



Characterising patterns in catchment nutrient and sediment mobilisation and transport to inform management strategies in changing agricultural landscapes

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Mixed agricultural landscapes exhibit complex patterns in water quantity, nutrient and sediment dynamics. These are typically further affected by altered drainage networks. In addition, many agricultural landscapes are constantly changing, including to other uses e.g. via urbanisation and afforestation. While one suitable management approach that fits all of these different agricultural landscapes does not exist, there is a common need for understanding which areas are most sensitive to change and when, both to minimize detrimental effects of land use and to optimize mitigation strategy impacts. To explore this, there is a deficiency in multiscale monitoring platforms that consider a range of different agricultural strategies/other land uses. For a complex and actively changing agricultural landscape in NE Scotland, here we aim to better understand spatial and temporal patterns in water, nutrient and sediment dynamics, and the role of catchment and drainage network characteristics in sensitivity to change. We present results from a three-year (weekly to fortnightly) multiscale monitoring programme of nutrient and sediment data, sampled across a 10 km² river network under a range of hydro-climatological and land use conditions. It also involves samples from other parts of the drainage network (surface and subsurface drains, and a wetland). We present and compare the relative controls of catchment characteristics as well as aspects of the drainage network on the role timing and thresholds in mobilisation and transport of nutrient and sediment under the varying climatic and land use change conditions. The outcomes of this work will help to plan and deliver more effective and cost-effective land and water management strategies. These may need tailored for different typologies of agricultural landscapes.