

Comparative Analysis of Geodiversity and Geosystem Services in Three Mountainous Protected Areas

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Geodiversity and geosystem services are two concepts related to environmental protection and sustainable development of any area. The joint consideration of these two concepts is relatively new and so far there is no developed methodological and methodic basis. Therefore, it is important to address these issues and look for solutions that will serve the environment and people of the current and future generations. The assessment of geodiversity and the indication of geosystem services in protected areas of various importance is the main goal of the presented paper.

Three protected areas in mountain regions were selected for this analysis. Namely: Chablais UNESCO Global Geopark (UGGp) in France, Sesia Val Grande UGGp in Italy, and Karkonosze National Park in Poland. The Chablais UGGp is situated between Lake Geneva and Mont Blanc. It encompasses more than 250 million years of geological history from the formation of the Alps to the recent glacial events that have carved out the landscape. The Sesia Val Grande UGGp is located at the north-east of the Piemonte Region, from the Monte Rosa massif to the Lake Maggiore. Its territory includes a spectacular section of the deep structure of the Alpine collisional belt as well as a record of past and present climate changes through glacial, periglacial, water- and gravity-related processes. The Karkonosze National Park is located within the Bohemian Massif in the Sudetes range, constituting a range of medium-sized mountains. The Polish part of the Karkonosze Mountains is built of granite, has a relatively dense river network and is intensively used for tourism.

Mapping and assessment of geodiversity and geosystem services were performed based on available data sources. Geodiversity maps were made, based on which geosystem services were identified in five categories. Among the most frequently appearing geosystem services in the studied areas, the following should be mentioned. The Chablais Geopark stands out in terms of both provisioning services due to a large number of lakes and a wealth of renowned mineral waters (Evian, Thonon) and cultural knowledge services, because of the quality of its geological record and the ease of its interpretation rendering the area of international significance for the understanding of the Alpine Orogeny and the development of tectonic thrust theories. The scientific relevance of the Sesia Val Grande geoheritage highlights the role of its geological matrix in influencing human culture. The Geopark's motto, "Where stone becomes culture" is a recognition of the importance of the abiotic ecosystem services offered by different lithologies, which foster not only the local stone cultural landscape, but also great architectural achievements. The Karkonosze National Park is characterized by the occurrence of granite groats as a geosite, peat bogs on the ridge surfaces of the main ridge which are an important element of biodiversity against the background of the entire park and rock formations that provide tourist services.

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