

Lake sediment records of nutrient fluxes

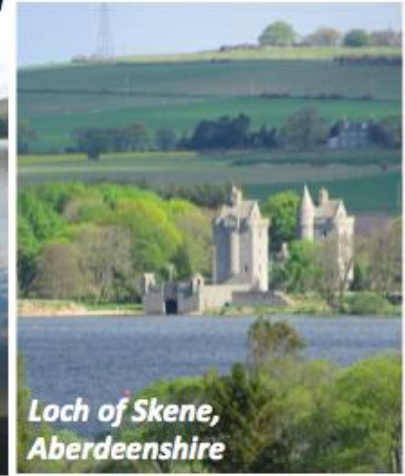
John Boyle, Neil Rose,
Dan Schillereff, Hannah
Toberman, Simon Turner,
Ed Tipping

- “100” lakes
- 4 new sites

Croze Mere, Shropshire



Loweswater, Cumbria

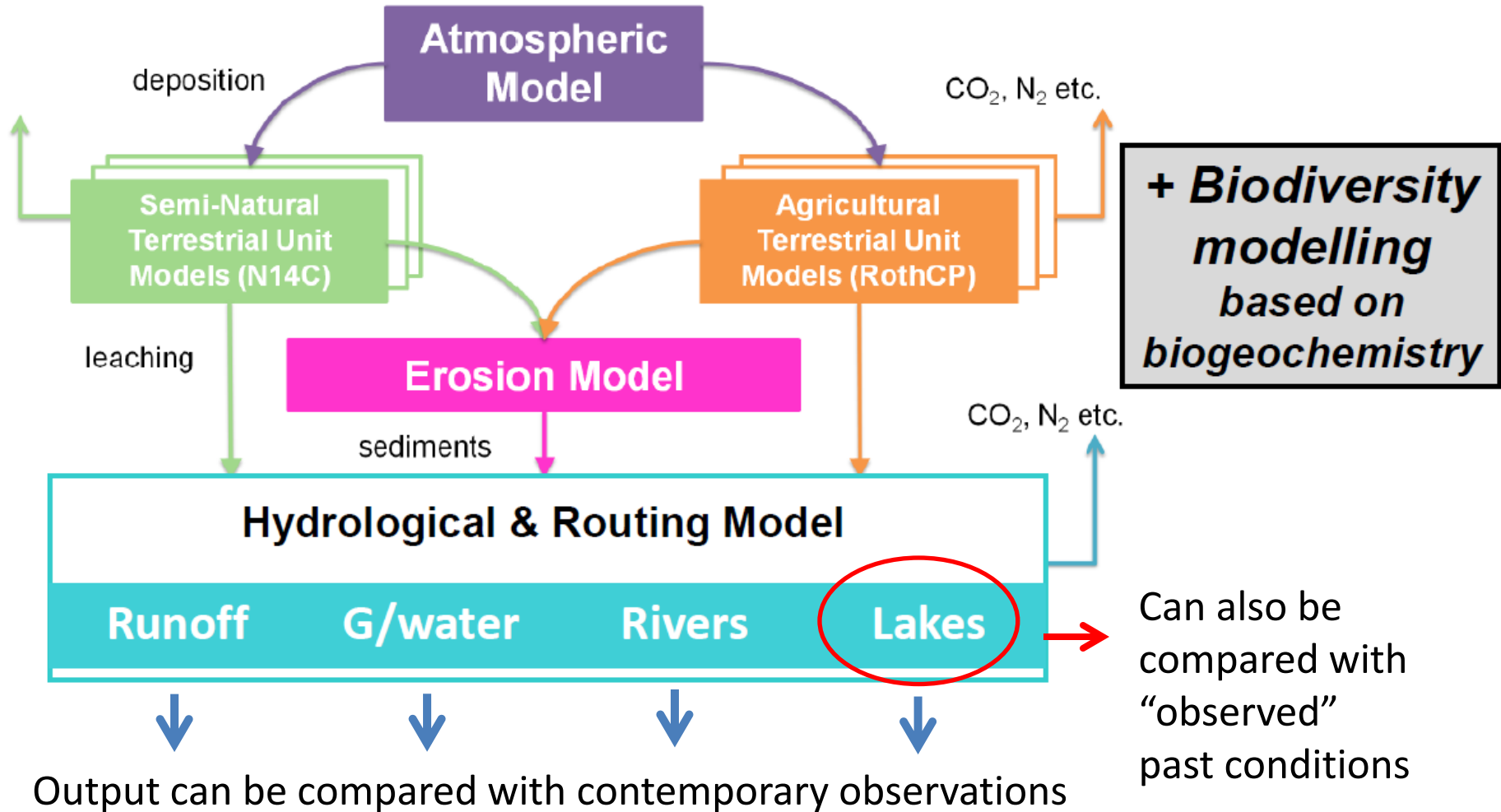


Loch of Skene, Aberdeenshire

Melynlyn, Snowdonia

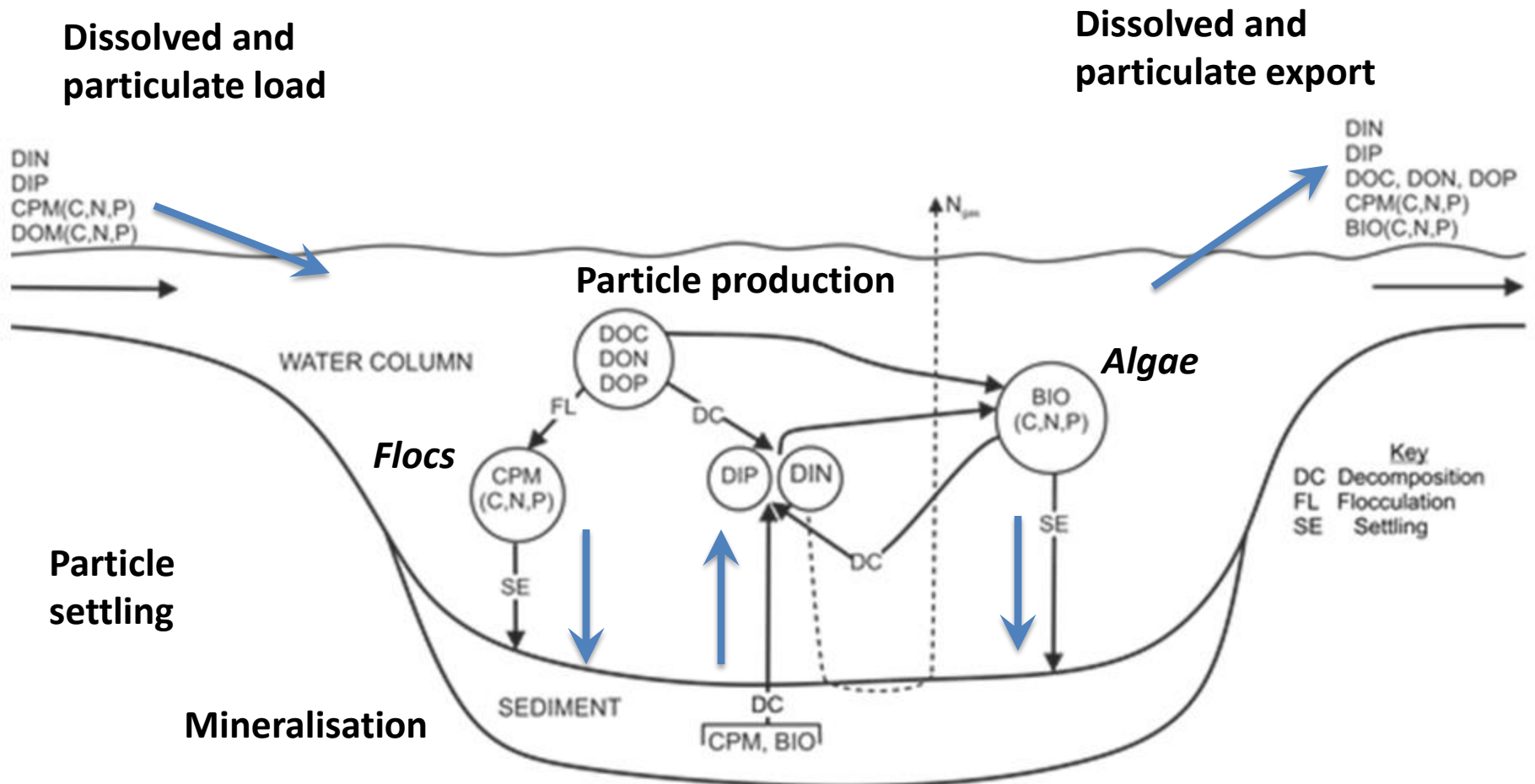


Where do lakes fit into LTLS?



Macronutrient processing by temperate lakes: a dynamic model for long-term, large-scale application

E Tipping, JF Boyle, D Schillereff et al



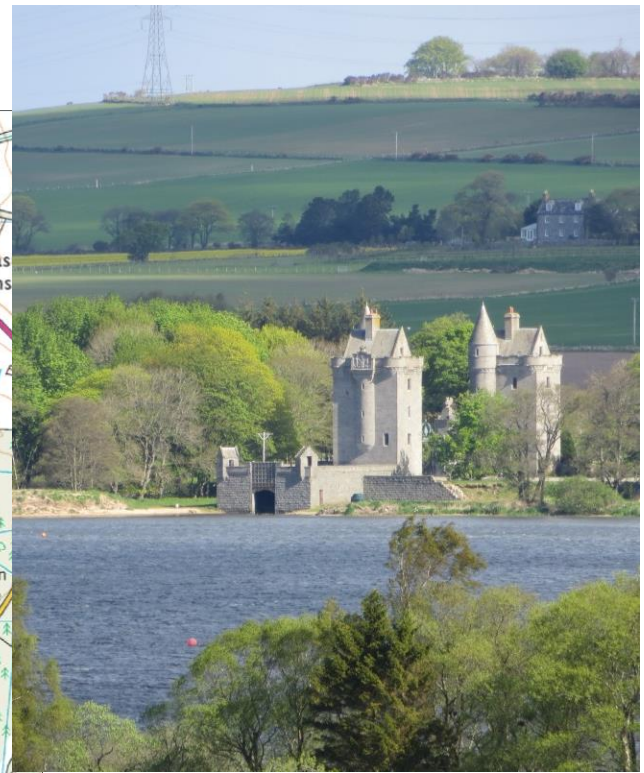
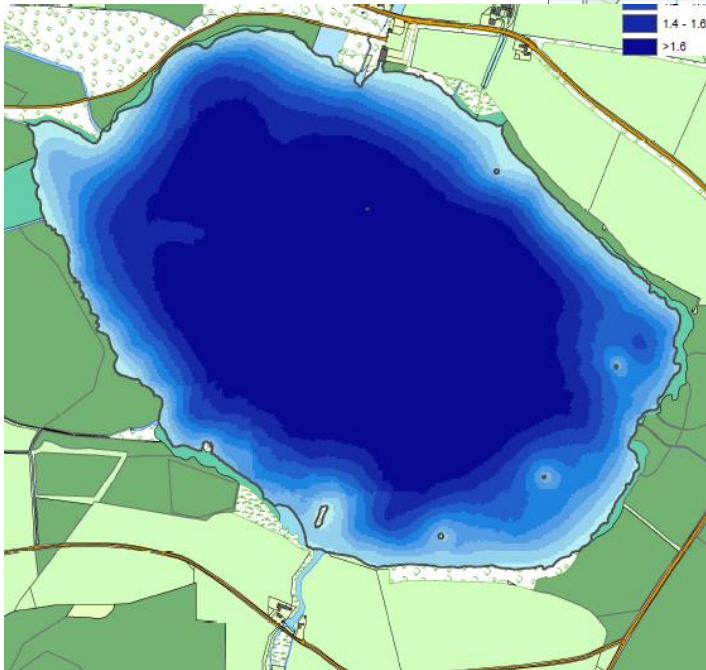
Lake sediment records

The 4 new lakes

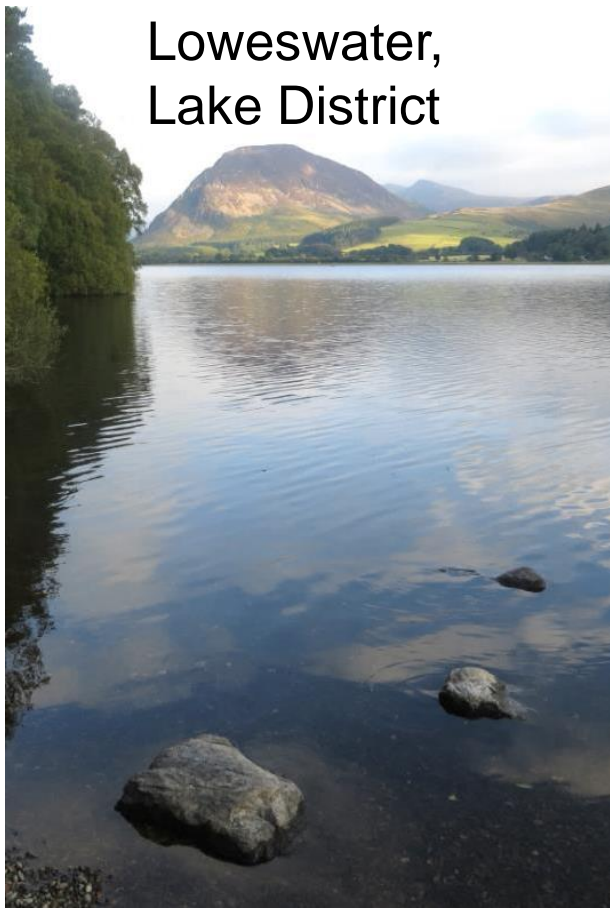


Loch of Skene, Aberdeenshire

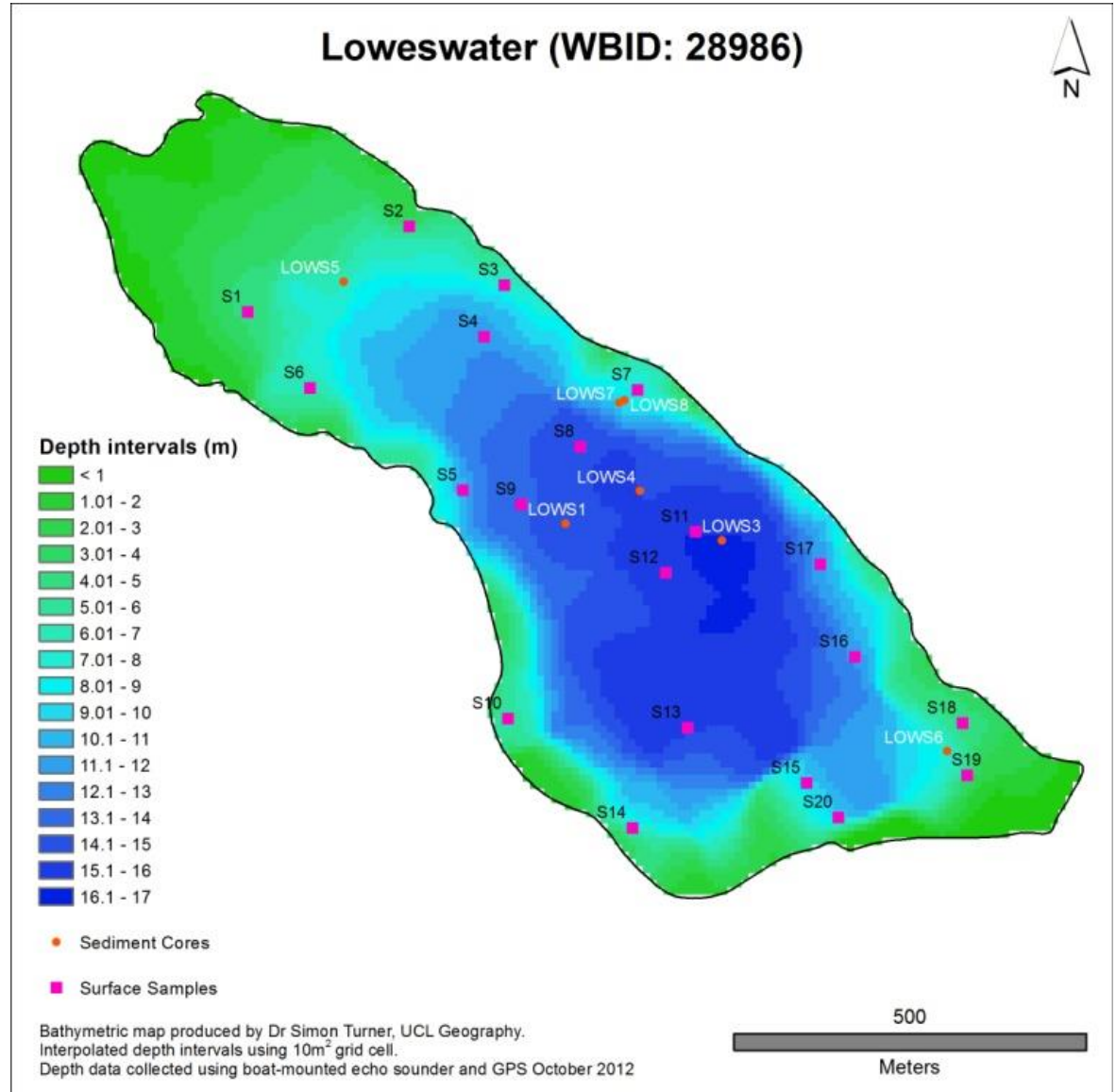
Large catchment of
mixed agriculture,
with a growing
residential area



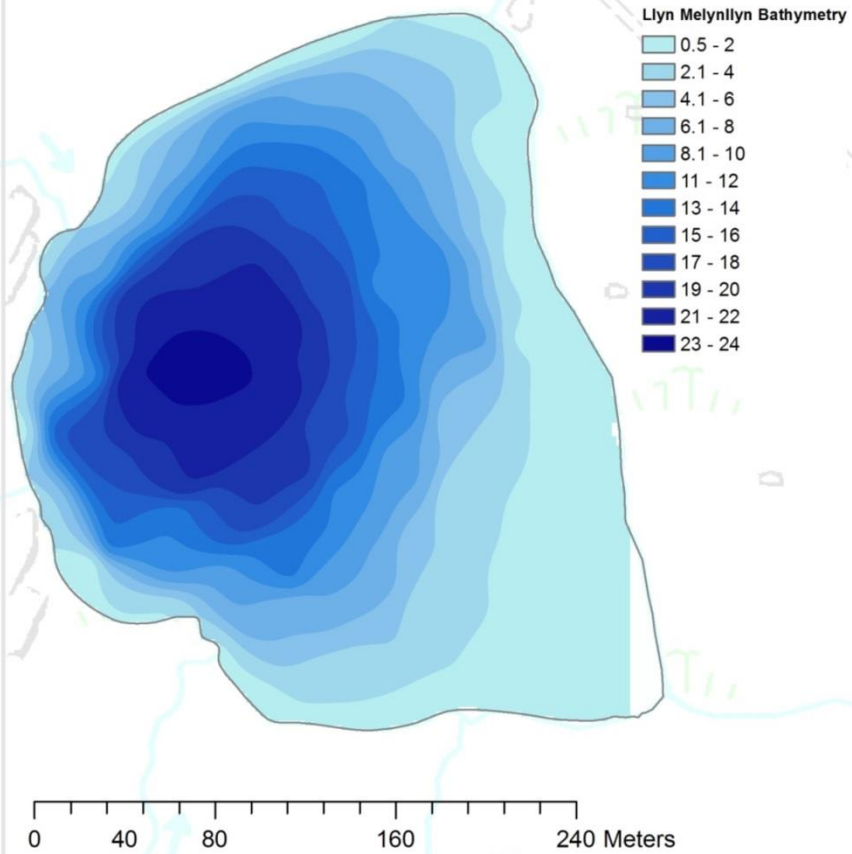
Loweswater, Lake District



Lower catchment
improved grassland

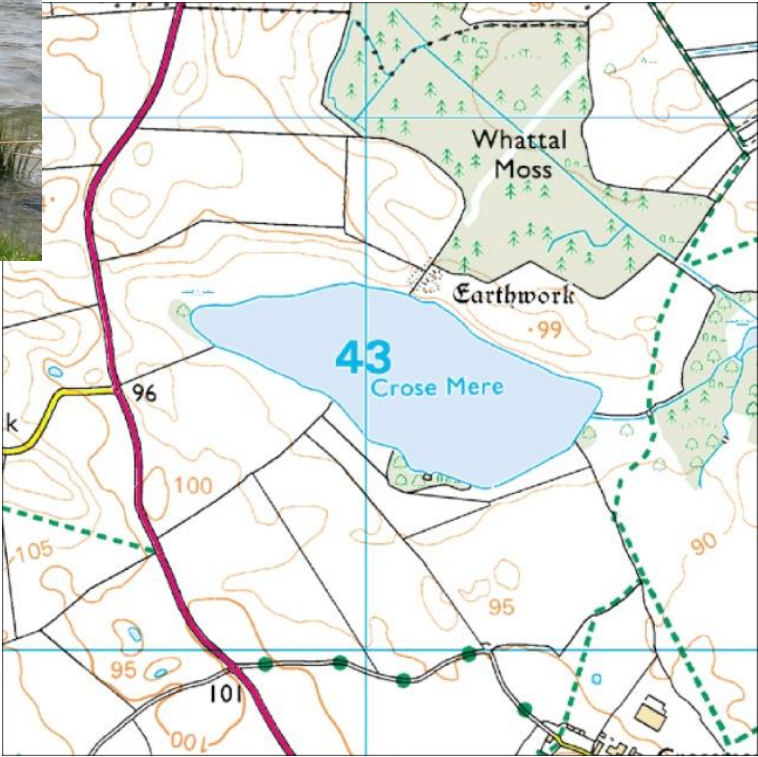


Melynlllyn Upper Conwy Catchment Unimproved grassland



Croze Mere, Shropshire

Improved grassland + some arable

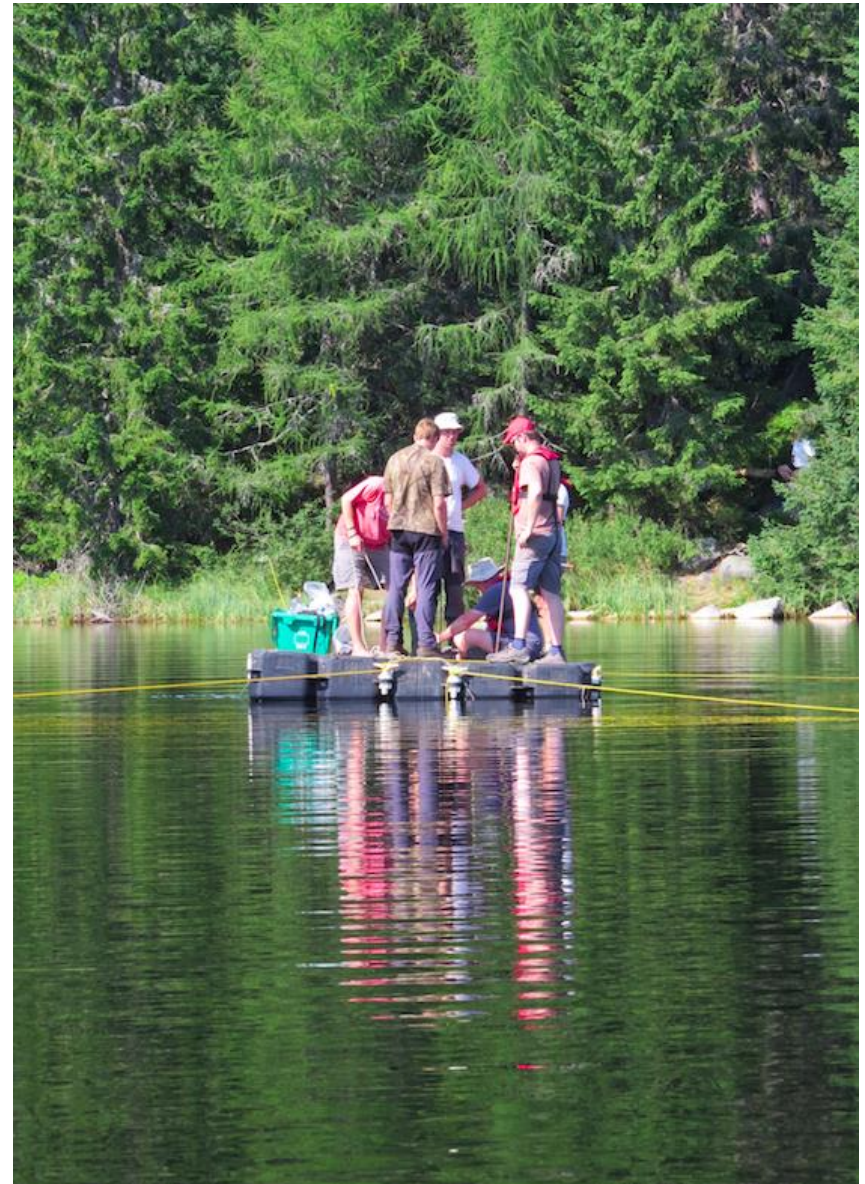


Lake sediment records

The 4 new lakes

Procedures

- Sediment coring (Russian corer for long record, 5 short (ca. 30 cm) gravity corer for the recent past)
- Measurement of dry density
- Age models (^{210}Pb , matching with existing ^{14}C records)
- XRF analysis for element analysis including P
- C, N, ^{13}C and ^{15}N for selected subsamples
- Calculation of lake-wide average sediment burial fluxes
- Calculation of catchment yields

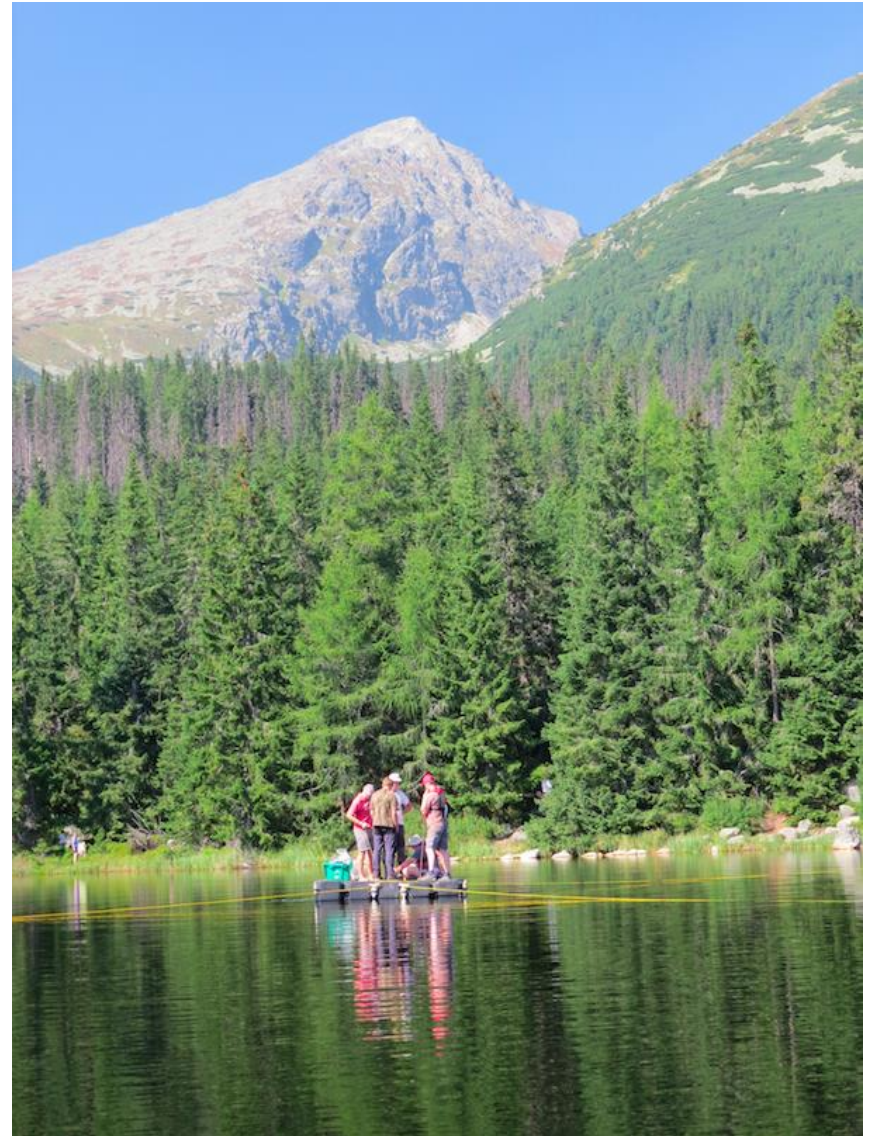


Lake sediment records

The 4 new lakes

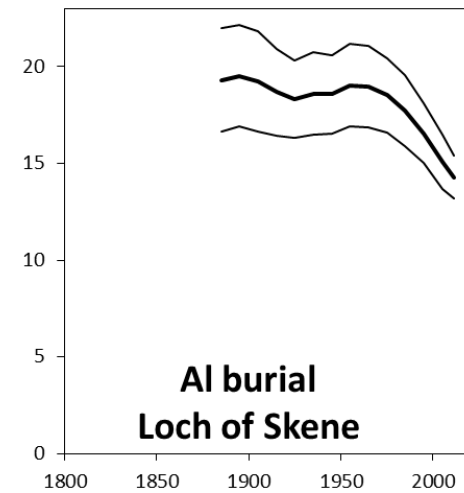
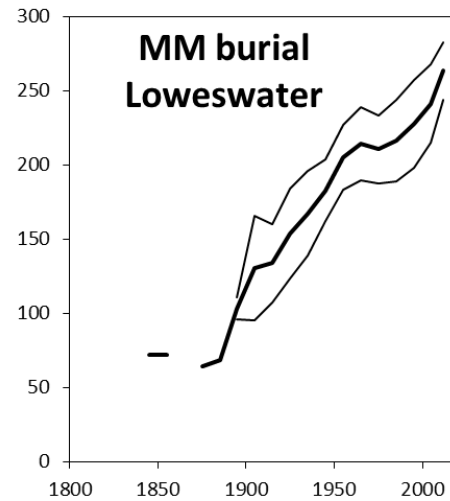
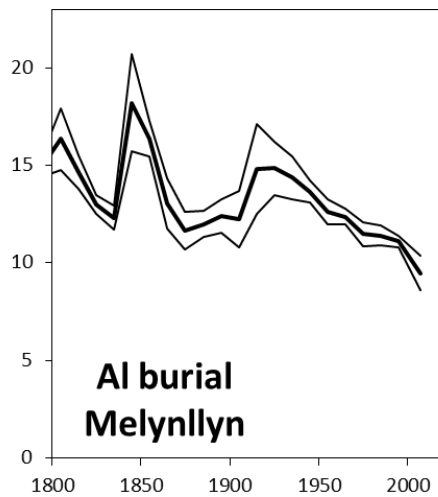
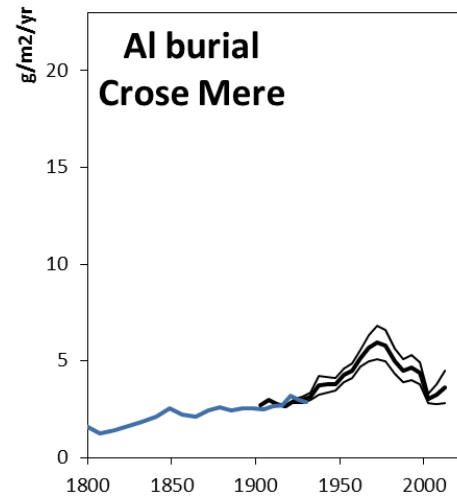
Results

- “Soil” supply record
- C record
- N record
- P record



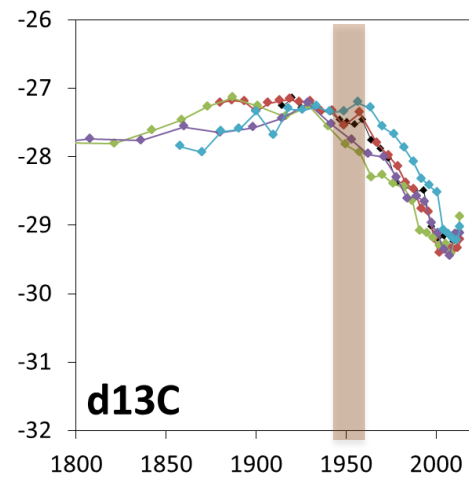
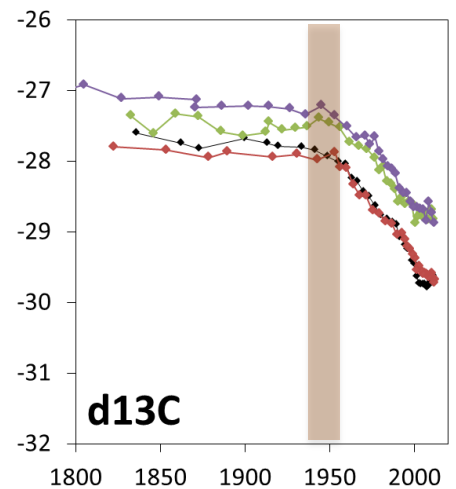
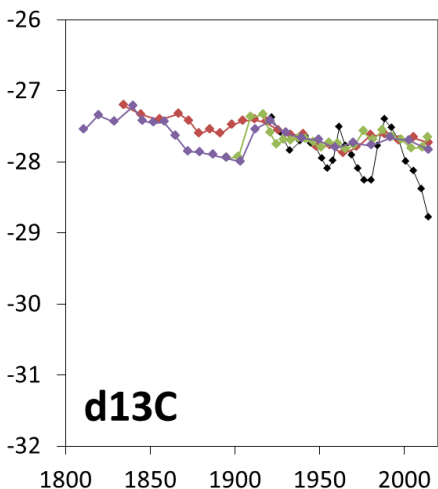
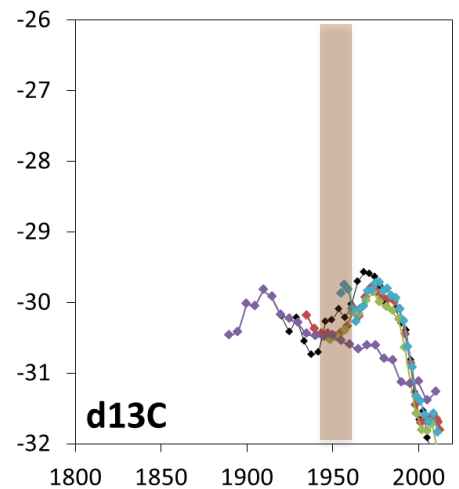
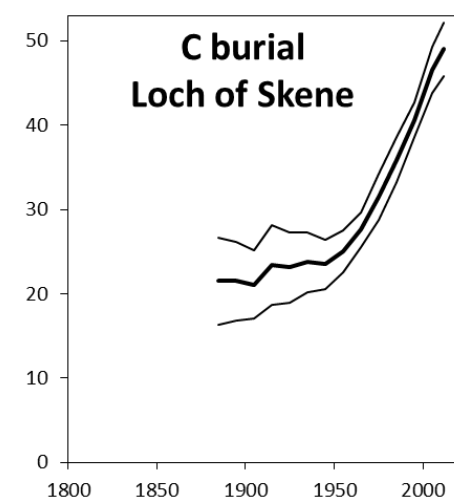
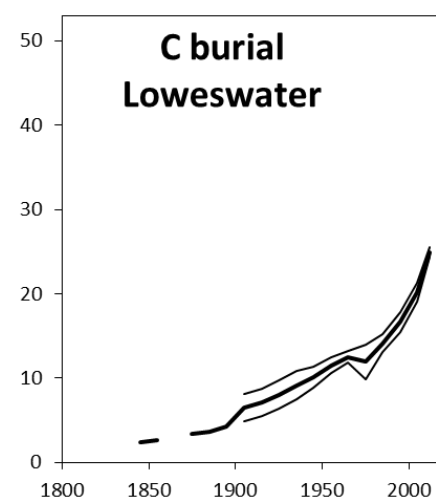
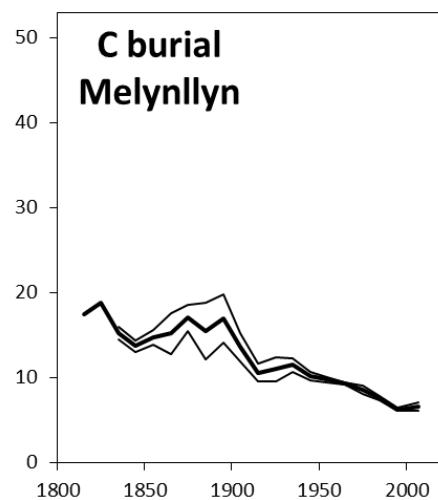
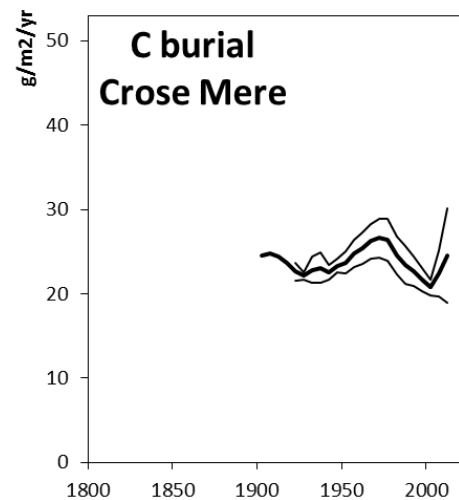
4 lakes - results

- Al (mineral matter) burial flux – $\text{g m}^{-2} \text{ yr}^{-1}$
- Indicates soil erosion history



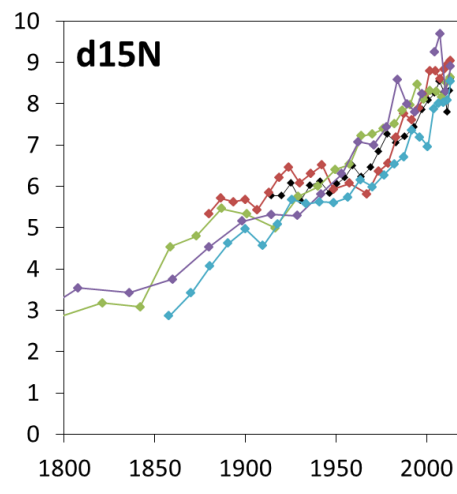
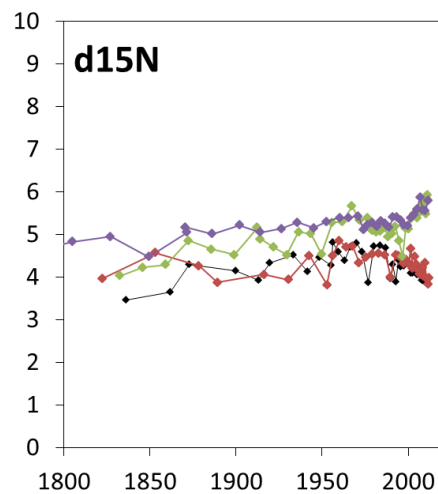
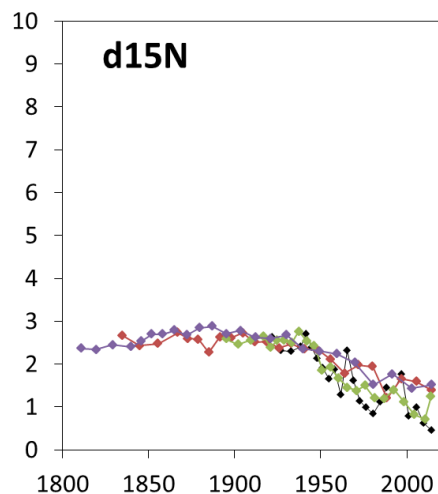
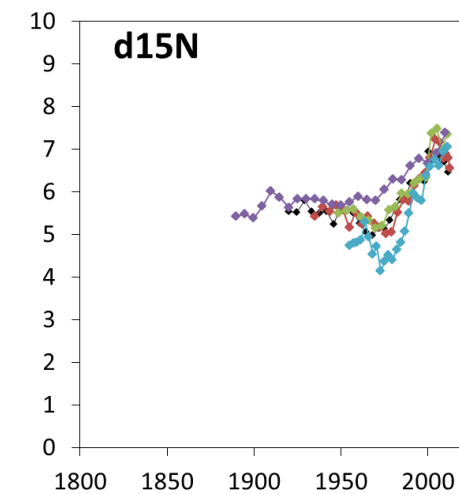
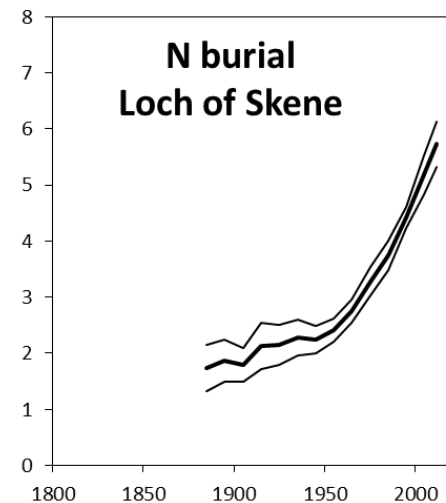
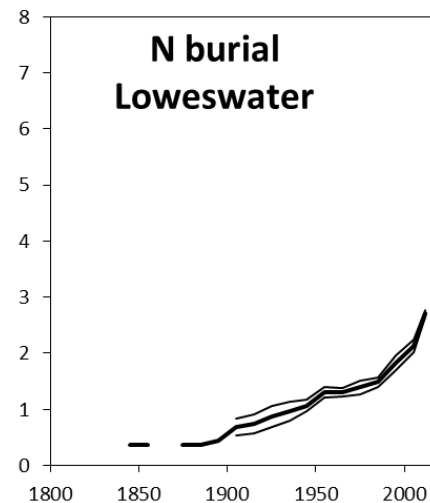
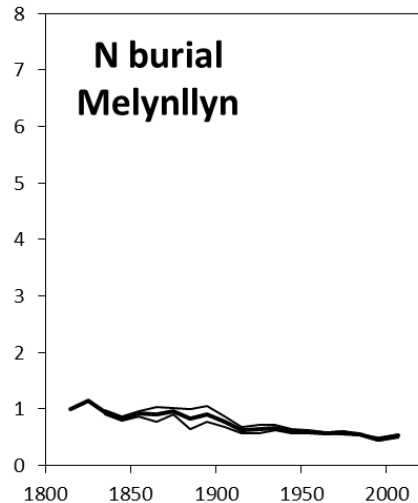
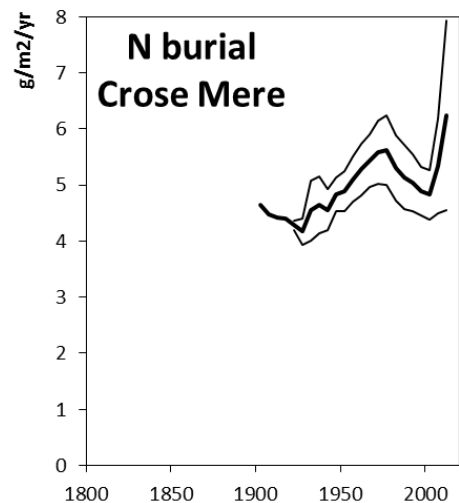
4 lakes - results

- C burial flux – $\text{g m}^{-2} \text{yr}^{-1}$
- $\delta^{13}\text{C}$ per mille



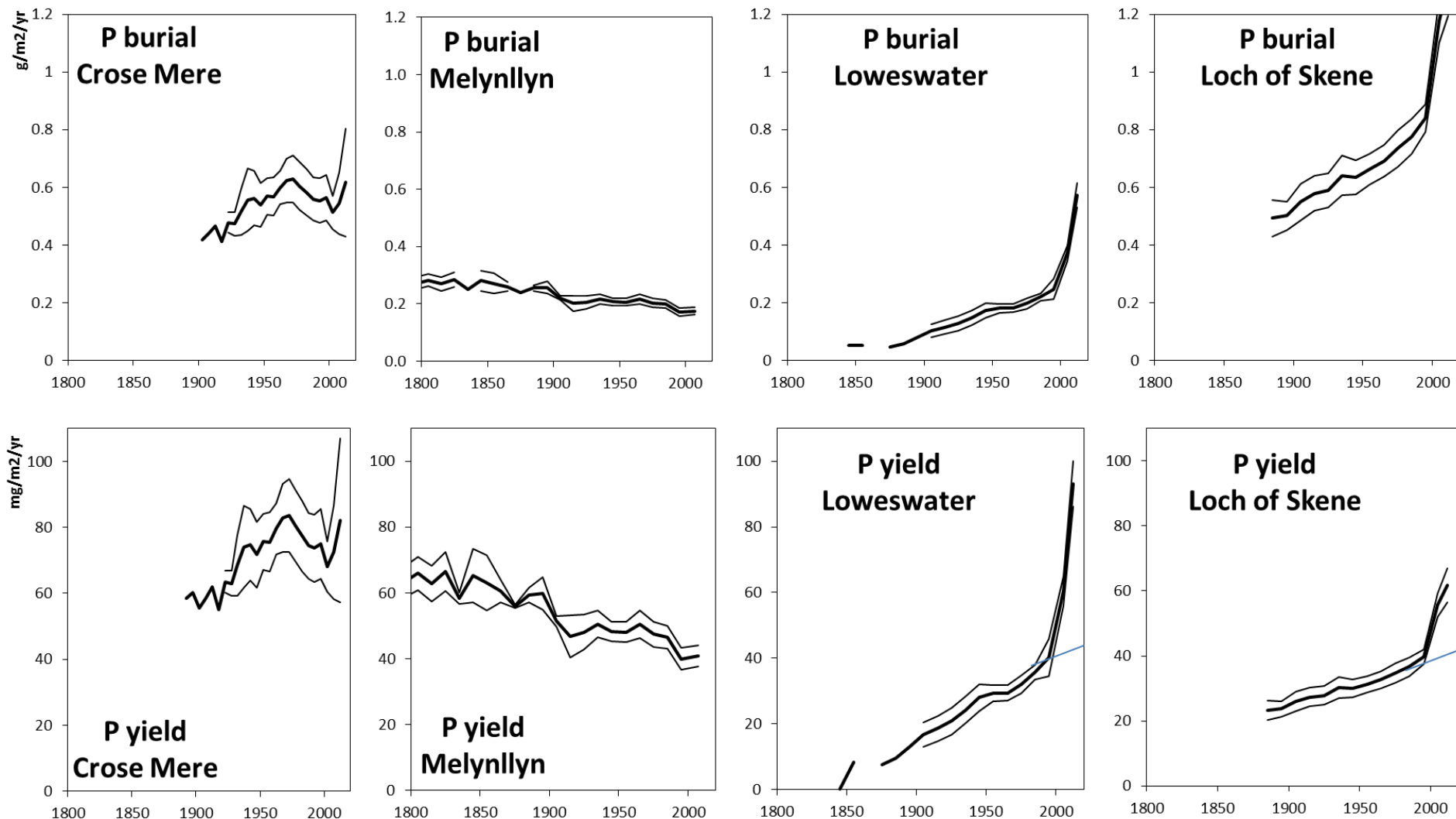
4 lakes - results

- N burial flux – $\text{g m}^{-2} \text{yr}^{-1}$
- $\delta^{15}\text{N}$ per mille



4 lakes - results

- P burial flux – $\text{g m}^{-2} \text{yr}^{-1}$
- P yield – $\text{mg m}^{-2} \text{CA yr}^{-1}$





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LIVERPOOL

Lake sediment records of nutrient fluxes

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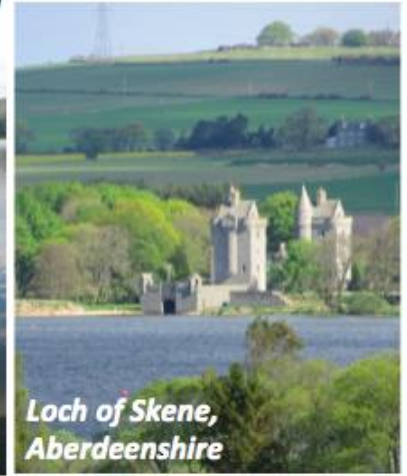
Next steps:

- Comparison with IM output
- Publications

Croze Mere, Shropshire



Loweswater, Cumbria



*Loch of Skene,
Aberdeenshire*

Melynllyn, Snowdonia

