Title **The geomorphodiversity index for Italy as a tool for geoheritage evaluation and improvement**

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The geomorphodiversity assesses and evaluates the geomorphological diversity of a given area, in a multiscale approach such as a region, country, or specific .

Geoheritage selects areas with an high value of the abiotic factors together with ecological and cultural parameters, for promoting the geological diversity that is the basis of biodiversity and the mankind's survival.

Geomorphodiversity, that is a part of geodiversity, evaluates the geomorphological variability of a given area and takes into account the range of geomorphological features, drainage patterns, slope variation, rock types, land-use patterns.

The geomorphodiversity numerical index derived for Italy (Burnelli et al., 2023) is presented with a special focus on the areas where it shows the highest values. These areas correspond to Italian natural parks of great interest providing a good correspondence with the index results.

refers to the variety of landforms and morphological proesses characterizing the landscape. The definition of an index to quantify geomorphodiversity is a relevant step for multiple fields of Earth sciences, since it is widely accepted that the variability of the geosphere deeply influences the biosphere.

The necessity to design and manage the sustainability of cities is a current challenge. As a consequence, such an index describing the number and type of landforms and geomorphological processes can provide a new model to clarify the relationship between geodiversity and biodiversity, especially in the urban context.

In this work we propose a quantitative geomorphodiversity index valid for Italy, considering multiple input quantities describing geological constraints and geomorphological processes. Compared to previous methods, we introduced some innovations concerning the landforms assessment and related the morphometric quantities of interest to specific spatial scales. Our aim was to obtain an index that equally represents diversity of areas with large topographic variability and flat areas.

We validated the index against selected geomorphological maps, in specific regions. A further analysis has been carried out, considering the interaction with the biotic and anthropic compartment.

We consider our contribution as a new significant model for the analysis of geomorphodiversity in different context at different scales and resolutions. Eventually, it can also enhance the local land use planning and the environmental management, contributing to the geoheritage conservation and safeguarding ecodiversity.