

Geoconservation in Latin America and the Caribbean

Maria G.M Garcia ¹, Marcos A.L. Nascimento²

¹ Institute of Geosciences, University of São Paulo, São Paulo, 05580-080, Brazil

² Department of Geology, Federal University of Rio Grande do Norte, Natal, 59078-970, Brazil

The geodiversity of Latin America and the Caribbean (LAC) is linked to the geological evolution of several tectonic units: the South American Platform, the Andean unstable areas (including the Caribbean, Northern, Central, and Southern Andes), and the Patagonian block, as well as terranes related to the North America and Pacific plates. From Argentina and Chile in the south to Mexico in the north, this geodiversity mirrors a geological narrative discernible in rocks that date back to 3.6 Ga, sediments, landforms, fossils, soils, and both tectonic and superficial active processes that give origin to volcanoes and earthquakes, deserts, glacial and mountainous areas. Serving as the abiotic facet of natural diversity, LAC's geodiversity influences the rich biodiversity of the region, as well as cultural, social and economic aspects. Its understanding is then crucial for formulating territorial plans and public policies and establishing effective

mechanisms for environmental conservation with a holistic approach. This is a task achievable only through effective communication with society, which is the role of geoconservation.

In this context, initiatives on the diagnosis, conservation and promotion of geodiversity and geoheritage exist in the region with different levels of development. These differences are explained by factors such as geographical heterogeneities, non-comparable geological knowledge across countries, socioeconomic conditions and level of involvement of the geoscientific community with the theme. In the book "Patrimonio geológico y su conservación en América Latina: Situación y perspectivas nacionales" (in English, "Geological heritage and its conservation in Latin America: National situation and perspectives"), Palacio-Prieto *et al.* (2016) make a panorama of the state-of-

Article information

First Publish Date:2023-12-20

DOI:10.57647/j.gcr.2023.0602.16

How to cite: Garcia MDGM & Nascimento MALD (2023). Geoconservation in Latin America and the Caribbean. *Geoconservation Research*. 6(2): 250-254. <https://doi.org/10.57647/j.gcr.2023.0602.16>

Geoconservation Research e-ISSN: 2588-7343 p-ISSN: 2645-4661

© Author(s) 2023, this article is published with open access at <https://oiccpres.com/geoconservation-research/>



This work is licensed under a Creative Commons Attribution 2.0 Generic License.

the-art of geoconservation in the region, as well as a synthesis of the key events that contributed to the current status.

According to Palacio-Prieto *et al.* (2016), one of the first initiatives was the incorporation of the Araripe Geopark, Brazil, into the Global Geoparks Network, in 2006. Subsequently, in 2008, the Andean Meeting for the Protection of the Geological, Mining, and Paleontological Heritage took place in Loja, Ecuador. The year 2009 witnessed the inception of the Latin American and Caribbean Network for the Protection and Defense of Geological, Mining-Metallurgical, and Paleontological Heritage during the I Latin American Congress on Initiatives in Geotourism in La Asunción, Venezuela. Moving forward to 2010, the landscape of geotourism activities unfolded with the I National Geotourism Congress held in Mérida, Venezuela, and the I Latin American and Caribbean Conference of Geoparks in Juazeiro do Norte, Brazil. The subsequent year, 2011, featured the initiation of the I Symposium on Geoparks and Geotourism in Milipeuco, Chile, alongside the convening of the II National Congress of Geotourism in Yaracuy,

Venezuela. Additionally, the year included the II Latin American and Caribbean Geotourism Congress and the II Latin American Congress of Geoparks held in Rio de Janeiro, Brazil, together with the I Brazilian Symposium on Geological Heritage.

Advancing to 2013, events encompassed the II Latin American Meeting of Geoparks and the inaugural Argentine Symposium on Geological Heritage, in San Martín de Los Andes. In 2015, a significant workshop titled “Geoparks and Geoheritage: Promoting the Geoheritage of Latin America” took place. In 2017, the noteworthy creation of GEO-LAC, the UNESCO Global Geoparks Network for Latin America and the Caribbean (<https://redgeo-lac.com/>), marked a milestone in the continuous development of geopark initiatives in the region. Currently, twelve UNESCO Global Geoparks (UGGp) comprise the network: five in Brazil, two in Mexico, and one each in Nicaragua, Ecuador, Peru, Chile and Uruguay (Fig. 1). Besides these UGGp, there are initiatives in different levels of development, either as aspirants or projects across the countries.



Figure 1. UNESCO Global Geoparks in Latin America and the Caribbean, which are part of the GEOLAC.

Studies on Geoconservation in Latin America and the Caribbean have focused on several aspects, such as the identification, evaluation, and management of geodiversity and geological heritage, topics that have been discussed during these meetings over the years. In this context, the Association of Ibero-American Geology and Mining Services – ASGMI has been making efforts to foster the Geoheritage Map of South America and stimulate systematic inventories of geological sites in the countries, using workshops, discussions and publications, such as the Workshop on Geoheritage, in Villa de Leyva, Colombia, in 2018.

Several countries, or groupings thereof, present significant studies and publications on geoheritage or geoconservation, with notable contributions standing out. Palacio-Prieto (2012) addresses research and education in geodiversity and geoheritage in Mexico. James-Williamson *et al.* (2016) provide insights into protecting geoheritage in the Caribbean, with a special focus on Jamaica. Benado *et al.* (2019) offer a comprehensive analysis of the state of geoconservation in Chile. Also in the same year, Sánchez-Cortez (2019) discusses the conservation of geoheritage in Ecuador, providing an overview of the current situation and prospects. Carrion-Mero *et al.* (2022) conducted an assessment of geodiversity on a regional scale, using Ecuador as a case study. In Cuba, Corvea *et al.* (2020) explore the integration of geoheritage into the management of protected areas. Quesada-Román and Pérez-Umaña (2020) present an overview of the state of geodiversity, geoconservation, and geotourism in Costa Rica. Quesada-Román *et al.* (2022) focus on geodiversity, geoconservation, and geotourism in Central America, while Scammacca *et al.* (2022) assess the geodiversity in French Guiana, highlighting challenges and implications for sustainable planning. Coronato and Schwarz (2022) discuss the approach to geodiversity and geoconservation in Argentina. Manzaneda *et al.* (2022) explored geo-

ethics and the promotion of geoheritage in Peru. Garcia *et al.* (2022a) presented a framework of geoconservation strategies in Brazil, addressing the current status through the analysis of representative case studies, and Garcia *et al.* (2022b) emphasized the promotion of actions to foster geological diversity in Brazil, highlighting initiatives that drive geological diversity in the country. These collective contributions form a comprehensive network of knowledge about the preservation of geological heritage in various regions of Latin America and the Caribbean.

A recent and notable endeavor involves the establishment of a working group dedicated to creating a regional branch of ProGEO (International Association for the Protection of Geological Heritage) in Latin America and the Caribbean in 2022. In the initial phase, two workshops were conducted in 2023, focusing on the LAC geoconservation landscape and the progress of the Geoheritage Map of South America. These workshops mark the first step toward consolidating efforts in inventory management, developing appropriate legal frameworks, and promoting best practices for geodiversity and geological heritage management in the region. The overarching goal is to foster collaborative and coordinated actions among geoconservation experts in the region, aiming for the sustainable development of Latin America and the Caribbean and addressing key socio-environmental challenges within society.

This volume comprises contributions that provide an overview of geoconservation efforts in seven countries within Latin America and the Caribbean, exploring various aspects and developmental perspectives. Topics covered include Geotourism, such as its connection to public policies in Argentina (Coronato and Schwarz), and specific case studies like the Sumaco Volcano in Ecuador (Sánchez-Cortez *et al.*). The papers also address the identification and assessment of geological

sites, such as the amethyst deposits in Uruguay's Los Catalanes Gemological District (Goso and Faraone), Poás Volcano National Park in Costa Rica (Pérez-Umaña), and the Eastern Colombian region (Betancurth *et al.*). Additionally, the geological heritage of the Ñandeyvytykuera Geopark Project in Paraguay is explored (Salinas *et al.*). In Brazil, Fernandes *et al.* present a panorama of Geoconservation initiatives in the State of Paraná, while Lima and Garcia discuss the contributions of geodiversity to local communities in the State of Amazonas.

This publication aims to showcase initiatives in geoconservation across Latin America and the Caribbean, emphasizing local and national perspectives. Despite the limited number, the papers explore a broad spectrum of abiotic nature conservation issues, providing insights into the current state of regional studies. Our goal is to catalyze future actions and research collaborations within the geoscientific community and society.

References

- Benado J, Hervé F, Schilling M, Brilha J (2019). Geoconservation in Chile: State of the Art and Analysis. *Geoheritage* .11: 793–807. <https://doi.org/10.1007/s12371-018-0330-z>
- Manzaneda CJ, Villacorta Chambi SP, Toledo Gutierrez C (2022). Geoethics and the Promotion of Geoheritage in Peru. In Villacorta Chambi SP (eds) *Geoethics in Peru*. Springer-Briefs in Geoethics. Springer, Cham. https://doi.org/10.1007/978-3-030-86731-7_6
- Carrion-Mero P, Duenas-Tovar J, Jaya-Montalvo M, Berrezueta E, Jimenez-Orellana N (2022). Geodiversity assessment to regional scale: Ecuador as a case study. *Environmental Science & Policy*. 136 (167-186). <https://doi.org/10.1016/j.envsci.2022.06.009>
- Coronato A, Schwarz S (2022). Approaching geodiversity and geoconservation in Argentina. *International Journal of Geoheritage and Parks*. 10(4):597-615. <https://doi.org/10.1016/j.ijgeop.2022.08.011>
- Corvea JL, Gutiérrez R, Pascual JA, De Bustamante I, Blanco A (2020). Geoheritage Integration in the Management of the Cuban Protected Areas. *Geoheritage*. 12 (3). <https://doi.org/10.1007/s12371-020-00491-2>
- Garcia MG, Nascimento MAL., Mansur KL, Pereira RGFA (2022a). Geoconservation strategies framework in Brazil: Current status from the analysis of representative case studies. *Environmental Science & Policy*. 128:194-207. <https://doi.org/10.1016/j.envsci.2021.11.006>
- Garcia MGM, Queiroz DS, Mucivuna VC, Moura P (2022b). Geological diversity fostering actions in geoconservation: An overview of Brazil. *International Journal of Geoheritage and Parks*, 10(4):507-522. <https://doi.org/10.1016/j.ijgeop.2022.08.008>
- James-Williamson SA, Aratram M, Green PE (2017). Protecting Geoheritage in the Caribbean—Insights from Jamaica. *Geoheritage*. 9, 195–209. <https://doi.org/10.1007/s12371-016-0195-y>
- Palacio-Prieto JL (2012). Geodiversity and geoheritage research and education in Mexico. EGU General Assembly, Vienna, Austria.
- Palacio-Prieto JL, Sánchez Cortez JL, Schilling ME (2016). Patrimonio geológico y su conservación en América Latina. Situación y perspectivas nacionales. México. Instituto de Geografía, Universidad Nacional Autónoma de México.. Access in: <http://www.publicaciones.igg.unam.mx/index.php/ig/catalog/book/77>
- Quesada-Román A, Pérez-Umaña D(2020). State of the Art of Geodiversity, Geoconservation, and Geotourism in Costa Rica. *Geosciences*. 10(6): 211. <https://doi.org/10.3390/geosciences10060211>

Quesada-Román A, Torres-Bernhard L, Ruiz-Álvarez M.A, Rodríguez-Maradiaga M, Velázquez-Espinoza G, Espinosa-Vega C, Toral J, Rodríguez-Bolaños H (2022). Geodiversity, Geoconservation, and Geotourism in Central America. *Land*, 11, 48. <https://doi.org/10.3390/land11010048>

Sánchez-Cortez JL (2019). Conservation of geoheritage in Ecuador: Situation and perspectives. *International Journal of Geoheritage and Parks*. 7(2):91-101. <https://doi.org/10.1016/j.ijgeop.2019.06.002>

Scammacca O, Bétard F, Aertgeerts G, Heuret A, Fermet-Quinet N, Montagne D (2022). Geodiversity Assessment of French Guiana: Challenges and Implications for Sustainable Land Planning. *Geoheritage*. 14 (3): .83. <https://doi.org/10.1007/s12371-022-00716-6>