



## DEM time series of an agricultural watershed

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In agricultural landscape soil surface evolves notably due to erosion and deposition phenomenon. Even if most of the field data come from plot scale studies, the watershed scale seems to be more appropriate to understand them. Currently, small unmanned aircraft systems and images treatments are improving. In this way, 3D models are built from multiple covering shots.

When techniques for large areas would be too expensive for a watershed level study or techniques for small areas would be too time consumer, the unmanned aerial system seems to be a promising solution to quantify the erosion and deposition patterns. The increasing technical improvements in this growth field allow us to obtain a really good quality of data and a very high spatial resolution with a high Z accuracy.

In the center of Belgium, we equipped an agricultural watershed of 124 ha. For three years (2011-2013), we have been monitoring weather (including rainfall erosivity using a spectropuviograph), discharge at three different locations, sediment in runoff water, and watershed microtopography through unmanned airborne imagery (Gatewing X100).

We also collected all available historical data to try to capture the “long-term” changes in watershed morphology during the last decades: old topography maps, soil historical descriptions, etc. An erosion model (LANDSOIL) is also used to assess the evolution of the relief.

Short-term evolution of the surface are now observed through flights done at 200m height. The pictures are taken with a side overlap equal to 80%. To precisely georeference the DEM produced, ground control points are placed on the study site and surveyed using a Leica GPS1200 (accuracy of 1cm for x and y coordinates and 1.5cm for the z coordinate). Flights are done each year in December to have an as bare as possible ground surface.

Specific treatments are developed to counteract vegetation effect because it is know as key sources of error in the DEM produced by small unmanned aircraft systems.

The poster will present the older and more recent changes of relief in this intensely exploited watershed and notably show how unmanned airborne imagery might be of help in DEM dynamic modelling to support soil conservation research.