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Geomorphology of the Serra da Formiga, western ranges sector of the Borborema Plateau, semiarid region of the Seridó, Northeastern Brazil

Geomorfologia da Serra da Formiga, setor das serras ocidentais do Planalto da Borborema, região semiárida do Seridó Potiguar

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Abstract: Over recent decades, a growing expansion of wind farm installations has been observed in mountainous environments of the Brazilian semiarid region. This expansion has also affected the Seridó Desertification Nucleus, a region that hosts several mountain ranges acting as important refuges for local fauna and flora. The objective of this study was to characterize the geomorphology of the Serra da Formiga, located in the semiarid region of the Seridó, Rio Grande do Norte State. To this end, office-based analyses were carried out, including image processing, analysis of cartographic databases, and the production of thematic maps using a Geographic Information System, in addition to field surveys and in situ verification. In the Serra da Formiga and its immediate surroundings, five landform units were identified: (i) fluvial plains and terraces; (ii) inselbergs; (iii) mountain ranges; (iv) Sertaneja Surface I; and (v) Sertaneja Surface II. The area is characterized by steep relief and numerous escarpments, which impose restrictions on land use and occupation. On the other hand, these conditions have favored the preservation of Caatinga vegetation remnants. However, the installation of wind farms may intensify erosional processes and the siltation of water bodies. Therefore, the establishment of a conservation unit in the area constitutes a recommended strategy aimed at sustainable land use.

Keywords: Escarpments; Morphogenesis; Relief.

Resumo: Ao longo das últimas décadas, tem-se observado uma crescente expansão na instalação de parques eólicos em ambientes serranos do semiárido brasileiro. Essa expansão também tem afetado o núcleo de desertificação do Seridó, uma região que abriga diversas serras atuando como importantes refúgios para a fauna e a flora locais. O objetivo deste trabalho foi caracterizar a geomorfologia da Serra da Formiga, na região semiárida do Seridó Potiguar. Para tanto foram realizadas análises de gabinete, como o processamento de imagens, análises de bases cartográficas, confecção de mapas temáticos com o uso de Sistema de Informações Geográficas e ainda foram realizadas atividades de campo e checagens *in situ*. Na Serra da Formiga e em seu entorno imediato, foram identificadas cinco unidades de relevo: (i) planícies e terraços fluviais; (ii) inselbergs; (iii) serras; (iv) superfície sertaneja I; e (v) superfície sertaneja II. Constatou-se que a área apresenta relevos íngremes e numerosas escarpas, o que impõe restrições ao uso e à ocupação do solo. Por outro lado, essas condições têm favorecido a preservação de remanescentes de caatinga. A instalação de parques eólicos, contudo, pode intensificar processos erosivos e o assoreamento de corpos hídricos. Diante disso, a criação de uma unidade de conservação na área constitui uma estratégia recomendável visando o uso sustentável.

Palavras-chave: Escarpas; Morfogênese; Relevo.

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1. Introduction

Summit surfaces of the Brazilian semiarid region, such as mountain ranges and plateaus, constitute ecosystems of high environmental and ecological relevance (OLIVEIRA; SILVA FILHO; COSTA, 2021; HILÁRIO et al., 2024). They host rich biodiversity, including forest formations, humid environments of high-altitude wetlands, and refuges for fauna and flora species adapted to milder and more humid microclimatic conditions (OLIVEIRA; SILVA FILHO; COSTA, 2021). Despite the historical environmental degradation of the Caatinga biome, vegetation in elevated areas tends to remain more robust and better conserved compared to the lowered Sertaneja surfaces (NETO; SILVA, 2012; OLIVEIRA; SILVA FILHO; COSTA, 2021).

Within environmental and territorial studies, relief analysis constitutes a fundamental step, as it allows the understanding of landscape structure and dynamics, as well as its natural potentialities and vulnerabilities (DINIZ et al., 2017; SANTOS; VITAL, 2020; LIRA et al., 2024; HILÁRIO et al., 2024; FREITAS et al., 2024; HILÁRIO; LOPES, 2024). The geomorphological approach, at both regional and detailed scales, provides essential support for environmental planning and management, as well as for the assessment of impacts resulting from anthropogenic activities (AB'SÁBER, 2003; PORTO et al., 2004; SOUZA; OLIVEIRA, 2006; MEDEIROS; CESTARO, 2018; LIRA et al., 2024; HILÁRIO et al., 2024; FREITAS et al., 2024; HILÁRIO; LOPES, 2024; DANTAS et al., 2025).

Over the last decades, there has been a significant increase in the installation of wind farms in mountainous environments of the Brazilian semiarid region (HILÁRIO et al., 2024; FREITAS et al., 2024; SILVA; HILÁRIO; LOPES, 2024). These environments, due to their high elevations and persistent winds, are strategic for renewable energy generation. However, they are generally better preserved than the lowered surfaces, presenting unique characteristics in terms of climate, soils, relief, hydrography, fauna, and flora (SANTOS et al., 2023; HILÁRIO et al., 2024; FREITAS et al., 2024; SILVA; HILÁRIO; LOPES, 2024; DANTAS et al., 2025).

Despite the advance of environmental degradation processes in recent decades in the Seridó Potiguar, some mountainous areas still lack more detailed studies of their physical and biotic aspects (SALES et al., 2022; HILÁRIO et al., 2024; FREITAS et al., 2024). Among these areas, the Serra da Formiga stands out, located in the western ranges sector of the Borborema Plateau, constituting an important geomorphological and ecological landmark in the regional context. In addition to its expressive relevance in relief modeling, the Serra da Formiga hosts preserved fragments of native Caatinga vegetation, which play a fundamental role in maintaining local biodiversity and conserving natural resources within an environment marked by intense anthropogenic pressures (OLIVEIRA; SILVA FILHO; COSTA, 2021).

Thus, the objective of this study was to characterize the geomorphology of the Serra da Formiga, seeking to understand the organization of the relief and the main morphogenetic processes at work. This analysis aims to contribute to the geographic and environmental knowledge of the region, providing technical and scientific support that may assist conservation strategies, territorial planning, and sustainable management of natural resources.

2. Materials and methods

2.1 Study area

The Serra da Formiga is located between the municipalities of Caicó and Cruzeta, Rio Grande do Norte State, covering an area of 80.2 km² (Fig. 1). This residual relief constitutes a crystalline massif under a median semiarid climate (OLIVEIRA; OLIVEIRA; COSTA, 2019), which appears isolated in the landscape and is bounded by steep slopes (SILVA et al., 2018). The massif is composed of igneous (e.g., granite) and metamorphic rocks (e.g., gneisses and orthogneisses) belonging to the Borborema Province, with elevations ranging from 311 m (base level) to 688 m (mean summit elevation). From a phytogeographic perspective, the study area is located within the Northern Sertaneja Depression Ecoregion (OLIVEIRA; OLIVEIRA; COSTA, 2019).

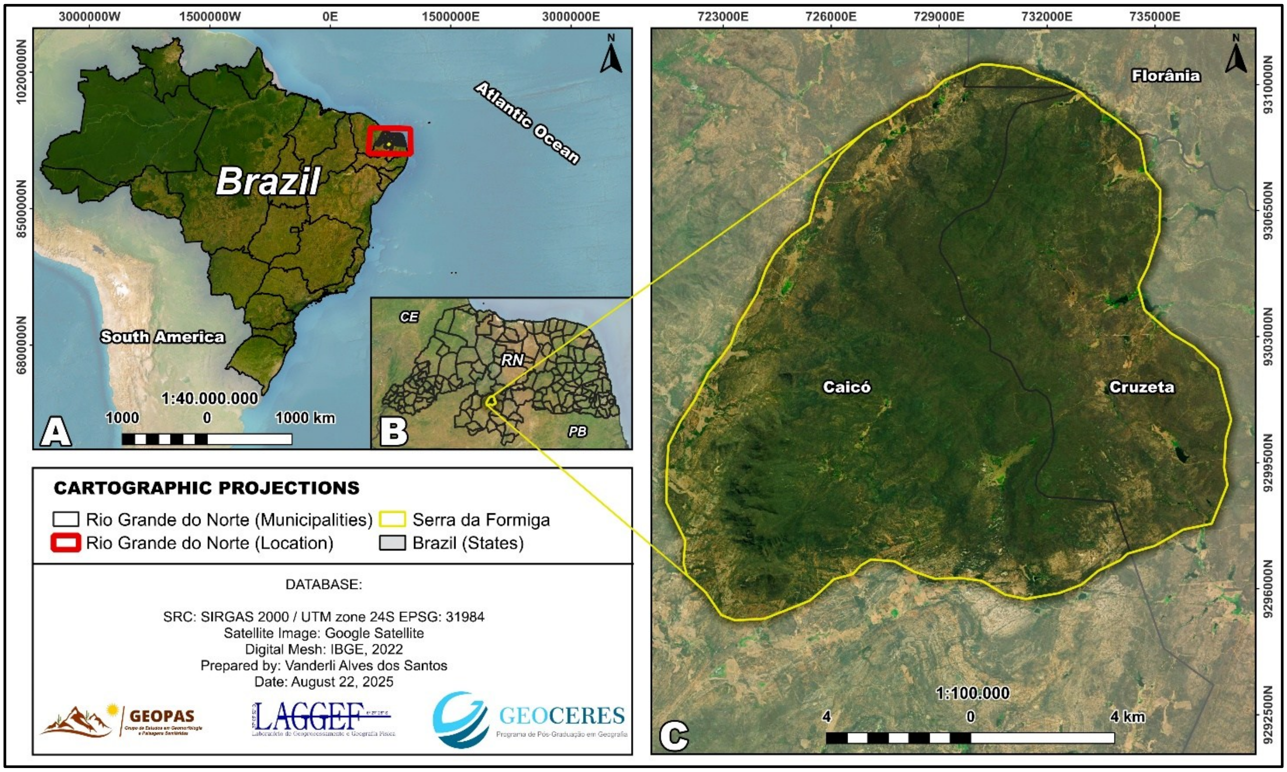

Figure 1 – Location of the study area.
Source: Authors (2025).

2.2 Relief mapping and analysis

The geological map was produced using vector data obtained from the Seridó Mineral Province geological sheet at a scale of 1:350,000 (COSTA et al., 2019). Geomorphological mapping was carried out considering the following criteria for identifying and delimiting compartments: altitude, slope, summit shape (tabular, sharp, or convex), and modeling processes (dissection, dissolution, or accumulation), following the procedures proposed by Costa et al. (2020) and IBGE (2009).

Hypsometry was developed using QGIS software (version 3.22.12). This process involved the use of a Digital Elevation Model (DEM) from NASADEM (NASA Shuttle Radar Topography Mission Digital Elevation Model – SRTM DEM). Based on this model, a raster was generated which, following established criteria, incorporated a distinct color scale for each 33 m elevation interval, allowing a detailed and differentiated visualization of altimetric variations in the analyzed area.

The Relief Dissection Index (RDI) is a morphometric parameter used in the segmentation and analysis of landform units, enabling the assessment of incision degree and interfluve dimensions (ROSS, 1994). Its calculation follows the procedures proposed by Ross (1994) and Crepani et al. (2001), adapted within the QGIS environment. The index results from the sum of Vertical Dissection (VD), representing valley incision, and Horizontal Dissection (HD), expressing the mean width of interfluves, both reclassified into categorical classes.

The process begins with the correction and inversion of the DEM, used to generate the flow direction raster and delimit "half-basins" using the r.watershed function. VD is obtained from relief amplitude (Range), while HD is calculated by the ratio between basin area and basin length (HD = Area / Length, where Length = Perimeter / 2). After reclassification of variables according to Ross (1994), the final index is determined by summing the reclassified values (RDI = VD_ross + HD_ross). The result is converted into a raster and symbolized into dissection classes (Very Weak, Weak, Moderate, Strong, and Very Strong), enabling relief analysis and compartmentalization.

Sertaneja Surface I (SS I) encompasses altitudes up to 250 m, whereas Sertaneja Surface II (SS II) extends from 251 to 350 m. In the context of the study area, mountain ranges were delimited as areas with elevations above 401 m, where sharp or convex summit forms predominate. Fluvial plains and terraces were delimited using a raster file indicating slopes between 0 and 3% (flat), associated with the drainage network. Polygon selection was based on proximity to the drainage network, ensuring correspondence with fluvial accumulation features. Finally, inselbergs of significant extent were mapped based on the observation of isolated rocky formations rising above 400 m in elevation and standing out in the surrounding landscape. Field activities were also conducted using a portable Global Navigation Satellite System (GNSS) receiver, digital camera, and an unmanned aerial vehicle (UAV), aiming at data acquisition and validation of results obtained through QGIS software.

3. Results and discussion

3.1. Lithostructural context of the Serra da Formiga

The geology of the Serra da Formiga covers an approximate area of 162.77 km² and is characterized by marked lithological diversity associated with high structural complexity (Fig. 2). The regional geological framework is dominated by Paleoproterozoic and Neoproterozoic units, reflecting a long and complex tectono-metamorphic evolution within the Borborema Province.

The oldest units correspond to the Caicó Complex, which constitutes the main lithostratigraphic basement of the area and occupies the largest portion of the mapped surface. Biotite orthogneisses stand out, representing about 35% of the area, and undifferentiated banded gneisses, accounting for approximately 30% (Fig. 2). These lithologies are predominantly distributed in the central-southern and eastern sectors of the Serra da Formiga, occurring in association with granitic and granodioritic orthogneisses, as well as intercalations with amphibolites and migmatites (Fig. 2). Locally, the presence of orthogneisses and amphibolite lenses belonging to the Arabia Complex is also recorded, concentrated in the northern sector of the study area.

Overlying the Paleoproterozoic basement, Neoproterozoic supracrustal sequences develop, mainly represented by the Jucurutu Formation, part of the Seridó Group. This unit exhibits marked lithological heterogeneity, composed of granoblastic biotite–amphibole gneisses, amphibolites, iron formations, feldspathic gneisses, as well as calc-silicate and meta-ultramafic rocks (Fig. 2). The occurrence of a marble layer is also noteworthy, indicating depositional conditions associated with former marine environments (Fig. 2). In the northwestern sector of the area, the Genezaré Body introduces syenogranitic to monzogranitic orthogneisses, which are intercalated with supracrustal units, contributing to the complexity of the regional geological arrangement.

Cenozoic alluvial deposits show restricted distribution, corresponding to approximately 0.43% of the mapped area. These units are mainly associated with drainage channels and recent sediment accumulation sectors, reflecting the current dynamics of erosional and depositional processes (Fig. 2).

From a structural perspective, the Serra da Formiga is strongly compartmentalized by a system of dextral and sinistral strike-slip faults, with predominant NE–SW and E–W directions, in addition to numerous structural lineaments that exert direct control over relief compartmentalization and dissection. In the northern portion of the area, the presence of a normal synform with indicated plunge stands out, evidencing folding of lithological layers. This structural framework plays a fundamental role in guiding ridges and valleys, conferring to the Serra da Formiga a morphology directly conditioned by differential rock resistance and the combined action of ductile and brittle tectonic processes (Fig. 2).

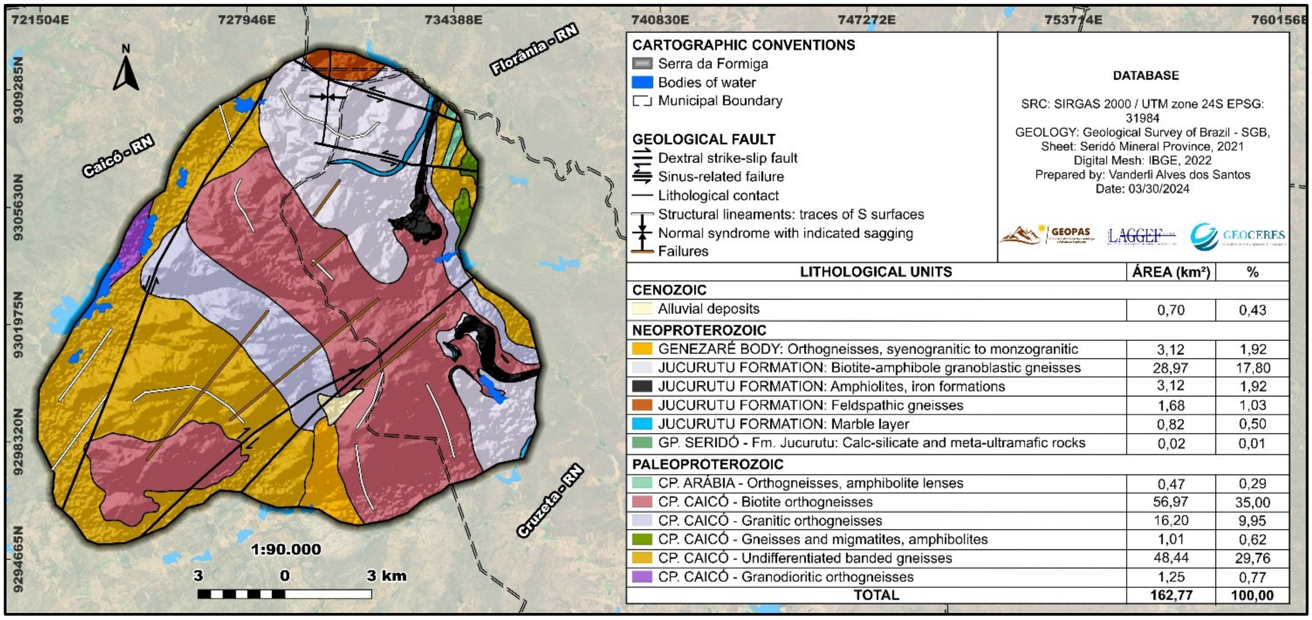

Figure 2 – Geological map of the study area.
Source: Authors (2025).

3.2. Altimetric patterns and morphoenvironmental implications

The Serra da Formiga and its immediate surroundings present an altimetric range varying between 233 and 685 m (Fig. 3). The highest elevations are concentrated in the central and southern portions of the area, where aligned ridges and interfluves are observed, while the lowest altitudes occur in the western portion of the study area toward the Seridó River valley (Fig. 3). The drainage network exhibits a predominantly dendritic pattern, typical of strongly dissected crystalline terrains. Watercourses display high slope gradients, reflecting the influence of lithological structure and the resistance of Caicó Complex orthogneisses (Fig. 3). Hypsometric distribution indicates strong altimetric contrasts, with abrupt slopes and well-defined escarpments, reinforcing the mountainous character and lithostructural control of the relief. This morphology imposes restrictions on land use and occupation but contributes to the preservation of Caatinga remnants, especially in areas of difficult access.

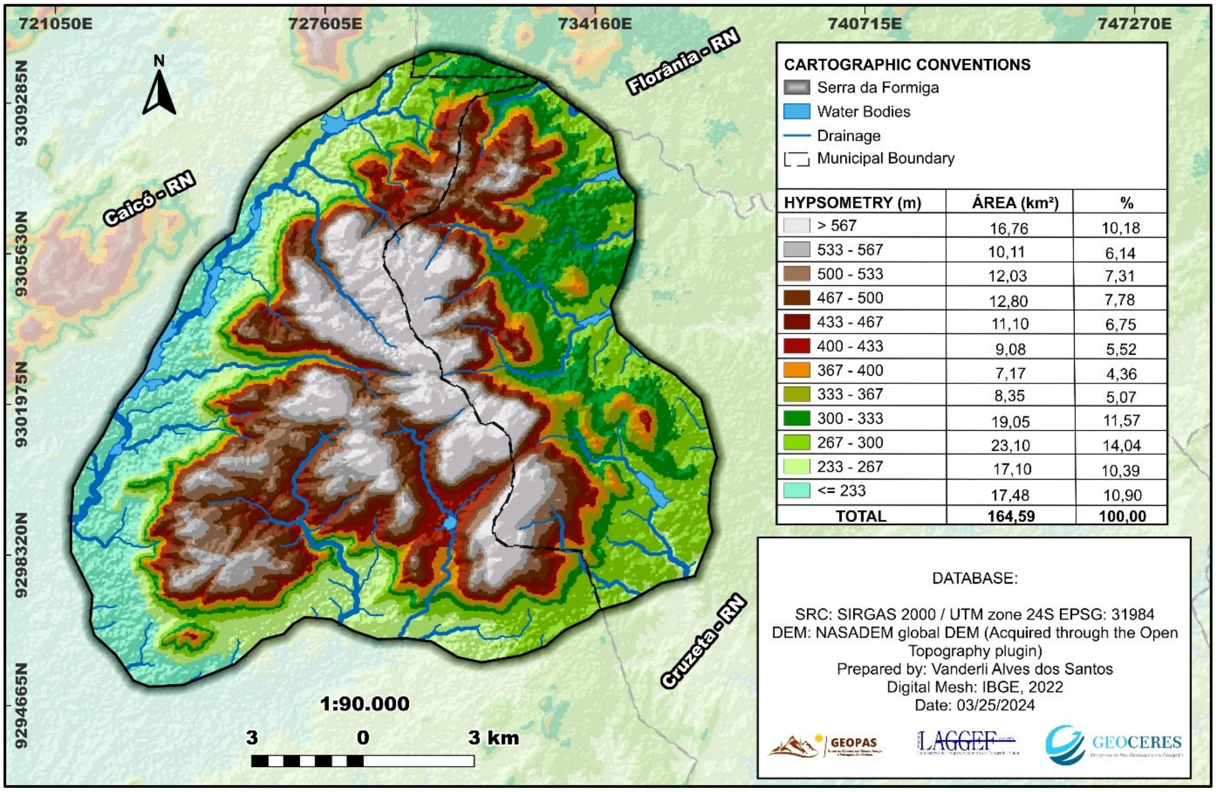

Figure 3 – Hypsometric map of the Serra da Formiga.
Source: Authors (2025).

Analysis of the distribution of altimetric classes reveals that the Serra da Formiga exhibits highly diversified relief, with altitudes ≤233 m and >567 m, totaling an area of 164.59 km² (Fig. 3). Intermediate altimetric ranges between 267 and 500 m concentrate most of the mapped area, corresponding to approximately 70% of the total surface (Fig. 3). These elevations represent gently undulating surfaces and mid-slopes, composing the immediate surroundings of the mountain ranges and transition areas toward adjacent Sertaneja depressions.

Lower altitudes (≤233 m and 233–267 m) occupy about 21% of the total area, mainly corresponding to fluvial plains and terraces associated with drainage valleys. These areas tend to present flat to gently undulating relief and greater potential for agricultural use, although they are vulnerable to erosional processes and siltation. Higher altitudes (>533 m) represent about 16% of the area and are concentrated in the central and southern portions of the Serra da Formiga (Fig. 3). These sectors configure residual summits, ridges, and steep escarpments, which mark the mountainous structure of the relief and reflect lithological control exerted by Caicó Complex rocks (e.g., orthogneisses).

Topographic profiles of the Serra da Formiga, traced in a north–south direction, allow the understanding of altimetric compartmentalization and morphological variations (Fig. 4). Profile A–B, approximately 8 km long, shows rugged relief characterized by elevations exceeding 600 m, interspersed with lower valleys around 350–400 m, suggesting strong structural control associated with fluvial dissection (Fig. 4).

Profile C–D, more extensive at approximately 12 km, reveals the greatest topographic amplitude of the range (Fig. 4). It shows a well-defined mountainous pattern, with successive ridges and depressions, where elevations vary from about 300 m in lower areas to more than 650 m at summits. This behavior evidences the presence of dissected relief typical of crystalline areas, in which erosional and structural processes act intensely, producing a highly complex landscape.

Profile E–F, approximately 9 km long, presents smaller altimetric amplitudes, ranging between 250 and 450 m (Fig. 4). In this segment, the relief appears smoother compared to the other profiles, with predominance of lowered surfaces interspersed with discrete elevations. This pattern suggests areas of lower lithological resistance or greater erosional reworking, configuring a transitional sector of the range toward adjacent plains. The topographic profiles indicate that the Serra da Formiga is composed of strongly dissected relief, with maximum elevations close to 700 m, marked by aligned ridges, incised valleys, and significant slope variations. These aspects reflect both geological structure influence and prolonged action of erosional processes in landscape shaping.

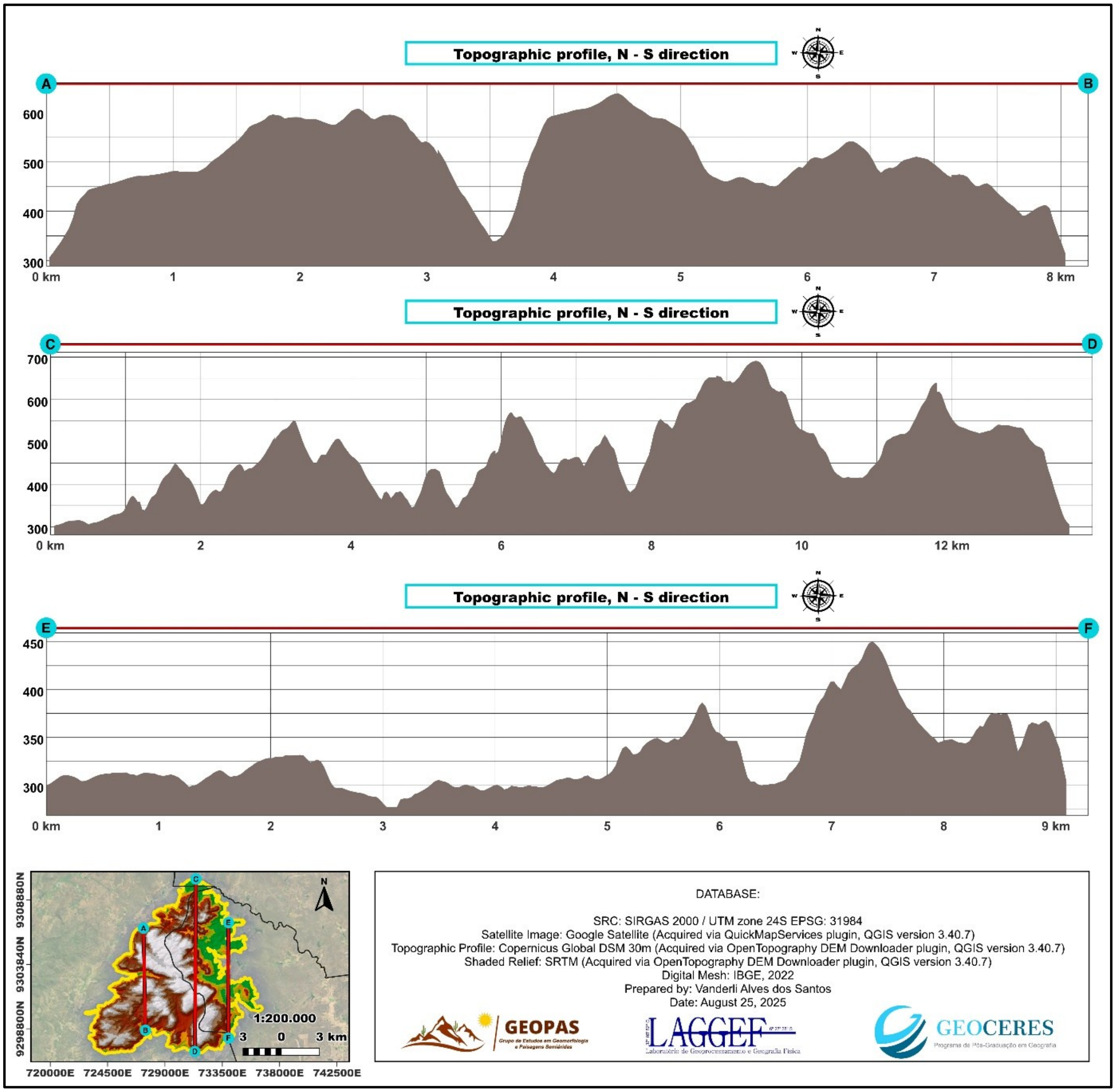

Figure 4 – Topographic profile of the Serra da Formiga.
Source: Authors (2025).

This altitudinal distribution reflects the interaction between geological and geomorphological factors, conferring a diversified landscape to the Serra da Formiga, with potential to influence environmental dynamics and land use in the region. Moreover, altitudinal variations (Fig. 5) may impact local climate and water availability, factors that are crucial for environmental understanding of the area.

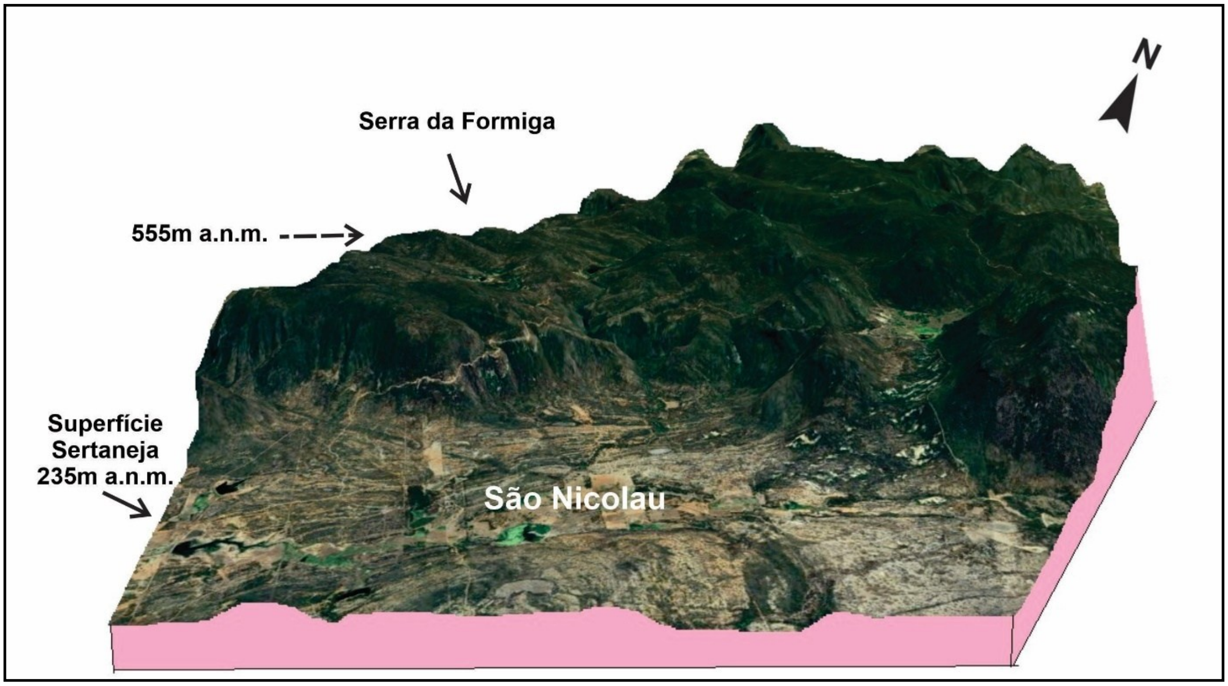

Figure 5 – Block diagram of the Serra da Formiga, showing summit and base elevation ranges near the rural community of São Nicolau (Caicó–RN).
Source: Authors (2025).

3.3. Relief Dissection Index

Application of the Relief Dissection Index (RDI) in the Serra da Formiga reveals predominance of the very strong class, indicating highly compartmentalized relief subjected to intense erosional reworking over time (Fig. 6). Areas of this class, represented in red, cover approximately 114.38 km², corresponding to 69.52% of the total area (Fig. 6). This predominance demonstrates that the Serra da Formiga is characterized by abrupt slopes, incised valleys, and expressive topographic amplitude, typical elements of strongly dissected landscapes in crystalline terrains.

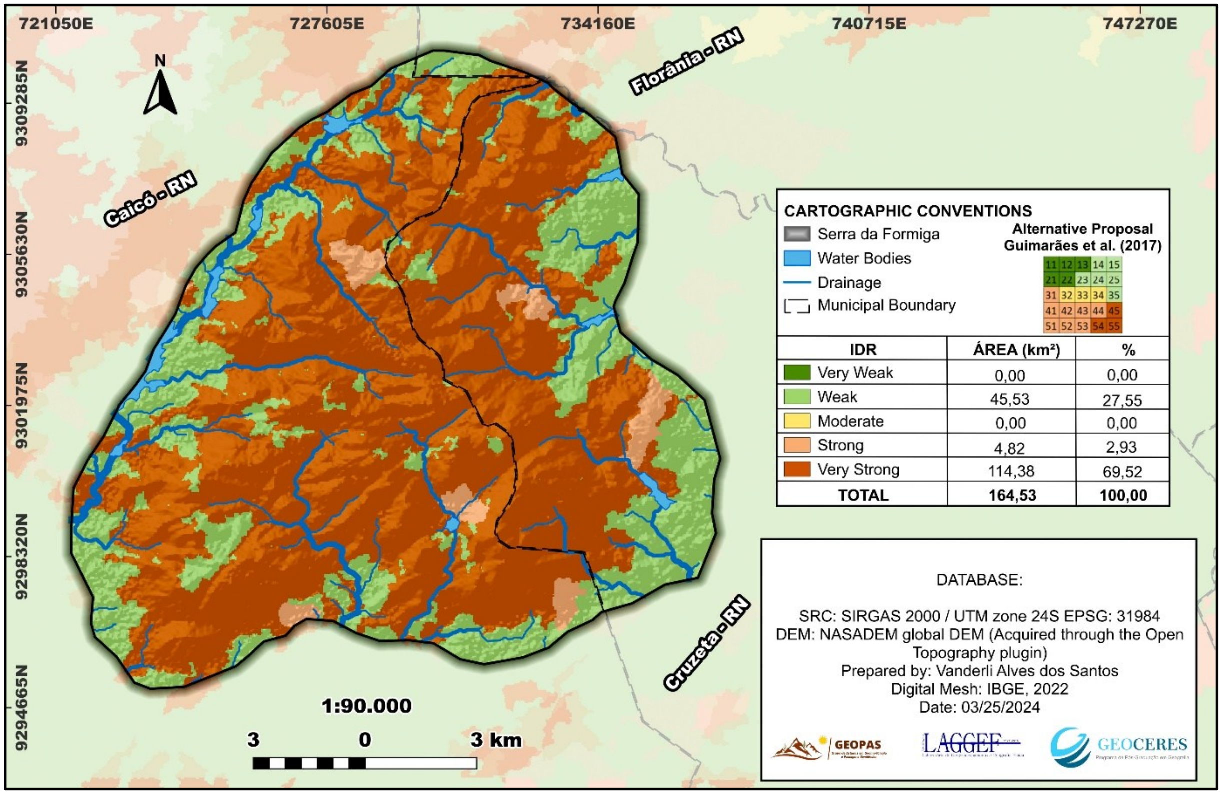

Figure 6 – Map of the Relief Dissection Index of the Serra da Formiga.
Source: Authors (2025).

The strong and weak classes occur in a very restricted manner, occupying respectively 4.82 km² (2.93%) and 45.53 km² (27.55%) of the area (Fig. 6). Strong-class areas are mainly concentrated in transitions between steep slopes and smoother surfaces, configuring intermediate zones of dissection. Weak-class areas are discontinuously distributed in peripheral sectors and smoothed interfluves, corresponding to more stable surfaces less affected by recent erosional processes (Fig. 6). The very weak and moderate classes showed no representativeness in the analyzed area, reinforcing the predominance of abrupt features and the absence of extensive flat or weakly dissected surfaces. This configuration reveals the morphological asymmetry of the Serra da Formiga, where areas strongly shaped by differential erosion and structural dissection associated with crystalline basement lithologies prevail.

The spatial pattern of the RDI confirms the strongly dissected and structurally controlled character of the Serra da Formiga relief. The landscape is dominated by residual forms, escarpments, and steep slopes, indicative of long-term morphogenetic processes under semiarid conditions. These results reinforce the importance of detailed geomorphological studies to support territorial planning and environmental conservation, as areas with a high degree of dissection present greater geotechnical and ecological fragility, requiring appropriate environmental management.

3.4. Slope and relief dissection

The slope map (Fig. 7) highlights the morphological complexity of the Serra da Formiga, characterized by strong topographic contrasts and significant variation in slope gradients. Quantitative analysis indicates predominance of the undulating (8–20%) and strongly undulating (20–45%) classes, which together correspond to 59.80% of the total area (98.36 km²) (Fig. 7). These sectors encompass most slopes and interfluves, indicating dissected relief typical of crystalline areas subjected to intense differential erosion.

Gently undulating areas (3–8%) represent about 24.94% of the area (Fig. 7), mainly located in peripheral portions and transition zones toward Sertaneja surfaces. In these areas, relief is more favorable to occupation and agricultural activities, although still subject to moderate erosional risks. Flat sectors (0–3%), covering 5.37% of the area (Fig. 7), correspond to fluvial plains and terraces, with lower slopes and greater agricultural potential, but also vulnerable to siltation and soil compaction. In contrast, mountainous and escarped classes (slopes >45%) total 9.89% of the area and are concentrated in central and southern portions of the Serra da Formiga (Fig. 7), where the highest elevations and relief breaks occur. It should be noted that these are permanent preservation areas (PPAs). These sectors present abrupt and unstable slopes with strong structural control and constitute areas of severe restriction to direct anthropogenic use, playing an important role in preserving Caatinga vegetation remnants and springs.

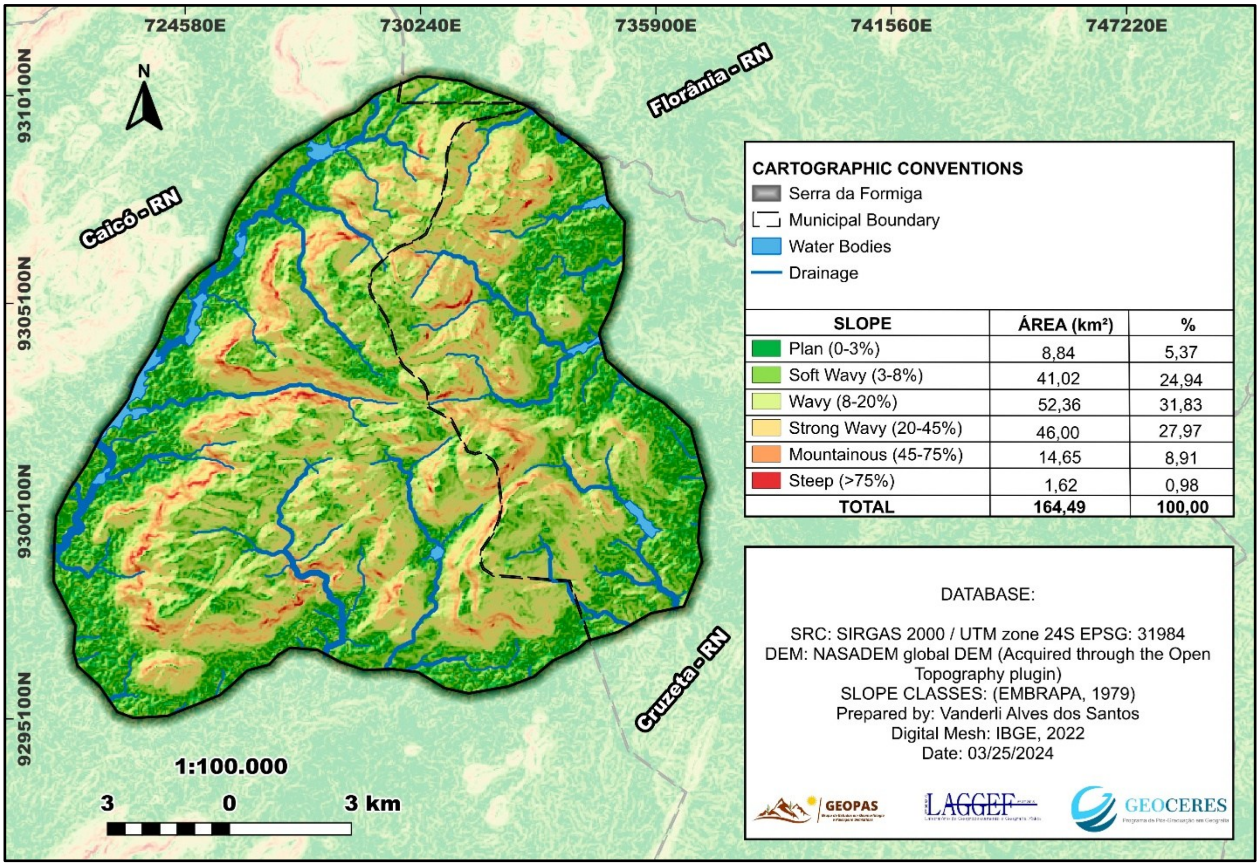

Figure 7 – Slope map of the Serra da Formiga.
Source: Authors (2025).

3.5. Landform units and landscape modeling processes

Five landform units were identified in the study area: (i) fluvial plains and terraces; (ii) inselbergs; (iii) mountain range; (iv) Sertaneja Surface I; and (v) Sertaneja Surface II (Fig. 8). These units evidence a complex landscape resulting from the interaction between structural and denudational processes acting on the crystalline basement of the western sector of the Borborema Plateau.

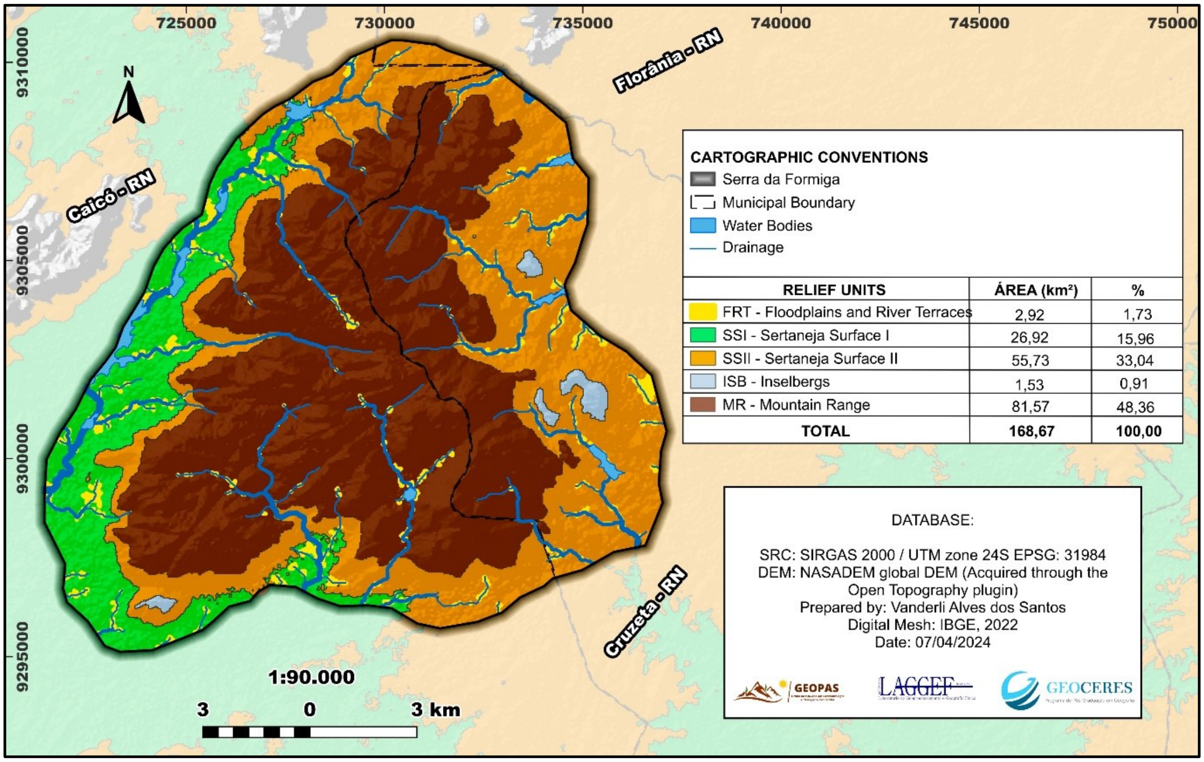

Figure 8 – Geomorphological map of the study area.
Source: Authors (2025).

The mountain range unit constitutes the predominant morphostructural domain, occupying 81.57 km² (48.36%) of the total area (Fig. 8). It presents elevations above 400 m, steep slopes, and abrupt escarpments, and is interpreted as a residual crystalline massif strongly controlled by regional tectonic structures. Aligned ridges and intense dissection indicate relief mainly controlled by fractures, which function as fluid pathways and zones of weakness for differential erosion (COSTA et al., 2020). The escarped features of the Serra da Formiga exhibit slopes between 25° and 45°, V-shaped valleys, and trapezoidal facets associated with fault and fault-line scarps (CRUZ, 1990; PFALTZGRAFF; TORRES, 2010; ROCHA et al., 2011). These morphological elements indicate intense denudational activity in areas of strong structural control.

Differential erosion acting on crystalline rocks, such as gneisses, has shaped slopes and expressive topographic steps, resulting in morphology characterized by sharp summits, abrupt hillslopes, and incised valleys (BRITES; LAPA, 2023). Mountain ranges play an essential role in regional environmental dynamics, influencing microclimates, drainage, and biodiversity. However, they are also ecologically sensitive areas, vulnerable to degradation from mining, urban expansion, and wind energy developments. Preservation of these mountainous environments is strategic both for conservation of montane Caatinga and for maintenance of local ecosystem services (BRITES; LAPA, 2023).

Sertaneja Surface I (15.96%) and Sertaneja Surface II (33.04%) units configure tabular and gently undulating areas situated at intermediate and peripheral elevations of the Serra da Formiga (Fig. 8). SS I represents the oldest planation surface, preserved at higher altimetric levels (250–400 m), while SS II corresponds to lowered levels (50–250 m), more reworked by denudational processes (Fig. 9).

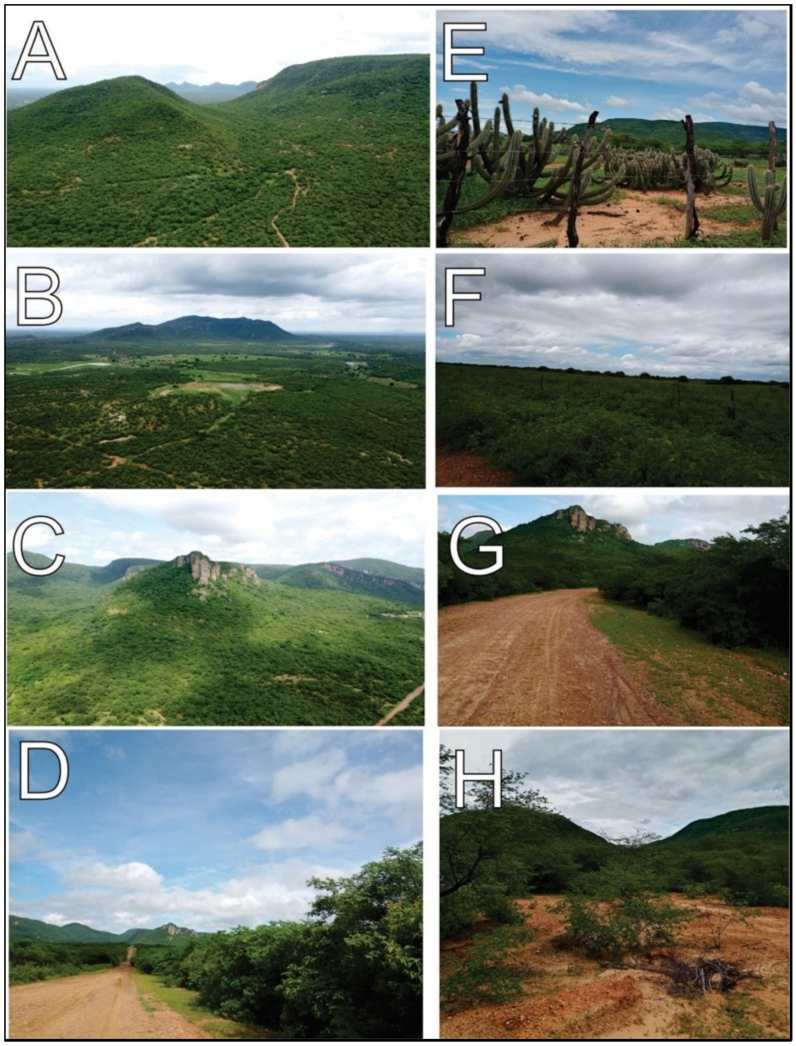

Figure 9 – Representation of landscapes in the study area. Legend: A – gorge (boqueirão) in the Serra da Formiga; B – Sertaneja surface in the foreground with the Serra da Formiga in the background; C – relief with sharp summit and escarped edges with rocky outcrops; D – gently undulating Sertaneja surface with the Serra da Formiga in the background; E – Sertaneja surface in the foreground and flat-topped sector in the background; F – Sertaneja surface; G – access road to the Serra da Formiga near the iron mining area; H – degraded landscape with exposed soil on the Sertaneja surface.
Source: Authors (2025).

These surfaces are remnants of pediplanation processes under semiarid conditions, reflecting long periods of tectonic stability. They are characterized by shallow, stony soils, widespread granitic outcrops, and the occurrence of inselbergs, evidencing an advanced stage of geomorphological landscape evolution (COSTA et al., 2020; SANTOS et al., 2023). The Sertaneja Surface, recognized by IBGE as the Sertaneja Depression, covers about half of the territory of Rio Grande do Norte State and stands out as one of the main geomorphological features of the semiarid region (PFALTZGRAFF; TORRES, 2010). The predominance of flat to gently undulating relief, combined with edaphic vulnerability and irregular rainfall regime, favors desertification processes and requires integrated environmental management to minimize anthropogenic impacts.

Inselbergs, occupying 1.53 km² (0.91%) of the total area (Fig. 8), correspond to isolated rocky elevations resulting from differential erosion of more resistant granites and gneisses (POREMBSKI, 2007; BASTOS et al., 2021). The term, derived from the German inselberg (“island mountain”), was proposed by Bornhardt (1898) to describe abrupt elevations amid planed surfaces. These features reflect differential lithological resistance and long periods of continental denudation under semiarid climate conditions (FREIRE; LIMA, 2015; COVRE, 2018). From an ecological perspective, they constitute unique microenvironments with endemic flora adapted to extreme edaphic conditions, low water availability, and high insolation, being considered biodiversity refuges of high scientific and conservation value (POREMBSKI, 2007).

Fluvial plains and terraces, although representing only 2.92 km² (1.73%) of the total area (Fig. 8), play a relevant role in regional sedimentary and hydrological dynamics (BASTOS et al., 2019; SILVA et al., 2023; ASSIS et al., 2024). These Quaternary depositional forms are composed of unconsolidated alluvial sediments deposited during flood events. Fluvial terraces mark former channel levels raised by incision, sedimentation, and neotectonic processes (ASSIS et al., 2024). Alluvial plains function as areas of recent deposition, frequently subject to periodic flooding. In the semiarid context, accelerated erosion on mountainous slopes feeds these systems with fine sediments, promoting siltation of valleys and reservoirs (SOBRINHO; ROSS, 2007; LIMA et al., 2013; SILVA et al., 2023; OLIVEIRA et al., 2024).

4. Conclusions

The Serra da Formiga and its surroundings configure a complex geomorphological landscape, marked by strong structural compartmentalization and intense erosional processes, resulting in the formation of planed surfaces, residual reliefs, and incised fluvial valleys.

Relief analysis reveals that the current morphology is the product of a long history of differential denudation and lithostructural control, typical of the western sectors of the Borborema Plateau. Steep relief, the presence of escarpments, and shallow soils impose severe restrictions on land use and occupation, but paradoxically favor the preservation of Caatinga vegetation.

The recent expansion of wind energy and mining enterprises in the region represents a potential threat to slope stability, possibly intensifying erosional processes and mass movements. In this context, the need to establish a Conservation Unit in the Serra da Formiga is reinforced, encompassing the dual objective of biodiversity preservation and environmental management of areas susceptible to degradation.

From a scientific perspective, the Serra da Formiga constitutes a privileged natural laboratory for the study of geomorphological evolution of residual crystalline reliefs under semiarid climate conditions, providing relevant elements to understand the morphodynamics of the western ranges sector of the Borborema Plateau and to support sustainable territorial planning strategies in the Seridó Potiguar.

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