# A Digital Soil Mapping approach using neural networks for peat depth mapping in Scotland

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Spatially explicit and accurate peat depth estimates are required for carbon stock assessment, carbon management stategies , hydrological modelling, ecosystem service assessment and land management (e.g. wind farms). In Scotland, a number of surveys have taken place over the years that have produced data on peat depth, and while many of these surveys have focussed on specific locations or peat bogs, a substantial proportion of the data produced is relatively old and has not been digitised, thus limiting its visibility and utility in new research activities, policy development and land management decision making. Here we describe ongoing work where the key objective is to integrate multiple peat survey datasets with existing spatial datasets of climate, vegetation, topography and geology. The dataset produced is generated from a small number of isolated surveys and while it is not representative of all of Scotland's soils, it is sufficient to demonstrate the conceptual basis for model development. It has been used to develop a neural network model of peat depth that has been applied across Scotland's peat bogs at 100m resolution. The resulting map gives an early indication of the variation of peat depth across the country, and allows us to produce an estimate of mean peat bog depth across the country. This estimate will improve with additional data and will contribute to improving our ability to undertake activities that depend on this kind of information. We have identified data gaps that need to be addressed in order to improve this model, in particular peat depth survey data from a wider range of peat types across the country and in particular, blanket bog and upland peat areas. Ongoing work to identify and integrate additional peat bog depth data is described. We also identify potential uses for the existing maps of peat depth, and areas of future model development.