Implications Of Input Data Scaling For Predictions Of Phosphorus Loss At The Catchment Scale

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Biography

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The influence of land use upon the spatial distribution of nutrient enrichment is central to the formulation of policy relating to good agricultural practice in the UK. However, accurate definition of patterns and comparisons between areas at appropriate scales are lacking. The P Indicators Tool (Heathwaite et al., 2003) provides a simple, transparent framework which identifies key indicators of Phosphorus loss based on existing, GIS held, national coverage databases of climate, soil type, topography and land use at the $1km^2$ scale. Herein, it is demonstrated that available datasets can be used to identify patterns of P loss by adopting a layered structure which allows operation of the model at a range of scales (up to the national scale) and calibration of model parameters against observed data whilst permitting a clear view of all assumptions that are built into the tool. Use of the VBA programming environment within ARCGIS is made to provide a user friendly interface on a widely available platform for the end-user who may range from the farm manager to decision makers at the national scale.

The following paper investigates the implications for model output of utilising input data at a range of spatial scales. Though the best available data describing parameters such as crop type and cover or livestock type and distribution have thus far been used in model formulation at the $1km^2$, further data describing such variables at the farm scale or at the larger $5km^2$ are also available. This work demonstrates the 'value-added' to spatial predictions of P loss by using three different scales of input data to model the response of two geomorphologically-distinct catchments in the UK; Windermere and Slapton Ley. The implications of the use of different data can be assessed by outputting maps of each of the key 'layers' within the model which describe loss potential, transfer and delivery of Phosphorus from the landscape. It is shown that the tool can operate effectively using a range of scales of input data, though resolution of model output is also shown to be dependent upon the resolution and quality of the input data used.

The paper will demonstrate output from the model with an emphasis on describing the benefits derived from using data available at different scales. In this way, the end-user may be informed as to the appropriate data choice within the GIS framework to suit the specific modelling task in question as demonstrated in Brazier *et al*., (2001)

References

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