UAS-based quantification of sedimentary body changes at Langgriesgraben, Styria, Austria

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The creek's sedimentary body at Langgriesgraben is characterized by inconstant but recurring earth surface changes. Mass transport and deposition occur partly spontaneously and endanger primary infrastructure, in particular a main road. It is often mentioned in literature that the use of small and lightweight UAS is promising. To contribute to that, this study focuses on the documentation and quantification of carried sedimentary material by using a hexacopter in a high alpine environment. The images which were captured on two different dates, allow generating orthophotos and DEMs. The comparison of these derivatives enables a deeper understanding of the sedimentary body and its conditions. Our specific study area is a part of a bigger research area of another research project (Sedyn-X). One of the main goals of that project is to create a conceptual model of the sedimentary cascade for the entire Johnsbachtal catchment and to quantify geomorphic processes (e.g. erosion, transport and rearrangement of sediments). Therefore Terrestrial Laser Scanning recordings are performed as well. Through the generated surface models from different eras, changes in surface and volume can be quantified. The photogrammetric surface models can be compared with almost simultaneous ALS and TLS recordings.

Apart from that, the outcomes will provide hard facts for decision-makers. The UAS related processing steps and methods (e.g. DGPS, SfM) are more or less established and well-known, but the applicability of UAS for recording feasible data, has to be proved constantly. We assume that our results will answer concrete questions and thus reduce expected damage and costs.