



**Analysis and simulation of the
Long-Term / Large-Scale interactions
of C, N and P
in UK land, freshwater and atmosphere**

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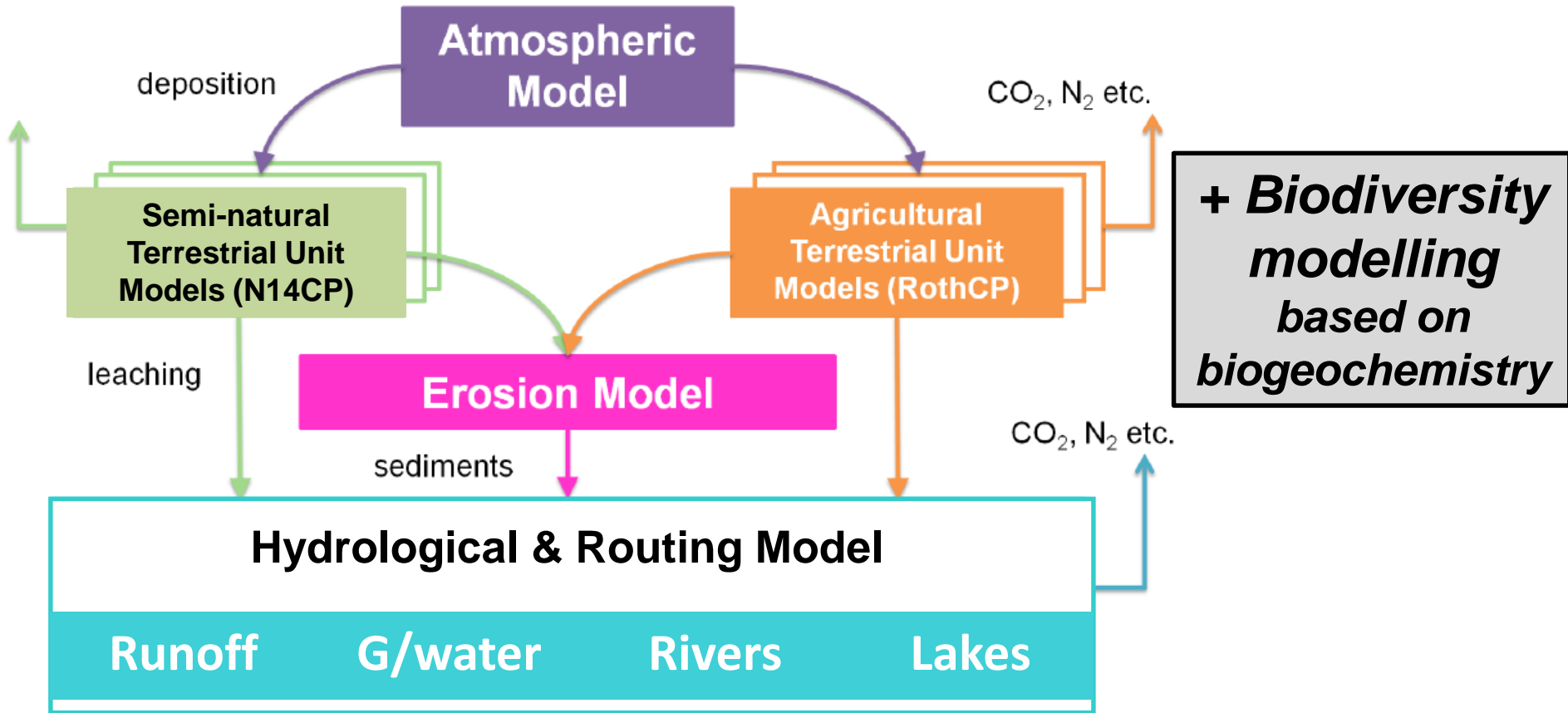
- Over the last 200 years, what have been the temporal responses of soil C, N and P pools in different UK catchments to nutrient enrichment?
- What have been the spatial patterns of C, N and P transfers from land to the sea in different UK catchments and estuaries?
- How has freshwater biodiversity responded to increases in ecosystem productivity engendered by nutrient enrichment at different locations?

...or, how did we get to where we are today?

Answered by:

***integrated modelling analysis,
aimed at accounting for observable present element
pools and fluxes in different UK catchments
in terms of their nutrient enrichment histories***

***Followed by: scenario-based forecasting with
Stakeholder participation***

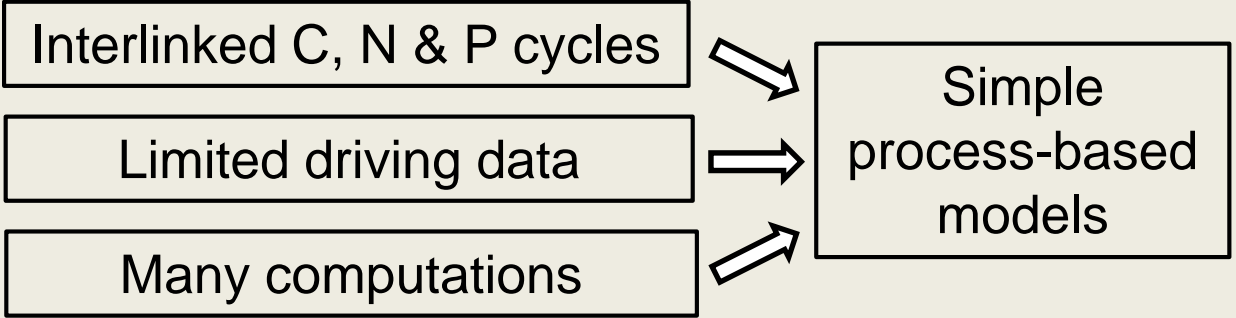


+ Biodiversity modelling based on biogeochemistry

+ Measurements

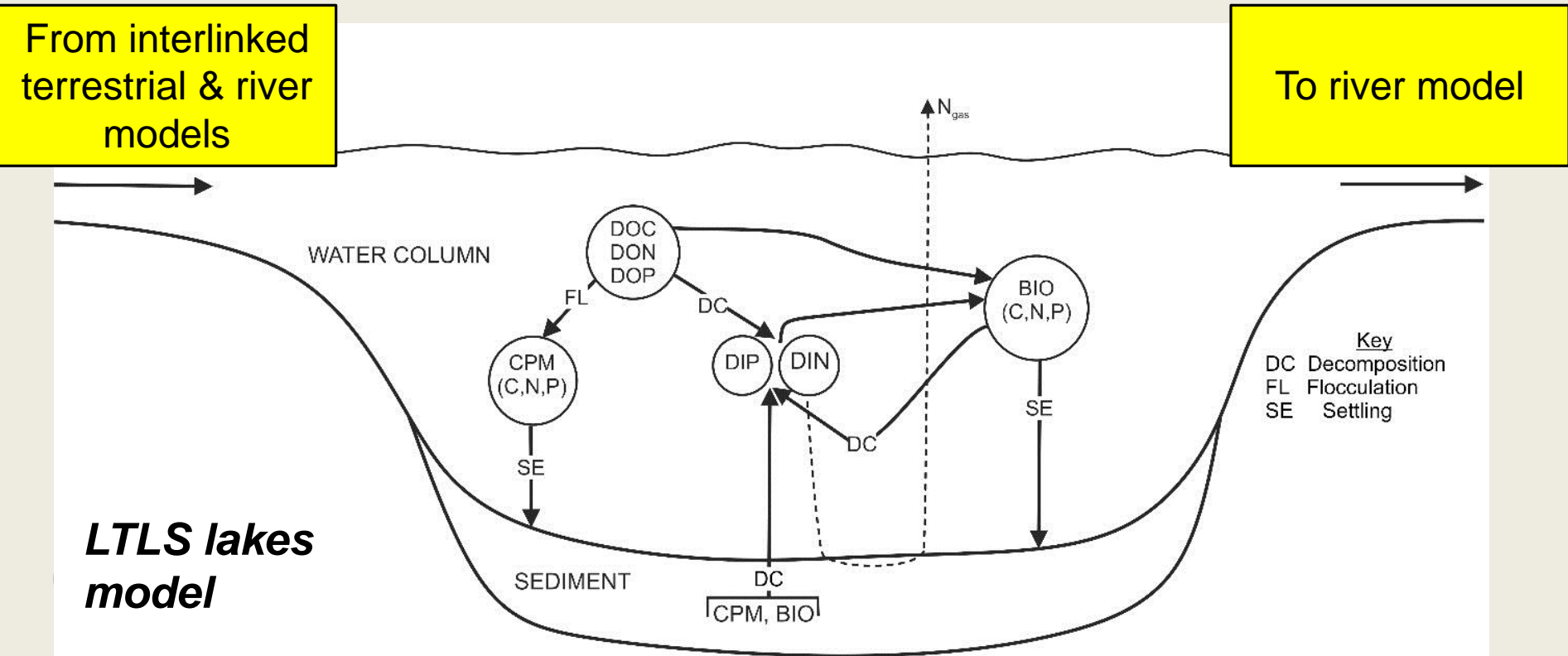
<i>soil denitrification</i>	<i>soil survey (¹⁴C)</i>
<i>river transport (¹⁴C)</i>	<i>lakes</i>
<i>fuel experiments</i>	<i>bracken survey</i>
<i>NPP</i>	<i>peat survey</i>

Modelling approach



“...we stick to the principle of simplifying to just short of the point of naivety.”

EC Rowe 2016



LTLS lakes model

Key
 DC Decomposition
 FL Flocculation
 SE Settling

- The modelling is based on a 5×5 km grid for the UK (~ 10,000 cells)
- Model time-steps vary, e.g.
 - 3-monthly for semi-natural terrestrial ecosystems
 - 2-hourly for river transport (*although monthly output*)
- Most calculated values are not calibrated
- These presentations have a science focus
- The project remains a work-in-progress

Introduction

Edward Tipping, Centre for Ecology and Hydrology

Modelling semi-natural terrestrial ecosystems

Jessica Davies, Lancaster University

Modelling C, N & P cycling under agricultural systems in the UK

Shibu Muhammed, Rothamsted Research

The LTLS Integrated Model

Victoria Bell, Centre for Ecology and Hydrology

Concluding remarks

Edward Tipping, Centre for Ecology and Hydrology

Questions

+ 6 posters = 1 mega-poster