

## Synergetic Paradigm of Geographical Science

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### ABSTRACT

It is shown that in the last decades, geography has expanded so much, that it has lost its object of study. It was not clear, what the geographical science does, and, as a consequence, households have an extremely low level of geographical cultures and geographical education. Each geography is extremely isolated, has its own object of study. Especially the big gap still lies between the physical and socio-economic geography. As a result, each geographical science was so moving away from geography that actually merges with the adjacent sciences - physics, geology, economics, sociology, biology, political science etc. The paper discusses the ideas of the Soviet scientists V.A. Anuchin and N.K. Mukitanov. To prevent the situation, proposed as the object of study of geography to define the human environment. The environment was defined as an area where natural sphere (geographical envelope), anthropogenic (man-made) sphere and the social sphere interact with each other. At the same time narrow scientific branches, not in charge of environment, should move to the appropriate related sciences, is now actually happening. Thus, we propose a new geographical paradigm, where the geography will become less scattered, and will take single or synergetic nature.

### KEYWORDS

environment; the study object of geography;  
single geography; synergetic geography

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## Introduction

Today, Russian geography is experiencing a major crisis. For example, the famous Russian geographer A.G. Isachenko writes that an objective fact is that in recent decades the geography in our country is deteriorating, "has entered a period of methodological crisis" (Isachenko, 2004). The impression is that geography is now becoming not an actual scientific discipline.

In high school and in the universities, geography is minimized or even removed from the curricula (Gorbanyov, 2015). Important and constructive insights and suggestions that geographers make on the development and modernization of the country as a whole and its individual regions are not claimed by the relevant subdivisions of the legislative and executive authorities at different levels.

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This fact makes it easier to understand, why geographic education, geographic culture, and especially the geographical thinking of the overwhelming mass of Russians, up to the decision makers of the state today are at the lowest level.

The question arises: what is the reason for the current situation? In our opinion, the reason should be sought in the geography itself. Geography has lost its object of study. If you ask geographers from different disciplines – ecologists, economic geographers, soil scientists, oceanographers, geomorphologists, biogeographers, socio-geographers, etc., what is the object of geographical science, we get a huge variation of answers and even unlikely to find two same answers (Gorbanyov, 2014). However, this should not happen! This is the essence and relevance of this work. The first task of this article is to understand, what is "disease" of geography and how to prevent its destruction. Therefore, the work is primarily intended for geographers. Secondly, the work will be useful and interesting for those citizens who would like to understand what is the geography.

### Literature Review

If you look at the evolution of geographical science, it originated as a complex science that describes the human environment – nature, people, and economy, clearly reflected in ancient geography. Later, the idea of a single geography has developed in the works of many Russian and foreign scientists. Then, geography was divided into parts for individual links or for separate branches, and later geography was divided into economic and physical. At the end of XIX – first half XX centuries, this "scatter" was perfectly objective phenomenon. It is no wonder that the leader of the Soviet geography, Professor N.N. Baransky, said that geography has two wings – the economic and physical geography, i.e. the geography is the only science that cannot be classified either group exclusively public nor exclusively to the group of natural sciences: it is both that, and another simultaneously (Baransky, 1980).

However, after the second world war, there was a question about the relationship between the two branches of geography when physical and economic geography in the Soviet Union was officially declared an independent science, and attempts of combining them was considered almost a crime (Anuchin, 1960; Gumilev, 1967). As a result, the concept of two separate geographies for a long time possessed the minds of most Soviet geographers. For example, the famous Soviet geographer S.V. Kalesnik wrote that "Soviet geographers, unlike most foreign ones, do not integrate physical and economic geography as a science for a very simple reason: these two disciplines, there is no such common object of study, whose development would occur according to specific laws, equally suitable for real social and natural phenomena." "To merge the social and natural geography... they should be object of study... There is no such object" - concludes S.V. Kalesnik (1970). In fact, he denied the existence of geography, precisely because it does not have, as he believed, a single object of study. A similar position was taken by another famous Soviet geographer and ethnographer L.N. Gumilev (Gumilev, 1967). In addition, even the insistence of N.N. Baranski (1980) to prove the need for a single geography was not successful.

During the existence of numerous "branches of social and natural geographies", geography has made many important discoveries. However, since the last third of the twentieth century, centrifugal forces in geography became too large, the scattered geography became increasingly playing a negative role. Well-known Russian geographer, biologist Professor G.A. Voronov once very aptly observed that in the modern era, sciences remind deep pits with a small diameter, i.e., science is narrowly specialized, but studies are very serious. However, geography, in the opinion of G.A. Voronov, began to resemble a huge flooded pond. We would add to this comparison that there are numerous indentations on the periphery of this pond, corresponding to specific geographical sciences, and the center also has a recess, but a minor one, where we can develop a general geographical direction. Centrifugal tendencies in the geography of the increasingly intensified, which allowed the academician D.V. Nalivkin to claim that after half a century, the process of geography differentiation will cease to exist. Moreover, the academician V.P. Maksakovsky said that "geography was compared to king Lear who, having given away his possessions to his daughters, turned himself into a beggar" (Maksakovskiy, 1998). The words of the scholars are now becoming a reality. In flooded water, which was spoken of by G. A. Voronov, is a "breakthrough of the dam" and water from small peripheral grooves flows into the neighboring "deep pits" of related scientific disciplines. Biogeography and Geoecology pass in Biology, Geomorphology is included in Geology, Oceanography, Meteorology and Glaciology – Physics, socio-economic Geography is included in Economy, or Sociology or Political Sciences. Now, it becomes clear why biogeographers very often call themselves ecologists or biologists, economic geographers – economists or analysts, geomorphologists – geologists, oceanographers – physicists. With deep concern for the fate of geography speaks of the oldest Soviet and Russian geographer A.G. Isachenko: "No matter how much we tried to pretend that geography is dominated by integration trends, there is no escape from reality; there is a deep gap between its two branches: physical and economic geography continue to speak different languages, have different methodological orientations... Uncontrolled crushing of science, the vagueness of its borders reinforce narrow specialization, lead to the loss of a common language between scientists, dissipation of forces, and ultimately to the loss of credibility of science in the eyes of the public... If we do not deal with urgent building bridges between the two branches of geography, we are threatened with complete collapse" (Isachenko, 2004).

### **Aim of the Study**

Many scientists today speak about the necessity of reforming geographical science. In particular, we are talking about the humanization of geography, which will put people at the center of studies on the socialization of geography with a view to involve in the orbit of geographic society, the greening of geography, which will give the opportunity to pay more attention to the environmental issues, but no one raises the question of the research object of Geography.

### **Research questions**

We have already mentioned that the main feature of geography is its interdisciplinary approach, combining social and natural science. No other



science has such a feature. Geography requires the involvement of works on philosophy, economics, sociology, political science, urban studies, demography, cultural studies, ecology, biology, geology, physics, soil science etc.

### Method

The methodological basis of the research is a set of principles, developed in the field of geography and historical-philosophical sciences. Namely, the principle of historicism, objectivism, dialectical unity of historical and logical, and the application of the comparative-historical and historical-analytical methods. We used such general scientific methods as abstraction and generalization of scientists on the considered problem. The most important feature of the geography – chorological research method, which allows studying areas of various sizes. Hence the need to use map method. Geography without a map cannot exist. The above-mentioned N. N. Baransky said that "the map is the alpha and omega of geography" (Baransky, 1980). And finally, not to mention physics, mathematics and remote sensing research, which are playing greater role in geographical research.

### Data, Analysis, and Results

Trying to keep the sprawling geography in the USSR in the 60-70-ies, the outstanding Soviet geographer V.A. Anuchin(1960) actively fought for the revival of a single geography and introduced the idea of geographical monism. The essence of this idea is that geography is not a unified complex of sciences, as suggested by many researchers, but it is a single comprehensive science. The objects of its study are not individual components of nature or of society, but the environment (Anuchin, 1960; Anuchin, 1972). By this, V.A. Anuchin emphasized that the object of study of any science is what determines (along with method) its specificity, the core, without which it is inconceivable that conventionally separates it from other sciences. "Retreat from the subject principles of classification of science inevitably leads to an impasse" (Anuchin, 1972).

About the same thoughts later expressed by another well-known Soviet geographer and philosopher N.K. Mukitanov (1985). He stressed that the focus should be on analyzing the process of interaction between society and geographical environment but not on the territorial organization of society. Theory of interaction of society and nature, according to N.K. Mukitanov, is designed to be the central core of the whole system of geographical science. Chorological method is very important in geography, but it cannot be dominant. Geologists, biologists, historians, surveyors, military figures, economists, engineers of different profiles and even forensics, do not less successfully use chorological method.

V.A. Anuchin (1972) and N.K. Mukitanov (1985) most closely approached the problem of the future of geography as a complex science with a unique object of study – environment (geographical environment). However, many highly respected scientists have not seen it and, therefore, geography has continued to deteriorate.

Attempts to restrain the spread of geography as unified science took more than half a century. Many scientists advocated the cooperation of the two main branches of geography; however, there are no real changes happening. The situation is currently even worse than in the 60 years since, almost no scientists,

are in favor of the revival of a single geography, with the result that, as mentioned above, the meaning of geography leaves the proscenium of Russian science and education. As it was noted by A.M. Trofimov and M.D. Sharygin, "in the twenty-first century, debates on a single geography have ceased, but remain committed to a "broken" geography" (Trofimov & Sharygin, 2007).

How is it possible to synthesize geographical sciences, if they naturally pull away from geography? Every science is, first of all, the system where its individual elements are in interaction with each other, as a single mechanism. Nevertheless, if a separate geographical sciences are unable to establish a unified geographical system, and vice versa, tend to branch out and unite with other sciences, thus an independent science, in this case geography, as the system, cannot continue to exist. Traditional geography, as the system disintegrates. Therein lies the reason that all the previous intentions of the association of geography failed. This is a pessimistic conclusion. However, scientists should realistically and objectively assess the situation. All attempts of its artificial, mechanical unification in an integrated, common, single geography are doomed to failure (Gorbanyov, 2015).

Nevertheless, a blessing in disguise. You need to remember those geographers who emphasized that object of geography should be the geographical environment (although they called it sometimes different, but the essence has not changed) (Golubchik et al., 2005).

In Soviet and Russian geography, the doctrine of the geographical envelope was widespread, developed by academician A.A. Grigoriev(1932). It is understood as a sphere where lithosphere, atmosphere, hydrosphere and biosphere interact, penetrate each other. I.e., geographical envelope is natural or the physical sphere, studying physical geography. The environment (or geographical environment) is a more difficult concept: it is a part of the geographic envelope, affected by anthropogenic activities. The Russian geographer N.F. Reymers(1992) directly writes that the environment consists of four interrelated components: natural environment, environment, changed by methods of farming ("second nature"), artificial environment (the "third nature") and social environment (Reymers, 1992). In other words, it is not only the natural environment of man, but also created by him synthetic or anthropogenic environment, and social environment. Therefore, we can say that the environment is an area where the components of geographic envelope, anthropogenic and social spheres interact, penetrate each other. The man, thus, refers to a geographical envelope (because it is part of the biosphere) and social sphere (Figure 1) (Gorbanyov, 2014).

As geography is marked by its complexity, the object of geography is the environment, and the subject of the study – environment of spatial space-territorial units, i.e. the space-territorial systems of all sizes, ranging from around the globe, to the country, region, etc. And not coincidentally, the former President of the Russian Geographical Society (RGS) U. P. Seliverstov called one of his articles "Modern geography – environmental science" (Seliverstov, 2000). A similar idea was expressed by another President of the RGS, academician Vladimir Kotlyakov, calling his article – "Geography as the most important science of the environment". V.M. Kotlyakov stresses that in the mid-twentieth century the subject of geography was not clearly defined, "... it was assumed that the geography studies everything that is around us: land, water, climate, plants,



animals, people, etc. indeed, the geographical science has not been studying the elements of the environment. The focus of geographers has always been the ratio of these elements in space, their communication, relationship, i.e. in other words-the environment itself" (Kotlyakov, 2012). The subject of single geography should recognize the territorial natural-social systems (Trofimov & Sharygin, 2007).

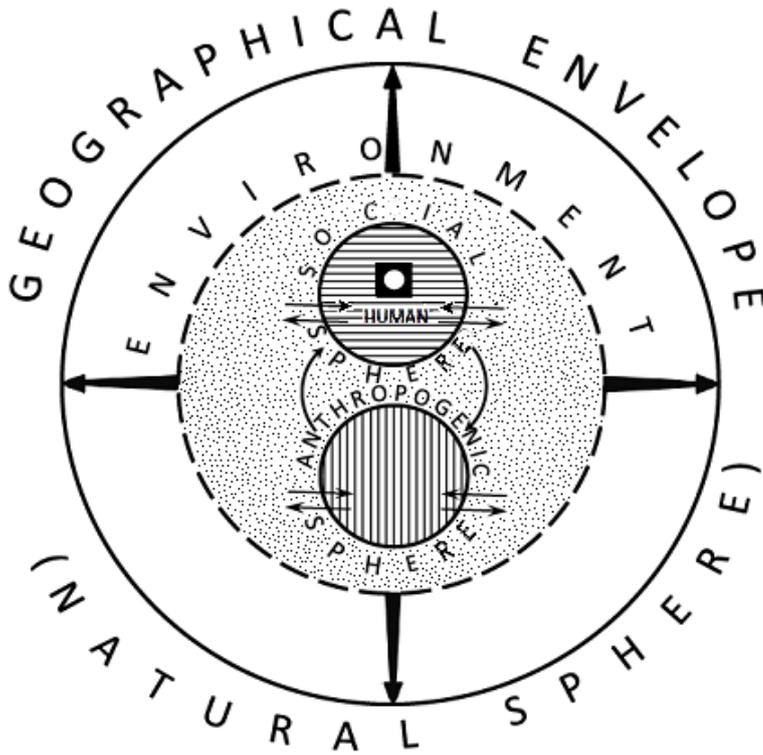


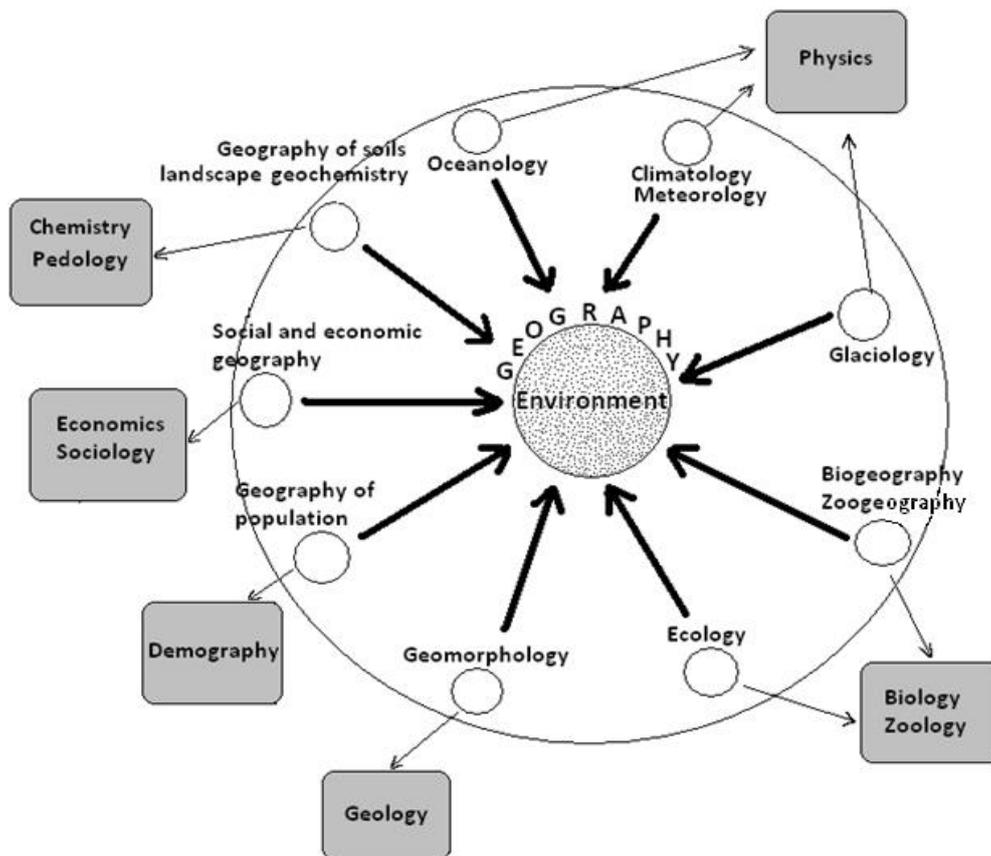
Figure 1. Environmental structure.

The famous Soviet geographer J.G. Saushkin emphasized that the natural environment, i.e. geographic envelope, may explore the physical geography, but the geographical (surrounding) environment can be studied only together with social geography. "The study of the geographical environment... the case of the geography overall, the entire system of geographical sciences are the essence of physical geography and economic geography" (Saushkin, 2001).

If approached from this standpoint and to continue the analogy with the pond Professor G.A. Voronov, "geographical basin", freed from the peripheral recesses, should greatly be reduced, and its central part is deeper, i.e. geography acquire features characteristic of other sciences: it is small in diameter but fairly deep hole, the name of which is the single or synergistic geography. We need to recognize what is happening now: if the branches of geographical sciences go about their narrow problems, they cease to be geographical and should go into the related sciences, and they will bring and are already bringing a lot more use. Nevertheless, if the branches of geographical sciences, each with their positions, will focus on the study of the environment – then it will be geography. In this case, our science will take its place in the hierarchy of the sciences, for environmental or otherwise- of the natural-anthropogenic geosystem as a

combination of physical, anthropogenic and social spheres, no other science does not do and cannot do (Figure 2) (Gorbanev, 2015).

The same idea of transition to a single geography is very accurately and vividly expressed by one of the famous domestic geographers, V.S. Preobrazhensky(2001): "it is time to move on to the exploration of fundamental laws from the position of "sowers of ideas in 600-square-meter estates of specialized garden houses" to the position of "collectors of ideas at the community fields". And further: "the failure we have here on the axis of development of world science, with depth in a few decades" (Preobrazhensky, 2001).



**Figure 2.** The place of geography and related sciences.

Our esteemed opponents sometimes say that there are frontier sciences that cannot be fully attributed neither to geography nor to any other science. To my mind in any case, this line can and should be drawn. For this purpose, it is expedient to talk not about science splice, but about splice issues, where there are often major discoveries. For example, if the oceanographer or meteorologist are studying Arctic climate change based on the analysis of energy and mass exchange between ocean, atmosphere and ice, analyzing the circulation of the atmosphere and ocean, thus developing a serious mathematical model, etc., then this is physics. The geographer-oceanographer has simply not enough knowledge to conduct such studies. However, the same oceanographer or meteorologist studying the same problem, but from the standpoint of the impact of climate



change on social conditions of the population, indigenous peoples of the North, on ecosystem functioning, on the condition of navigation, the development of fuel-energy complex, and actively using the results obtained by physicists and other experts – then it will be geography, because the oceanographer set the environment for his research. In addition, physicist cannot cope with this task, because he does not have enough geographical knowledge. There are similar examples of economic, social geography, biogeography, geomorphology and other branches of geography.

Recently, an article was published by the famous Russian geographer Y.N. Gladkiy dedicated to the debate about monism and dualism in geography (Gladkiy, 2010). The author very convincingly defends the position of V.A. Anuchin, who "virtually alone rebelled against the conservative (and frightened) figures of Soviet geography and warned of the risk "to disperse in shop floor's separate lumber rooms and cocoons", called for simultaneous study and comparison of natural and social processes, on the study of the geographical environment as a whole object". "Critique of the single geography, emphasizes Y.N. Gladkiy (2010) - discredited geographical science in general, and generally questioned its "being".

### *Synergetic geography*

Let us consider the questions, which can be the subject of synergistic geography study. First of all, the oldest area of geography is the country studies. In 1946, N.N. Baranskiy gave a profound analysis of the development of country studies and formulated its foundations, including the concept of "single view" on the natural, economic and social phenomena (Baransky, 1980).

Another important area of geography is Geoecology or, as A.G. Isachenko, G.M. Lappo, and Y.P. Seliverstov wrote, ecological geography. Recently in the literature, not only geographical, there are many ecologies – human, social, engineering, industrial, biological, applied, cultural, medical, and many other ecologies. This difference of concepts is not conducive to accurate scientific interpretation of ecology as a science (Gorbanyov, 2014). In 1866, E. Haeckel introduced into scientific use the concept of ecology, implying that the study of interactions of living organism with the surrounding biotic and abiotic environment, i.e., according to Haeckel, ecology is a branch of biological science. Moreover, today it remains the same.

Currently, however, we should speak about the interaction of man as a living organism, a member of the social environment, surrounding not only the biotic and abiotic nature, but also man-made (anthropogenic) and social spheres, i.e. in this case we are talking about the environment. A study of the environment, as was shown above, is the prerogative of the synergetic geography. Thus, ecology as a biological science develops into a geographic ecology (abbreviated in the geo-ecology) and becomes a part of the geographical sciences (Gorbanyov, 2014, Egorenkov & Kochurov, 2005). Moreover, just now, studying the geoecology, you can approach it from different sides – industrial, medical, social, cultural, etc. Therefore, the study of geoecological problems at different scale – the most important task of the synergetic geography.

It should be noted, and the concept of sustainable development, affecting not only the natural sphere, but also the problem of economic development, social and political stability. With the concept of sustainable development is

directly linked to global geocological problems – climate change, degradation of ecosystems, deforestation, desertification, biodiversity, scarcity of water and land resources, hunger, poverty and many other problems, which also combine natural, economic and social aspects. However, a number of scientists and not without reason, are very skeptical of the theory of sustainable development, considering it a utopian, and, conversely, alternatively, support the theory of rational nature use, which, of course, should be an essential element of single geography (Gorbanyov, 2015).

### Discussion and Conclusion

Considering the objectives of the single geography, it is impossible not to recall the ideas put forward by academician I.P. Gerasimov (1976) in his concept of constructive geography. The author emphasizes that the geography in the center of its tasks poses problems of harmonization of human interaction with nature and the rational territorial organization of society.

Even more important are studies of the process of spatial self-organization of society. Academician A.G. Granberg emphasized the importance of interdisciplinary synthesis of sciences about space, and allocated a special science about the space, calling it "spatial science" (Granberg, 2009). Spatial science – research direction of an interdisciplinary nature, combining research, characterized by commonality of the object (Minakir, Demyanenko, & Pilyasov, 2015). Essentially, we are talking about the single geography where the object of research is the environment.

The concept of territorial and spatial organization of the economy derives directly of the theory of regionalism and regionalization in geography. According to Y.G. Saushkin (2001), namely the doctrine of the areas became the nucleus of all geographic sciences and to a large extent determined the boundaries of the system of geographical sciences in general. The problem of Russia complex zoning is a serious and extremely relevant problem for today and at the same time is still not solved. This problem is very complex, but it should be addressed on the basis of single geography. In Russia, the strengthening of integrated regional studies is largely due to the problems of formation of Russian federalism. In addition, in the conditions of transition to the market, of particular importance for the Federal and regional programs aimed at solving urgent tasks of regional development and regional policy. We would especially like to emphasize that in the transition of the most developed countries in the postindustrial (informational) stage of development, the paradigms of geography change dramatically. The center for regional studies become not so much the material productive force as the man himself.

As the examples, we considered the main streams of the single geography. Of course, you can allocate many directions, but we would like to mention one very important thing that will stand apart because it is in some degree instrumental in geography. This refers to cartography as such, and the theory of geographical cartography, developed by Professor K.A. Salishchev (1966). He believed that the essence of geographical cartography is the integration and synthesis of geographical knowledge of the components of geosystems – nature, population, economy, culture in a certain area.



## Implications and Recommendations

Scientific novelty of the work lies primarily in the fact that we offer to narrow the object of study of geography: to transfer some geographic branches to the specialized sciences, and on another hand – to put the human environment at the forefront of geographical research, understood as the interaction of physical, anthropogenic and social spheres. In this case, we will be able to bridge the gap that existed not only between the physical and socio-economic geography, but also between the individual branches of geography. In the end, geography will become a science with clearly defined object of study. In addition, science is unique because it is simultaneously natural and social. In this form, for any person, including the geographer, it will be clear what geography should work with and what are its prospects. This is the way of the revival of geography.

In conclusion, I would like to reiterate that the proposed new paradigm of geography will allow delineating the object and subject of research, will help geography to take its own niche in the hierarchy of the sciences, and to not interfere with other sciences, and thus to free itself from the offensive and unfair label, adhered to geography – "geography is the science about everything and nothing". And finally, we should note that the proposed new development paradigm of geography will allow every geographer after V.S. Preobrazhensky to say loudly: "I am a geographer!" (Preobrazhensky, 2001).

## Disclosure statement

No potential conflict of interest was reported by the authors.

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