



Mapping temporal changes in connectivity using high-resolution aerial data and object based image analysis

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Within the field of geomorphology mapping has always been an important tool to interpret spatial and temporal distributions of phenomena and processes at the surface. In the field of connectivity however, although throughout the past decade many articles have been published, there are only very few that go into the mapping of connectivity.

This study aimed at developing a new, automated method for mapping connectivity within agricultural catchments. The method, which is a combination of Object-Based Image Analysis (OBIA) and traditional geomorphological field mapping, was applied to two agricultural catchments in Navarre, Spain, both with an area of approximately 2 sq.km.

An unmanned aerial vehicle (UAV) was used to take aerial photographs with a resolution of 6 cm, of which a DEM with a 12 cm resolution was created using structure-from-motion photogrammetry. Connectivity was mapped within the study areas using OBIA using a top down method, meaning that connectivity was mapped at different scale levels, starting at the largest scale. Firstly sub-catchments were automatically delineated, after which several characteristics and features that affect connectivity within the sub-catchments were classified, e.g. landuse, landslides, rills, gullies, riparian vegetation, changes in slope, ploughing direction etc. In two consecutive years (2013-2014) photographs were taken and connectivity of both catchments of both years will be compared.

Future work will include a quantification of the mapped connectivity (highly connected years vs. low connected years), causes and consequences of these differences in connectivity, comparison to existing connectivity indices and comparison of mapped connectivity in sub-catchments and measured discharge.