
Physical geography in the context of global environmental changes: new challenges and perspectives

La geografía física en el contexto de los cambios ambientales globales: nuevos desafíos y perspectivas

A Geografia física no contexto das mudanças ambientais globais: novos desafios e perspectivas

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Abstract

The dossier presented here is part of the selection of some of the articles evaluated by the Scientific Committee of the XX Brazilian Symposium on Applied Physical Geography and the IV Luso-Afro-American Meeting on Physical Geography and Environment, designed to promote debate and dissemination of scientific knowledge produced in the field of Physical Geography, Afro-American and European. The selected research debates emerging themes in the current global context with great relevance to contemporary society, covering the advances of geographical science, as well as its research in the context of the Relationship between Society and Nature and the use of techniques and technologies aimed at different applications of geography, the promotion of resilient cities and the improvement of goals to achieve the 17 Sustainable Development Goals - SDGs, advocated by the United Nations for the 21st Century.

Keywords: epistemology of geography, dossier, physical geography, SDG, capitalocene

Resumen

El dossier aquí presentado forma parte de la selección de algunos de los artículos evaluados por el Comité Científico del XX Simposio Brasileño de Geografía Física Aplicada (SBGFA) y del IV

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Encuentro Luso Afroamericano sobre Geografía Física y Ambiente (ELAAGFA), destinado a promover el debate y difusión del conocimiento científico producido en el ámbito de la Geografía Física, afroamericana y europea. La investigación seleccionada discute temas emergentes en la situación global actual de gran relevancia para la sociedad contemporánea, abarcando avances en las ciencias geográficas, así como investigaciones en el contexto de la Relación entre Sociedad y Naturaleza y el uso de técnicas y tecnologías orientadas a diferentes aplicabilidades de geografía, promoviendo ciudades resilientes y mejorando metas para alcanzar los 17 Objetivos de Desarrollo Sostenible - ODS, recomendados por las Naciones Unidas para el Siglo XXI

Palabras clave: epistemología de la geografía; dossier; geografía física; ODS; capitaloceno.

Resumo

O dossiê apresentado aqui faz parte da seleção de alguns dos artigos avaliados pela Comissão Científica do XX Simpósio Brasileiro de Geografia Física Aplicada (SBGFA) e do IV encontro Luso Afro-Americano de Geografia Física e Ambiente (ELAAGFA), concebido para promover o debate e divulgação do conhecimento científico produzido no âmbito da Geografia Física, Afro-Americana e europeia. As pesquisas selecionadas debate temas emergentes na atual conjuntura mundial com grande relevância para a sociedade contemporânea, abarcando os avanços da ciência geográfica, bem como de suas pesquisas no contexto da Relação Sociedade e Natureza e no emprego das técnicas e tecnologias voltadas para diferentes aplicabilidades da geografia, da promoção de cidades resilientes e do aprimoramento das metas para alcançar os 17 Objetivos do Desenvolvimento Sustentável - ODS, preconizados pela Organização das Nações Unidas para o Século XXI.

Palavras-chave: epistemologia da geografia; dossiê; geografia física; ODS; capitaloceno.

Introduction

The Brazilian Symposium on Applied Physical Geography, in conjunction with the 4th Luso-Afro-American Meeting on Physical Geography and the Environment-2024, was structured into thirteen thematic axes, aiming to deepen the debate on geographic science with an emphasis on environmental issues, such as climate change, the Anthropocene x Capitalocene, and emerging environmental issues in contemporary society. The research presented here falls within the multi-scale dimension of geography, encompassing studies and research on national and international scales. Such studies and research were carried out in an integrated

manner with the local and global, taking into account the inter-scalarity of the processes and their insertion in the totality-world. The Symposium is an international event that in 2024 had inherent contributions to Geography as a science, emphasizing the development of research in physical geography, the teaching of geography in its different specialties such as Biogeography, Climatology, Geomorphology, Hydrogeography, Geotechnologies, Pedology, which are applied to contribute to the solution of different problems in Society. The main objective of this event is to establish itself as a privileged forum for the discussion of issues related to Physical Geography and the Environment, bringing together African, European and American researchers, under the theme “Physical Geography and the Environment in Portuguese-Speaking Countries in the Context of Global Environmental Changes: new challenges and perspectives” (Bento-Gonçalves, et. al 2024).

A relevant issue is the aspects of environmental changes that the studies presented at the event and published here help to understand. With emphasis on geography and paleoenvironmental studies. In geography, paleoenvironmental studies have been widely developed, especially in the field of Quaternary geomorphology and pedology and related sciences. These studies contribute substantially to the prognosis of the environmental conditions of areas, since it is important to know their past and evolution.

At Symposium, this discussion is essential, as it is urgent to present to the scientific community new discussions on the intersection between geography and other disciplines such as paleoecology, paleoethnobotany, archaeology and paleoclimatology, to support new research, as well as the management, handling and conservation of natural landscapes and/or geosites and cultural sites. (Calegari; Carvalho, 2024)

Another relevant issue highlighted is the study of socio-environmental risks and vulnerabilities; it is noted that in recent years, these studies have advanced within the scope of geographic science. It even permeates the area of Physical

Geography, as it presents itself as a multidisciplinary and transdisciplinary field. In Geography, especially, contributions have been made in the area of society-nature relations, which is typical and inherent to this science. In this sense, new data, new discussions and advances in the study of disasters and their relations with extreme events arising from global climate and environmental changes were presented (Almeida; Falcão, 2024).

Geography and its epistemologies in the context of global environmental changes and the relationship between society and nature.

De um modo geral, a compreensão da epistemologia da Geografia parte, do entendimento de seu objeto de estudo. Isso porque o que justamente confere um teor científico a uma dada ciência é a existência de um objeto que lhe seja particular (Cavalcante; Lima, 2018). Do ponto de vista do avanço epistemológico, pode se dizer que a geografia abdicou por um longo período da discussão sobre natureza e sociedade e das questões ambientais emergentes em nome uma tentativa de purificação do método para a análise espacial.

Dizer que existe uma relação homem e natureza, no sentido lato é manter a dualidade Sociedade e natureza, é manter “res extensa e o res cogitans” do plano teórico cartesiano, uma vez que as relações entre seres humanos são também relações da natureza. Assim, no contexto epistemológico é possível afirmar que a apropriação do espaço e da natureza bem como os diversos usos pelas forças produtivas, produz natureza gerando riscos e vulnerabilidades para uma parcela da população especialmente aquelas populações que residem em cidades fornecedoras de espaços produtivos voltados para o capital e para o desenvolvimento (Rocha, 2023).

In general, understanding the epistemology of Geography starts with understanding its object of study. This is because what gives a given science a scientific content is the existence of an object that is particular to it (Cavalcante; Lima,

2018). From the point of view of epistemological advancement, it can be said that geography has for a long time given up on the discussion of nature and society and emerging environmental issues in the name of an attempt to purify the method for spatial analysis.

To say that there is a relationship between man and nature, in the broad sense, is to maintain the duality between society and nature, it is to maintain “*res extensa* and *res cogitans*” of the Cartesian theoretical plane, since the relationships between human beings are also relationships of nature. Thus, in the epistemological context, it is possible to affirm that the appropriation of space and nature, as well as the various uses by productive forces, produces nature that generates risks and vulnerabilities for a portion of the population, especially those populations that reside in cities that provide productive spaces aimed at capital and development (Rocha, 2023).

For Suertegaray (2005 p. 7), Epistemology has assumed significant importance for some decades; its importance is associated with our contemporary world. Nowadays, science is the driving force behind technology; today's society is based on scientific knowledge, technical or instrumental knowledge, and, because of this, the epistemological discussion emerges.

The author states that there is a need to deepen the understanding of knowledge and, in this context, geographic knowledge, to know how science is done, what it is for and who it serves. This concern promotes interest in science and it becomes the object of study of different disciplines, and in particular geographic knowledge (Suertegaray 2005).

Vitte (2006), analyzing the epistemological origin of physical geography, states that Kantian metaphysics of nature had a great influence on the development of modern geographical thought. Vitte points out that the structuring of modern geography arises from a strong influence of the philosophical debate on the metaphysics of nature and advances to Kantian reflections. This Kantian metaphysics promoted the conceptual dualism of Nature that geographical science has not been

able to shake off to this day. For Smith (1988), throughout the 19th and 20th centuries, the dualism about the concept of nature inherent to Kant crystallized in the backbone of the bourgeois ideology about the concept of nature and still remains in the theoretical analyses of geography today. In this context, Porto Gonçalves (2002) points out that the “universality sought by modern thought was achieved by abandoning the concrete geographic space of each day, a place where diversity coexists, where different qualities cohabit” in order to mathematically abstract a type of idealized world where these qualities are suspended, just as thought is separated from matter.

In another analysis of this geographic perspective, Porto-Gonçalves (2012) states that in the natural climatic-botanical domains that were formed since the end of the last glaciation, evolving into the current geographies, the native populations developed a rich body of knowledge built in a relationship with and not against nature, such as biological megadiversity. This megadiversity is represented by the Amazon in its entirety, by the Atlantic Forest, by the Caatinga and by the Brazilian Cerrados. This knowledge produced by the native societies of America could and should be incorporated into the epistemic set of geography.

It can be said that Geography currently has a very diverse and sophisticated conceptual arsenal. For (Souza, 2022, p. 1) this diversity can be perceived in Human Geography, with older concepts such as the concept of region, or with a very broad application, such as territory and place. In this context, Souza (2022) states that at the same time that new concepts gained importance such as geographic networks, there was an increase in the plethora of specific concepts, originating or not from the discipline itself, such as: central location, metropolis, megalopolis, medium-sized city, global city, city-region, gentrification, urban reform, agrarian structure, agrosystem, agrarian reform, agroindustry, agribusiness, agroecology. In physical geography, Souza (2022) highlights the increase in the range of more comprehensive geographic concepts such as: ecosystem, geosystem, biome, morphoclimatic

domains, moving towards more specific ones with emphasis on erosion processes, weathering, landslides, colluvium, cuesta, inselberg, folding, hydrographic basin, cyclone, anticyclone, heat islands, warming, ecotone, sandblasting, environmental damage and many other concepts that are widely studied in the context of geographic science today and many of them were addressed in the debates and articles published here.

Geography and environment at the Brazilian Symposium on Applied Physical Geography

Analyzing the Symposium presentations, axis 1, called Geomorphology in the context of environmental changes, stands out: new theoretical, technological and application advances. It was evident that in the current context of geography, especially geomorphology, much research has been done on new technologies and applications that can help solve environmental problems. In the meantime, important theoretical discussions are also urgently needed to help develop the theoretical-methodological aspects of Geomorphology, especially regarding the emergence of not only new analysis techniques, but also the framework of its main guiding theories (Rodrigues; Nazar 2024).

Another highlight was the study of climate in geography; this axis addressed topics of geographic climatology: climate change, extreme events and their impacts on society. In this context, the study of heat islands in the context of urban climate, the role of dynamic climatology in understanding large climate systems in their interscalarity and the recurrence of extreme events in the face of these changes are highlighted. (Nóbrega; Cabral Junior, 2024).

Integrated studies of hydrogeography and river basins are also highlighted, detailing new approaches to the study of water resources. Hydrogeography addresses issues related to water and water resources, with regard to the hydrological survey of qualitative dynamics and reserves of surface and

underground water bodies, as well as access to potable water and demands of productive activities.

In the context of environmental changes, one of the most impacted resources is water, especially in arid and semiarid regions of the world, where, linked to the physical-natural and environmental issue, it already predisposes them to physical scarcity, pollution and chemical unavailability, also resulting from poor management of water resources. Therefore, the aim of this axis is to discuss new possibilities for approaches in the field of Hydrogeography, especially those linked to the study of river basins and aquifers. (Peixoto; Santos 2024)

Final considerations

In the current context, it is clear that the interest of social sciences, especially geography and geographers, in the issue of understanding nature and the risks posed by the appropriation of this nature through the production of social spaces has had a significant impact on the development of a more robust philosophical and epistemological basis on the subject, especially for themes that constitute geographical science (Rocha 2023). In this sense, when geographers say space, this also means nature, since all social relations are spatial relations, they are relations within the web of life and the web of life is nature materializing itself in the socio-spatial context (Moore, 2015, p.11). For the author, socio-spatial relations develop through nature. All species “construct” environments — they are “ecosystem engineers”. But some engineers are more powerful than others. Humans have been especially powerful in this production of ecosystems and, therefore, in the production of nature. In the themes addressed by the XX SBGFA, it became clear that there is an attempt to overcome dual metaphysics in favor of a more comprehensive geographical science, without, however, losing the particularities of each of the categories of analysis that guide the research in the list of physical geography themes

presented here and in the various other works presented at the symposium but which could not be included in this dossier.

It is also clear that there is a very strong tendency in physical geography to use technologies on an increasingly comprehensive scale, as well as the dissemination of research that focuses on global environmental changes as central themes in the environmental analysis carried out by geography as a science.

Finally, it can be said that the current environmental problems, centered on climate change and its risks and damages, are not only an environmental issue, but also a social and economic issue, whose consumerist matrix on a global scale promotes unequal social development, as well as producing an equally unequal space.

This capital-ocean logic is also the logic that guides studies on climate change. We believe that geography as a science should expand its contribution more actively to this global, complex and obstacle-filled debate. We believe that geostrategies already exist, both in the theoretical basis that geographic science possesses and in the conceptual contributions of the categories of analysis that geography has built over the centuries of its existence.

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