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Geodiversity assessment in the Sesia Val Grande UNESCO Geopark: the case study of the Pogallo Valley (NW Italy)

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A growing attention has been paid towards the economic and environmental dynamics affecting geodiversity under climate change conditions, and a strong innovation potential for this research field is evident. Moreover, recognizing the most diversified parts of the territory turns out to be very crucial for management and planning of UNESCO geoparks. Nevertheless, the lacking of integration between regional and local, geological and geomorphological data can limit the validity of geodiversity assessment and prevent its applicability for enhancement and protection of geoheritage. A holistic and integrated approach, also considering geosystem services, has been proposed to assess the geodiversity of an area of the Sesia Val Grande UNESCO Geopark and to manage its touristic fruition in a perspective of natural system sustainability.
The study area is located in the Italian Western Alps, nearby the Maggiore Lake. It includes the entire Pogallo drainage basin and the southern part of the Val Grande one (Eastern part of the UNESCO Geopark). Both geomorphological and structural settings are strongly dominated by the tectonic juxtaposition of the Ivrea-Verbano Zone and the Serie dei Laghi Units along the Pogallo Line.
Geological-structural and geomorphological investigations supported by aerial photo interpretation covered an area of approximately 30 km2. A structural-geological map (1:15 000 in scale) and an interpretive map (1:30 000 in scale) have been design using GIS software.
The geodiversity assessment has been performed by means of the proper selection of features of the high-mountain environment, its reclassification and integration by the map algebra analysis. The map of geodiversity is based on five factor maps: a relief energy map (geocomputation based on digital elevation model), a landform fragmentation/geomorphological map (using TPI and expert classification), a geological setting – an expert assessment of rock types, Quaternary sediments and lineaments, landform preservation (based on CORINE land cover) and finally mesoclimatic factor map (calculated on the basis of geomorphometric parameters). It was decided to use five classes of diversity (from very low, low through medium and high, up to very high). Final map of geodiversity was used for educational field and laboratory activities of the “GeoCentrum 2017” Polish-Italian Summer School.
Maps of geodiversity may prove to be helpful in determining the directions for management of the most valuable parts of the areas from the abiotic nature point of view, as well as delimitation of the geodiversity hotspots for purpose of the definition of goods and services they geodiversity could provide to our society within the ecosystem service approach.