Geophysical Research Abstracts
Vol. 21, EGU2019-8595, 2019
EGU General Assembly 2019

The use of different remote sensing methods for structuralgeologic mapping- advantages and limitations

Sandra Melzner (1) and Alexander Preh (2)

(1) Department of Engineering Geology, Geological Survey of Austria,Vienna, Austria (sandra.melzner@geologie.ac.at), (2) Institute of Geotechnics, Research Unit Engineering Geology, Vienna University of Technology, Austria

Remote sensing methods, such as Laser Scanning, have established a solid position in geological surveying over the past 12 years. Although the underlying technological and geometric principle is very similar to today's tachymeters, the basic recording and data characteristics are very different from traditional geodetic surveying. This opens up areas of application in the geosciences where such a detailed geodetic 3D data acquisition was previously not possible or only possible under great circumstances. However, the seeming ease of surveying may also result in insufficient use (e.g. Geodetic principles being ignored) by inadequately trained personnel, which in the worst case may result in total inefficiency of the data (Schiller & Melzner, 2017).

One main objective of the research project NoeTALUS is the comparison of different methodologies for the determination of rockfall hazard zones (Fleris & Preh, 2019). In the frame of the project, different techniques are used for geological mapping. It was decided, that a geodetic expertise is a prerequisite for planning a measurement campaign in order to obtain a qualitatively suitable data basis for geoscientific analyzes. Therefore, geodetic experts were involved into the project to collect the data. Two different systems of Remotely Piloted Aircraft Systems (RPAS) are used to collect data: a high-resolution photogrammetric survey using a ShapeMetriX UAV (Gaich et al., 2017, www.3GSM.at) and high-resolution LIDAR point clouds were collected with a RiCOPTER equipped with a VUX-SYS AP20 laser scanner (www.riegl.com). In addition, the geodetic office of the Federal State Government conducted a TLS survey. The Geological Survey of Austria was responsible for the geological field mapping and the structuralgeologic analysis of the remotely sensed data.

The aim of this work is to compare the performance of these techniques towards the collection of data and to evaluate the quality of the different data sets. The characteristics of the LIDAR point clouds (point distribution, point density, scan direction) as well as the characteristics of high-resolution orthophoto images have a direct influence on the quality of the resulting application. In addition to the point cloud itself, the geodetic reference system is of great importance for the utilization of the data. Furthermore, different software packages are tested for data processing (e.g. image or point cloud segmentation and classification) and structural geological analysis. Results will form a basis for best practices in the field of rockfall hazard zoning.