

Cheap, easy and accurate point cloud filtering for micro-DEMs

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Drones (also Remotely Piloted Aircraft Systems (RPAS) and Unmanned Aerial Systems (UAS)) have revolutionised the way that we can now image the Earth's surface and study earth surface processes. We now have the tools to create point clouds to study processes at an unprecedented level of detail – at mm to cm resolution and over meaningful field areas and whole landform features. However, how do we sort through the datasets that are produced by this approach, make sense of the geomorphology data at such a micro-scale.

We provide a cheap, easy and accurate method for allowing drone photogrammetry point clouds data to map features over areas of many hectares, at point densities of hundreds to thousands of points per square meter at the mm to cm scale and precision. Using simply Python tools, we show how we can efficiently process and filter superfluous points from “hyper-spatial” data that can then support the creation of high resolution data, such as DEMs to support high-resolution topographic change analysis and process modelling studies. We profile work from a sedimentary washover fan, forest ecohydrology and alpine snow hydrology work to show the versatility of this approach, and using multiple data types.