Geophysical Research Abstracts
Vol. 20, EGU2018-17322, 2018
EGU General Assembly 2018

A 3D model of a cave collapse from Peristerionas cave, northern Greece

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In this study, we follow an integrated approach to understand the collapse mechanism that shaped the cave passages of Peristerionas cave in northern Greece. Peristerionas cave is a 600 m long and 45 m deep cave that is developed in pre-Paleozoic marbles of the Rhodope Massif. The pattern of the cave shows a clear correlation of the cave development with the tectonic setting while speleogens such as, cupolas, pendants and blind passages suggest hypogene speleogenetic setting. Although there are evident morphological characteristics of the cave walls most of the cave is shaped by wall and ceiling collapses. During the survey expedition within the Peristerionas cave we identified three major collapses (c1-3). We employed a photogrammetric methodology (Agisoft PhotoScan pro v. 1.4.0) in order to create a digital surface model of the most profound breakdown (c2) that preserves the sagged upper parts of the bedrock. This methodology is based on the latest multi-view 3D reconstruction technology and operates with arbitrary images. We used more than 300 photo stills to build a three-dimensional mesh of the collapse. Our results show that the structural setting of the broader area is the driving mechanism of the major collapses inside Peristerionas cave.