



The sky is the limit? 20 years of small-format aerial photography taken from UAS for monitoring geomorphological processes

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One hundred years after the first publication on aerial photography taken from unmanned aerial platforms (Arthur Batut 1890), small-format aerial photography (SFAP) became a distinct niche within remote sensing during the 1990s. Geographers, plant biologists, archaeologists and other researchers with geospatial interests re-discovered the usefulness of unmanned platforms for taking high-resolution, low-altitude photographs that could then be digitized and analysed with geographical information systems, (softcopy) photogrammetry and image processing techniques originally developed for digital satellite imagery. Even before the ubiquity of digital consumer-grade cameras and 3D analysis software accessible to the photogrammetric layperson, do-it-yourself remote sensing using kites, blimps, drones and micro air vehicles literally enabled the questing researcher to get their own pictures of the world. As a flexible, cost-effective method, SFAP offered images with high spatial and temporal resolutions that could be ideally adapted to the scales of landscapes, forms and distribution patterns to be monitored.

During the last five years, this development has been significantly accelerated by the rapid technological advancements of GPS navigation, autopiloting and revolutionary softcopy-photogrammetry techniques. State-of-the-art unmanned aerial systems (UAS) now allow automatic flight planning, autopilot-controlled aerial surveys, ground control-free direct georeferencing and DEM plus orthophoto generation with centimeter accuracy, all within the space of one day.

The ease of use of current UAS and processing software for the generation of high-resolution topographic datasets and spectacular visualizations is tempting and has spurred the number of publications on these issues – but which advancements in our knowledge and understanding of geomorphological processes have we seen and can we expect in the future? This presentation traces the development of the last two decades by presenting and discussing examples for geomorphological research using UAS, mostly from the field of soil erosion monitoring.