CREATING ROCKFALL DATABASE USING ESRI Collector for ArcGIS

Within the project a new methodology for collecting historic rockfall events on the field by using the ESRI application Collector for ArcGIS was developed (Figure 1). The application enables the user to collect crucial information of rockfall source area and corresponding rockfall deposits in a shape of points. Firstly, the user on the field collects the location of rockfall source areas. At those areas are usually hardly accessible (e.g. rock cliffs) it would be extremely difficult and dangerous to reach them, consequently the user captures the location of the standing point and measures the angle and azimuth towards the real source area. The exact location is later calculated by using the those two measurements and precise digital terrain model (DTM) (Figure 2). Secondly, the locations of corresponding rockfall deposits are added to the same rockfall source area. One rockfall source area can therefore have several associated rockfall deposits. The connection among rockfall source area and rockfall deposits is based on the relationship “one-to-many” which means that each object in the original table is linked to the multiple objects in the associated table. Additional attributes can also be collected for both rockfall areas (Figure 2). Collected rockfall data (Figure 3) are serving for calculating the rockfall propagation statistics and can also be used for calibration and validation of rockfall models. In the case of RockTheAlps project the collected data served for the development and evaluation of the ROCK-EU model.

WEB GIS ROCKFALL DATABASE

The collected data are formalized in a GIS-related database and available through the ESRI WEB Mapping Application (Figure 4). Within the RockTheAlps project, 2040 rockfall events and corresponding 6205 rockfall deposits were already recorded in the database till October 2018. WEB map enables the viewing of locations and additional attributes (including photos) of all collected rockfall sources and deposits. Additionally, the statistics for different rockfall attributes can be showed in the interactive way. The database will update till the end of the project.

INTRODUCTION

In order to develop an efficient rockfall risk assessment methodology, adequate/accurate data for testing, calibrating and validating models are needed to evaluate the performance of the model. Therefore, one of the aims of first work package (WP T) was to collect and analyse well documented data on historic rockfall events, which would include data about rockfalls in Alpine Space.

Figure 1: The collection of rockfall data on the field (Photo: M. Kobal, 2017).

Figure 2: Concept of calculating an actual rockfall source based on the measurements on the field and DTM (left). The relationship “one-to-many” among rockfall source and deposit areas with the additional attributes for each right.

Figure 3: Different dimensions of rockfall events are included in the database (Photo: B. Žabota, 2017).

Figure 4: GIS-based rockfall database presented through the ESRI WEB Mapping Application.

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