Geomorphological Research of Geodiversity for the Needs of the Declaration, Expansion and Management of Protected Areas

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Abstract

Geomorphology researches Earth relief, i.e. its characteristics, origin, development and dynamics. Relief characteristics are the result of active interaction between endogenous and exogenous processes. Geodiversity is a natural range of geologic (rocks, minerals, fossils), geomorphological (relief forms, processes) and soil phenomena including their totality, relations, properties, interpretations and systems. Geoheritage covers the most valuable parts of inanimate nature – important geological, geomorphological and pedological sites and areas of exceptional scientific, geoecological, educational, cultural and aesthetic significance which need to be preserved for future generations by various forms of protection. Geomorphological phenomena are often ignored or trivialized in evaluation and presentation of geodiversity and geoheritage, although they are often the underlying phenomenon of protected areas. Therefore, members of the Croatian Geomorphological Society (HGMD) made a series of geomorphological research projects concerning geodiversity and geological heritage in order to develop methodology for inventorying, evaluating, visualizing and presenting geomorphological phenomena and processes, and apply it to declare, modify and manage protected areas. Geomorphological mapping and producing geomorphological maps are among the most important methods of geomorphological research. In addition to detailed field work, topographic maps and digital terrain models are analysed and geospatial database is developed. Most cabinet work is done in the GIS environment. Morphographic and morphogenetic data are displayed on a geomorphological map and accompanying content morphometry. An evaluation of certain geomorphological elements or relief as a whole can be made within those research projects. The project of geomorphological research and interpretation of geoheritage in the Grabovača Cave Park has been conducted since 2011, with the final goal of expanding park boundaries and establishing a new regional park. JU Grabovača with the area of 5955 km^2 was founded in 2006. As part of preparation of the professional expertise for the expansion of the park's boundaries, detailed geomorphological and speleological research was carried out to make an inventory of geomorphological values, confirming justification of the declaration of a higher category protected area (Regional Park) and the definition of new boundaries. Special geomorphological maps and geospatial databases were produced for the analysis in the GIS environment. Similar examples of applied geomorphological research of protected areas were carried out in the "Žumberak-Samoborsko gorje" Nature Park, the "Sjeverni Velebit" National Park, the "Baraćeve špilje" Protected Area and others.

Keywords: geomorphology, geodiversity, geoheritage, geomorphological mapping, GIS