



Towards a national-scale understanding of soil erosion in the UK: Building a national soil erosion database

Pia Benaud (1), Jason Carvalho (2), Ian Truckell (2), Jane Rickson (2), Karen Anderson (3), Timothy Quine (1), and Richard Brazier (1)

(1) Geography - College of Life and Environmental Sciences, University of Exeter, Exeter, Devon EX4 4RJ, United Kingdom (P.Benaud@exeter.ac.uk), (2) School of Energy Environment & Agrifood, Cranfield University, Cranfield, Bedfordshire MK43 0AL, United Kingdom, (3) Environment and Sustainability Institute, University of Exeter, Penryn Campus, Penryn, Cornwall TR10 9FE, United Kingdom

The United Kingdom has a rich dataset of soil erosion observations, which have been collected using a wide range of methodologies, across various spatial and temporal scales. Yet, whilst observations of soil erosion have been carried out along-side agricultural development and intensification, understanding whether or not the UK has a soil erosion problem remains a question to be answered. Furthermore, although good reviews of existing soil erosion rates exist, there isn't a single resource that brings all of this work together. The following work seeks remedy this situation through collating all available, UK-based, soil erosion datasets into a spatially explicit database, describing soil erosion at the national scale.

Soil erosion occurs through a complex series of processes, consequently, capturing the full extent of soil erosion requires utilising a suite of techniques across varying spatial and temporal scales, and a wide range of soil types and land management practices. However, preliminary analysis of the geodatabase has highlighted the ad hoc and biased nature of previous soil erosion studies. Exploring the spatial distribution of the datasets has identified a general trend towards conducting erosion studies at locations known to erode. Furthermore, many of the studies use a single research method and are thus unable to capture all erosion processes or pathways. For example, whilst volumetric surveys can quantify soil loss via large rills and gullies, such methods cannot quantify the less-visible, diffuse erosion processes due to sheetwash, wind or tillage (for example).

Collating and visualising all UK-based soil erosion datasets has been a useful exercise, however, it has highlighted many shortfalls within existing soil erosion research. The database, therefore, cannot be used to make an unbiased assessment of UK erosion rates. As such, there is a strong argument for a replicable and robust national soil erosion monitoring program to be carried out along-side the proposed sustainable intensification of agriculture. Furthermore, due to the variability in methods used, scales of understanding and units of the data that has been collected, the database justifies further work to develop an understanding of the compatibility of erosion data that were collected using different techniques at different scales of interest.

The collation of soil erosion data into the database is an on-going, open-access project and resource; consequently, any researchers wishing to contribute are encouraged to get in touch, especially if they hold existing datasets that may be added to the geodatabase.