

### 1.3. The Kühgraben in the Gesäuse National Park - UAV-based investigation of anthropogenically influenced geomorphological processes

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*Abstract:* This paper deals with the recording of human activity and the change of a highly process-influenced area. The Kühgraben in the Gesäuse National Park in Styria, Austria, was chosen as a trench with episodic water flow and a high relief energy with associated high morphodynamics. The decisive processes that endanger the existing infrastructure and people are mudflows in the summer months and occasional avalanches in the winter months. These processes also change the morphology of the graben due to bed load relocation in the graben area, erosion on the slopes and effects on vegetation. Since the Kühgraben is designated as a conservation zone of the National Park, technical and bioengineering measures to combat bed load were taken from 1991 to 2003 to minimize these damaging effects from torrent and avalanche control. The main focus of this work is on the following points: (1) To fly over the study area (Kühgraben) using an Unmanned Aerial Vehicle (UAV) and to take high-resolution aerial photographs of the current situation from July 2020. (2) To create orthophotos, surface models and point clouds from these images using the Structure from Motion Method (SfM). (3) Analyze historical aerial photographs from the years 1954, 1961, 1973, 1997 and 2004 and create orthophotos, surface models and point clouds. (4) The result should be compared with the laser scan data from 2010. (5) The main part of this study deals with the analysis of the height change of the detailed areas of the Kühgraben as well as the analysis of the effects of human intervention through road construction or the avoidance or containment of geomorphological activities through biological engineering and technical measures.