OBJECT-BASED DEFINITION OF MORPHOSTRUCTURES FOR THE REFINEMENT OF GEOMORPHOLOGICAL DIVISION OF SLOVAKIA

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Currently used traditional geomorphological division of Slovakia was elaborated in scale 1: 200 000 and published in scale 1:1 000 000 already in the last century (Mazúr and Lukniš 1978). Since its first publication, it has been reprinted in form of several maps in scale 1:500 000 (e.g. in the Atlas of the Slovak Socialist Republic in 1980, or more recently in the Atlas of the Slovak Republic in 2004). Moreover, update of this division in terms of vectorisation, refinement of boundaries as well as adding some new division, was carried out in scale 1:50 000 (Urbánek et al. 2009). Although this work brought more accuracy to the boundaries and provided useful digital form of this division, it still suffers from ambiguity of boundaries’ course, and, similarly to the original division, subjective decisions of the authors played great role here. Moreover, this update is still not fully completed.

Therefore, we want to propose possibility of using object-based image analysis (OBIA) based on DEM and its derivatives for the purposes of further refinement of this traditional geomorphological division. As a result of several segmentations of geomorphometric characteristics such as slope gradient, vertical dissection and elevation in a multi-level manner, relatively homogeneous objects, mainly in terms of terrain roughness, were delineated. They can be labelled as either morphometric individuals or morphometric-morphostructural individuals, since the shape of morphostructures of Slovak territory is well reflected in terrain morphology. Even though majority of boundaries of the delineated objects (ca. 60 %) are not quantitatively compatible with the traditional geomorphological division, they still have a morphostructural meaning. The most compatible boundaries are in highly contrast areas (e.g. high mountains surrounded by relatively flat intramontane basins), and most of the mismatch is in less contrast areas or due to using different criteria for delineation of traditional regions (e.g. geology or expert knowledge).

Consequently, using this automated approach we should be able to provide objective alternative for this traditional division mainly in the fuzzy and questionable areas on several hierarchical levels and thus contribute to the ongoing discussion of its update.

References:


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