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# Uncertainty in delineation of peatland microcatchments

**Adam Johnston**[1], Emma Shuttleworth[1], Martin Evans[1], Tim Allott[1], and Michael Pilkington[2]
[1]Department of Geography, School of Environment Education and Development, University of Manchester, Manchester, United Kingdom (Adam.Johnston@manchester.ac.uk)
[2]Moors for the Future Partnership, Edale, UK

Microcatchments (<10 ha) are often used to monitor the effect of disturbances or restoration on the hydrological functioning of peatlands. Catchment areas serve as the spatial limits within which fluvial processes are studied and topographic parameters are derived. Digital Elevation Models (DEMs) and Digital Surface Models (DSMs) are used in standard practice to delineate the watershed boundary of microcatchments. These digital representations of topography contain errors, meaning the derived catchment areas have inherent uncertainty. The low-slope and hummock/hollow nature of peatland surfaces mean catchment delineation is particularly sensitive to vertical errors, so understanding the potential effect of uncertainty on the accuracy of catchment delineation is essential to providing a reliable account of peatland microcatchments hydrology.

This paper investigates the sensitivity of catchment delineation to DEM/DSM error for 30 peatland microcatchments across the Peak District National Park, UK. To evaluate the suitability of DSMs for hydrological applications in peatlands, a 0.25m photogrammetric DSM is used and evaluated against a 1m LiDAR DEM. Monte Carlo simulation is applied to produce a range of realisations of the DSM and DEM within their vertical error margins, from which a range of catchment areas are calculated. The variability of the watershed boundaries of each catchment is evaluated in the context of local gradient, difference from mean elevation and extent of gullying, to determine the relationship between terrain characteristics and variability in catchment delineation. Findings will have implications for the generation of catchment areas in peatland hydrology.