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Digital mapping methodology applied for the creation of a 3D inventory and model of geology and geomorphology of the Moldavian Plateau (Romania)

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The geological and geomorphological information 3D nature has been until recently represented in 2D or 2.5D. The development of digital formats, methods and software capable of storing and manipulating tridimensional data opens the possibility for 3D and 4D representations. Not always the methodological advances are followed or supplemented by data availability. In this context we present a study case of data integration with various methodologies of digital mapping for the creation of a 3D inventory and a 3D model for the Moldavian Plateau (Romania) geology and geomorphology.

The first step represented the compilation of a small scale resolution geologic model based on the information existent in literature, but the inevitable problems have appeared. The main issue in our workflow was the inconsistency of information gathered from different sources, which relied on scanned paper base maps with different scales. Also, there was a lack of original geophysical data which was used in the interpretations which was published in the literature.

To overcome these inherent issues we used methods of semi-automatic extraction of geological bedrock topographic features from high-resolution DEMs, assisted by the 3D environment in order to better understand the geologic body geometries and the relations between structures in the geologic model. The extracted bedrock bedding, supported by information from local wells and quarries found in literature were modeled, in Midland Valley's Move software, making possible to create the top horizon's planes of the lithologic bodies. The obtained 3D model is going to be used for landslides pattern and distribution analysis and to observe the local influence of neo-tectonic activity.