



Application of Structure-from-Motion photogrammetry for studying peat erosion processes

Changjia Li, Richard Grayson, and Joseph Holden

water@leeds, School of Geography, University of Leeds, Leeds, United Kingdom (gycl@leeds.ac.uk)

The cost-effective and flexible photogrammetric surveying technique 'Structure-from-Motion (SfM)' has recently been widely applied in soil erosion studies but little is known in peatlands. This study aims to provide new insights into peat erosion processes such as rainsplash and weathering processes using SfM. SfM photogrammetry was used for topographic data collection in the laboratory and on field plots. We compared traditional sampling approaches and SfM derived high-resolution topographic data in quantifying erosion of laboratory peat blocks under two slopes (2.5° and 7.5°) and three laboratory experiments including rainfall simulations, inflow (upslope overland flow) simulations and combined rainfall + Inflow simulations. From 11/2016 to 11/2017, 12 time-series SfM surveys were conducted on four geomorphological sites (peat hagg, gully wall, river bank and gully head) in a blanket peatland in Northern England. The effects of needle ice production and desiccation on topographic and roughness changes were examined based on high-resolution topography derived from SfM. The findings are helpful for informing long-term and multi-scale in-situ monitoring that will benefit land management decision-making in peatlands.