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Review Article

Revista Brasileira de Geomorfologia (Brazilian Journal of Geomorphology): Past, Present, and Future

Revista Brasileira de Geomorfologia: Passado, Presente e Futuro

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Abstract: This article analyzes the publications of the Revista Brasileira de Geomorfologia (RBGeomorfologia) between 2000 and 2024, assessing temporal evolution, affiliation profiles, collaboration networks, and thematic areas. The methodology also involves a bibliometric analysis of data manually collected from the official website, such as the Web of Science and Scopus databases, covering data of published documents like titles, abstracts, and keywords. Publications were grouped into subareas and subjected to quantitative analysis to determine their representativeness. The results reveal a progressive increase in articles incorporating new approaches and attention to environmental issues. Among the subareas, Environmental Geomorphology leads, followed by Modeling and Geoprocessing, and Fluvial Geomorphology. Areas such as Tectonic Geomorphology, Quaternary Geomorphology, and Geochronology show lower participation because of high technical demands and the need for greater investment. The analysis of indexed databases indicated an average of 2.7 citations per document and collaboration with institutions from 12 countries, notably France and Portugal. The study highlights a mismatch in emerging areas such as Geodiversity and Geomorphological Heritage, which are represented in a few publications. It is concluded that RBGeomorfologia has been consolidating national geomorphological research and expanding its international visibility. However, it is recommended that the topics addressed be diversified and that underrepresented subareas be strengthened.

Keywords: Bibliometrics; Geomorphology; Bibliographic production; RBGeomorfologia.

Resumo: Este artigo analisa as publicações da Revista Brasileira de Geomorfologia (RBGeomorfologia) no período de 2000 a 2024, avaliando a evolução temporal, os perfis de filiações, as redes de colaboração e as áreas temáticas. A metodologia também envolve análise bibliométrica de dados coletados manualmente no site oficial e nas bases de dados Web of Science e Scopus, compreendendo títulos, resumos e palavras-chave de documentos publicados. As publicações foram agrupadas em

subáreas e submetidas à análise quantitativa para identificar representatividade. Os resultados revelam crescimento progressivo no número de artigos, associado à incorporação de novas abordagens e à atenção a questões ambientais. Entre as subáreas, destaca-se a Geomorfologia Ambiental, seguida pela Modelagem e Geoprocessamento e pela Geomorfologia Fluvial. Áreas como Geomorfologia Tectônica, Quaternária e Geocronologia apresentam menor participação devido à alta exigência técnica e à necessidade de maiores investimentos. A análise das bases indexadas indica média de 2,7 citações por documento e colaboração com instituições de 12 países, destacando-se França e Portugal. A pesquisa expõe descompasso em áreas emergentes, como Geodiversidade e Patrimônio Geomorfológico, que registram poucas publicações. Conclui-se que a RBGeomorfologia vem consolidando a produção geomorfológica nacional e ampliando sua visibilidade internacional. Recomenda-se, contudo, a diversificação dos temas abordados e o fortalecimento das subáreas com menor representatividade.

Palavras-chave: Bibliometria; Geomorfologia; Produção bibliográfica; RBGeomorfologia.

1. Introduction

The *Revista Brasileira de Geomorfologia* (RBGeomorfologia - Brazilian Journal of Geomorphology), founded in 2000, stands as the premier scientific publication in Brazilian geomorphology. Its establishment and evolution mirror the growth of this discipline as an independent field of research. The journal's scope focuses on understanding landform development, surface dynamics, and environmental interactions.

The RBGeomorfologia project began in 1997, culminating in the publication of its inaugural issue in 2000 (Figure 1a). This first issue was launched at the 3rd National Symposium on Geomorphology (III SINAGEO), held at the Institute of Geosciences, UNICAMP (University of Campinas), in Campinas, São Paulo State, Brazil. It featured eight articles by distinguished geomorphologists: Aziz Ab'Sáber, Lylian Coltrinari, Jorge Xavier da Silva, José Pereira de Queiroz Neto, Tereza Cardoso da Silva, Kenitiro Suguio, Luís B. Piló, and João José Bigarella. The topics covered included pedogeomorphology, coastal, aeolian, and karst geomorphology, as well as applications in geotechnologies and environmental planning.

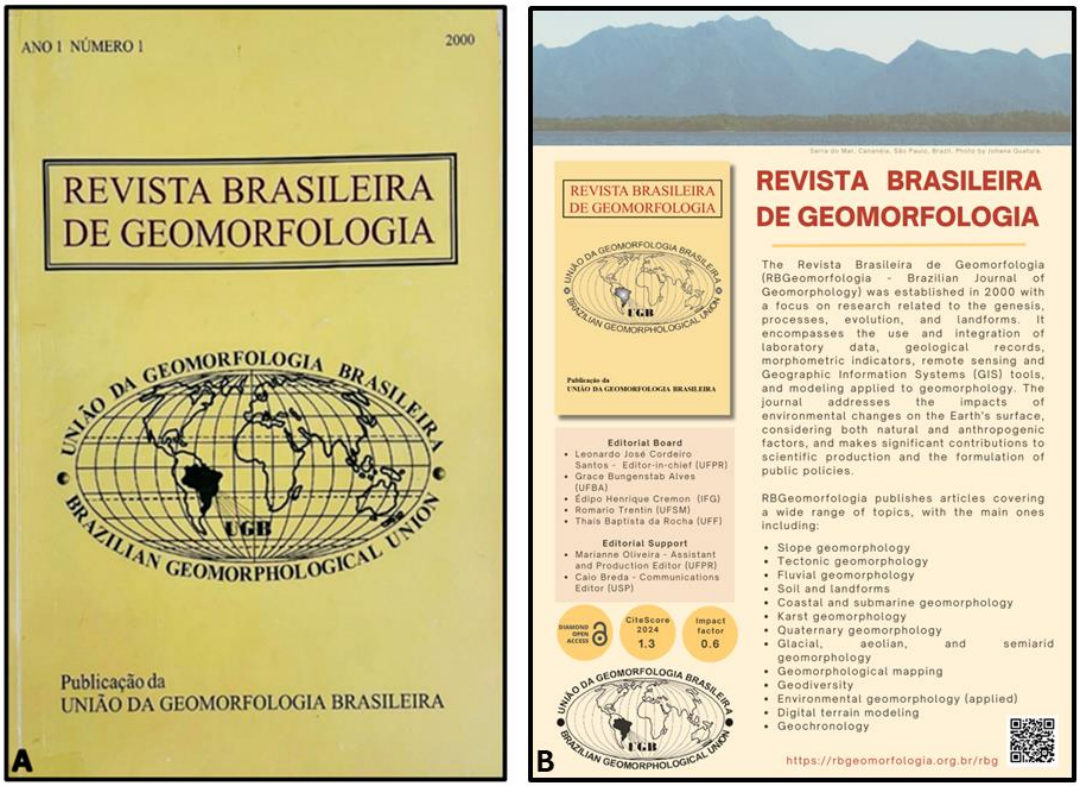

Figure 1. Visual trajectory of RBGeomorfologia. (a) Cover of the first issue of the Revista Brasileira de Geomorfologia, published in 2000; (b) Brochure of the journal from 2025, including its main publication areas.

The journal was exclusively available in print until 2011. In 2012, it transitioned to a digital format, aligning with the broader trend of expanding access to and disseminating scientific knowledge in the field. Today, the journal incorporates traditional and modern approaches, such as digital modeling and isotopic analyses, reflecting the field's methodological evolution (Figure 1b). Indexed in international databases like DOAJ, Scopus, and Web of Science, RBGeomorfologia operates on an open-access policy, which enhances its visibility and support for environmental policies. Over its 25-year history, the journal has published more than 700 articles, establishing itself as a central repository of national scientific production.

Previous studies have examined the output of RBGeomorfologia in a segmented manner. Analyses covering the periods 2001–2005 (Salgado; Biazini; Hennig, 2008), 2006–2010 (Oliveira; Salgado, 2013), and 2016–2020 (Dal Pai; Salgado; Martins, 2022) identified key production centers and the most prolific research areas. These studies also noted growth in international participation and the expansion of inter-institutional cooperation networks in the field. However, they also highlighted challenges such as a geographic concentration of authors in Brazil's South-Central region, the underrepresentation of biomes like the Amazon and Caatinga, and the heterogeneity in methodological applications (Salgado; Biazini; Hennig, 2008; Oliveira; Salgado, 2013; Dal Pai; Salgado; Martins, 2022).

Despite these surveys, no comprehensive study has assessed the entirety of the RBGeomorfologia's output since its foundation. Existing investigations are restricted to fragmented periods, which prevents a systemic evaluation of the mutual influence between the journal and global geomorphology paradigms. This gap limits understanding of the long-term thematic evolution, hindering the identification of strategic directions for future research.

This study presents a bibliometric analysis of the articles published in RBGeomorfologia between 2000 and 2024. The objectives include: quantifying the temporal evolution of publications, authorship profiles, and citation indicators; mapping institutional and geographical collaboration networks; and identifying emerging and declining thematic clusters.

2. Methodology

Bibliometric analyses use quantitative and statistical techniques to evaluate knowledge production, dissemination, and behavior within a specific field (Araújo, 2006; Bornmann; Mutz, 2015). For this study, data were manually collected from the official website of the RBGeomorfologia (https://rbgeomorfologia.org.br/rbg/index). Only the title, abstract, and keyword fields were considered exclusively from research and review articles published between 2000 and 2024. The information was organized in an Excel 365 spreadsheet and underwent a stage of terminological standardization to avoid duplication from synonyms or linguistic variations. While acknowledging that manual collection may introduce biases or inconsistencies, primarily due to human error, the adopted procedure is considered to have minimized these limitations. The year 2025 was excluded from the analysis because its evaluation and publication processes were still ongoing.

The data analysis involved organizing the publications into thematic subareas. This approach enabled a quantitative description of publications over time and contextualized the development of each subarea within the Brazilian geomorphology landscape. The subareas considered in this study are: Environmental (Applied) Geomorphology, Modeling and Geoprocessing, Fluvial Geomorphology, Geomorphological Mapping, Soils and Landforms, Coastal and Submarine Geomorphology, Tectonic Geomorphology, Quaternary Geomorphology, Geochronology, Glacial and Periglacial Geomorphology, Karst Geomorphology, Aeolian Geomorphology, Geodiversity and Geomorphological Heritage, Conceptual, Theoretical and/or Methodological Geomorphology, and Slopes and Hillslope Processes. These categories represent the diversity and complexity of geomorphological research in Brazil, ranging from applied approaches to environmental issues to theoretical and methodological investigations.

For part of the bibliometric analysis, data were obtained by reviewing all manuscripts published in RBGeomorfologia between 2005 and 2024. The databases consulted were Web of Science (Clarivate Analytics/Thomson Reuters) and Scopus. Although the journal has existed since 2000, its indexing on these platforms is limited to manuscripts published from 2005 onward in Web of Science and from 2017 onward in Scopus, reflecting the availability of documents.

After downloading the articles and technical notes, the records were stored in a .bib format and processed in the R environment. This processing included integrating databases, removing duplicates, and standardizing the structure. The consolidated file was then analyzed using Biblioshiny, the web version of the Bibliometrix package, a tool known for its comprehensive bibliometric analysis capabilities and user-friendly interface (Aria; Cuccurullo, 2017).

A word cloud was generated using all keywords—including both Author Keywords and Keywords Plus—to identify the predominant concepts in the selected studies. Keywords Plus are indexed from cited references, and their inclusion provides greater analytical strength. This method expands thematic coverage and reduces biases from individual indexing, thus overcoming the limitations associated with the use of titles, abstracts, and author keywords in isolation. Analysis was performed using the Bibliometrix package (Aria; Cuccurullo, 2017).

The extracted indicators included: (i) annual scientific output; (ii) institutions with the highest number of publications, considering the full counting method—each manuscript was fully credited to all institutions listed in the metadata, regardless of order or number of affiliations; (iii) international collaboration networks; (iv) output by geomorphology subarea; (v) word cloud; and (vi) thematic analysis via the Thematic Map. Only English words were used for the word cloud and thematic analysis, due to the databases consulted (Scopus and Web of Science) and the requirements of the Bibliometrix package (Aria; Cuccurullo, 2017).

The thematic analysis followed the approach proposed by Callon, Courtial, and Laville (1991) and Cobo et al. (2011), which categorizes themes into four quadrants within a strategic diagram. This categorization is based on two main dimensions calculated from the keyword co-occurrence network of each theme: centrality (Relevance Degree) and density (Development Degree). Centrality measures a theme's relevance within the field, quantifying its interaction with other clusters. A theme with high centrality is frequently associated with diverse subjects, acting as a bridge or hub that integrates different topics. Density assesses a theme's maturity and internal cohesion, indicating how well-developed and conceptually articulated its cluster of terms is. A high density suggests that studies within the theme are strongly interrelated, forming a solid and specialized conceptual core. Conversely, low density suggests that a theme is fragmented or incipient.

In the strategic diagram, centrality is plotted on the X-axis and density on the Y-axis. The four quadrants, defined by the global average values of each dimension, are classified as: (i) motor or driving themes (high centrality/high density: consolidated cores that are relevant and well developed, driving publications); (ii) basic themes (high centrality/low density: transversal but immature; important topics with weak internal development, often conceptual foundations); (iii) emerging/declining themes (low centrality/low density: peripheral and either incipient or in decline; poorly developed with low connectivity); and (iv) niche or highly specific themes (low centrality/high density: specialized and autonomous; well-developed internally but with limited connection to other fields). The global averages of the dimensions were used as thresholds for categorization in the Bibliometrix package (Aria; Cuccurullo, 2017). During preprocessing, measures were taken to remove toponyms (e.g., “Brazil,” “Amazon”) and to unify synonyms, to avoid thematic redundancy and regional biases.

3. Results

3.1. Bibliometric Profile of RBGeomorfologia

The publication history of RBGeomorfologia from 2000 to 2024 demonstrates a pattern of consolidation and expansion (Figure 2). The journal's output remained relatively modest during its initial years, with eight articles published in 2000 and an annual volume ranging from five to eleven publications between 2001 and 2004.

Production doubled in 2005 to twenty articles, then stabilized between fifteen and twenty-one articles per year from 2006 to 2010. From 2011 to 2016, the number of publications grew gradually, reaching forty-eight per year. This output stabilized from 2016 to 2022, under an editorial policy that limited each issue to twelve articles. A temporary increase to sixty-seven articles occurred in 2023, with a special issue entitled "Gullies: processes, study methods, and control" edited by Coelho Netto, Augustin, and Castro (2023). The journal published forty-one articles in 2024, reflecting the ongoing consolidation of its new editorial workflows.

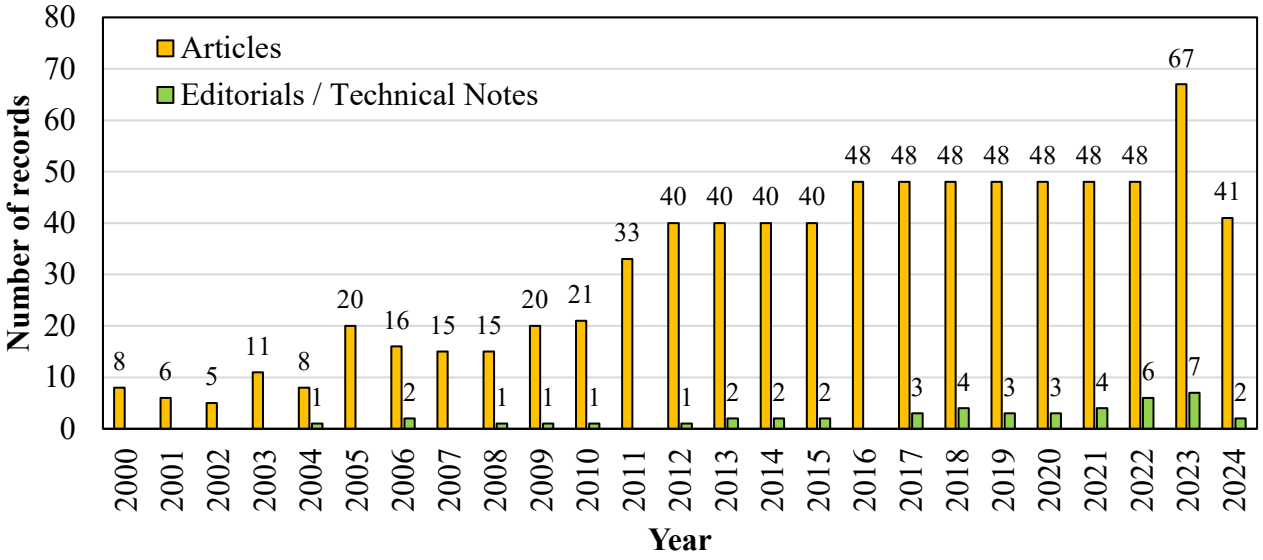

Figure 2. Temporal evolution of the number of manuscript publications in RBGeomorfologia.

Bibliometric data from the Web of Science and Scopus databases, covering the period from 2005 to 2024, indicate that RBGeomorfologia has an average of 2.6 citations per document. Over this period, 1,317 authors contributed to the journal, with 32 single-authored publications, and the average number of coauthors per manuscript was 3.3. In total, 7.9% of the articles resulted from international collaborations.

The list of affiliations with the highest output (Figure 3) reveals a strong concentration of contributions from institutions in Brazil's Southeast region. The Federal University of Minas Gerais (UFMG) leads with 115 documents, followed by the Federal University of Rio de Janeiro (UFRJ), with 100 papers, and São Paulo State University (UNESP), with 93. Other notable regional contributors include the Fluminense Federal University (UFF), with 56 manuscripts, and the University of São Paulo (USP), with 38.

The South region also contributed substantially, represented by the Federal University of Rio Grande do Sul (UFRGS), with 68 documents, the Federal University of Paraná (UFPR), with 53, and the State University of Maringá (UEM), with 40.

In the Northeast, the Federal University of Rio Grande do Norte (UFRN) accounted for 57 documents, and the Federal University of Ceará (UFC) had 41. Notably, universities from the Center-West and North regions do not appear among the top ten most productive institutions in the journal's history. The analysis indicates that federal and state public universities from the Southeast, South, and Northeast regions were the primary sources of publications for RBGeomorfologia during this period.

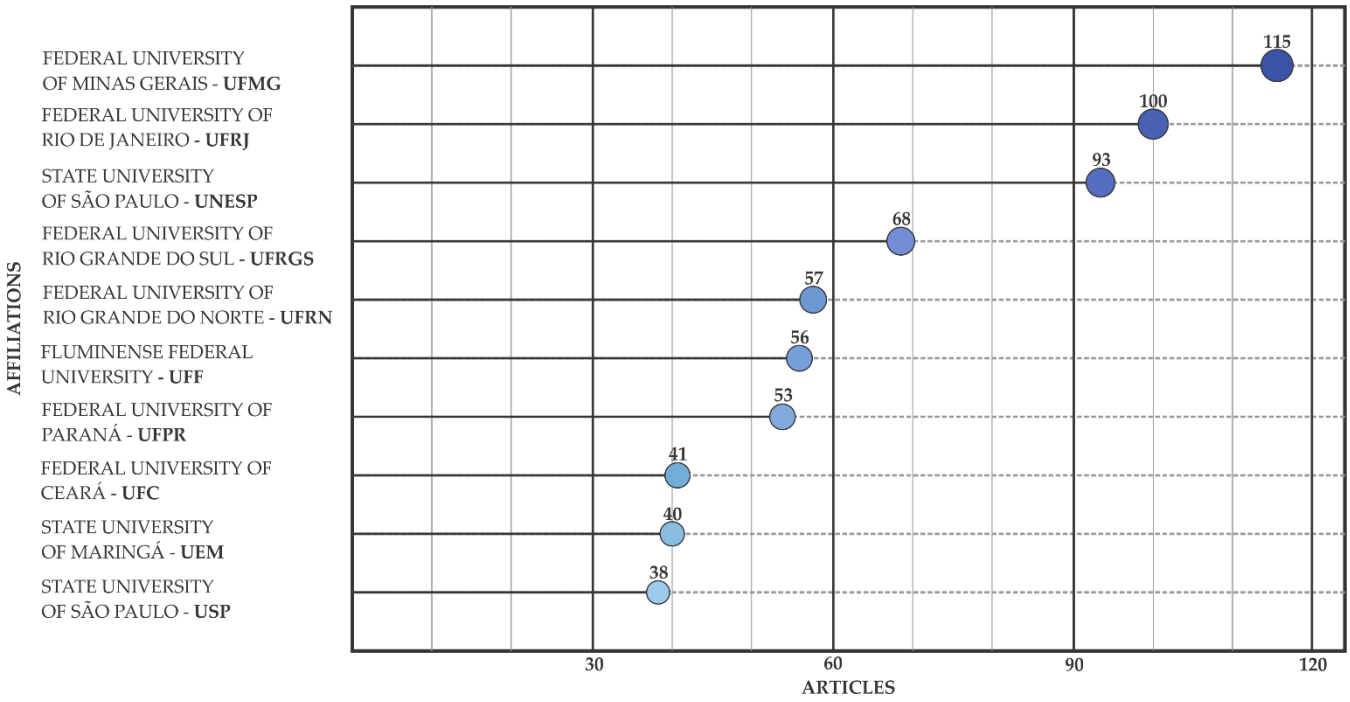

Figure 3. Distribution of RBGeomorfologia scientific output by institution, highlighting the ten affiliations with the highest publication volume between 2005 and 2024.

Collaboration records in RBGeomorfologia (Figure 4) reveal that authors from Brazilian institutions most frequently collaborated with researchers from France and Portugal. Notable partnerships also exist with Colombia, Italy, Argentina, Chile, Germany, and the United States, and additional collaborations with Australia, New Zealand, Canada, and Spain.

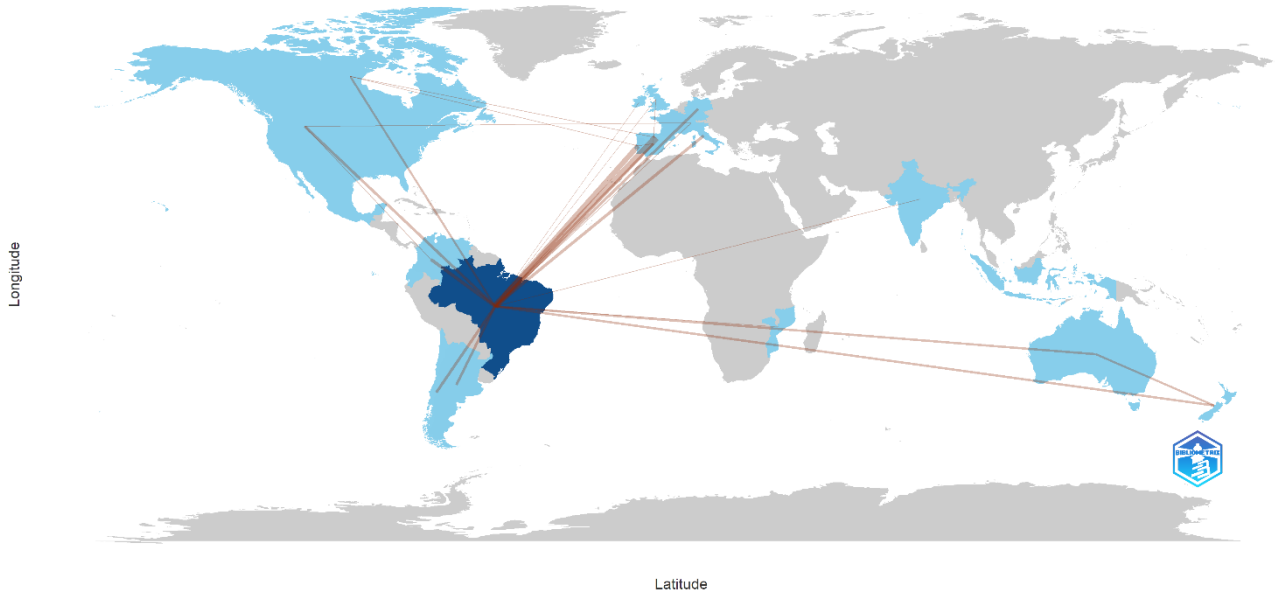

Figure 4. Collaboration between countries in RBGeomorfologia between 2005 and 2024, according to Web of Science and Scopus.

3.2. Thematic distribution of publications by subarea and thematic trends

The analysis of the number of records by geomorphology subarea (Figure 5), covering the period from 2000 to 2024, shows that Applied Environmental Geomorphology stands out with 124 publications. Modeling and Geoprocessing, as well as Fluvial Geomorphology, follow with 104 publications each.

Other subareas with a significant presence include Geomorphological Mapping (81 publications), Soils and Landforms (63 publications), and Coastal and Submarine Geomorphology (63 publications). Tectonic Geomorphology accounted for 50 publications.

Intermediate topics comprise Conceptual, Theoretical, and/or Methodological Geomorphology (46 publications) and Hillslope Geomorphology (39 publications). More specialized subjects with lower representation (fewer than 30 records) include: Quaternary Geomorphology (28), Geochronology (24), Glacial and Periglacial Geomorphology (19), Karst Geomorphology (19), and Aeolian Geomorphology (10). Finally, topics related to Geodiversity and Geomorphological Heritage present only nine occurrences.

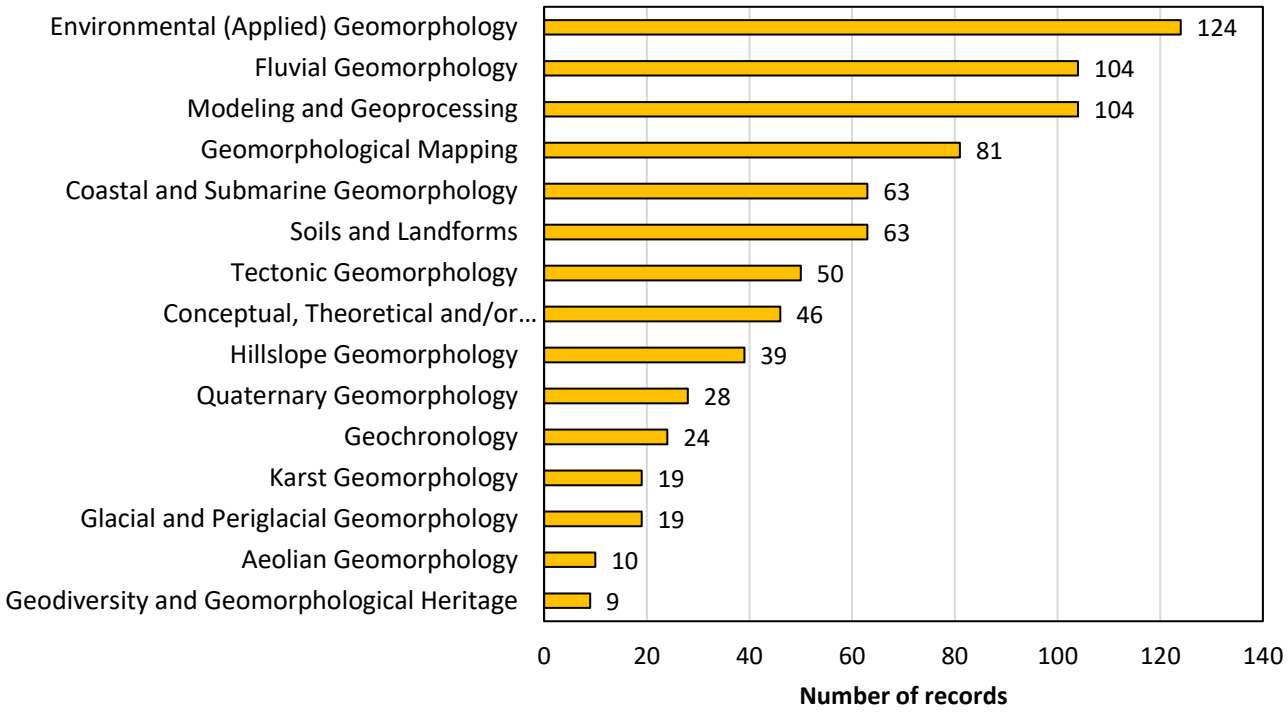

Figure 5. Thematic distribution of publications in RBGeomorfologia between 2000 and 2024.

The word cloud (Figure 6) illustrates the central themes and concepts of geomorphology research in RBGeomorfologia, reinforcing the publication panorama by subareas (Figure 5). The diversity of terms in the cloud demonstrates the interdisciplinary nature of geomorphology and highlights specific locations and regions that have concentrated the studies published in the journal.

The word cloud also highlights mapping and modeling methods, as well as studies related to watersheds, coastal areas, soils, and vegetation. While central themes are predominant, the word cloud reveals less recurrent topics, reflecting the wide range of subjects published in the journal and the integrative nature of geomorphological research in Brazil.

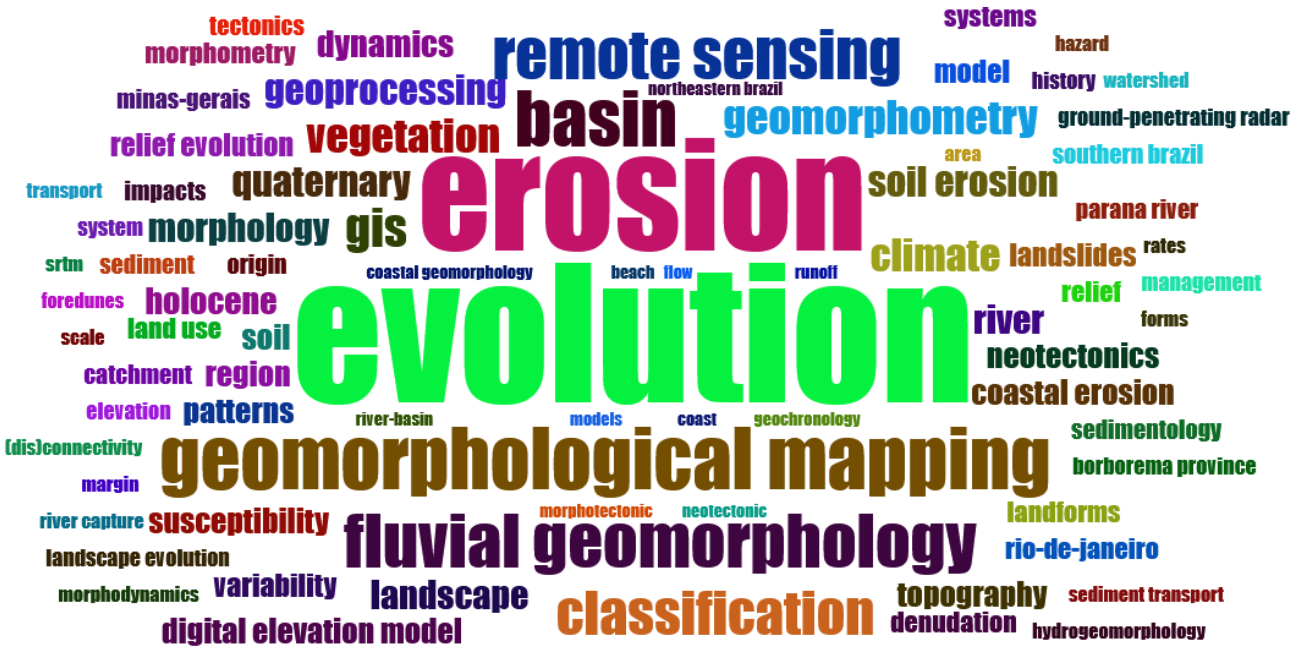

Figure 6. Word cloud of the 100 most frequently used words in RBGeomorfologia publications between 2000 and 2024.

The thematic map, based on the co-occurrence of keywords from published manuscripts and generated with the Bibliometrix package, identified thematic clusters with distinct levels of development and relevance to the research field (Figure 7). Each term was positioned on a Cartesian plane, with the X-axis representing centrality (interaction with other themes) and the Y-axis representing density (internal development of the cluster). The size of the circles represents the frequency of term occurrence, highlighting the greater presence of broadly addressed themes (Figure 7).

Three clusters were identified as motor themes, occupying the quadrant of high density and high centrality. These clusters were: (i) "quaternary, soil, and climate;" (ii) "denudation rates, drainage rearrangement, and escarpment;" and (iii) "coastal erosion, beach, and coastal geomorphology." These three clusters share high density, suggesting conceptual and methodological maturity, and high centrality, indicating their role as structuring axes in the organization of knowledge in the field. Each represents a thematic domain with a strong potential to generate interdisciplinary connections and foster new research.

This analysis also indicated other relevant groups distributed across the remaining quadrants, reflecting distinct levels of development and thematic integration. In the lower-right quadrant, associated with basic themes, three clusters with high centrality and intermediate density were observed. The first includes terms such as "geomorphological mapping, GIS, and watershed," reflecting a consolidated methodological core that supports multiple applied approaches in the field. The second includes "relief evolution, morphotectonics, and remote sensing," linking morphotectonic and landform evolution analyses with Earth observation technologies. The third combines "erosive processes, fluvial geomorphology, and classification," indicating systematic approaches to characterize erosive dynamics and fluvial features. These clusters maintain strong connections with other themes, serving as conceptual and instrumental foundations for various investigations.

In the upper-left quadrant (niche themes), four clusters with high density and low centrality were identified. The first encompasses "tafoni and weathering," specifically focusing on landforms and weathering processes. The second includes "longitudinal profile, continental margin, and drainage anomalies," reflecting detailed analyses of river networks and geomorphological patterns in continental environments. The third is represented by the term "geoheritage," and the fourth by "geoconservation," both showing considerable density, which suggests a degree of thematic specialization related to the management of geological and geomorphological heritage.

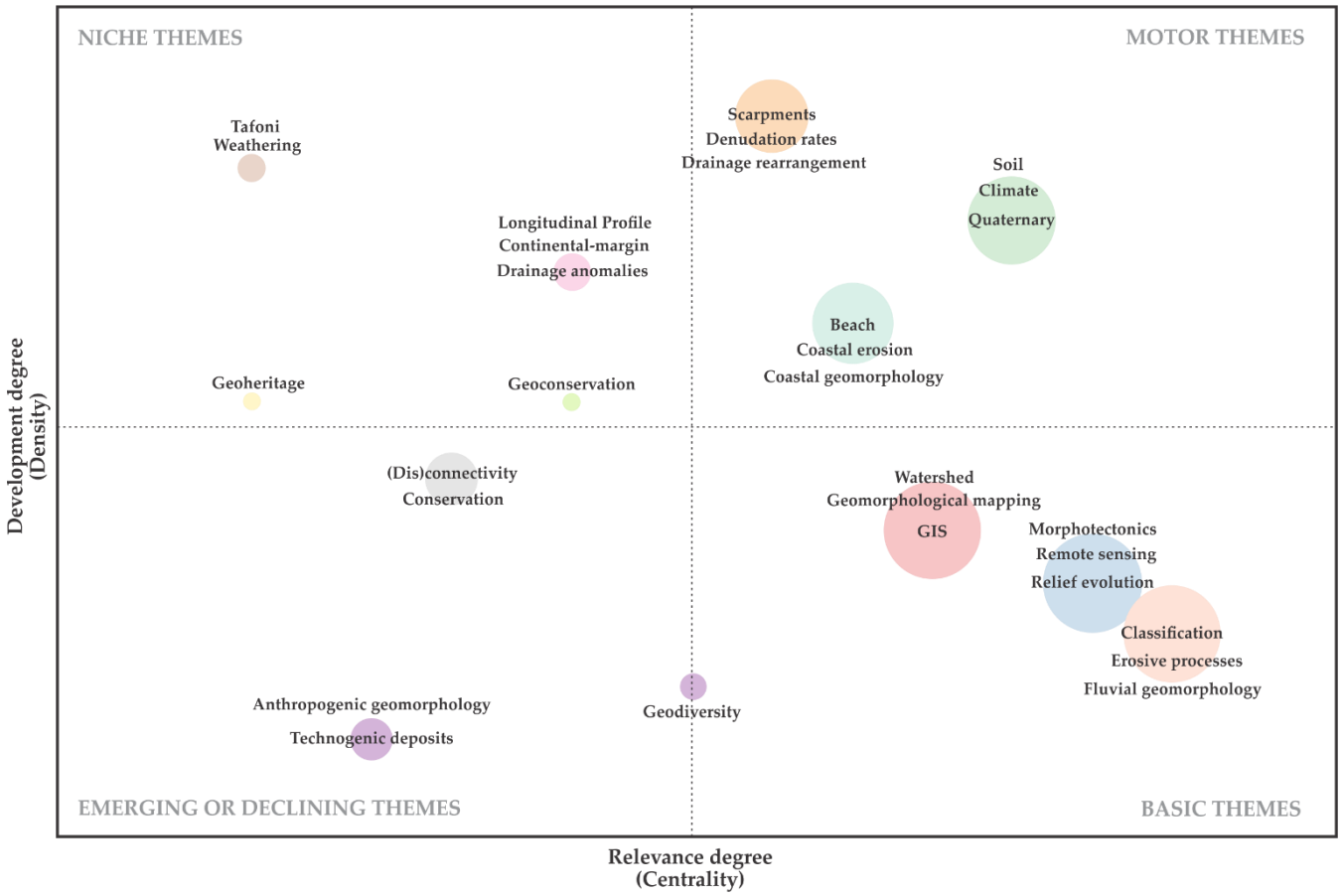

Figure 7. Comparison between density and centrality of the dominant keyword clusters in RBGeomorfologia between 2005 and 2024, according to Web of Science, following Callon et al. (1991).

In the lower-left quadrant, associated with emerging or declining themes, two main clusters stand out. The first encompasses "anthropogenic geomorphology, and technogenic deposits," pointing to the recognition of landforms and processes resulting from human activity as an autonomous subject of study. The second includes "connectivity, (dis)connectivity, and conservation," indicating recent interest in geomorphological systems' fragmentation and functional connectivity with direct implications for environmental conservation. Although these themes show low density and centrality, their presence may indicate areas either in consolidation or decline.

Finally, the term "geodiversity" is positioned at the interface between the quadrants of basic and emerging themes. This intermediate position suggests that, although the concept is widely cited and related to multiple topics, its degree of internal development remains limited, requiring stronger articulation with consolidated research cores. This observation reinforces the need to deepen conceptual and methodological approaches that support the systematic application of the concept in the scientific literature.

4. Discussion

4.1. Publication dynamics in RBGeomorfologia

Salgado, Biazini, and Hennig (2008) described that, in the period 2001–2005, Brazilian geomorphology consolidated its methodology. The increase from 11 to 20 publications in 2005 reflects this consolidation. Stabilization at a moderate level (15–21) until 2010 confirmed the field's initial maturation. After 2011, the number of publications grew to about 40 per year, which suggests thematic diversification and expanding collaboration networks, as noted by Salgado and Limoeiro (2017) and Dal Pai, Salgado, and Martins (2022).

Dal Pai, Salgado, and Martins (2022) observed the maintenance of 48 annual publications between 2016 and 2020, with strong thematic cohesion and consistent coauthorship patterns. The plateau in the data corroborates this

observation. Salgado, Salgado, and Martins (2020) questioned the future horizons of the field. The peak of 74 publications in 2023 may signal a response to that call, indicating an increase in initiatives and emerging themes.

The growth in the number of publications throughout the period analyzed is related to changes in the journal's editorial policies. This increase also reflects the global context of scientific output expansion, beginning in the 1980s, a phenomenon driven by the growing number of researchers, journals, and resources allocated to science (Bornmann; Mutz, 2015). In geomorphology specifically, annual publications increased from about 60 in the 1980s to approximately 700 in recent years (Salgado and Limoeiro, 2017).

In the 2001–2005 survey, Salgado, Biazini, and Hennig (2008) found that the initial consolidation of Brazilian geomorphology was based on universities from the Southeast, Center-West, and South regions, with UFRJ and UNESP standing out. Extending the analysis to 2024 reveals the rise of UFMG to first place and the continued presence of UFRJ and UNESP among the leaders, reflecting institutional realignments over the past twenty years. Dal Pai, Salgado, and Martins (2022) observed similar patterns in the 2016–2020 period, with UFMG, UFRJ, and UNESP accounting for a significant share of published documents. A broader analysis highlights the presence of universities from the Northeast (UFRN and UFC) among the most productive, indicating geographical diversification of research networks. Overall, the predominance of public universities as the most productive institutions in RBGeomorfologia has remained (Dal Pai; Salgado; Martins, 2022).

Regarding international collaboration networks, the initial panorama identified by Salgado, Biazini, and Hennig (2008) showed the consolidation of national geomorphology between 2001 and 2005, with few authors and a focus on local studies. In contrast, Dal Pai, Salgado, and Martins (2022), when analyzing 2016–2020, recorded France and Portugal as Brazil's main co-authorship partners, which coincides with the frequencies presented in this study. Salgado, Salgado, and Martins (2020) suggested diversifying partnerships beyond Europe and Latin America. The emergence of collaborations with Australia and New Zealand signals the beginning of this expansion phase. The data indicate that the thematic broadening of Brazilian geomorphology occurred in parallel with the geographical expansion of research networks (Salgado; Limoeiro, 2017).

RBGeomorfologia has shown steady growth throughout its 24 years of analysis, consolidating itself as a relevant vehicle for the dissemination of Brazilian geomorphological knowledge. The quality of national scientific production, combined with the journal's credibility and editorial policies, creates opportunities for greater international insertion, pointing to the continuous expansion of the journal and Brazilian geomorphology research.

4.2. Subareas of geomorphology and future perspectives

Brazilian geomorphology has gone through distinct evolutionary phases. Initially, Davisian influence predominated; from the 1950s onward, it was gradually replaced by a more specialized approach driven by the incorporation of new techniques and concepts. In the 1970s, environmental themes gained relevance, followed by advances in quantitative studies and modeling in the 1980s.

Publication data by subareas show the predominance of applied topics within Environmental Geomorphology. This reflects the consolidation stage described by Salgado, Biazini, and Hennig (2008), in which the field responded to Brazil's territorial and environmental demands. This consolidation dates back to the 1970s, when practical applications in natural hazard mitigation, soil conservation, and territorial planning became central to the field (Vitte, 2011). The dominance of publications in Environmental Geomorphology as a subarea in RBGeomorfologia explains the moderate number of studies in Soils and Landforms and Hillslope Geomorphology, because the primary focus has been on geomorphological processes with environmental implications, such as soil erosion and mass movements.

The tie between Modeling/Geoprocessing and Fluvial Geomorphology indicates the expansion of computational tools and a growing interest in water and sediment flow processes (Dal Pai; Salgado; Martins, 2022). Geomorphological Mapping, the fourth most frequent theme, aligns with the central role of cartography in creating geomorphological databases (Gomes et al., 2018) and benefits from advancements in Modeling and Geoprocessing.

The strong presence of Soils and Landforms, as well as Coastal Geomorphology, confirms the continuity of investigations into pedological and coastal processes since the earliest national studies (Salgado; Biazini; Hennig, 2008). This reflects (i) a consolidated tradition of research on soil–landform relationships and (ii) the relevance of Brazil's approximately 8,000 km-long coastlines. The Conceptual, Theoretical, and/or Methodological Geomorphology subarea suggests that, despite the focus on applied studies, there is a solid theoretical basis

supporting methodological development in the field, consistent with the proposal of Salgado, Salgado, and Martins (2020) to consolidate disciplinary foundations.

Subareas like Tectonic Geomorphology, Quaternary Geomorphology, and Geochronology have a moderate number of publications in RBGeomorfologia, even though they are considered core (basic) themes of the journal. Their connection with geology and the need for specific, often expensive, techniques and greater funding help explain this pattern. Recent advancements in these fields are tied to methods such as Optically Stimulated Luminescence (OSL) for fluvial and coastal environments and the use of cosmogenic nuclides to measure denudation rates.

Other subareas, including Glacial and Periglacial Geomorphology, Karst Geomorphology, and Aeolian Geomorphology, show fewer occurrences for distinct reasons. For instance, research in Glacial and Periglacial Geomorphology occupies a niche often connected to Antarctica and the Brazilian Antarctic Program (PROANTAR). Karst Geomorphology studies are limited by the spatial distribution of specific rock types, while Aeolian Geomorphology has connections with Coastal and Quaternary Geomorphology. These subareas suggest opportunities to broaden paleoclimatic and extreme-environment investigations (Salgado et al., 2020).

Despite a rise in research on Geodiversity and Geomorphological Heritage—as seen in theses, dissertations, and conference presentations—this trend has not yet led to a significant increase in publications in RBGeomorfologia. This lack of representation may be due to the relatively recent emergence of these topics in Brazil. A key moment for this field was the 2006 publication of the Geodiversity Map of Brazil by the Geological Survey of Brazil (CPRM/SGB), a foundational step toward consolidating the concept of geodiversity nationally.

According to the analysis by Salgado, Biazini, and Hennig (2008), the consolidation of national geomorphology in the initial period of RBGeomorfologia (2001–2005) did not systematically emphasize fluvial geomorphology. This explains the current classification of "fluvial geomorphology" as a basic theme, indicating its conceptual importance but low internal development.

The high frequency of "evolution" in the word cloud reflects the conceptual and methodological progress documented by Dal Pai, Salgado, and Martins (2022) for the 2016–2020 period. The prominence of "geomorphological mapping" with high centrality confirms its consolidation as a key research area, aligning with the methodological evolution observed since the early 2000s. In contrast, the nearly peripheral position of "anthropogenic geomorphology" points to a fragmented field. Its classification as an emerging or declining theme indicates that this area still lacks articulation with the journal's central thematic cores.

The themes "geodiversity," "geoheritage," and "geoconservation" exhibit moderate to low centrality, which suggests a growing interest in heritage and the protection of geological and geomorphological sites. Specifically, "geoheritage" and "geoconservation" lie in the quadrant of niche themes, characterized by high density and low centrality. This indicates that these topics have internal cohesion and conceptual depth within a restricted group of studies but maintain little articulation with the journal's principal thematic axes. Similarly, the term "continental margin" also appears in this quadrant, reflecting the specialized nature of submarine geomorphology. This field tends to share a stronger centrality with other disciplines like oceanography, geology, and geophysics.

Prospects for the journal point to the consolidation of applied areas that focus on environmental problem-solving and the use of geotechnologies. The subareas of Geodiversity and Geomorphological Heritage show growth potential. Meanwhile, subareas with broader interfaces, such as geology-related ones, may face greater thematic dispersion due to the diversity of techniques and approaches employed.

5. Concluding remarks

The analysis of RBGeomorfologia's scientific output from 2000 to 2024 shows its progressive consolidation as the leading geomorphology journal in Brazil. The consistent increase in publication volume, particularly the growth after 2011 and the peak in 2023, highlights the expansion of national geomorphological research. The predominance of public universities from various Brazilian regions as a source of articles and technical notes, along with expanding international collaboration beyond Europe and Latin America, reinforces the strengthening of research networks and the geographical diversification of authorship.

The results indicate that Environmental (Applied) Geomorphology is the most prominent subarea in RBGeomorfologia, aligning with the demand for solutions related to natural hazards, soil conservation, and territorial planning. The many publications in Modeling and Geoprocessing, Fluvial Geomorphology, and

Geomorphological Mapping demonstrate the incorporation of computational tools and the relevance of cartography and geoprocessing in the field. While the journal maintains a solid theoretical and methodological research foundation, subareas such as Tectonic Geomorphology, Quaternary Geomorphology, and Geochronology—especially Geodiversity and Geomorphological Heritage—remain underrepresented. These fields represent areas with potential for further development and increased visibility within the journal.

It is concluded that RBGeomorfologia fulfills its role as a vehicle for disseminating and consolidating geomorphology in Brazil. The journal reflects the discipline's evolution by adapting to new methodologies and approaches, and it fosters the discussion of relevant themes for understanding and applying geomorphological knowledge in national and international contexts. The analysis suggests pathways for thematic diversification and the encouragement of underrepresented subareas, which would promote both the breadth and depth of Brazilian geomorphological research.

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