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Article

Scientific and theoretical foundations of the formation of views on the concept of geographic environment

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Abstract: The geographical environment is a fundamental concept in geography that provides the theoretical basis for understanding interactions between natural and human systems. However, inconsistent definitions of its structure, boundaries, and methodological foundations continue to limit its theoretical coherence and interdisciplinary application in addressing contemporary environmental challenges. This study aims to examine the historical evolution of the geographical environment concept, critically evaluate the principal theoretical approaches developed by different geographical schools, identify the key methodological challenges associated with its interpretation, and develop an updated conceptual model reflecting its natural-social characteristics. The research employs historical-geographical and comparative analyses, qualitative content analysis, and structural-functional conceptual modeling to synthesize existing theoretical perspectives and establish a comprehensive conceptual framework. The findings demonstrate that the geographical environment should be understood as a dynamic, integrated natural-social system continuously shaped by reciprocal interactions between environmental processes and anthropogenic activities operating across multiple spatial and temporal scales. The analysis identifies persistent theoretical ambiguities regarding the definition and scope of the concept and highlights the importance of integrating perspectives from geography, ecology, sociology, economics, and environmental sciences to strengthen interdisciplinary research on coupled human–environment systems. Based on these findings, an updated theoretical model is proposed that illustrates the transition from a static perception of nature to a co-evolutionary framework emphasizing the mutual interdependence of society and the biosphere. The proposed framework provides a robust theoretical foundation for interdisciplinary geographical research and offers practical guidance for sustainable regional development, environmental management, spatial planning, ecosystem conservation, and evidence-based decision-making in response to increasing anthropogenic pressure and global environmental change.

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1 Introduction

The global challenges facing humanity today—such as climate change, the depletion of natural resources, and increasing human pressure—require a reevaluation of the "human-nature-society" system at the international level. The 2030 Agenda for Sustainable Development, adopted by the United Nations (UN), and UNESCO's strategic initiatives on environmental protection have established the preservation of the planet's ecological integrity as a global priority. In these documents, a scientifically grounded

understanding of the interrelationship between natural systems and social development is presented as a guarantee of a sustainable future. In this global context, modern geographical science stands out as a complex interplay of various disciplines in which knowledge and perceptions of the natural environment converge (United Nations, 2015).

Modern geography is a complex interplay of various sciences and disciplines in which knowledge and perceptions of the natural environment are interwoven (Abdullaev & Islomov, 2016). One of the fundamental concepts of modern geography is the geographical environment; this concept expresses a specific set of general and essential characteristics of an object (Shalnev & Degtyareva, 2011), which is viewed as a dynamic environment divided into countless individual elements that shape the natural conditions of society's existence (Stozhok, 2011). The concept of the "geographical environment" was initially viewed solely as part of the geographical envelope, but later became an established and essential foundation of social life, coming to encompass productive, economic, and social infrastructure components. This concept is approached from a unique perspective in each field of science. Since it is philosophically considered insufficient to view the geographical environment solely as a natural category, some scholars have proposed abandoning the use of this concept to avoid contradictions (Cherkashin, 2021).

Debates over the concept of the geographical environment continue, and this term is still perceived as a concept that has not received full theoretical justification. For example, while some view the geographical environment as a concept reflecting the interaction of social and natural laws, others reject the legitimacy of including humans in the geographical environment, arguing that "humans play the role of 'masters' in their interaction with nature" (Fedyunina, 2012). In the works of many renowned geographers, the geographical environment is regarded as the unifying principle of geographical research. Even in the early stages of the Siberian School of Geography's development, scholars considered the study of the geographical environment and the development of scientific foundations for its comprehensive use to be the primary subject of geography. They believed that the geography of the future was a science "specializing in and focused on the study of the environment of human society, primarily the natural environment" (Cherkashin, 2020).

The issue of the interaction between society and nature has become one of the pressing issues of our time. It is impossible to analyze the relationship between humans and nature without examining concepts such as "geographical environment," "environment," "biosphere," and "noosphere," as well as their interrelationships (Volkov, 2010). Human dependence on the nature surrounding them—or, more precisely, on the geographical environment—has never been disputed, although the degree of this dependence has been assessed differently by various scholars (Andreev, 2009). Thus, some scholars view the geographical environment as part of the geographical envelope that has been subjected to human development, integrated into the production process, and constituting the material basis of society's existence. Due to changes in society and the world, the concept of the geographical environment in the modern world is characterized not only by a multitude of different interpretations but also by its interdisciplinary nature. This concept is gradually moving beyond the scope of classical geography and finding wide application in other fields of science. It is noted that global environmental degradation is also intensifying. However, the pace of measures aimed at environmental protection clearly lags behind this process. In one of their papers, American scholars write: "The question is whether the geographical environment is part of the economy or, conversely, whether the economy is part of the geographical environment?" (Kirvel, 2009; Gorbunov, 2013).

Contemporary research has yet to fully elucidate the complete structure and dynamics of the geographical environment. Previous studies have failed to fully describe the interaction between natural and social factors and have reached differing conclusions when assessing human impact on the geographical environment. It can be said that, at present, there is no comprehensive study of the impact of society's economic activities on the geographical environment and their effects on natural systems, nor of the long-term ecological and geographical consequences of anthropogenic changes.

As the geographical sciences become increasingly integrated and converge around the unified subject of the geographical environment, it is becoming increasingly difficult to reconcile physical geography with the natural sciences, and economic geography with the social sciences and, more broadly, with the traditional classification of sciences, which no longer meets contemporary requirements. Solving complex geographical problems requires drawing on knowledge from other sciences to achieve a comprehensive understanding of territorial systems, but the use of such data and knowledge leads to a loss of the geographical uniqueness of the research (Cherkashin, 2020). It is therefore crucial to foster a shared understanding of the concept of the "geographical environment" among scholars in other fields. The aim of this study is to address the shortcomings of current research through a comprehensive analysis of the structure and dynamics of the geographical environment. The study aims to clearly describe the interaction between social and natural factors, assess the long-term ecological and geographical consequences of anthropogenic changes, and examine changes in the geographical environment using a combination of interdisciplinary approaches. The results obtained during the study provide a deeper understanding of the connections between the natural and social components of the geographical environment.

2 Materials and methods

This article draws on several scholarly sources and methods to define the concept of the geographical environment. The literature review examined the works of leading scholars who have studied the term "geographical environment." Their work, in turn, was based on many years of research that enabled them to view the geographical environment as a dynamic system comprising numerous components of the natural and social environments. The research material for this article is based on the scientific works of the classics of geographical science — Reclus (1986), Mechnikov (1995), Baransky (1956), Pletnikov (1971), Kalesnik (1970), Saushkin (1973), and other scholars who studied the formation of the concept of the geographical environment. The study of the modern geographical environment is closely linked to contemporary social, economic, and environmental trends, as the expansion of human activities, urbanization, climate change, and technological development have a significant impact on the structure of the geographical environment and its relationship with ecosystems.

Currently, Fedyunina (2012), Shalnev & Degtyareva (2011), Abdullaev & Islomov (2016), Borankulova & Murzinova (2018), Kirvel (2009) and Andreev (2009) are studying issues related to the geographical environment. Their works extensively examine the interaction between humans and nature, the influence of natural and social factors, as well as methods for managing and effectively utilizing the geographical environment. For example, in her work "The Geographical Environment and Social Development", Fedyunina (2012) examines several interesting theories that address issues related to the environment's influence on humans. These theories include geographical nihilism, possibilism, geographical probabilism, environmentalism, environmental conservationism, historical materialism, and geographical determinism. These theories vividly demonstrate the influence of the geographical environment on human behavior, material life, and culture, which proves the multifaceted nature of the concept of the geographical environment.

During the course of the study, methods of description, comparison, systematic analysis, selection, and differentiation of necessary data were employed, as well as the synthesis and analysis of various scientific approaches to the research topic. This allowed for a comprehensive examination of the research object and the identification of key trends and interrelationships between the geographical environment and society.

3 Results and discussion

The original meaning of the concept of "geographical environment" is viewed as a natural component (Fedyunina, 2012). For example, the works of certain thinkers of the Ancient East, particularly ancient philosophers and historians (Aristotle, Hippocrates, and others), contain interesting observations on the role of the geographical environment. Since historiography played an important role in ancient societies,

and the first elements of political science, political economy, and social philosophy were beginning to take shape, the attention of ancient authors to the problem of the conditioning of social phenomena by the geographical environment was a natural phenomenon.

In the Middle Ages, Arab and Chinese scholars paid particular attention to the issue of the geographical environment. Among them, Ibn Khaldun (1332–1406) holds a special place. He explained the differences in the way of life, psychological makeup, behavior, and customs of various tribes and peoples by the natural, particularly climatic, conditions in which they lived.

The systematic development of the concept of the "geographical environment" began in the 18th century. Jean-Jacques Rousseau (1712–1778) developed the theory of "natural man" (the savage), who lives in harmony with nature, believing that civilization would have a negative impact on human society. Enlightenment scholars who studied the historical stages of economic development, the evolution of material culture, crafts, progress, and other issues also attached great importance to the role of climate, soil, natural transportation routes, and other factors. The 18th century also saw the emergence of stage-based theories of human economic development: these examined the stages of transition from hunting and gathering to animal husbandry, from there to agriculture, and then to trade and industry. The most famous foundational work examining the interrelationship between geographical and socio-political factors is Charles Montesquieu's (1689–1755) "The Spirit of the Laws", which laid the groundwork for the theory of geographical determinism. According to the author, certain climatic and geographical conditions influence the structure of the state, shaping the country's legislation and the behavior of its population.

This concept was definitively established in science at the end of the 19th century through the works of Reclus (1986) and Mechnikov (1995). Émile Reclus viewed the concept of the "geographical environment" not only as "pure" nature, but also as something closely linked to social elements. His fundamental principle is the assertion that life is in complete harmony with the environment. In this regard, the scholar sought the origins of civilization in the context of human adaptation to the natural environment. His historical-cultural concept is based on the study of the static and dynamic properties of the geographical environment. Here, the static environment represents the influence of the geographical environment in space, while the dynamic environment represents the study of its influence over time (Odintsev, 2006; Grinin, 2011).

In the modern period, Kotlyakov noted that the geographical shell has not been preserved in its original natural state. Currently, the term introduced by Shalnev and Degtyareva (2011) is considered more accurate and comprehensive. According to Shalnev's definition: "The geographical environment is a system of aggregate and unique properties of individual spherical and territorial formations in geospace, constituting a part of the universe of the material world, the Solar System, and the planet Earth. Its characteristics manifest as an invariant system that stabilizes the human habitat through constant object-oriented and subject-object relationships within specific geospatial structures" (Fedyunina, 2012).

Thus, the development of the concept of the "geographical environment" has undergone a long historical evolution, from the first observations of ancient philosophers regarding the interconnection between nature and society to modern comprehensive scientific concepts. Each historical period expanded the scope of this understanding and contributed to a deeper explanation of the interaction between humans and the natural environment. The main stages of this development are presented in Table 1.

Table 1. Stages in the Development of the Concept of Geographical Environment

Period	Description	Representatives
Ancient Period	Ancient authors noted that the environment, particularly the climate, influences the physical characteristics of peoples, their customs and behavior, the level of development and political structures of society, types of economic activity, and population size.	Aristotle (384–322 BCE), Polybius (200–120 BCE), Posidonius (135–51 BCE), Strabo (64/63 BCE–23/24 CE), Hippocrates (460–370 BCE), and Vitruvius (1st century BCE).

Table 1. (Continued)

Period	Description	Representatives
Middle Ages	In the Middle Ages, very little attention was paid to the role of the geographical environment due to the predominance of theological interpretations of history.	Isidore of Seville (560–636), Ibn Battuta (1304–1377), Ibn Khaldun (1332–1406).
Mid-17th to 19th Centuries	Seventeenth-century thinkers sought general social laws analogous to those of physics and geometry, without developing comprehensive theories on the influence of the geographical environment. In the 19th century, philosophers and historians with a philosophical orientation abandoned the search for immutable foundations of human nature and turned to studying the historical roots of the phenomena of their time, as well as the causes that contributed to the organic and systematic development of society.	Carl Ritter (1779–1859), Lev Mechnikov (1838–1888), Friedrich Ratzel (1844–1904)
Early 20th–21st Centuries	In modern geography, discussions within the framework of the theory of the geographical environment continue to this day, though they are not as heated as they once were. According to Professor V. A. Shalnev, the theories of globalistics and the geoversum can be considered the foundation for the development of the theory of the geographical environment.	Nikolai Baransky (1881–1963), Innokenty Gerasimov (1905–1985), Vladimir Pavlovich Maksakovsky (1924–2011).

The historical development of the concept of the geographical environment has laid the foundation for its current understanding. Its historical evolution from antiquity to the present day has revealed the multifaceted nature of the geographical environment and allowed it to be examined from various perspectives. In the 21st century, this concept has taken on new meaning and has become one of the fundamental categories of modern geographical science.

As historical development shows, the geographical environment should be viewed not only as a collection of natural or social components, but also as a complex system that takes into account their interrelationships and dynamics. In this sense, contemporary researchers seek to interpret the geographical environment as a dynamic system that evolves in space and time.

Borankulova & Murzinova (2018) views the geographical environment as an open dynamic system that evolves in space and time. In her view, the geographical environment emerged as a result of evolution, and its main components were formed not only from space but also from interconnected and interdependent natural complexes or elements. By studying the geographical environment from a functional perspective, she examines its most important functions: the formation of climate, the distribution of light, heat, moisture, and pressure, as well as the formation of climatic zones and microclimates. In her view, precipitation affects soil moisture, river flow, and land use, while meteorological phenomena play a regulatory and destructive role. Water is the primary dynamic component that links all elements of the geographical environment; its circulation is essential for the functioning of natural systems and the sustenance of life. Water is vital for living organisms and human economic activity, while the seas and oceans are rich in resources and energy potential and provide access to transportation routes. Borankulova studies the geographical environment from the perspective of geographical patterns and functions, believing that the geographical environment has a significant influence on the development of human society and connects it with culture and society. In this regard, Borankulova's work resonates with the works of Fedyunina and Wallis (Borankulova & Murzinova, 2018).

In her work "The Geographical Environment and the Development of Society," Fedyunina (2012) demonstrates that people are always surrounded by the geographical environment, and therefore an unconditional interaction exists between them. This interaction is divided into two aspects: the influence of nature on people and the influence of people on nature. The work examines a variety of interesting theories regarding the influence of the environment on people. In particular, she analyzes geographical nihilism, which, in turn, denies the influence of the geographical environment on society. The author

disagrees with this theory, since human activity is impossible without nature. The author also examines the theory of probability, according to which the natural environment provides only opportunities, the realization of which depends on people and their level of culture. The focus is also on the ecological approach, which views humans as part of the biosphere and allows for the purposeful transformation of nature in the interests of society, as well as on environmental protection, which aims for the rational use of natural resources and their equitable distribution. The overview concludes with the theory of historical materialism, which emphasizes that the geographical environment plays a decisive role in social development but is not a determining factor, since the mode of production of material goods plays the decisive role (Fedyunina, 2013).

By comparison, foreign authors such as Wallis (1926) take a philosophical approach to the geographical environment. In his work "The Geographical Environment and Culture," he notes that humans are a product of the Earth's surface and can sustain life only by maintaining a connection with nature. In his view, the geographical environment is the cradle of human genius, a cradle that rocks impulses and motives, allowing people to control their own destiny (Wallis, 1926). A scientific approach in a direction opposite to that of Wallis (1926) is presented in the work by Shalnev and Degtyareva (2011), "The Geographical Environment: Controversial Issues and Ways to Resolve Them." Their work notes that the geographical environment is a categorical concept pertaining to the theoretical foundation of general geography and is the least understood among the geographical sciences. In the study of the methodology of the geographical environment, humans are considered alongside biological entities. In this sense, approaches based on geospace and activity should be viewed as the methodological foundation of the concept of the geographical environment, while theoretically, a distinction should be made between categorical concepts such as the factors and conditions of geospace, relationships within geospace, and continuity in the hierarchical sequence of environment formation (Shalnev & Degtyareva, 2011).

In modern geographical science, the geographical environment is viewed not only as a set of natural components but also as a complex multilevel system formed through the interaction of natural and social factors. The intensification of interdisciplinary research has expanded the scope of this concept and contributed to the emergence of various scientific approaches to its interpretation.

Contemporary researchers note that the geographical environment manifests itself in several interrelated scientific dimensions. First, it is viewed as a structural element of the Earth's geographical envelope. Second, the geographical environment is recognized as an independent scientific concept reflecting the characteristics of the interaction between nature and society. Third, it can be viewed as the result of the long-term historical development of natural and anthropogenic processes. This multifaceted concept is explained by the complexity of the Earth's geographical envelope, as it forms a unified and constantly changing system of interconnected natural spheres (Table 2).

Table 2. Theoretical Framework of the Concept of the Geographical Environment

Geographical Environment		
As a concept	Yu.K. Pletnikov	"The geographical environment is a concept encompassing that part of nature which, at a certain stage of historical development, becomes involved in the sphere of social life, creating the material conditions necessary for the existence and development of human society" (Pletnikov, 1971)
	S.V. Kalesnik	"The geographical environment is that part of nature on Earth that is directly involved in the sphere of human society's life, necessary for its existence, and as a concept characterizes the system of interrelationships between society and nature in a specific historical period" (Kalesnik, 1970)
	I.V. Saushkin	"The geographical environment is a scientific concept that surrounds human society, constantly interacts with it, and thus establishes an integral system of Earth's nature (the geographical envelope or a part thereof) distinct from the rest of the world" (Saushkin, 1973)

Table 2. (Continued)

Geographical Environment		
As an element	E. Reclus	"The geographical environment is the sum of all external conditions that give rise to life. It is an element that determines human diet, mode of habitation, and even the direction of human thought, serving as the foundation of the historical process" (Reclus, 1986)
	L.I. Mechnikov	"The geographical environment, primarily the hydrological factor, acts as a necessary element that prompts people to cooperate. It is an external situation without which social progress is impossible" (Mechnikov, 1995)
	N.N. Baransky	"The geographical environment is viewed in geography as an element of the productive forces, a material base whose qualitative uniqueness influences economic specialization and the social division of labor" (Baransky, 1956)
	V.A. Anuchin	"The geographical environment is not pure nature; it is the result of long-term interaction between society and nature—a nature that has been significantly altered by human labor and bears the imprint of human activity" (Anuchin, 1960)
	E.B. Alaev	"The geographical environment is the part of the geographical envelope that interacts directly with society and represents the materialized result of this interaction, which is reflected in cultural landscapes and the technosphere." (Alaev, 1983)
	A.A. Grigoriev	"The geographical environment is the end result of a complex historical process of development of the natural crust, during which natural connections are supplemented and altered by connections of anthropogenic origin" (Grigoriev, 1966)

Authors have differing perspectives on the concept of the geographical environment, a phenomenon linked to the historical development of geography and the emergence of new methodological and philosophical approaches. However, their definitions share several common principles. First, all researchers view the geographical environment as a system closely linked to human activity and essential to the functioning of society. Second, it is perceived as a dynamic structure evolving in time and space, in which natural and social components constantly interact. Third, the geographical environment is understood as a holistic system comprising both material natural elements and the results of their transformation under human influence.

Differences in the authors' approaches indicate an emphasis on different aspects of the same phenomenon. Thus, scholars who define the geographical environment as a concept (Kalesnik, 1970; Pletnikov, 1971; Saushkin, 1973) emphasize its theoretical, systemic, and historical-social criteria. They emphasize that the geographical environment is not merely a set of natural conditions, but a system of relationships between people, society, and nature that has developed over a specific historical period and reflects concrete socio-natural relationships.

Authors who view the geographical environment as a system (Baransky, 1956; Reclus, 1986; Mechnikov, 1995) focus on the structural components of the environment and their functions. The elements of the geographical environment ensure human survival and determine human lifestyles, economic activities, and socio-economic interactions. This approach emphasizes specific factors, such as hydrology, climate, soil, and resources, which constitute the material foundation of society and serve as instruments for its development.

Researchers who focus on the outcome of the geographical environment (Anuchin, 1960; Grigoriev, 1966; Alaev, 1983), study the result of the interaction between humans and nature. In this sense, the geographical environment is not merely nature, but the result of long-term socio-natural interaction, materialized in cultural landscapes, the technosphere, and anthropogenic changes in natural systems. Here, the historical variability of the environment and its ability to reflect traces of human activity while maintaining a connection with its natural foundation are emphasized.

The authors' approaches do not contradict one another but rather complement each other, revealing various levels of analysis of the geographical environment: from theoretical and systemic understanding to the analysis of historically established and materially recorded results of the interaction between society and nature through the study of specific components and their functions. Based on this integration, a

modern concept of the geographical environment is formed, which views it as a complex phenomenon consisting of a concept, an element, and a result.

The modern "concept-element-result" model (Figure 1) allows for a comprehensive assessment of the geographical environment, linking theoretical categories to specific components and outcomes of the interaction between humans and nature.

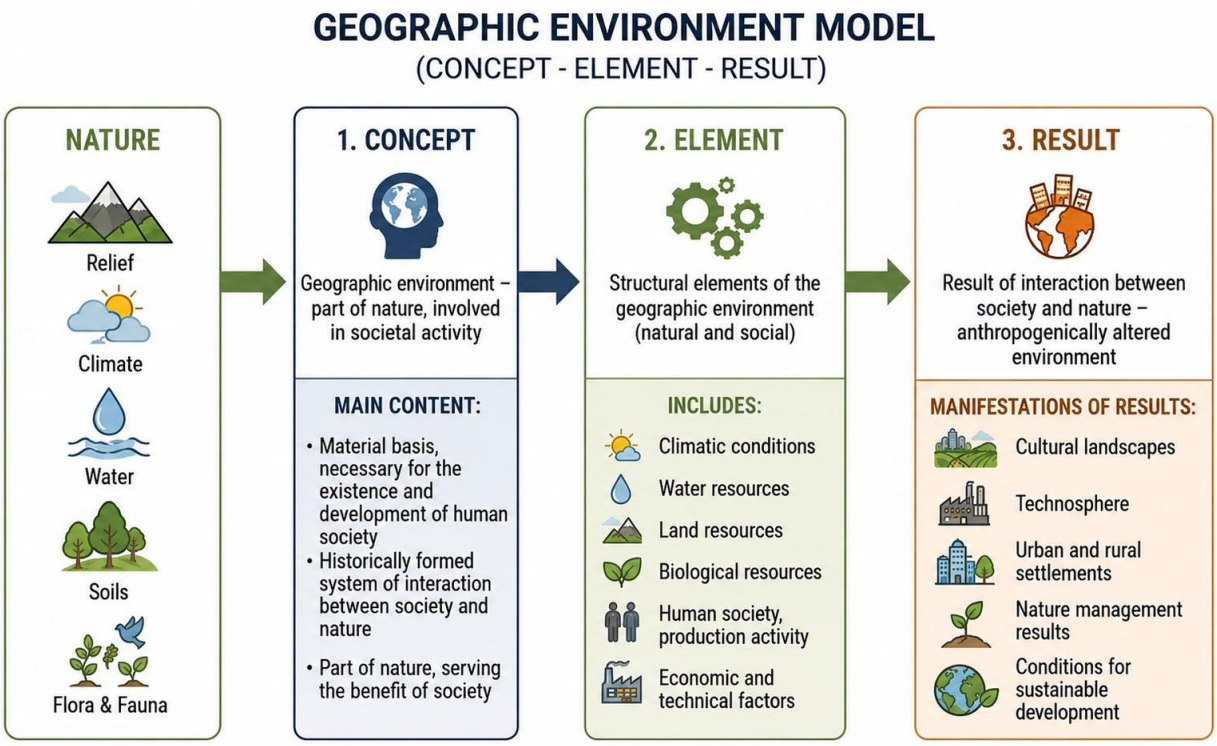

Figure 1. Description of the "Concept-Element-Result" model

This model provides a systematic view of the geographical environment and is methodologically useful for analyzing its structure, functions, and impact on society. However, it is important to note that understanding of the geographical environment was not limited solely to the views of the Russian classics. Foreign geographical science has also developed its own approaches to interpreting the geographical environment, reflecting different emphases and research methods. The following table presents the theoretical framework of the concept of the geographical environment as developed by foreign scholars (Table 3).

Table 3. Theoretical framework of the concept of the geographical environment in foreign scholarship

Geographical Environment		
As a foundation	Karl Sauer	"The geographical environment is the 'natural foundation (areas, climate, resources) which, under the influence of a human group's culture, is transformed into a dynamic system—the cultural landscape'" (Sauer, 1925)
	Richard Hartshorne	"The geographical environment is an integrated spatial interweaving (spatial complex) of natural and cultural foundations, which acquire meaning only through their unique mutual interplay within a specific territory (area)." (Hartshorne, 1939)
	Dervent Whittlesey	"The geographical environment is a stable natural foundation, constituting a spatial base and an unchanging material substrate upon which successive human cultures carry out their economic activities, transforming this basis in accordance with their technologies." (Whittlesey, 1929)

Table 3. (Continued)

Geographical Environment		
As a totality	Harlan Barrows	"The geographical environment is the totality of the physical-geographical conditions of a territory, considered exclusively as the habitat and area of adaptation for the human organism and social groups" (Barrows, 1923)
	Torsten Hagerstrand	"The geographical environment is a spatial-temporal continuum filled with physical objects (biological, technological, and natural) that impose strict physical and temporal constraints on the trajectories of human life" (Hägerstrand, 1970)
	Ellen Churchill Semple	"The geographical environment is a set of differentiated physical factors, including climatic conditions, topographical features, hydrographic barriers, and natural resources of a territory, which, in their systemic unity, act as the main driving force determining the physical, economic, and social development of humanity" (Semple, 1911)
As a natural state	Richard Chorley	"The geographical environment is an objective, open geosystem functioning as a thermodynamic mechanism in which its basic natural state is determined by a constant balance, self-regulation, and an intensive exchange of matter and energy between geophysical components" (Chorley, 1962)
	David Stoddart	"The geographical environment is an objective, open geosystem functioning as a thermodynamic mechanism in which its basic natural state is determined by a constant balance, self-regulation, and an intensive exchange of matter and energy between geophysical components" (Stoddart, 1965)
	Karl Butzer	"The geographical environment is a macrospatial physical matrix (context), whose dynamic natural state is shaped by global paleoclimatic, hydrological, and geomorphological processes, serving as a rigid external foundation for the evolution of life" (Butzer, 1964)

An analysis of the concept of the geographical environment in foreign geographical thought reveals a fundamental pattern: this concept has never had a static or unified meaning. Its definition has depended directly on the scientific paradigm prevailing during a given period. The differentiation of foreign scholars' understanding of the geographical environment into three key categories—as a foundation, as a complex, and as a natural state—is driven by profound epistemological and ontological reasons.

The understanding of the geographical environment as a "foundation" took shape during the crisis of radical geographical determinism in the first third of the 20th century and was intended to distinguish the spheres of influence of nature and society. Scholars such as Sauer (1925), Hartshorne (1939), and Whittlesey (1929) sought in their works to demonstrate that physical-geographical conditions do not alter the course of history, but merely provide a framework for these changes. In their works, the geographical environment is not viewed as a dynamic system, but rather plays the role of a stable foundation. For example, Sauer's (1925) concept notes that nature is static, with dynamics introduced by external events—human culture. This concept largely contributed to the development of regional geography and human geography, as it was this concept that indicated that space acquires scientific meaning only when it is transformed by humans. While geographical determinism prevailed in the field of geography prior to Sauer (1925), in his seminal work "The Morphology of the Landscape", he asserted that human geography should not study how nature "shapes" humans, but rather how humans transform nature through their culture. This approach significantly changed not only human geography but also the very concept of the geographical environment.

However, viewing the geographical environment exclusively as a passive material basis and a "canvas" for society's cultural activities (within the traditions of Sauer's school) eventually revealed its epistemological limitations. The further evolution of foreign geographical thought required a shift from a substratum-based understanding of the environment to its operational analysis. As a result, within the framework of anthropocentric and adaptationist approaches, researchers' focus shifted from the passive "basis" to its internal content. The geographical environment began to be interpreted as a dynamic set of

differentiated physical factors, barriers, and conditions, each of which exerts a direct, measurable influence on the trajectory of human life. The geographical environment came to be viewed as a "set" of individual elements, each of which affects human life. For example, Semple (1911), in her works, took a specific element of the geographical environment and studied its influence on human nature, while Barrows's (1923) works were primarily focused on the study of farmland and ecology. A qualitative leap occurred in the methodology of Hägerstrand (1970), who, using three-dimensional spatiotemporal modeling, formalized the components of the environment, transforming the physical, technological, and institutional barriers of a territory into a measurable system of mathematical constraints on human activity.

The geographical environment began to be viewed as a natural state only in the mid-20th century, when scholars consciously distanced themselves from sociological interpretations of the geographical environment, returning geography to the realm of the strict natural sciences. During this period, the geographical environment was removed from the category of "space for humans" and transformed into a dynamic system, where it began to be perceived through the prism of various physical qualities, such as energy balance, material cycles, and geomorphological cycles. The shift from simply structuring elements to understanding their systemic significance led to the increasing complexity of theoretical models of the geographical environment in the West. This process developed along three main lines: from a passive perception of the environment as a spatial basis to its interpretation as a set of barriers and, finally, to its interpretation as an autonomous natural state of an open system. This paradigmatic evolution, reflecting a shift in research approaches (from substratum-based to adaptive and system-physicalist), is clearly conceptualized in the second theoretical model (Figure 2).

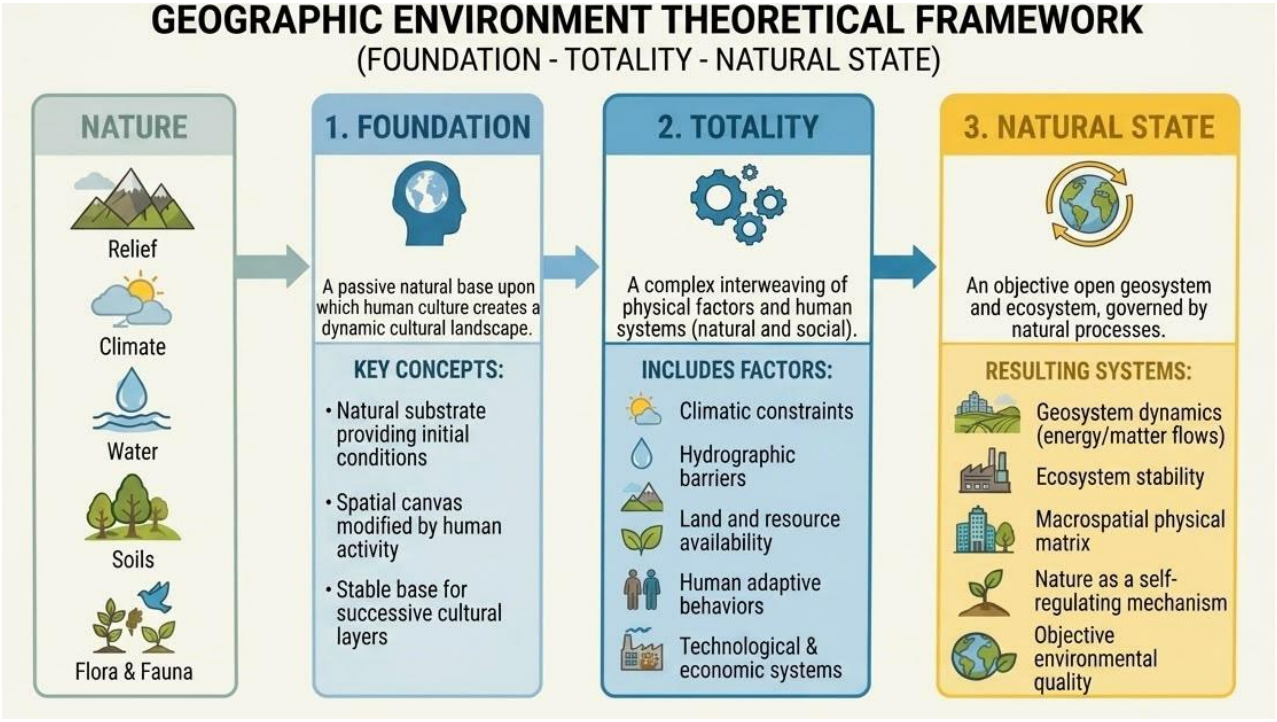

Figure 2. Paradigmatic evolution of the "Geographical Environment" concept in Western geographical thought

As the theoretical framework demonstrates, the concept of the geographical environment has undergone a profound process of de-sociologization and mathematization. While in the "Foundation" block the environment functions as a starting substrate whose value is manifested solely through human cultural activity, a significant shift occurs in the "Total" block. The environment becomes more complex, transforming into a network of physical, hydrographic, and technological constraints that actively govern the logistics and behavior of human groups. Finally, the "Natural State" is generally considered the most systematic block, where the geographical environment is enclosed within an objective and self-sufficient geosystem. Here, its qualities are determined not by humans and their life activities, but by geographical

mechanisms, energy flows, and material flows.

A retrospective analysis of the evolution of the concept of the "geographical environment" in foreign scholarship allows us to conclude that Western geographical thought exhibits a high degree of methodological flexibility and pluralism. Having traveled a path from a substrate-passive "foundation" (a stage for cultural processes) through an anthropocentric "aggregate of factors and barriers" to the autonomous "natural state" of a self-regulating open system, the concept of the geographical environment has transformed from a descriptive spatial category into a complex, interdisciplinary object of systems analysis. Throughout the 20th century, the development of concepts regarding the geographical environment in the USSR and the West proceeded under conditions of profound methodological determinism. While foreign researchers demonstrated great flexibility, easily shifting from interpreting the environment as a passive cultural canvas to its mathematical formalization, Soviet classics (Grigoriev, 1966; Anuchin, 1960) were forced to develop their scientific apparatus within the rigid framework of dialectical materialism. This predetermined the emergence of a fundamental epistemological conflict: while Western geography sought to unite physical space and culture into an indivisible continuum, Soviet science prioritized a strict distinction between the blind laws of nature and the socio-productive laws of societal development.

An analysis of the proposed definitions shows that many authors focus on the individual properties of the geographical environment but do not examine its fundamental characteristics—genesis, internal structure, and complex spatiotemporal relationships (Stozhok, 2011). Nevertheless, a common conceptual thread emerges: the geographic environment is interpreted as a holistic space in which natural and anthropogenic systems function in inseparable unity. In this regard, contemporary researchers are increasingly turning to an interdisciplinary approach.

The special issue "Virtual Geographic and Ecological Environment Analysis" is dedicated to the use of geoinformation and digital technologies for analyzing and modeling the state of the environment and assessing the impact of human activities on it (Yu, 2021).

Similarity: In Yu's work, the concept of the geographic environment is considered as a system that shapes the ecological and social landscape.

Difference: The article analyzes the issue of using geospatial technologies to assess the interaction between natural and human components.

Lü's study examines the concept of a "geographical scenario" as a theoretical basis for the development of virtual geographical environments (Lü et al., 2018).

Similarity: In his work, Lü defines the environment as a dynamic part of the geographical envelope.

Difference: The article states that the interaction between nature and society leads to specific territorial scenarios suitable for virtual modeling.

In their article, Yang et al. (2024), Xu et al. (2024) and Wang et al. (2024) examine the influence of the geographical environment on public trust and define the role of tourism in this process.

Similarity: views the geographical environment as a concept directly linked to economic activity and ecosystem quality.

Difference: the article extensively analyzes the need to account for environmental dynamics in spatial planning and management.

The transformation of classical concepts in the digital age deserves special attention. In his work, Khoroshilov and Katsko (2015) examines the essence of geoinformation space and the virtual geographic environment and their scientific significance.

Similarity: Khoroshilov demonstrates the connection between the concept of the geographic environment and geographic space.

Difference: The article examines the active integration of elements of the geographic environment into GIS technologies.

The study of the geographic environment from a sociological perspective is presented in the works of Shteinberg (2025). The work analyzes the influence of the geographical factor on human development and

the formation of society.

Similarity: Shteinberg considers the concept of the geographical environment as an external determinant influencing processes of integration and conflict.

Difference: the geographical environment is studied from a sociological perspective.

An interdisciplinary expansion of the concept of the geographical environment occurred in the works of Golubchikov (2023). He is dedicated to the study of the theory of landscape therapy and the therapeutic impact of the natural environment on living systems.

Similarity: In his work, Golubchikov examines the concept of the geographical environment and studies it within an interdisciplinary framework.

Difference: He links the concept of the geographical environment to medicine through the concept of landscape therapy.

4 Conclusion

Based on an analysis of the approaches taken by various authors, it can be concluded that the geographical environment is a multi-layered and multifaceted phenomenon. While one group of scholars emphasizes the historical, social, and systemic nature of this concept, another examines the specific natural and social components it encompasses and the functions they perform. A third group of researchers places greater emphasis on the end results of the interaction between humans and nature, i.e., the formation of cultural landscapes and anthropogenic changes. These approaches do not contradict one another; on the contrary, they complement our understanding by revealing the theoretical, structural, and outcome-oriented aspects of the geographical environment. Such integration allows us to consider the object as a whole within the framework of the "concept–element–result" triad, which is highly effective for analyzing its structure and impact on society.

Guided by this systemic approach and taking into account natural and anthropogenic factors, we can provide a modern definition of the geographical environment as follows "The geographical environment is a historically and spatially evolving system of natural and anthropogenic components that shape the living conditions of people, society, and culture, where each element contributes to the functioning of the environment while yielding materialized results in the form of altered landscapes and sustainable socio-natural systems." Thus, the geographical environment is defined as a complex dynamic system in which natural and social processes are closely interrelated.

The conceptual solutions proposed in this paper pave the way for bridging the long-standing methodological divide between the fields of physical and socio-economic geography. By combining the architectural-structural level ("concept – element – result") and the paradigmatic-evolutionary approach ("foundation – aggregate – natural state"), the article develops a universal analytical tool. This approach demonstrates that these categories do not contradict one another but, on the contrary, indicate stages of the researcher's gradual immersion into the object: first, the initial state of the territory is recorded; then, the operational factors influencing it are measured; and finally, the self-regulatory functions of the Unified Geosystem are modeled.

The methodological value of this scientific synthesis lies in its ability to fully respond to the challenges of the Anthropocene era—that is, the present day—when human economic activity has become a powerful global geological force. Reinterpreting the classical heritage of domestic and foreign geographical schools from the perspective of the modern systems paradigm helps purge the scientific apparatus of outdated one-sided assertions and dualistic dogmas. The geographical environment is no longer viewed as merely a passive backdrop or shell upon which humans exert an external influence. It takes on the character of a dynamic system in which natural cycles and sociocultural trajectories converge to form a single co-evolutionary continuum.

From a practical standpoint, the developed models and the proposed integrated definition provide a reliable applied foundation for strategic spatial planning, geo-ecological auditing, and long-term regional forecasting. A clear distinction between the initial elements of the environment and the actual material

results of its development allows for an accurate assessment of the ecological carrying capacity of landscapes, a correct calculation of anthropogenic load, and the minimization of risks associated with natural resource use. In addition, the identified systemic connections will give new impetus to the modern process of digitizing geographic knowledge, including the design of virtual geographic environments (VGE) and the creation of digital twins of real territories, as well as the development of intelligent systems that support decision-making.

Thus, this study not only synthesizes years of theoretical debate on the nature of the geographical environment but also identifies new directions for interdisciplinary research. Restoring the status of the geographical environment as a fundamental and dynamic category will significantly strengthen the position of geography as an integral meta-discipline capable of comprehensively and accurately addressing contemporary global environmental, economic, and social challenges.

Author contributions statement:

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Aknura Alimkhanova	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
Dina Borankulova	✓	✓		✓		✓	✓		✓	✓	✓			

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

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References

Abdullaev, I. Kh., & Islomov, I. N. (2016). Особенности современной географии и пути её изучения [Features of modern geography and ways of its study]. *Current Issues in the Humanities and Natural Sciences*, (4-4), 24–26. Available online at: https://cyberleninka.ru/article/n/osobennosti-sovremennoy-geografii-i-puti-eyo-izucheniya (Accessed 07 September, 2025) (In Russian).

Alaev, E. B. (1983). Социально-экономическая география [Socio-economic geography], Mysl, Moscow, Russia.

Andreev, M. D. (2009). Экологическая культура как основа гармонизации отношений между обществом и природой [Ecological culture as a basis for harmonizing relations between society and nature]. *Advances in Modern Natural Science,* (7), 143–145. Available online at: https://www.elibrary.ru/item.asp?id=12928168 (Accessed 07 September, 2025) (In Russian).

Anuchin, V. A. (1960). Теоретические проблемы географии [Theoretical problems of geography], Geografgiz, Moscow, Russia.

Baransky, N. N. (1956). Экономическая география СССР [Economic geography of the USSR], Geografgiz, Moscow, Russia.

Barrows, H. H. (1923). Geography as human ecology. *Annals of the Association of American Geographers,* 13(1), 1–14. https://doi.org/10.1080/00045602309356884

Borankulova, D. M., & Murzinova, A. S. (2018). Географиялық ортаның құрылымы, функциясы және заңдылықтары [Structure, function and laws of the geographical environment]. *Bulletin of the Kazakh National Women's Pedagogical University*, (4), 19–25. Available online at: https://cyberleninka.ru/article/n/geografiyaly-ortany-rylymy-funktsiyasy-zh-ne-za-dyly-tary (Accessed 07 September, 2025) (In Kazakh).

Butzer, K. W. (1964). Environment and archaeology: An ecological approach to prehistory. Aldine Publishing Company, London, UK.

Cherkashin, A. K. (2020). Теоретическая и метатеоретическая география [Theoretical and metatheoretical geography]. *Geographical Bulletin*, 1(52), 7–21. https://doi.org/10.17072/2079-7877-2020-1-7-21

Cherkashin, A. K. (2021). Геосистемы и географическая среда [Geosystems and geographical environment]. *Geography and Natural Resources,* 1(42), 5–15. https://doi.org/10.15372/GIPR20210101

Chorley, R. J. (1962). Geomorphology and general systems theory. Government Printing Office, USA.

Fedyunina, D. Y. (2012). Развитие учения о географической среде [Development of the doctrine of the geographical environment]. *Bulletin of Moscow State Regional University. Series: Natural Sciences*, (2), 101–103. Available online at: https://scienceit.elpub.ru/jour/article/view/538 (Accessed 08 September, 2025) (In Russian).

Fedyunina, D. Y. (2013). Географическая среда и развитие общества [Geographical environment and societal development]. *Science. Innovation. Technology,* (2), 63–74. Available online at: https://cyberleninka.ru/article/n/geograficheskaya-sreda-i-razvitie-obschestva (Accessed 08 September, 2025) (In Russian).

Golubchikov, Y. N. (2023). К теории ландшафтотерапии [On the theory of landscape therapy]. *Geographical Environment and Living Systems,* (1), 101–115. https://doi.org/10.18384/2712-7621-2023-1-101-115

Gorbunov, V. A. (2013). Природопользование и устойчивое развитие [Nature management and sustainable development]. *Bulletin of MGIMO University*, 5, 180–189. https://doi.org/10.24833/2071-8160-2013-5-32-180-189

Grigoriev, A. A. (1966). Закономерности структуры и развития географической среды [Regularities of the structure and development of the geographical environment]. Mysl, Moscow, Russia.

Grinin, L. E. (2011). Лекция: Природный фактор в аспекте теории истории [Lecture: The natural factor in the aspect of the theory of history]. *Philosophy and Society,* 2, 168–198. Available online at: https://cyberleninka.ru/article/n/lektsiya-prirodnyy-faktor-v-aspekte-teorii-istorii (Accessed 09 September, 2025) (In Russian).

Hägerstrand, T. What about people in Regional Science?. *Papers of the Regional Science Association*, 24, 6–21 (1970). https://doi.org/10.1007/BF01936872

Hartshorne, R. (1939). The nature of geography: A critical survey of current thought in the light of the past. *Annals of the Association of American Geographers,* 29(3/4), 173–658. Available online at: https://www.jstor.org/stable/2561063 (Accessed 08 September, 2025).

Kalesnik, S. V. (1970). Общие географические закономерности Земли [General geographical regularities of the Earth], Mysl, Moscow, Russia.

Khoroshilov, V. S., & Katsko, S. Yu. (2015). Геоинформационное пространство и виртуальная географическая среда. University News. Geodesy and Aerial Photography, (5), 256–260. https://elibrary.ru/item.asp?id=24852346

Kirvel, Ch. S. (2009). Природные факторы и" власть пространства" в жизнедеятельности общества [Natural factors and the "power of space" in the life of society]. *Social Sciences: Sociology, 3, 69-85.* Available online at: https://elib.bsu.by/handle/123456789/7788 (Accessed 11 September, 2025).

Lü, G., Chen, M., Yuan, L., Zhou, L., Wen, Y., Wu, M., … Sheng, Y. (2018). Geographic scenario: A possible foundation for further development of virtual geographic environments. *International Journal of Digital Earth,* 11(4), 356–368. https://doi.org/10.1080/17538947.2017.1374477

Mechnikov, L. I. (1995). Цивилизация и великие исторические реки [Civilization and the great historical rivers], Mysl, Moscow, Russia.

Odintsev, A. V. (2006). Формирование и развитие географической культуры при изучении общей экономической и социальной географии [Formation and development of geographical culture in the study of general economic and social geography]. *In Geoecology of the Altai-Sayan Mountain Region (pp. 414–416).* Available online at: https://www.elibrary.ru/item.asp?id=49928733 (Accessed 07 September, 2025) (In Russian).

Pletnikov, Yu. K. (1971). О форме социальной формы движения [On the nature of the social form of motion], Publishing house of Moscow University, Moscow, Russia.

Reclus, E. (1986). Человек и земля [Man and Earth], Progress, Moscow, Russia.

Sauer, C. (1925). The morphology of landscape. *Foundation Papers in Landscape Ecology,* 2(2), 19-54.

Saushkin, I. V. (1973). Экономическая география: история, теория, методы [Economic geography: history, theory, methods], Mysl, Moscow, Russia.

Semple, E. C. (1911). Influences of geographic environment: On the basis of Ratzel's system of anthropo-geography. Henry Holt and Company.

Shalnev, V. A., & Degtyareva, T. V. (2011). Географическая среда: спорные вопросы и пути их решения [Geographical environment: controversial issues and ways to solve them]. *Science. Innovation. Technology*, (74),

145–153. Available online at: https://cyberleninka.ru/article/n/geograficheskaya-sreda-spornye-voprosy-i-puti-ih-resheniya (Accessed 15 September, 2025).

Shteinberg, A. G. (2025). Географический фактор человечества [Geographical factor of humanity]. Orenburg State University. 493-496. Available online at: https://elibrary.ru/item.asp?id=88744957 (Accessed 15 September, 2025) (In Russian).

Stoddart, D. R. (1965). Geography and the ecological approach. The ecosystem as a geographic principle and method. *Geography*, 50(3), 242-251. Available online at: https://www.jstor.org/stable/40567044 (Accessed 15 September, 2025).

Stozhok, E. V. (2011). Термин, понятие и значение [Term, concept and meaning]. *Omsk Scientific Bulletin*, (1), 79–81. Available online at: https://cyberleninka.ru/article/n/termin-ponyatie-i-znachenie (Accessed 16 September, 2025).

United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development (A/RES/70/1). Available online at: https://docs.un.org/ru/A/RES/70/1 (Accessed 09 September, 2025).

Volkov, K. V. (2010). Влияние природы на общество [The influence of nature on society]. In Current Issues in Social Communication (pp. 163–164). Nizhny Novgorod State University. Available online at: https://www.elibrary.ru/item.asp?id=23586534 (Accessed 10 September, 2025).

Wallis, W. D. (1926). Geographical environment and culture. *Social Forces*, 4(4), 702–708. https://doi.org/10.2307/3004448

Wang, F., Shi, S., Wu, Z., Chen, J., & Guo, B. (2024). Spatiotemporal variation and influencing factors of ecological quality in the Guangdong-Hong Kong-Macao Greater Bay Area based on the unified remote sensing ecological index over the past 30 years. *Frontiers in Environmental Science*, 12, 1446313. https://doi.org/10.3389/fenvs.2024.1446313

Whittlesey, D. (1929). Sequent occupance. *Annals of the Association of American Geographers*, 19(3), 162–165. https://doi.org/10.1080/00045602909360459

Xu, H., Lin, M., & Fu, W. (2024). Quantitatively exploring the influence of geographical conditions on ecological quality using a novel remote sensing model: A comparison between two geographical disparity regions in China. *International Journal of Remote Sensing*, 45(18), 6120–6143. https://doi.org/10.1080/01431161.2024.2380779

Yang, G., Zheng, J., & Zhang, Y. (2024). The influence of geographical environment on public social trust: What role do tourism activities play? *Behavioral Sciences*, 14(3), 218. https://doi.org/10.3390/bs14030218

Yu, D., Tang, L., Ye, F., & Chen, C. (2021). A virtual geographic environment for dynamic simulation and analysis of tailings dam failure. *International Journal of Digital Earth*, 14(9), 1194-1212. https://doi.org/10.1080/17538947.2021.1945151

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