

Geomorphological analysis of a limestone cave using a 3D laser scanner

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In recent years, 3D technology has been used to analyze landforms. It gives us highly accurate and dense data of topography, from which cross sections, area and volume of an object can be obtained. However, there are few cases of geomorphological analysis of limestone cave using 3D technology. The purpose of this study is to measure a limestone cave using a 3D laser scanner to analyze its form. Ryugashi Cave in Hamamatsu, Shizuoka Prefecture in central Japan is the target of this study, which has a length of 470 m in total. The cave was surveyed from 41 locations, resulting in 904,5800 measured points that have provided a 3D survey map. GLS-1500 by Topcon was used as a laser scanner to survey the cave, and Topcon ScanMaster software was used to edit the obtained 3D data. Quantitative analyses of the 3D data suggest some correlations between the overall shape of the limestone cave and solution forms, speleothems and sediments.

Keywords: Limestone cave, 3D laser scanner, Topography