GEOMORPHOMETRIC ANALYSIS OF A 3-D DIGITAL SURFACE MODEL OF THE DOMICA CAVE

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Geomorphometry has been focused on parameterisation and analysis of surficial terrain. The theoretical and methodological concept has been based on two-dimensional scalar fields, which is sufficient for most cases of the surficial terrain. Therefore, the terrain surface is traditionally modelled with a bivariate function of altitude (elevation) and represented by a raster digital elevation model. However, the cave is a three-dimensional entity therefore a different approach is required for geomorphometric analysis. In this paper, we demonstrate the benefits of high resolution cave mapping and 3-D modelling to better understand the palaeohydrography of the Domica Cave in Slovakia. This methodological approach adopted traditional geomorphometric methods in a unique manner and also new methods used in 3-D computer graphics, which can be applied to study other 3-D geomorphological forms. The results provided quantitative description of the cave surface and defined exact position of specific speleofoms, which reveal new aspects of the speleogenesis of the Domica Cave.

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