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Foreword to Volume 48

The Italian Association of Physical Geography and Geomorphology (AIGeo) celebrated on June 22nd 2025 the 25th anniversary of its foundation. In order to mark this event, the AIGeo Directive Council decided to promote the publication of a dedicated issue, aimed at providing an overview of the main research branches cultivated by the Italian geomorphological community. The Editorial Board of Geografia Fisica e Dinamica Quaternaria (Physical Geography and Quaternary Dynamic) agreed to host this volume, entitled "Progress in Physical Geography and Geomorphology", in which issues 1 and 2 of Volume 48 are merged. Geografia Fisica e Dinamica Quaternaria has been a recurrent publishing location for the Italian geomorphological community not only in the past 25 years but also long before, since its foundation in 1978.

As appointed guest editors, our purpose was to attract original scientific articles presenting case studies on topics specific to Physical Geography and Geomorphology or on interdisciplinary topics of interest to the field. In particular, contributions demonstrating innovative approaches to the study of geomorphological phenomena and processes, developed through interactions among AIGeo members or developed within the framework of AIGeo's scientific activities, were encouraged. Submissions from young researchers and collaborative work with foreign co-authors were also encouraged.

The response of the Italian geomorphological community to the solicitation of AIGeo has been very satisfactory: eighteen papers were submitted, of which thirteen have so far completed the editorial process and have been included in Volume 48 after being published online on the Journal website at the moment of their acceptance. The editorial process was completed within seven months, thanks to the prompt response and excellent work of a board of Italian and international reviewers, to which we are very grateful. Four more papers are still under review and will hopefully be published in the next issue. Only one paper was rejected.

The thirteen papers collected in this volume have 7.2 co-authors on average, with a minimum of two and a maximum of seventeen. The thirteen corresponding authors are in nine cases young geomorphologists (six of male and three of female gender). Nineteen institutions contributed to the issue (two of which from foreign universities), together with two research institutes (CNR, ISPRA). The topics addressed can be grouped within three main subjects: anthropogenic impacts and climate change (five papers), applications of Geomorphology to address societal challenges (five papers) and Geoheritage, geodiversity and geotourism (three papers).

The works included in the first group highlight the contribution that Physical Geography and Geomorphology can provide to climate science and anthropogenic impacts on the climate system.

The paper by Angelone *et al.* presents a method for the reconstruction of medium-term river channel pattern evolution using multitemporal analysis of maps and aerial imagery. The methodology was tested on four rivers in Southern Italy, and the results show changes of channel patterns over time, with land-use change and floods as the primary drivers.

In the work by Cilla *et al.* two calcareous tufa deposits in the Umbria-Marche Apennine are analysed by means of integrated methods and dated exploiting U/Th method at sharp warming peaks within cooling periods in the Upper Pleistocene. According to the findings of the Authors the genetic model of freshwater travertine deposition seems to be confirmed as the result of reversed thermal gradient in the aquifer, in correspondence with climate warming.

The paper by Forti *et al.* analyzes the environmental changes occurred in the Stelvio Pass area, along the main watershed of the European Alps, where anthropogenic impacts, occurred since the mid-20th century, have affected geomorphic processes, significantly increasing natural hazards occurrence in the area. The identification of novel landforms triggered by human-induced changes to natural morphology is a key strategy for future hazards assessment and mitigation.

The study by Pelacani *et al.* examines the link between geomorphic connectivity (CI) and soil microbial functional indicators in a watershed of Tuscany (Italy), by developing a new weighted Connectivity index (CIFB), which integrates the fungi-to-bacteria (F:B) abundance ratio. By using high-resolution geospatial data, rare earth elements (REEs), satellite indices (NDVI, NDWI), and machine

learning (Stochastic Gradient Boosting, SGB), Authors brought to light the role of soil microbial characteristics in determining the geomorphic connectivity in the study area.

The anthropogenic impacts on natural landscape are the focus of the large scale geomorphological map of a small area along the rocky coast of Eastern Liguria (Italy, NW Mediterranean) and the associated article by Pietrogrande *et al.* This work shows how, in this highly sensitive area, at the foothill of a densely vegetated mountain range plunging directly into the sea, the tough urbanization performed since the 1960s has remarkably altered ongoing geomorphic processes.

The second group of papers emphasizes how Physical Geography and Geomorphology can support stakeholders in decision-making processes in order to effectively solve the environmental issues affecting modern societies.

In the paper by Beccatini *et al.* the Authors develop a fully automated methodology to extract and classify ground deformation patterns from EGMS (European Ground Motion Service) data for the whole Italian territory, for supporting large-scale geomorphological analysis and hazard assessment. The results demonstrate that steeper slopes exhibiting horizontal movement are commonly associated with landslides, while vertical motion in flat areas is indicative of subsidence.

The work by Bocchiola *et al.* highlights the relevance of Physical Geography in addressing societal challenges in high-mountain areas, where hydrometric monitoring must be adapted to the peculiar features of snow/ice meltwater-fed streams. Data collection and sensor maintenance strategies in such environment must be tailored based on the global comprehension of the glacierized environment features. The case-study addressed by this paper, the IDROSTELVIO network, is presented as a reference model for similar projects.

The paper by Brenna and Surian presents an overview of scientific advancements related to the geomorphological response of river channels to extreme flood events, and the development of geomorphic tools for the assessment and mapping of flood-related hazards. The recognition of key geomorphic factors that drive channel change, and the implementation of recent promising tools can lead to an improvement in flood hazard assessment with positive consequences on communities and infrastructure.

In the paper by Filippelli *et al.* the Authors aims at quantifying the economic impact of three key forest ecological services (supporting biodiversity, mitigating climate change, and protecting human settlements from natural hazards) in two areas of Northern Italy: the Stelvio National Park (LSNP) and the Orobie Bergamasche Regional Park (OBRP). The results obtained confirm that forest composition and management practices strongly influence the effectiveness of the ecological services provided, with direct quantitative (money costs) estimable consequences.

The contribution of Iacobucci *et al.* gives a picture of the running optimised approaches for advancing research chains on climate-related environmental risks. In particular, the paper discusses three optimized climate-driven geomorphological proxies: i) landslide frequency and distribution (mountainous and hilly environments); ii) river channel bankfull variations (alluvial plain environment); iii) shoreline position and morphology (coastal environment).

Finally, some more papers are devoted to the recognition of the cultural value of natural landscapes and to their exploitation for touristic purposes, in order to drive a wider audience to understand the necessity to preserve our planet.

The work by Agnesi *et al.* quantitatively addresses the evaluation of the geotouristic potential of a 7 km long itinerary along the Tyrrhenian coast of northwestern Sicily, between the towns of Cinisi and Terrasini. The geomorphological diversity of this area is the result of the presence of alternating rocky cliffs and sandy beaches, where geomorphic processes have shaped a lithologically complex bedrock under the control of active tectonics. The itinerary allows a comprehensive interpretation of the lithostratigraphic, structural, and geomorphological features of the area, being particularly compact and accessible to a wider public.

The paper by Ascione *et al.* proposes a geoitinerary in the western sector of the Campi Flegrei caldera, which has been recognized as one of the first 100 IUGS Geological Heritage Sites. Along the geoitinerary, the Authors identified seven geosites, whose geological and geomorphological features are assessed and described. The proposed initiative is evaluated by means of a SWOT analysis and can represent a model for the development of geotourism in other active volcanic regions.

The paper by Migoń *et al.* explores coastal landforms along the Basque Coast UNESCO Global Geopark in Spain, highlighting that lithological and structural features of the bedrock control the distribution of geomorphic features. The results emphasize the relevance of the geomorphological component in the assessment of the geodiversity of the area, providing support to its belonging to an internationally recognized environmental inventory.

The content of this volume testifies that the Italian community of Physical Geographers and Geomorphologists is lively and focused on contributing to the worldwide progress of the discipline. AIGeo is likely to represent, in the future as it has been in the past, a valuable driver for the community, in which members can find opportunities for disciplinary debates and exchanges, and in which young researchers can be trained and their abilities emphasized.

The Guest Editors,

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