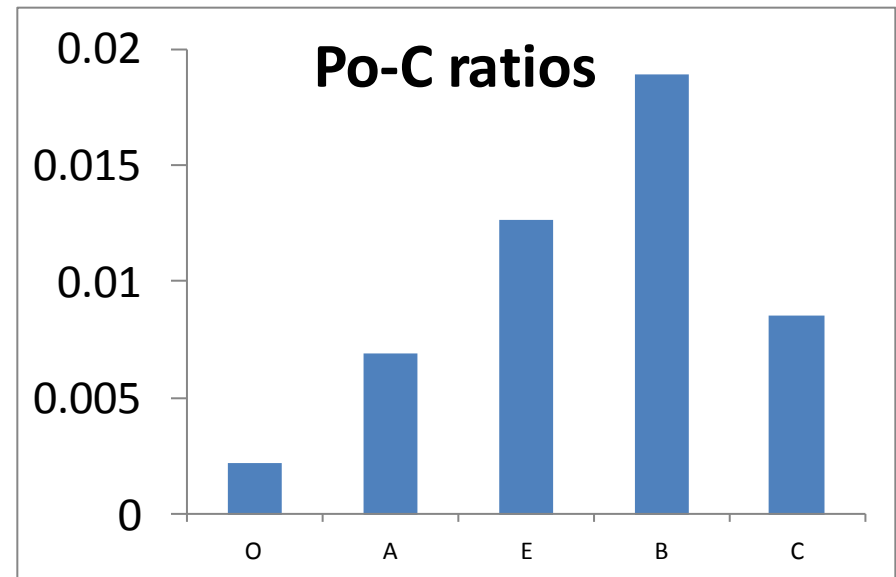
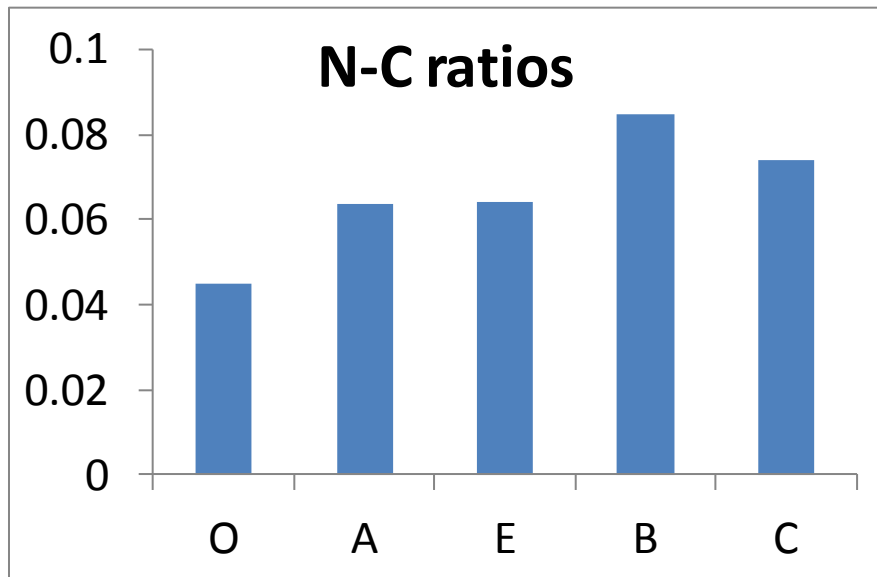
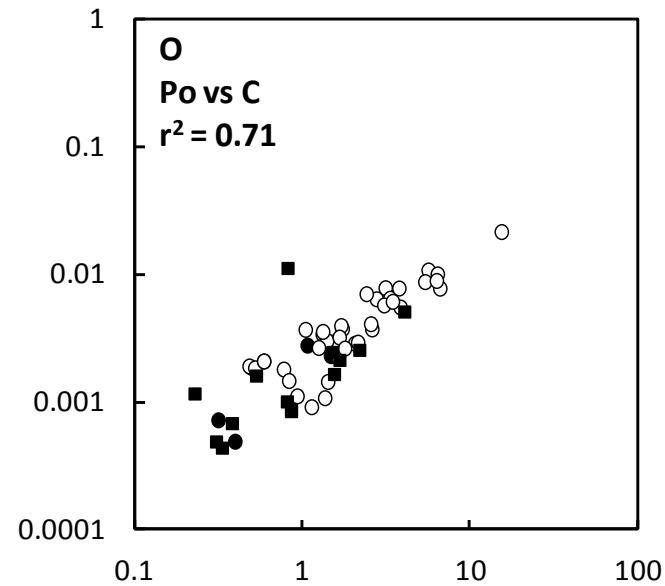
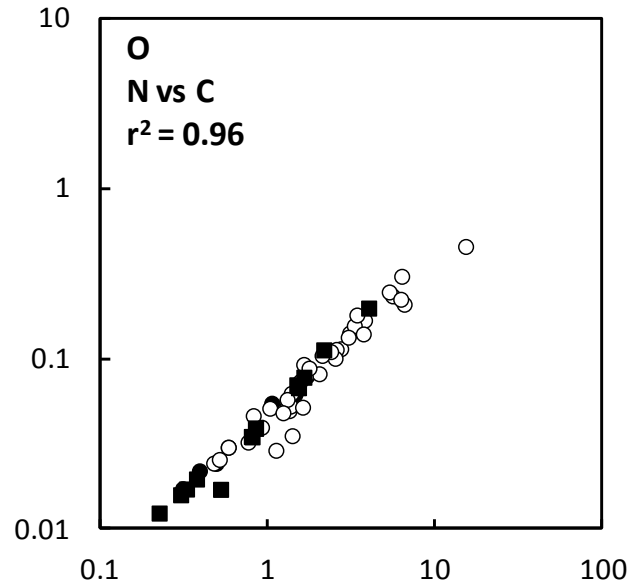
Total annual deposition  
**3.7 Tg**

Particles < 10 μm  
**1.4 Tg**



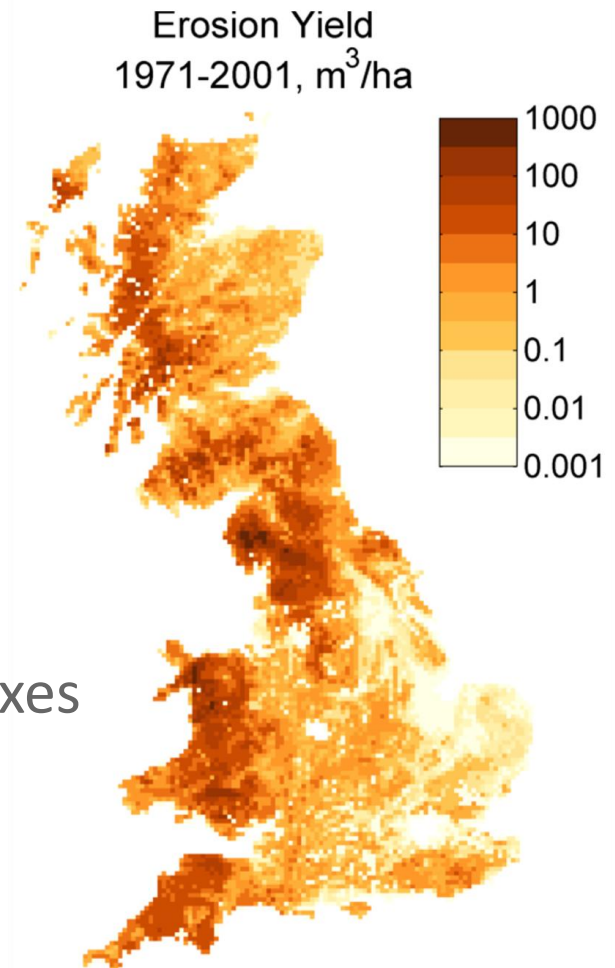
Important for oligotrophic lakes,  
ombrotrophic peats, tropical forests, oceans

# Swiss forest soils (170 profiles) *Somerville et al*



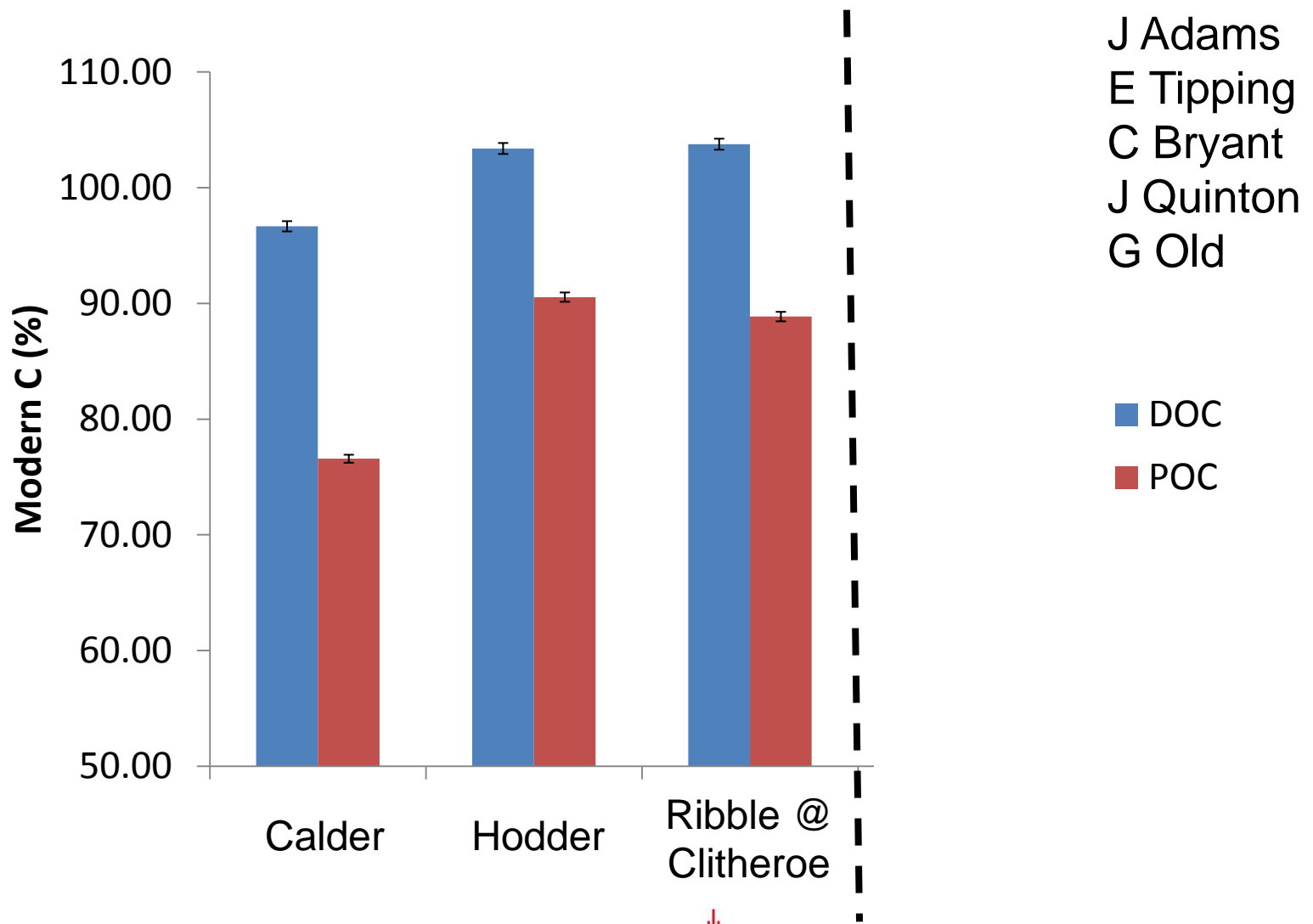
# Erosion Modelling

- Using a simple empirical energy-based model that takes into account
  - Sub-grid topography
  - Soil type
  - Crop protection
  - Connectivity to the waterbody
- Driven by hydrological flows from the run-off part of the LTLS integrated model
- New results incorporating deer grazing
- Testing against site based data, river fluxes and lake sedimentation rates imminent



# Riverine DO<sup>14</sup>C and PO<sup>14</sup>C

**Averages of 4  
high flow events**



J Adams  
E Tipping  
C Bryant  
J Quinton  
G Old

■ DOC  
■ POC



# Communicating outputs

J Davies



There will be a lot of outputs to communicate!

Just from the terrestrial model:

27 output variables

× reported seasonally from 1800 to 2100

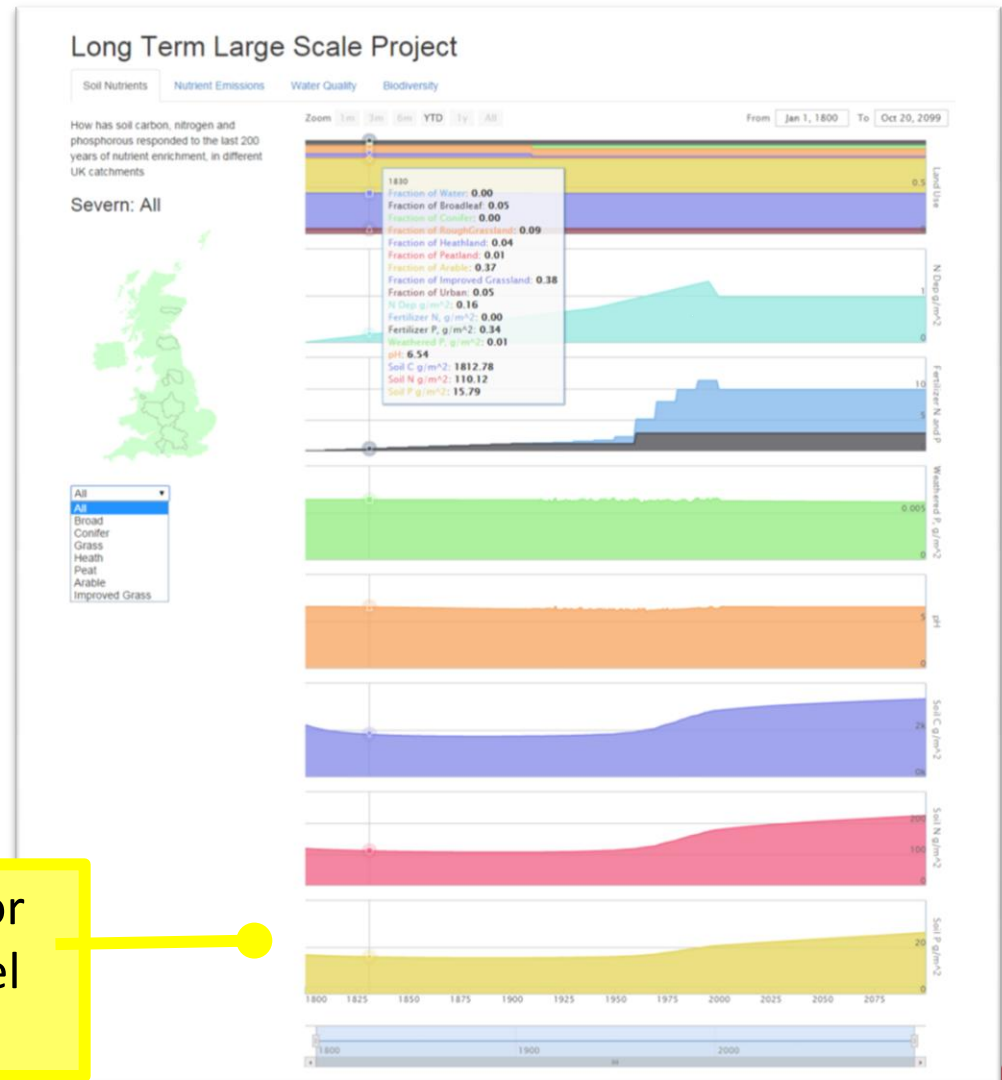
× for each land fraction in the UK (45,000)

= ~1,5 billion data points

or ~145,800 output maps

- National/Catchment/Grid scale summaries
- Animated maps

Prototype web-tool for interacting with model outputs



# Terrestrial NPP discussion meeting

Lancaster December 2013

20 participants

LTLS

T2S

BESS

EVO

COSMOS-UK

Changing Water Cycle

Presentations etc – [www.ltls.org.uk](http://www.ltls.org.uk)

# LTLS Stakeholders meeting

Lancaster April 2014

Day 1: *Reviewing LTLS modelling and Stakeholder interests*

Day 2: *Scenarios – how to define and implement them*

Jenny Banks

Peter Coleman

Nicola Dunn

Ruth Hall

Tristan Ibrahim

Helen Jones

Anne Liddon

Elena Vanguelova

Linda Pope

Yorkshire Water

Defra

National Farmers Union

Natural England

Defra

Scottish Government

Newcastle University

Forest Research

Environment Agency

Report, presentations, flier etc – [www.ltls.org.uk](http://www.ltls.org.uk)



# Publications

## Published

*Tipping et al*

*Sgouridis & Ullah*

*Mills et al*

*Davies*

*Phosphorus deposition review*

*Potential denitrification*

*Long-term C turnover in soils*

*Westminster Policy Note*

## Manuscripts in progress

*Davies et al*

*Toberman et al*

*Tipping et al*

*Sgouridis & Ullah*

*Sgouridis & Ullah*

*Somerville et al*

*N14C parameterisation*

*peat CNP*

*lakes model*

*in situ denitrification*

*greenhouse gas fluxes*

*CNP stoichiometry in Swiss soils*

## 18 Planned / promised

# Posters

John Boyle

Jessica Adams

Hannah Toberman

Jessica Davies

Shibu Mohammed

Pam Naden

Ed Carnell

Lakes

River radiocarbon

C,N and P in peats

Semi-natural ecosystems modelling

Agricultural ecosystems modelling

Rivers modelling

Atmospheric deposition modelling

# LTLS what have we learned so far?

Joining models together is hard work

National-scale modelling is informative

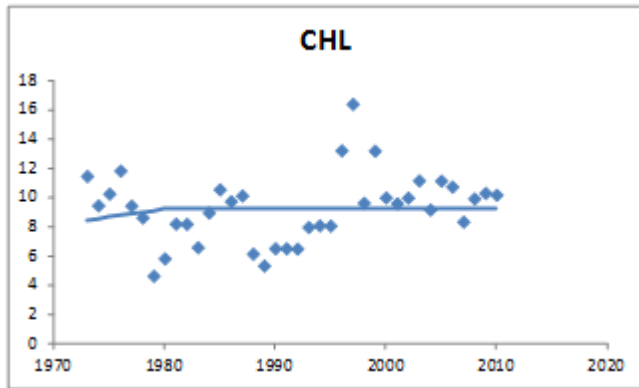
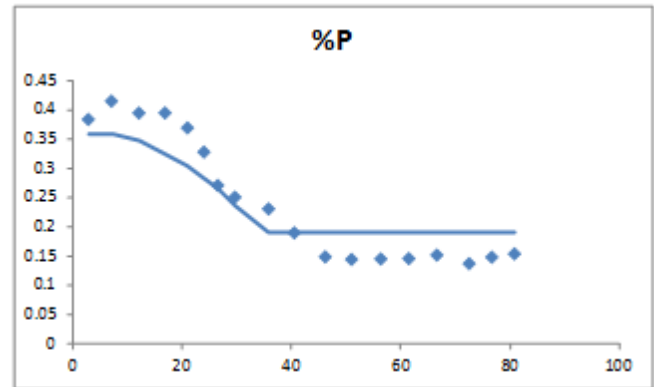
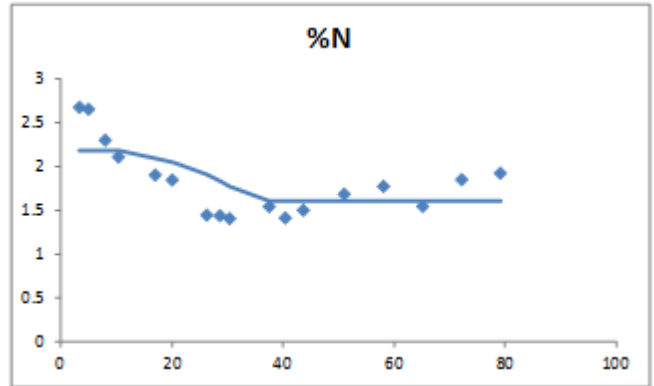
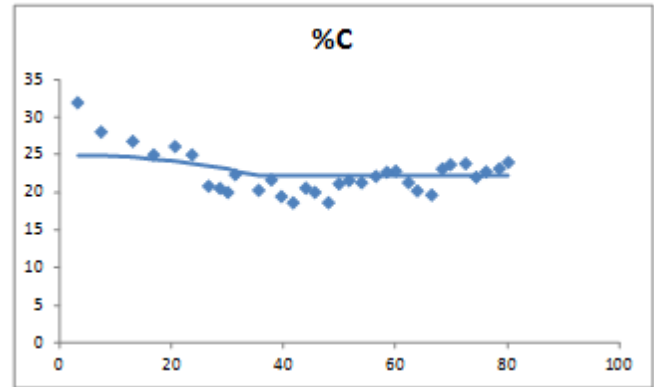
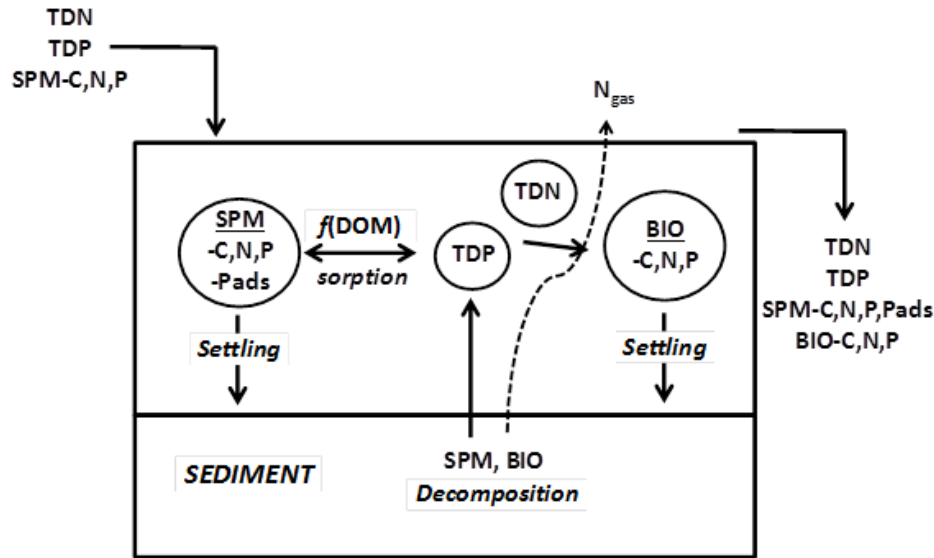
The British landscape is heterogeneous

We need to think about displaying outputs

**Workshops are useful – we need more!**

**The long-term importance of P in  
terrestrial ecosystems**

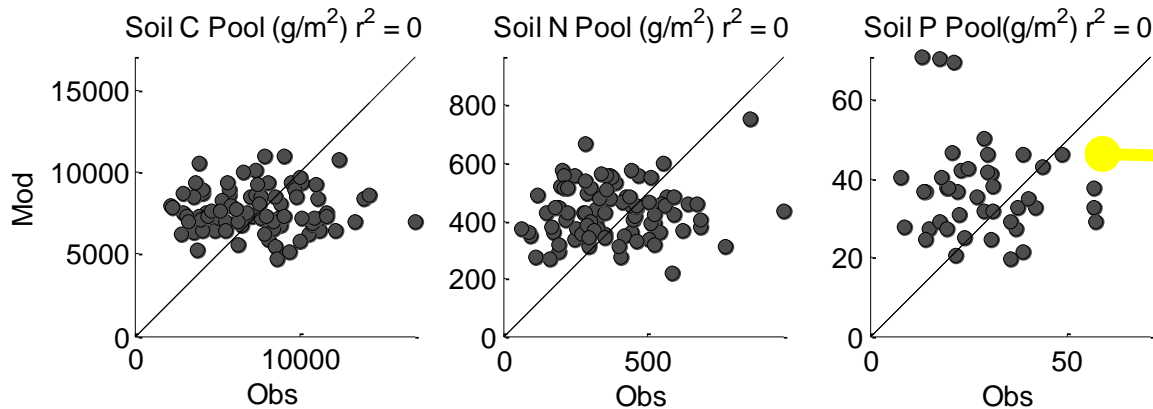
# LTLS Lakes modelling



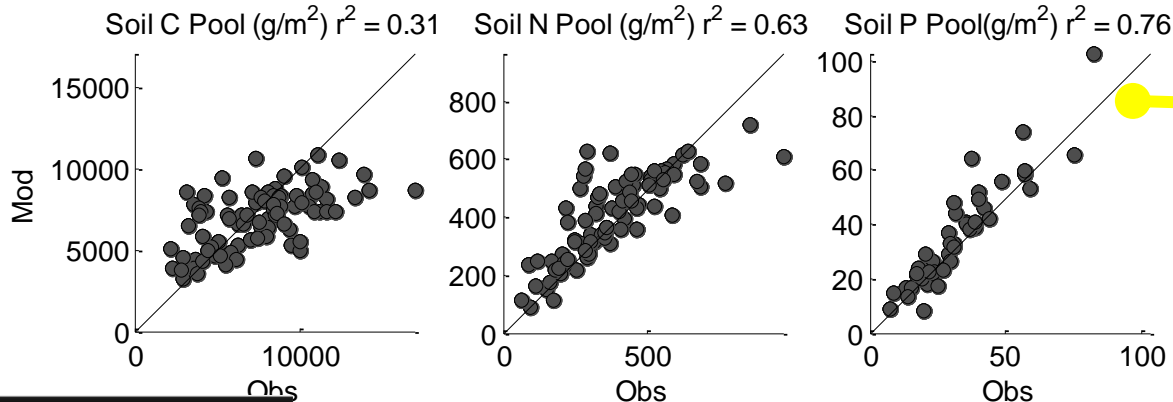
Parameterised with data from ~ 100 lakes  
*Simulations for Grasmere*

# Semi-Natural Terrestrial Modelling

- New insights
  - sensitivity of model output to dissolved organic fluxes
  - importance of weatherable P to contemporary pools of soil C and N



Two values of initial bedrock P (podzols & non-podzols)



Allowing initial bedrock P to vary within a sensible range values