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Quantitative evaluation of geodiversity: development of methodological procedures with application to territorial management

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Abstract

Although geodiversity is considered the setting for biodiversity, there is still a huge gap in the social recognition of these two concepts. The concept of geodiversity, less developed, is now making its own way as a robust and fundamental idea concerning the abiotic component of nature.
From a conservationist point of view, the lack of a broader knowledge concerning the type and spatial variation of geodiversity, as well as its relationship with biodiversity, makes the protection and management of natural or semi-natural areas incomplete. There is a growing need to understand the patterns of geodiversity in different landscapes and to translate this knowledge for territorial management in a practical and effective point of view. This kind of management can also represent an important tool for the development of sustainable tourism, particularly geotourism, which can bring benefits not only for the environment, but also for social and economic purposes. The quantification of geodiversity is an important step in all this process but still few researchers are investing in the development of a proper methodology. The assessment methodologies that were published so far are mainly focused on the evaluation of geomorphological elements, sometimes complemented with information about lithology, soils, hidrology, morphometric variables, climatic surfaces and geosites. This results in very dissimilar areas at very different spatial scales, showing the complexity of the task and the need of further research. This current work aims the development of an effective methodology for the assessment of the maximum elements of geodiversity possible (rocks, minerals, fossils, landforms, soils), based on GIS routines. The main determinant factor for the quantitative assessment is scale, but other factors are also very important, such as the existence of suitable spatial data with sufficient degree of detail. It is expected to attain the proper procedures in order to assess geodiversity at different scales and to produce maps with the spatial representation of the geodiversity index, which could be an inestimable contribute for land-use management.