



SFB 1199

Processes of Spatialization
under the Global Condition

Jana Moser
Sofia Gavrilova
Philipp Meyer

**Non-territorial
spatial formats:
Insights into the toolkit
of map analysis**

Working paper series
des SFB 1199
an der Universität Leipzig
Nr. 35

Collaborative Research Centre (SFB) 1199
„Processes of Spatialization under the Global Condition“
at Leipzig University

Funded by



Jana Moser, Sofia Gavrilova, Philipp Meyer
Non-territorial spatial formats: Insights into the toolkit of map analysis

This working paper is part of the Working Paper Series of the Collaborative Research Centre (SFB) 1199 “Processes of Spatialization under the Global Condition”. This working paper is also part of the Working Paper Series of ReCentGlobe, to which the SFB 1199 contributes since 2020.

© SFB 1199
02/2024

Vertrieb:
Leipziger Universitätsverlag GmbH, Oststraße 41, 04317 Leipzig
info@univerlag-leipzig.de

ISBN: 978-3-96023-537-8
ISSN: 2510-4845

Content

1	Imagining spatiality: an introduction	4
	1.1 Why analysing human-nature relations and maps	4
	1.2 The role of maps and atlases in imagining the world	5
	1.3 A long story told in short: the history of geographical thought in relation to ecological aspects	7
	1.4 Spatial formats concept through analysis of maps and atlases	14
2	Non-territorial spatial formats	17
	2.1 An introduction	17
	2.2 Distinguishing between territorial and non-territorial spatial formats	17
	2.3 Approaching the actors challenging territorial spatiality	18
	2.4 Toolkit description: attempt to “see” non-territorial spatial formats in maps / atlases	19
	2.5 Attempt to list of non-territorialised spatial formats	21
3	Recognizing non-territorial spatial formats in maps / atlases	23
	3.1 Spatial formats and maps	24
	3.2 Planetary spatial format	24
	3.3 Ecological spatial format	29
	3.4 Universal spatial format	33
4	Discussion and further research possibilities	38

1 Imagining spatiality: an introduction

1.1 Why analysing human-nature relations and maps

“The goal of the modern study of geography is a thorough understanding of the relation between mankind and the physical forces of his environment.”¹

This statement by one of the most prominent and influential U.S.-American atlas publishers sets the tone for this paper and our research on spatial formats in maps and atlases. As we will show, in the 20th century, human-nature relations were one of the topics that influenced geographical thought. Goode’s statement not only tells us a great deal about the evolution of geographic thought and the discipline of geography, but it also defines a way of understanding human-nature relationships. Therefore, he not only wrote about it, but tried to highlight the concept of especially worldwide relations also in his maps. Just to name one example: No political world map is included in the “Goode’s School Atlas” in 1925 (2nd edition), and none of the other world maps contain political boundaries, which one would expect to find in contemporary atlases. Analysing Goode’s maps, atlases, and ideas regarding Geography and Mapmaking, it is somehow possible to follow an argumentation and its evolution: that of human ecological thought in US Geography: Goode is credited with coining the term “human ecology” for the first time in the history of U.S. geography.²

This text attempts to recognize and define non-territorialized spatial formats³ in a seemingly thoroughly territorialized world. In this attempt, we refer specifically to geographical maps and atlases made for educational purposes and their contextualisation by archival and other written material. Within a subproject of CRC 1199 on “Processes of spatialization under the global condition” we research “Maps and atlases as mediators and producers of space (knowledge)”. By adopting a critical and comparative perspective, we investigate visual spatial production logics in various world regions (e.g. in France, Russia / Soviet Union, Germany and the U.S. between around 1880 and 2015) that includes visually laid down spatial concepts and imaginations. However, our view is strongly based on a geographic and cartographic perspective. Nevertheless, we take (1) findings from other disciplines into account and aim to discuss how maps can challenge or strengthen the spatializing actions and imaginations about space of various actors. (2) we contextualize our map analysis by using further material such as publishers’ writings and interviews, textbooks, teacher’s handbooks, conference proceedings. We consider atlases and maps to be the result of pre-existing spatial ideas that are visually expressed. The impact of the visualization on the reader of such maps, who perceives them in a very subjective manner, is often underestimated, unless they are obviously propaganda maps. For this very reason, however, maps can also convey new spatial concepts in the form of spatial formats without the reader being aware of this at first glance.

Our aim is to describe how, starting from cross-disciplinary discussions about spatial formats in CRC 1199 and a resulting overview,⁴ we have analysed our material in terms of the spatial concepts they contain. What emerged are complementary spatial formats that we think are worth for further discussions and therefore will propose and describe them here. These are, in addition to the territo-

1 Goode, J.P. (1932): Goode’s School Atlas, p. xi

2 Martin, Geoffrey J. (2014): American geography and geographers. Toward geographical science. Oxford, New York: Oxford University Press. p. 754

3 Spatial formats are (as well as spatial orders) a category to describe actor-based processes of spatialization under the global condition and to find a language that allows to define more abstract types of such processes of space formation established by routines. For a brief description of the notion of spatial formats see chapter 1.4 below.

4 Middell, Matthias (2019): Category of Spatial Formats: To What End? In: Steffi Marung und Matthias Middell (eds.): Spatial formats under the global condition. [1. Auflage]. Berlin, Boston: Walter de Gruyter (Dialectics of the global), 15–47pp.

rialized formats already discussed in the SFB – such as nation-state or nation-state with imperial supplementary space – predominantly non-territorialized spatial formats. We especially propose to look at other spatial concepts besides predominantly politically and economically defined spatial units. It is precisely human-nature relationships that shape our thoughts and actions and are recognizable, if not so obviously, in maps. Specifically, we refer to an ecological, a planetary and a universal spatial format and describe content-related as well as visual features and aspects, i.e. through which aspects we can perceive and recognize such formats in maps. However, we want to point out that maps frequently reflect and contain multiple concepts of space. Different logics of spatial organization in different spheres of life rarely allow a clear assignment of territorializing or non-territorializing spatial formats. Therefore, not only overlaps are argued, but also simultaneities and contradictions.

As atlases, particularly school atlases, are frequently viewed as instructional tools for teaching nation-based territorial concepts, we are questioning this by posing the following questions:

1. Do atlases, particularly school atlases, offer spatial perspectives and imaginations that extend beyond territorialized concepts such as the nation state?
2. Are we capable of recognising and decoding de-territorialized spatial perspectives, such as ecological or planetary spatial formats?
3. How can we define these formats in map semiology and map characteristics?

In the following, we try to answer these questions and explain our findings that we interpret as societal relevant spatial conceptions as being used and visible in many atlases. Our results are essentially based on our empirical material in the form of maps, atlases and related contextual sources. At the same time, we would like this publication to be understood as an offer for discussion on the further development of the systematics of spatial formats and spatial orders in CRC 1199.⁵

1.2 The role of maps and atlases in imagining the world

The conventional positivistic history of cartography approaches maps as precise objective models of the earth or smaller parts of it, and views the development of cartography as a progression toward ever better and more accurate maps, with the utopian goal of constructing an ideal model of the earth and establishing the best possible communication between reader and author.⁶

In his seminal work “Deconstructing the Map” published in the late 1980s, the geographer and historian of cartography John Brian Harley was the first to argue that maps should be viewed in a broader context as social constructions. He proposed a “shift in epistemology” in how we interpret and approach the nature of cartography, introducing a postmodern perspective on the topic.⁷ Harley uses Foucault’s analysis of texts and power relations to approach the power relations in map production, “even though the power is invisible or implied, including the specific knowledge encoded in maps and atlases”⁸. Harley transforms the concept of maps from “nature’s mirror” to “cultural texts” and introduces a vast array of postmodernist approaches. This enables to “deconstruct” a map by critically analysing the role of the author, the power relations in the mapping process, and the visual elements of the map in a manner similar to an analysis of visual art. This approach prompts a reassessment of the history of European and non-European cartography and has resulted in the development of

5 Our big thanks go to Sebastian Lentz (IfL Leipzig) for intensive discussions around the concepts of this working paper. He gave us numerous important hints, ideas and impulses for its development.

6 Crampton, Jeremy W. (2001): Maps as Social Constructions: Power, Communication and Visualization. In: Progress in Human Geography 25, pp. 235–252.

7 Harley, John Brian (1989): Deconstructing the map. In: Cartographica 26 (2), pp. 1–20, here p. 3

8 *ibid*, p. 245

a new post-communication map theory,⁹ which is associated with the works of Denis Wood, John Pickles, Michael Curry, Matthew Edney, and Jeremy Crampton, among others. The “epistemic break”¹⁰ occurring in cartography has questioned the map as an “atheoretic” communication system and reshaped the relationships between critical cartography and human geography, examining the field in which maps are viewed as “in the field of power relations.” Crampton concludes that maps are “social constructions” by appealing to the “representational crisis” in the humanities as a whole. He adds a new dimension to the theory of cartography by proposing new ways to engage further with social theory.

This paper adheres to the critical cartography approach, which views maps not in the tradition of positivistic cartography (as close to objective perspectives of the earth and as a technical process alone), but rather, as with many other mediums in the postmodern era, as “texts” that have been produced with a particular agenda and by particular actors in a particular moment. It approaches maps (and atlases) in the tradition outlined, viewing them as social and cultural products whose content is mediated by numerous factors, such as editors, authors, and production institutes, as well as the social and political climate of the country in which they are produced. However, being mapmakers ourselves, we additionally reflect and take into account pragmatic needs for producing maps and atlases which are a prerequisite for the product that we analyse. This article does not provide a detailed analysis of specific maps, revealing the methods of persuasive cartography and deconstructing mapping techniques¹¹; rather, it aims to generalise the atlas and atlas maps on a broader scale and initiate a discussion about its goals, methods, and narratives. As such, it focuses primarily on the selection of map contents and data.

Even though we cannot really measure an impact on people and pupils it is obvious, that maps and atlases, along with other visual media (such as paintings and photographs), influence how people visualise or imagine places and spaces. Geographical knowledge in any society is a potent tool for shaping how people perceive and view their own country, creating a layer of “spatial identity” that is an essential component of people’s overall sense of self. Prince introduced the concept of “geographic imagination” as a “persistent and universal instinct of the human race,”¹² which was later developed by Harvey.¹³ Geographical imagination refers to how people envision a place (in this case, their country or portions of it) and how these images are formed. Because “visibility” and “representation” are concepts associated with production and, therefore, power, the geographical imagination¹⁴ is socially and politically constructed. Because map users are accustomed to view maps as objective scientific models of the earth, they tend to view them with less scepticism when compared to other images. As a result of seeing a projected image with a coordinate grid and legend, people frequently disregard subjective map production methods and the possibility of manipulation and selection of data, which are integral and necessary components of map production.

School maps and atlases are one of the most influential media in this regard, as they introduce the spatial imagination to the vast majority of the population in young age and are mandated by the school system. Therefore, it is essential to comprehend the spatial imaginations produced by school cartography and the spatial formats and orders they impose.

9 Crampton, Jeremy W. (2001): Maps as Social Constructions: Power, Communication and Visualization. In: *Progress in Human Geography* 25, pp. 235–252.

10 *ibid.*, p. 245

11 see e.g. Tyner, Judith A. (2018): Persuasive map design. In: Alexander J. Kent und Peter Vujakovic (eds.): *The Routledge handbook of mapping and cartography*. New York: Routledge (Routledge handbooks), pp. 438–449; Muehlenhaus, Ian (2012): If Looks Could Kill: The Impact of Different Rhetorical Styles on Persuasive Geocommunication. In: *The Cartographic Journal* 49 (4), pp. 361–375; Tyner, Judith A. (2007): Persuasive cartography. In: *Journal of Geography* 81 (4), pp. 140–144.

12 Prince, Hugh C. (1962): The Geographical Imagination. In: *Landscape* 11, p. 22–25.

13 Harvey, David (1979): *Explanation in geography*. Repr. London: Arnold.

14 see e.g. Möhring, Maren; Pizarz-Ramirez, Gabriele; Wardenga, Ute (2019): *Imaginationen*. Berlin, Boston: Walter de Gruyter (Dialektik des Globalen. Kernbegriffe, 5).

At the same time, school maps and atlases are producing world views that were predetermined by the dominant worldview of the particular society, time and the theories of geographical knowledge. In other words, we consider school education and the educational cartography system to be the ones who impose specific spatial ideas on society at the most fundamental level. The CRC 1199 has developed the terms “spatial format” and “spatial order” as categories to describe actor-based processes of spatialization under the global condition, which we will use when discussing spatial concepts.

1.3 A long story told in short: the history of geographical thought in relation to ecological aspects

As we began to analyse atlases (specifically educational geographical world atlases) of various origins, we discovered, that the maps depict a broad range of spatial concepts. Especially human-nature relationships are included in a variety of ways and forms. That has inspired us to work towards a better understanding of how human-nature relationships have evolved in the 20th century and to investigate which modes of thinking about the world have been prevalent in various nations. Doing so, we came to the conclusion, that atlases show much more than territorialised spatial formats such as the nation state, which seem to be predominant due to the constant use of state borderlines in maps, especially in world maps of geographical atlases today.

We argue that concepts of space in general, ideas about the relationship between humans and nature in particular, and their representation on maps influence each other. Therefore, we would like to start with some thoughts on the development of geography as a discipline, exemplarily elaborated for the trends of geographic nature-human related thinking in Russia and Germany.

Our starting point is that especially, but not limited to, world maps seem to represent various spatial concepts as well as human-nature relationships, and as a result they produce and simultaneously represent particular spatial orders and formats (see chapter 1.4 for a definition of these concepts). Since the beginning of the nineteenth century, geography as a branch of science has undergone significant changes, and regional schools of geographical thought have also developed with varying perspectives. Numerous historians of science¹⁵ have discussed in detail the history of European geographical thought in the 20th century, which is not the subject of this working paper. This paper aims to extract from the broad history of the development of geographical thought the manner in which thinking about human-nature relationships on a global scale was evolving, and how that has been reflected or produced by maps in the geographical education system.

Russian school of geographical thought connected to ecological and planetary thinking

In Europe, the discipline of geography underwent a period of redefinition between the last quarter of the 19th century and WWI. The “national school” of professional geography in Russia dates back to 1884, when the first geography departments were established in Russian universities.¹⁶ Nonetheless, the geographical tradition of Russia (which stands for Russian pre-imperial, Soviet and post-Soviet Russia) can be traced to 1725, when Peter the Great established the Academy of Science.¹⁷ The German school, particularly the works of Alfred Hettner, Friedrich Ratzel, and Ferdinand von Rich-

15 e.g. Martin, Geoffrey J. (2005): *All possible worlds. A history of geographical ideas*. 4th ed., New York: Oxford Univ. Press; Dunbar, Gary S. (ed.) (2001): *Geography. Discipline, profession and subject since 1870; an international survey*. Dordrecht: Kluwer Academic Publ (GeoJournal Library, 62).

16 Hooson, D. J. (1968): The development of geography in pre-Soviet Russia. *Annals of the Association of American Geographers*, 58(2), p. 250–272.

17 *Ibid*, and also see Shaw, D. J. (1996): Geographical practice and its significance in Peter the Great’s Russia. *Journal of Historical Geography*, 22 (2), p. 160–176.

thofen (see below), influenced Russian geographical thought the most.¹⁸ Kruber was the first Russian scientist to recognise geography as an independent branch of science and a distinct field of study.¹⁹ Shaw / Oldfield²⁰ have outlined several characteristics of the Russian (and then Soviet) geographical school as it emerged in the 1880s: an emphasis on fieldwork and exploration, a bias towards the physical rather than the human side of the discipline (and consequently geography's growing proximity to cognate sciences like geology, soil science, and meteorology), and the significant role of aligning the research agenda with Soviet planned economy.²¹ Shaw and Oldfield also identified the prevalence of a landscape approach (*landshaftovedenie*) in Soviet geography. Martin²² identifies these same characteristics, arguing that Soviet geography remained a natural science rather than a social science until the 1980s and was heavily focused on serving the economic needs of the country. For the purposes of this paper, the ecological aspect of Soviet geographical thought is the most significant. This aspect of human–nature relations, which is unique to Soviet geography and has its origins in pre-revolutionary Russian geographical thought, is the attitude toward nature conservation and ecology. Weiner²³ summarised and analysed the aims emphasising the utilitarian, cultural-aesthetic-ethical, and scientific justifications for nature conservation in prerevolutionary Russia.²⁴ The basis of all three approaches is a relatively utilitarian relationship with nature. Weiner traces the utilitarian tradition of nature protection back to the hunting law of 1852, which 'allowed' the year-round hunting of 'harmful' animals without restrictions and thus created a hierarchy of animals. The cultural-aesthetic and utilitarian approaches are contrasted. Weiner associates it with the 'neo-romantic mood' against the backdrop of modernism, industrialism, and the German school of geography, which even 'provided key terms' for Russian conservation: the Russian '*pamyatniki prirody*' is an almost literal translation of the German 'Naturdenkmal'. However, in Weiner's opinion, the Soviet Union experienced "first the success and then the subsequent collapse of ecological conservation." The Soviet approach to conservation was primarily pre-revolutionary ecological ('scientific') in nature. However, Weiner emphasises that the conservation mission was constantly attempting to strike a balance with the utilitarian view of nature imposed by the Soviet government; ecological conservationists frequently found themselves in conflict with government economic plans. Thus, the Soviet geographical school viewed "nature" as an objective reality that could be studied, described by sets of laws, and utilised for socialist purposes. These characteristics—the dominance of physical geography and the landscape approach, the utilitarian view of nature, and the absence of conservation practises in the school of Soviet geography—influenced the human–nature and human–animal relationship on multiple levels, including education, in this knowledge production system.

German school of geographical thought connected to ecological and planetary thinking

In Germany as early as the 1820s, Carl Ritter's appointment to a chair of "Erd-, Länder-, Völker- und Staatenkunde" at Berlin University (1820) and the founding of the "Gesellschaft für Erdkunde" (1828) led to a certain institutionalization of geography in the capital of Prussia, Berlin. The other classical "founding figure" of modern geography was Alexander von Humboldt. With his integrative empirical

18 Ibid, pp. 120–135.

19 Loskutova, M. (2011): 'Nauka oblastnogo masshtaba: ideya yestestvennykh rayonov v russkoy geografii i istoki krayevedcheskogo dvizheniya 1920-kh godov.' *Ab Imperio*, (2 / 2011), pp. 83–121.

20 Shaw, Denis, Oldfield, John (2007): *Landscape science: a Russian geographical tradition*. *Annals of the association of american geographers*, 97(1), 111–126, Oldfield, John, Shaw, Denis (2015). *The development of Russian environmental thought: scientific and geographical perspectives on the natural environment*. Routledge.

21 Oldfield / Shaw (2015), p. 135

22 Martin, Geoffrey (2005): *All possible worlds: A history of geographical ideas*. OUP Catalogue.

23 Weiner, Douglas R. (2000): *Models of nature: ecology, conservation, and cultural revolution in Soviet Russia*. University of Pittsburgh Pre.

24 Ibid, p. 10

observation on the ground he had created what today is sometimes called “Humboldtian science”: the ideal of the later scientific geography and foreign research activity.²⁵

Ritter’s conception of geography became the model of an ideal synthesis of natural units of the earth surface (Länder) which were not following political divisions and their population. The synthetic descriptions of these countries, which should not merely consist of a simple addition of facts, as in the political science of states (Staatenkunde), should in turn be encompassed by a comparative geography (vergleichende Erdkunde). Already for Ritter the relationship between people and nature, especially the connection between climatic conditions and cultures had been a central object of interest. But where Humboldt followed a more nomothetic approach, Ritter had more of a historical-idiographic method in mind. In the tension between both approaches, the methodological disputes of the establishing science of geography, a “bridging subject” between human and natural sciences, developed.²⁶

After 1870, the academic discipline of geography was strengthened by the establishment of chairs at German universities, which was done in several waves. The question then, and well into the 20th century, was how to create a common understanding of its objects of research and its methods.²⁷ Crucial for the discipline was its emancipation from history and pure political geography where it merely served for illustrating historical events and depicting changing state borders. In this methodological discourse the conception of influential figures as Ferdinand von Richthofen or Oscar Peschel who defined geography as a natural science of the earth’s surface (with a strong geomorphological perspective) prevailed. With the triumph of natural scientific methods, the conditions for the establishment of geography as a discipline had shifted towards physical geography in the last third of the 19th century. But although the Strasbourg professor Georg Gerland proposed to focus purely on geophysical relations, humans and their political and social dimension as objects of research never disappeared from German geography. And Friedrich Ratzel’s multi-volume “Anthropogeographie,” published in the 1880s and 90s, laid the foundation for a renewal of human geography, especially after the First World War.²⁸

From the very beginning, there was a perspective of understanding the earth as an interdependent system of humankind and nature on a planetary scale. This was flanked by the globalization push in the second half of the 19th century. The goal was to be able to describe and explain the whole world in its totality within one science, geography, with a uniform method of observation and the same terminology. A visual translation of this ambition was the world map that made different but interconnected phenomena comparable on a global scale. Thus, the ideal result was a depiction of different zones, regions and places but embedded in a unified overall framework and structured by different scales. The earth was already considered as a complex, interacting and entangled system. The intention was to get to know this system better and better and to use this knowledge for economic development and the ideal of human progress.²⁹

Richthofen conceived Geography as a science where the general Geography (allgemeine Geographie) synthesizes general causal laws for larger parts of the world out of the data from specific regions which should be delivered by regional geography (Länderkunde). After 1900, Alfred Hettner and other scholars transformed this understanding of Geography. They considered Länderkunde

25 Cannon, Susan Faye (1978): *Science in Culture. The Early Victorian Period*, New York: Science History Publications.

26 Schultz, Hans-Dietrich (1980): *Die deutschsprachige Geographie von 1800 bis 1970. Ein Beitrag zur Geschichte ihrer Methodologie*, Berlin: Geographisches Institut der Freien Universität Berlin.

27 Ibid. See also Wardenga, Ute (1995a): *Geographie als Chorologie. Zur Genese und Struktur von Alfred Hettners Konstrukt der Geographie*, Stuttgart: Steiner.

28 Wardenga, Ute (1995b): “Nun ist alles anders”: Erster Weltkrieg und Hochschulgeographie, in: Wardenga, Ute / Hönsch, Ingrid (eds.), *Kontinuität und Diskontinuität der deutschen Geographie in Umbruchphasen. Studien zur Geschichte der Geographie*, Münster: Institute of Geography.

29 Laak, Dirk van (2004): *Imperiale Infrastruktur. Deutsche Planungen für eine Erschließung Afrikas 1880–1960*, Paderborn et al.: Schöningh, pp. 94–99. Supan, Alexander (1906): *Die territoriale Entwicklung der europäischen Kolonien. Mit einem kolonialgeschichtlichen Atlas von 12 Karten und 40 Kärtchen im Text*, Gotha: Justus Perthes, p. 318.

as being able to explore and depict causal natural laws also for smaller regions and landscapes, so on a larger scale than Richthofen thought it was possible. In consequence, Länderkunde was more valorized for scientific geography by these scholars as before.³⁰ For this type of regional research Hettner developed or developed further (because it existed already before) a scheme (länderkundliches Schema) for the depiction of individual regions in order to enable a methodologically validated comparison of individual regions and landscapes (vergleichende Länderkunde). This scheme aims at a very comprehensive coverage of natural and human phenomena in a limited space, starting with geology and geomorphology continuing with climate, hydrology, flora, soils, fauna and ending with human economy, transport and finally cultural, political and religious forms of organisation and order.

Of particular interest for our research is the elaborated understanding of geographical thinking of the late 19th and early 20th century with a deep interest about the human-nature or maybe better human-non-human relations. Even if Hettner and Richthofen were different in their estimation about the role of Länderkunde (regional geography) they shared a way of thinking that moved in its explanatory logic from natural phenomena towards human phenomena. Both considered nature not as a definitive determinant, but as a factor, which provides challenges and limitations to human activity (political geography searched in parallel for ideal “natural boundaries” of states).³¹

Similarities among geographical schools of thought

As a common feature in the conception of the relationship between man and nature from the late 19th to the second third of the 20th century, we can identify an understanding that sees in nature or in the non-human sphere above all a potential for human intervention, exploitation and extraction to improve human living conditions. On the one hand, there are profound similarities here between the Russian geographical school of thought and the socialist-influenced geography in East-Germany (GDR) after 1945. The academic geography of West Germany (rejected by the GDR as “bourgeois geography”) continued, to a certain extent, to follow the traditional interpretation that the ability to exploit nature was a sign of cultural ability and, building on this, argued in favour of colonial projects as cultural missions.³² On the other side, even if colonialism was officially rejected by socialist geography, the ideal of efficient control and exploitation of natural “resources” for the “good” of the people was structurally the same.

In this sense, the ability to transform and utilize nature according to human needs was seen on both sides of the “Iron Curtain” as an indicator of the state of culture and economic development. However, both social orders regarded the planetary ecosystem as relatively static, unchangeable and independent of human intervention. At the global level, long-term or permanent human-induced changes were hardly taken into account (at the local level this was rather an issue). However, empirical measurements at the global level were still quite underdeveloped until the 1950s and 60s.³³

In both social systems, in the predominant understanding of human-environment relationship prior to the 1970s, nature was consequently either potential or determinant, but not part of a reciprocal planetary ecological system of humans and the environment. This was also due to a dichotomous understanding of a culture-nature difference (indigenous peoples as “Naturvölker” were placed on the side of nature, it was a “duty” to “cultivate” them). In Germany, the idea of nature conservation

30 Wardenga 1995a, pp. 55–58.

31 Schultz, Hans-Dietrich (2002): Raumkonstrukte der klassischen deutschsprachigen Geographie des 19./20. Jahrhunderts im Kontext ihrer Zeit. Ein Überblick, in: *Geschichte und Gesellschaft*, 28, vol. 3, pp. 343–377.

32 Barth, Boris / Osterhammel, Jürgen (eds.) (2005): *Zivilisierungsmissionen. Imperiale Weltverbesserung seit dem 18. Jahrhundert*, Konstanz: UVK-Verlagsgesellschaft.

33 Oldfield, Jonathan D. (2016): Mikhail Budyko’s (1920–2001) contributions to Global Climate Science: from heat balances to climate change and global ecology, in: *WIREs Climate Change*, vol. 7, pp. 682–692. DOI: 10.1002/wcc.412, accessed March 20, 2023.

was already known in the 19th century, but it was limited to local or national measures and was often linked to political intentions such as "Heimatschutz" (e. g. the "German forest").³⁴

More prominent in Western Societies, over the course of the second half of the 20th century, a different paradigm of ecological thinking was developing which sees in humanity a very influencing factor on a planetary level and which at least in parts problematizes human activity. Some important stages here were the 1972 Club of Rome report on the limits to growth, the iconic Apollo17 image of the "Blue Marble" in the same year, the Chernobyl disaster of 1986, the discourses around global population growth since the 1970s, and the Anthropocene debate since the 2000s.³⁵ In this regard, in most industrialized societies and even beyond, there has been a remarkable and fundamental shift over the course of the 20th century from nature (despite all its idealizations) as a rather passive object of research and human intervention to a complex (self-)observing human-environment relationship on a comprehensive, planetary scale. Corresponding to that, beginning in 1970s, German geography underwent a conceptual change³⁶ from traditional *Länderkunde* to a stronger emphasis on functional systems, which were to be researched with quantitative methods. Human geography increasingly understood itself as a constructivist science of spatial human-environment relations.

Ecology as a cross-disciplinary concept in Western Societies in the 20th century

As this paper makes the concept of ecology so prominent in connection to spatial thinking and visually representation in maps, this paragraph wants to highlight the emergence and use of the concept in various disciplines over the course of the 20th century, especially in Western societies.

Ernst Haeckel was the first to define the term Ecology.³⁷ As physician, zoologist, philosopher and draftsman he adopted and developed Darwins theory in the 1860s and was initially defining the term "Ecology" in 1866. Adapting the term, J. Paul Goode is known as the one who introduced 'Human Ecology' as a study of the geographic conditions of human culture into US geography in 1907.³⁸ Being an economic geographer (and later atlas maker at University of Chicago) Goode defined human ecology as "a study of the geographic conditions of human culture. This would include the political and commercial and military and some other phases of geography."³⁹ In the 1920s also U.S. sociology, namely the Chicago School of Sociology with Robert E. Park, Ernest W. Burgess and Roderick McKenzie, discussed human ecology and its place and impact on spatio-temporal positioning of populations and institutions.⁴⁰ Even if there is no evidence of collaboration, it can be assumed that this constellation of simultaneous work on the concept of human ecology in various disciplines in Chicago had a significant influence on the development of Goode's atlas concept (first edition 1923) and its content. The concept of Human Ecology was further developed by American Geographers in part as an alternate to determinism in the first decade of the 20th century, when Geomorphology and Geography consolidated their own disciplinary developments and where there was the need for

34 Zechner, Johannes (2016): *Der deutsche Wald. Eine Ideengeschichte zwischen Poesie und Ideologie 1800–1945*, Darmstadt: Philipp von Zabern.

35 Speich Chassé, Daniel (2012): Fortschritt und Entwicklung, Version: 1.0, in: *Docupedia-Zeitgeschichte*, DOI: <http://dx.doi.org/10.14765/zzf.dok.2.270.v1>, accessed march 20, 2023.

36 See Michel, Boris / Paulus, Katharina (2018): *Jenseits von Kiel: Zu einer Wissenschaftsgeschichte der quantitativ-theoretischen Wende in der deutschsprachigen Geographie*, in: *Geographica Helvetica*, 73, pp. 301–307.

37 Haeckel, Ernst (1866): *Generelle Morphologie der Organismen. Allgemeine Grundzüge der organischen Formen-Wissenschaft, mechanisch begründet durch die von Charles Darwin reformirte Descendenz-Theorie*. Band 2, Berlin, p. 286.

38 Martin, Geoffrey J. (1984): John Paul Goode 1862–1932. In: Freeman T. W (ed.): *Geographers. Bibliographical studies*. Volume 8. London, New York: Mansell Publishing Limited, pp. 51–55, p. 53

39 Martin, Geoffrey J. (2014): *American geography and geographers. Toward geographical science*. Oxford, New York: Oxford University Press, p. 777.

40 e.g. McKenzie, R. D. (1924): *The Ecological Approach to the Study of the Human Community*. In: *American Journal of Sociology* 30 (3), pp. 287–301.

geography to disciplinary define its foci and purpose.⁴¹ In US academia “human ecology has been a stimulus for a diverse family of ideas about human-environment relations⁴² addressing “a broader perspective and holistic view of the world”.⁴³ Our aim in analysing atlases is to follow such traces and to recognize when new concepts appear in educational atlases and therefore become relevant for the spatial understanding of an entire society, i.e. how long it takes, for example, for scientific knowledge to become established as a social consensus.

Despite regional differences in approaches to geography as a subject, concerns about the planet’s ecology and climate change began to grow after the Second World War. The beginning of the Anthropocene was marked by the growing awareness of the ecological impact of the previous decades of modernization, which has also reframed human-nature relationships in scholarly discourse and policy. Morton argues in one of the most important and comprehensive summaries of the history of ecological thought that the primary obstacle to environmental thought is the image of nature itself: “Nature was an ideal image, a self-contained form suspended afar, shimmering and naked behind glass like an expensive painting”.⁴⁴ This book explores the value of art in imagining environmental projects, ranging widely from the 18th century to contemporary philosophy, culture, and history. Through the history of capitalism, the contexts of ecological constructions are traced. In environmental philosophy, it has frequently been argued that adopting a new ecological worldview is required to generate environmentalist social change in response to ecological crisis.⁴⁵ For atlas analysis such art related aspects are important and to consider due to influences of aesthetics to map production and map perception as well as the representation of space combining various visual formats (maps, photos, pictures) and text in atlases or in educational exhibitions etc.

Ecological thought in more recent years is also connected to concepts of the Anthropocene as well as Plantationocene⁴⁶. Commonalities and differences of both terms will not be discussed here, but both have sparked a revival of conversations about sustainability and the rights of non-human actors, which at least partly can be traced in the concepts and visual layouts of educational atlases. In connection to the notion of Anthropocene, for instance the previous approaches to the human-nature relationships and how they have contributed to climate change, are discussed.⁴⁷ Important aspects are how past approaches to the earth have harmed the planet in ways that will have lasting effects on future generations; how the old human-centrism or anthropocentrism of the 20th century, national tribalism, and our short-term perspectives must give way to new ways of thinking that accord moral standing to other animals and that take global and long-term perspectives;⁴⁸ and how future maps and other spatial visualisations have to be designed to support such understandings and perspectives. One approach among others could be, for example, the self-centered view of Western societies that has been learned over centuries by centring and aligning maps. Irritating visualisations like a fish-eye-perspectives can make users think about their role in the world and for the environment.

Especially aspects of sustainable development necessitate substantial shifts in philosophical and religious perspectives and a shift in attitudes toward mass transportation, consumption, and

41 E. g. Barrows, Harlan H. (1923): *Geography as Human Ecology*. In: *Annals of the Association of American Geographers* 13 (1), pp. 1–14.

42 Borden, Richard J. (2008): *A Brief History of SHE: Reflections on the Founding and First Twenty Five Years of the Society for Human Ecology*. In: *Human Ecology Review* 15 (1), pp. 95–108, p. 95.

43 Preiser, W.F.E. (1986): *A letter from the president*. *Human Ecology Bulletin* 3, pp. 1–4, quoted after: Borden 2008: 96 (see above).

44 Morton, Timothy (2012): *The ecological thought*. Cambridge, Mass.: Harvard Univ. Press, p. 5.

45 See e. g., Peterson, Keith R. (2021): *The Very Idea of an Ecological Worldview*. In: *Ethics & the Environment* 26 (1), pp. 21–55.

46 Haraway, Donna (2015): *Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin*. In: *Environmental Humanities* 6 (1), pp. 159–165; Barua, Maan, Rebeca Ibáñez Martín, and Marthe Achtnich (2023): *Introduction: Plantationocene*. In: *Theorizing the Contemporary, Fieldsights*. <https://culanth.org/fieldsights/introduction-plantationocene>.

47 Wallraff, Dean (2022): *Earthing. A new ethics for the anthropocene*. [S.l.]: Ethics International Press.

48 *Ibid.* See also: Sólón, Pablo (2018): *The Rights of Mother Earth*. In: Vishwas Satgar (eds.): *The Climate Crisis. South African and Global Democratic Eco-Socialist Alternatives: Wits University Press (Democratic Marxism Series)*, pp. 107–130.

emission. Population growth and demands for improved material well-being will result in mutually exclusive pressures on water and the environment in the developing world.⁴⁹

Consequences of modes of geographical and ecological thinking for atlas cartography

The sequence of above mentioned Hettner's *Länderkunde*-scheme also gives an indication of how to read and understand atlases, namely to see an atlas as a compendium of different layers with combinable dimensions. As such, an atlas is a medium that can incorporate very different spatial formats, also depending on how maps are combined and compared. Additionally, an atlas can be seen as a compendium that allows to compare different phenomena (human and non-human) of the whole world.

After the experience of the First World War, geographers attacked this kind of understanding as geodeterministic and as blind to the possibilities of human activity and technique to overcome and transform geofactors and other environmental conditions (for an example of the Soviet version of this thinking see fig. 6).⁵⁰ Even though Hettner emphasized that the scheme of regional geography was only an analytical system to organize studies in regional geography according to a general order to make them comparable, but without an implicit causal hierarchy of the different dimensions. Rather, it was a relational concept that Hettner had in mind to describe the impact of natural conditions on humans and vice versa.⁵¹ However, since the sequence of the different dimensions within the scheme of regional geography was directly transferred to atlas structures and starts from geofactors and then moves on to human phenomena, this system, conceived as a mere enabling framework, could be misunderstood as if geofactors were decisive for human economy and culture. This was the case both in the popular understanding of geography and in its political implementation. Consequently, Central European school atlases focused on physical maps rather than thematic maps until the 1960s and 70s. This was due to geodeterminist philosophies that claimed that the economic form of a society depended on physical factors.⁵² But of course, we are faced with changes in the understanding of human ecology. As a result of the critique of geo-determinism, since the 1920s there has been much greater recognition of the influence of human factors such as culture and technology in shaping landscapes, regions, etc. Such changes influenced also the atlases that included more and more thematic maps, first especially economic maps, gradually added by maps on land use, population, etc. up to maps on the impact of climate change to living conditions in most recent editions.

And also the conceptual change of German geography was reflected in German school atlases. First, the curricula were fundamentally revised. After 1970s, they focused more on competencies to be acquired than on concrete content to be learned. In 1976, the completely new designed Alexander Atlas was published for the first time by Klett publishing house. The traditional "Diercke-Atlas" from Westermann publishing house had already been comprehensively redesigned in 1974 with a large amount of new thematic maps and topics. But the implementation of environmental issues in maps did not begin in a comprehensive way until the 1990s. The successive increase in environmental topics has been reflected in new editions since then and received a renewed push in more recent editions since the 2000s.

49 Harremoës, Poul (1996). Dilemmas in Ethics: Towards a Sustainable Society. In: *Ambio*, 25(6), pp. 390–395.

50 Wardenga, Ute (2006): *Geographie*, in: Eckart, Wolfgang et al. (eds.): *Die Universität Heidelberg im Nationalsozialismus*, Heidelberg: Springer, pp. 1213–1244, 1213.

51 Wardenga 1995a, pp. 15–17 and 217–225.

52 Ormeling, Ferjan (2015): *School Atlas*, in: Monmonier, Mark et al. (eds.): *Cartography in the Twentieth Century, Part 1 (The History of Cartography, vol. VI)*, Chicago/London: The University of Chicago Press, pp. 106–110, 107.

1.4 Spatial formats concept through analysis of maps and atlases

Brief definition of spatial formats and spatial orders

The objective of the CRC 1199 is to examine processes of spatialization under the global condition with an emphasis on the role of space in social interaction.⁵³ One of the starting points was the call for a multidimensional consideration of sociospatial relations by Jessop et al.⁵⁴ They suggested the so-called TPSN scheme as a combined, multiperspective view on spaces and spatial relations taking territories, places, networks as well as scales (TPSN) into account. According to our understanding in the CRC, the use of abstract, ideal categories is problematic because it hides the point of perspective their development started.⁵⁵ Below, we would like to discuss them again in terms of mapping.

As an alternative, the concept of spatial formats and spatial orders was developed.⁵⁶ Both notions are actor centred and as such focusing on intentionally thinking, speaking, drawing, planning and doing, highlighting the processual character. The development and use of spatial formats can be empirically investigated, they are not stable but subject to constant negotiation, they can change and develop. As we trace them during various historical stages, they can be described by us as researchers but they were not necessarily used as terms by the actors of the time. Such actors used a set of spatial semantics to explain their doing and used various kinds of visual and written material to produce and transfer spatial knowledge and spatial imaginations⁵⁷, which we interpret as a specific spatial format with a specific standpoint. Additionally, actors developed a spatial literacy to be able to deal with a given set of spatially bound norms and rules and to change them.

We are aware that also our approach contains a special point of view, which we need to reflect, to relate to our sources and if possible to describe in our interpretation. Nevertheless, we have to assume that our interpretations are related to norms and standards that have emerged especially from a Western way of thinking – and in our special case – from a way of training concerning mapping.

Specific conjunctions of spatial formats within a certain point in time or time period we call spatial orders. They include a set of spatial formats, which might differ concerning tasks or aims of actors, their viewpoints in terms of space and time as well as education and training. The CRC investigates the evolution of various spatial formats and orders through time, actors, and institutions that have influenced their formation. Through the empires of the nineteenth century to the modern nation-states of the late nineteenth and twentieth centuries, CRC also explores and describes the extent to which global processes and globalization projects have shaped spatial orders and formats.

From our analysis of maps and atlases we additionally expected to find new or different spatial formats than those already identified and described due to the specific visual “language” of the material. Having in mind the strong focus of educational material to national, i.e. territorial, purposes, we were curious to “see” if and how maps possibly could add something other than the territorialized spatial format we are all accustomed to.

53 For further reading on spatial formats and spatial orders see: Middell, Matthias (2019): Raumformate – Bausteine in Prozessen der Neuverräumlichung. Universität Leipzig. Leipzig (Working paper series des SFB 1199 an der Universität Leipzig, 14); Middell, Matthias (2019): Category of Spatial Formats: To What End? In: Steffi Marung und Matthias Middell (eds.): Spatial formats under the global condition. Berlin, Boston: Walter de Gruyter (Dialectics of the global), pp. 15-47.

54 Jessop, Bob; Brenner, Neil; Jones, Martin (2008): Theorizing sociospatial relations. In: Environment and Planning D: Society and Space 26 (3), pp. 389–401.

55 see Middell (2019): Category of Spatial Formats: pp. 21–22.

56 see Middell (2019): Category of Spatial Formats: pp. 27–28.

57 see Möhring, Maren; Pizarz-Ramirez, Gabriele; Wardenga, Ute (2019): Imaginationen. Berlin, Boston: Walter de Gruyter (Dialektik des Globalen. Kernbegriffe, 5).

Methods used to analyse spatial formats in maps and atlases

For our analysis of how and with which visual and textual means and specific combinations aspects of a construct such as “spatial formats” appear on maps, we use a combination of complementary methods. These include (1) discourse analyses, e. g. of archive material in the form of letters or reports from cartographic production, but also of reviews or advertisements of new atlases, (2) interviews with mapmakers, especially from school atlas production in the German-speaking world, and (3) content analyses of maps and atlases for our international comparative approach in order to identify differences and similarities in map production regions and in time with regard to subjects, symbols, map design and other map elements.

In terms of the content analysis part, in our previous research, we have developed a method that enables us to deconstruct maps, taking the single pieces and framings of map production into account. While the full description of the method can be accessed in a publication by Cherrier et al.,⁵⁸ here in brief, we have applied a mainly binary coding table, coding a defined set of maps out of educational school atlases. On the one hand, this coding scheme allows for synchron as well as diachron comparison of a larger set of maps and atlases. On the other hand, we aim to use these codings to identify spatial formats, such as empires, nation states or networks, in maps and atlases. While searching for analytical starting points we have to state that:

- binary codings de-connect the symbology used in a map from its specific meaning. Therefore, the nature of maps as a visual medium whose effect is shaped by a complex set of symbols is lost. We can only document the specific connection of the used symbology to a topic and to the map title but are not able to code every single meaning which is encompassed in the totality of the map;
- coding allows on the other hand for in-depth analysis of regional as well as temporal developments in the use of the symbology. We are, for instance, able to “see” a rise of the use of arrows in German atlases starting in the 1970s.
- maps consist of a limited set of graphic drawing elements – points, lines and polygons. Even though these are varied in many ways (graphic variables⁵⁹), numerous content-related information is visualised with a small set of graphic variables, which makes the unambiguous interpretation of spatial formats much more difficult. Therefore, a combination of content, drawing elements, and context information is required in order to be able to conclude on certain spatial formats.

At this point, it is worth taking a second look at the TPSN scheme from a cartographic and map-analytical perspective. At first glance, the TPSN scheme is relatively easy to apply to maps: According to the definition, a territory is delimited from other territories by a boundary of some kind.⁶⁰ Such boundaries usually appear on maps either as lines, as border contour coloring or as sharply coloured

58 see Cherrier, Pierre; Moser, Jana; Lentz, Sebastian; Pflug, Laura (2019): Raumformate und Kartensprachen erkennen. Vorschlag einer Methodik zur Analyse von Karten und (Schul)Atlanten als Vermittler von Weltbildern unter Globalisierungsprozessen. Leipzig: Leipziger Universitätsverlag (Working paper series des SFB 1199 an der Universität Leipzig, 19).

59 Graphic Variables – the change of symbols to derive a specific meaning – for printed maps are for instance size and form of symbols, their colour, hue or pattern (see: Bertin, Jacques (1967): *Sémiologie graphique: les diagrammes, les réseaux, les cartes*. Paris). An important feature of maps is also the labelling. The set of variables was extended for digital, interactive mapping by highlighting, focussing and few more (see MacEachren, Alan M. (1995): *How maps work. Representation, visualization, and design*. New York: Guilford Press).

60 Maier, Charles S. (2016): *Once Within Borders. Territories of Power, Wealth, and Belonging since 1500*. Cambridge, MA: Harvard University Press.

areas. However, the content dimension of territory is a decisive factor in describing the changes in the understanding of space in a historical perspective, for example:

- the property rights or claims to a region,
- the installation of power as well as
- legal and socio-organisational regulations as a set of political-technological practices.⁶¹

This is something we also have to deal with in the analysis of spatial formats from our coding. It is easy to see and analyse the increase or decline of arrows or borderlines. It is much harder to interpret these symbols in terms of their meaning taking a larger set of maps (around 3000 coded maps) into account. Therefore, we have analysed the manner in which educational cartography in various nations represents spatial formats and correlated it with the specific map semiotics and map properties associated with them.

Interweaving of spatial concepts in maps

Nonetheless, during our research on the production of educational cartography and our analysis of the specifics, we came across spatial formats that go beyond territorial ones and that we did not expect to find in maps as a standardised and very nation-state-bound materials. In other words, we began to encounter visual representations that can clearly be defined as spatial formats of a different sort, which goes beyond a defined territorial dimension, and emphasises the (global) interconnection and interdependencies beyond national responsibilities.

To be clear at this point: there is not only one single spatial format or single spatial order at a time⁶² and we have, despite all our efforts to systematise, always a complex interweaving of different spatial formats in mind. The same is valid for maps that in general combine various spatial imaginations. That means, when speaking about non-territorial spatial formats that we can “see” in maps, at the same time there might be – and normally is – territorial symbology used.

We have been analysing both maps and atlases with regard to processes of social and economic development and of globalisation. The question that arises here is what kind of non-territorial spatial formats there might be and what the conceptual and visual distinction between territorial and non-territorial spatial format is. On the following pages we want to develop how we think educational atlases produce or reflect ideas about human-nature or universal laws.

To be able to approach it and recognise different spatial formats, we wished to elaborate on what we consider to be non-territorial spatial formats and how we relate them to our overall understanding of human-nature relationships. Today we face debates about planetary thinking in various disciplines, not only in geography.⁶³

61 after Elden, Stuart (2011): Die Entstehung des Territoriums. Übersetzung: Jochen Mayer und Luise Fischer. In: Erlanger Beiträge zur Kulturgeographie 1, pp. 1–11.

62 Therefore, these notions are always meant in plural, despite describing the concept as such.

63 Hanusch, Frederic; Leggewie, Claus; Meyer, Erik (2021): Planetar denken. Ein Einstieg (X-Texte zu Kultur und Gesellschaft). Bielefeld: transcript.

2 Non-territorial spatial formats

2.1 An introduction

“Die durch Modi wie Expansion, Zirkulation und Integration entstehenden räumlich-horizontalen Strukturen sind niemals flach, sondern stets mit Hierarchien verbunden; Globalisierungen sind dreidimensional [demnach auch räumlich] und asymmetrisch.”⁶⁴

People perceive, consider and use space in various ways and such spatial views change constantly. In history some spatial views became solidified, while others were unstable, both depending on the actors and actor groups which used them. In the last two centuries, the global condition as the incapable tendency of global interconnectedness of regions, states and places, of people, goods and capital facilitated the shaping of one special territorial spatial format: the nation state.⁶⁵ At the same time, other forms continued to develop: spatial formats of networking and cooperation and associated regulations, as well as spatial formats that focus on human-nature relations. The processes of establishing connections between institutions and actors have taken on various forms. Especially in the late 20th and early 21st centuries, the widespread implementation of digital infrastructures furthered the formation of new connections and spatial formats that had been initiated by the industrialization and commercialization processes and are used today by knowledge networks. Nonetheless, these connections and non-territorial spatial formats continue to coexist with territorial ones and together they form complex spatial orders that are in tension between spatial integration and spatial dissociation.

2.2 Distinguishing between territorial and non-territorial spatial formats

As previously outlined, our aim was to find methods and approaches to distinguish between territorial and non-territorial formats, as well as how they are represented or generated by atlases. The following chapter must be understood as a search movement that oscillates between our material in the form of maps, their decoding and quantitative analysis, qualitative individual case studies, and a meta-level of CRC conceptualizations. The approach to define and describe non-territorial spatial formats can by no means be regarded as completed. A first step towards this was a kind of inventory and rough classification of spatial formats discussed in the CRC (fig. 1), with the distinction here being made according to nationalization versus internationalization, since it was through world and thematic maps on international networking that we first became aware of the non-territorial spatial formats.

64 Osterhammel, Jürgen (ed.) (2017): Die Flughöhe der Adler. Historische Essays zur globalen Gegenwart. München: C.H.Beck, p. 41.

65 Breuilly, John (2019): Modern Territoriality, the Nation-State, and Nationalism. In: Marung, Steffi und Matthias Middell (eds.): Spatial formats under the global condition. Berlin, Boston: Walter de Gruyter (Dialectics of the global), pp. 149–182.

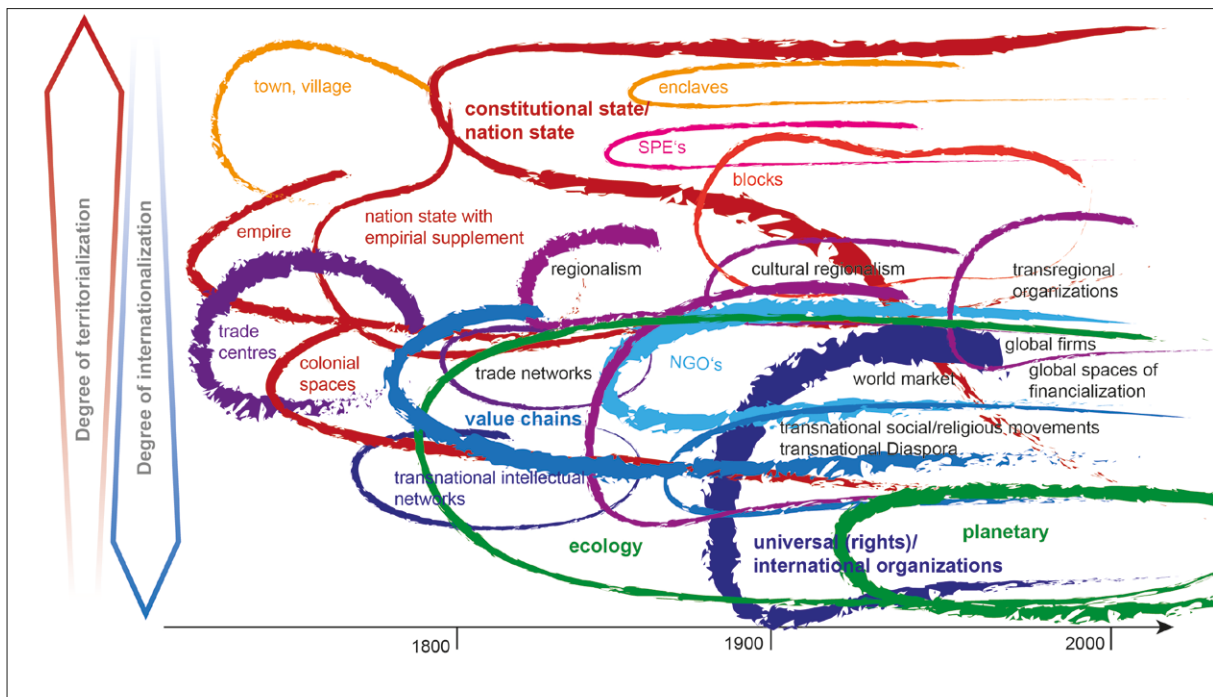


Figure 1: Conceptual approach to visualise the potential development of the territorialised and non-territorialised spatial formats. This approach may serve as a starting point for further discussion as it has the aim to become aware about the processual character of the development, where no spatial format starts from nothing but always as a continuation and re-formatting of previous formats. Nevertheless, the diagram faces some problems. First of all, it needs to be questioned if “non-territorialization” or “internationalisation” would be the best comparison to “territorialization”. Here we decided for “internationalisation” to highlight the global connectivity of some of the spatial formats. But at the same time, “internationalisation” does not necessarily mean non-territorial, as some, if not most of the formats mentioned shimmer between international collaboration and the use of national (territorial) rules, laws and organisations. Also, a critical reflection leads to the fact that the given set of spatial formats has to be understood from a Western perspective. Other forms of spatial social organisation such as nomadic life does not really fit into this kind of systematic and therefore would ask for other approaches, either in visual language or in naming and describing (graphic: selection after Middell 2019, complemented by J. Moser, 2023).

2.3 Approaching the actors challenging territorial spatiality

Since spatial formatting is constituted by people and their interactions, it is also actors or groups of actors who question, stabilise or modify existing spatial formats. One of our greatest challenges is to see spatial formatting processes as similar or different over the centuries, but to name them with the same terminology because of their respective structures. This is one of the reasons why, in our view, the TPSN scheme described above also oversimplifies and – at least apparently – names different things with the same terms, i.e. homogenizes them.

When we refer to the actors and groups of actors who have challenged the territorial spatial formatting of the world, we are referring to a variety of individuals and entrepreneurs who have actively contributed to the formation of connections between and beyond imperial, nation-state, and nation-state-dependent formats. From our point of view, there is a group of organisations, institutions, and individuals that have played a significant role in the formation of non-territorial spatial orders. We have decided to categorise them for our purposes as follows:

1. Individuals with global reach in the field of environment, global warming, and climate change, as well as human rights and bottom-up initiatives such as “Fridays for Future”.
2. Nongovernmental organisations with a global presence, such as the Red Cross, Amnesty International, Greenpeace, and WWF.

3. Scientists, authors, and artists (cultural entrepreneurs) with a concern for global social outreach.
4. Politicians and economists, such as the World Economic Forum, who discuss the social, economic, and natural consequences of climate change.
5. Globally active companies, in particular the globally active (social) media industry respectively its leaders.
6. „Global Citizens“, global activists, and digital nomads.

Nonetheless, this division that we introduce and argue for may be challenged further. Non-governmental global outreach organisations such as UNESCO, UNICEF, and regional organisations such as the African Union are one of such examples (see regionalism below, p. 22). These organisations may act extraterritorially, particularly in the areas of humanitarian aid, education, and sustainable development, but their structure and financial base are heavily dependent on territorial concepts, as their members and funders are nation states (to put it metaphorically: the nation state is part of their institutional DNA). In addition, for most of them, the data available and presented is frequently the statistical basis for reports and decisions, and nation-state-based statistics are used to produce maps and atlases for representation and decision-making processes.

All of the aforementioned actors demonstrate a specific way of thinking and acting that transcends the nation-state format, generates connections, and challenges national, and in this sense also territorial functions such as organisations, rules and regulations. Moreover, such actors challenge our anthropocentric perspective on rights and human-centered global governance as well as they represent a new way of digital communication and therefore develop special digitally-based spatialities.⁶⁶

2.4 Toolkit description: attempt to “see” non-territorial spatial formats in maps / atlases

In order to approach the manner in which the construct of non-territorial formats emerge or appear in school cartography, we have outlined two questions related to CRC 1199 definition of spatial formats:

1. Who are the actors responsible for the non-territorialized spatial order, and what are their potential objectives?
2. How have non-territorialized spatial formats evolved within the past century in general as well as in maps and atlases?

Focussing at the most fundamental level of the education system, and it’s material like educational maps, it can be quite difficult to classify which spatial concepts are represented, particularly in terms of determining whether they are territorial or non-territorial-based spatial formats. Examining maps in terms of the spatial concepts they convey, it becomes evident that spatial formats frequently overlap and combine. From the standpoint of “map reading” however, certain spatial concepts are perceived more strongly than others due to one’s own gaze training, which can lead to a one-sided perception and interpretation.

As mentioned above territorial formats are often connected to boundaries which can be visualised quite easily with lines on maps. Even in former times, when printing technology was not able to differentiate territories by coloured areas, such lines were able to demarcate a territory and therefore to claim, to include or to exclude something or someone. Having looked at about 3000 maps out of more

66 Bargués-Pedreny, Pol; Chandler, David; Simon, Elena (eds.) (2019): Mapping and politics in the digital age. London, New York: Routledge Taylor & Francis Group.

than 250 geographical atlases from various production regions we think we are able to “see” that maps can show more than what we have learned in a territorialized sense: they enable the confirmation and reproduction of non-territorial spatial formats.

To start from our empirical work we developed a table-based scheme to decode maps contents, basics and symbology as well as graphical variable using quantitative content analysis.⁶⁷ This coding serves as a basis for synchronic and diachronic analyses with larger data sets as well as a starting point for qualitative evaluations. However, for the present purpose of asking about the non-territorial spatial formats, it could be used to identify them by comparing a larger set of maps.

Therefore, our aim was to identify signifiers that enable us to distinguish between territorialized formats and non-territorialized ones:

- to have low level of the territorialisation symbology is most important,
- call for places and place-based comparison (bounded to individuals / groups); depending on observation level places can be villages, cities or even large regions, but not states,
- highlight, form and support all kinds of networks and their spatiality

This leads to highly consider a material, non-human dimension that other spatial formats do not consider, e.g. in form of a relationship between nature and human. Furthermore, we argue that non-territorial spatial formats embed planetary and ecological relations into every local action or impact, what to expect the presentation of different scale levels. Within the coding scheme this means for instance:

- maps might use borderlines for nation-states, but they must be in the background and not part of the given thematic information (we are able to see this as we differentiated it in the decoding of the maps)
- the thematic content of maps focuses on physical-geographical aspects (mainly for ecological spatial format (see below), other topics need to be interpreted depending on symbology and context,
- related to context, the combination of scales at an atlas page is likewise important, as we argue, that the comparative approach between small scale overview maps and large scale case studies of specific regions also indicate non-territoriality. As we coded additional material for maps, this may also be analysed from the coding scheme,
- the use of arrows or flowline refers to networks as non-territorial spatial formats

One primary distinction between territorialised and non-territorialised spatial formats is the spatial units addressed by each concept. Non-territorial spatial thinking contains and uses spatial components and addresses spatial dimensions at various scales that are independent from territorial spatial units. On the other hand, territorialised spatial components are primarily grounded in territorial units of varying scale as well as varying content and context. To be able to approach and “see” non-territorial spatial formats, we need to define some characteristics.

It is quite remarkable that the spatial core of non-territorialized spatial formats evolved over time as new modes of connections and networks emerged and expanded their reach.

While the rise and fall of various non-territorialized formats can be discussed in great detail, we began to focus on how school cartography can be used to trace the emergence and development of non-territorial spatial thinking, represented by spatial formats. Doing so, we always have in mind the

67 Cherrier, Pierre; Moser, Jana; Lentz, Sebastian; Pflug, Laura (2019): Raumformate und Kartensprachen erkennen. Vorschlag einer Methodik zur Analyse von Karten und (Schul)Atlanten als Vermittler von Weltbildern unter Globalisierungssprozessen. Leipzig: Leipziger Universitätsverlag (Working paper series des SFB 1199 an der Universität Leipzig, 19).

limiting character of the specific focus of geographical school atlases: serving national educational policies on the one hand and educating about the world on the other.

The pure analysis of primarily visual data, particularly maps, does not permit a comprehensive definition and depiction of different spatial formats; therefore, we decided to apply an analysis of maps and atlases that goes beyond the visual image. Our toolkit for the analysis of a map or atlas examines not only its symbols, colours, and projection, but also its production context. Therefore, the question of how to decode and interpret particular spatial formats from a map is complex and would involve multiple steps. For instance, territorial spatial formats are not only connected to the symbols chosen to create a representation, but also to those symbols that have been omitted (such as borders lines, for example) or the way an atlas page or atlas section is organised. Nonetheless, the analysis of the context of map and atlas production, such as goal and purpose, focus, contents and structure, title and legend, and choice of scales, also provides insight into the manner what kind and combination of spatial formats have been in mind and represented. Therefore, the context of the map to be analysed must always be taken into account.

2.5 Attempt to list non-territorialised spatial formats

As most spatial formats, also non-territorial ones were used before our investigation period. And as such, they also developed over time from other spatial conceptions. Nonetheless, as figure 1 demonstrates, we anticipate that non-territorialized spatial formats went through proliferation and changes in concept, meaning, and use. Just to repeat: what we describe about doings in history is done in our current terms which not necessarily have been used by contemporaries.

The purpose of this section is to provide a brief history of the evolution of non-territorialized spatial thinking, which is expressed in our research through non-territorial spatial formats over time, outlining the social and economic conditions that have shaped them as well as the direction of the intellectual development regarding humanity, civilization, and human-nature relationships. The ability to travel and establish trade and intellectual relationships beyond one's immediate surroundings is one of the most significant social and economic factors that have influenced the development of non-territorialized spatial formats. The increased mobility of people and goods because of what we call the global condition over the past two centuries promoted an awareness of mutual dependencies, fostered the growth of international networks, nongovernmental organisations with a global reach, and individual actors and activists. A further push towards global connectivity beyond territorial aspects is – from a current point of view – unquestionably the rise of the Internet and subsequent digitalization (even though it may be controlled by state actors). All of this paved the way for the development of non-territorialized spatial formats beyond the formerly dominant vector of mobility. The fact that there are some regions in which these developments are restricted is initially of secondary importance for the basic observation. As we can see, however, dramatic events such as pandemics, wars, and global geopolitical crises (such as the cold war) seem to promote rather territorial (or aggregated territorial ones) than non-territorial developments, even though there are always non-territorial spatial formats visible.

The rising awareness of the effects of the rapid modernization and industrialization of the Global North on the environment, global climate, and people's daily lives is the second major factor influencing the development of non-territorialized spatial formats.⁶⁸ On the whole, we can outline the global trend in scholarship, but also for individual areas such as energy policies, who are aware that the earth's carrying capacity has limits and that these limits have an impact on human development. Also human responsibility, and the emergence of the new global processes become more relevant, despite the

68 Orr, David W. (1992): *Ecological literacy. Education and the transition to a postmodern world*. Albany, NY: State Univ. of New York Press (SUNY series in constructive postmodern thought).

different approaches and variety of the regional schools of thought (climate migration, for example). At the same time, contradictory developments can be identified that endanger such processes.

Having analysed maps and atlases we are able to reveal the development of the ideas of non-territorialized spatial formats, which have been inspired by the emerging discourse of human-nature relationships, new discourses in the ideas of governmentality, and rising ecological awareness and conversation against the backdrop of rapid industrialization and modernization. However, there is a distinction between the appearance of a spatial format as a specific way of spatial thinking and doing in space as well as its use in terms of spatial literacy and its recognition and incorporation into the worldview. Particularly, we can speak of a time lag between the emergence and production of changes in spatial thinking by actors, on the one hand, and the incorporation of these ideas and changes into education, maps, and atlases, on the other. Equally important, particularly in the case of school atlases, are preserving forces (teachers and curriculum planners), who demand small-scale changes in school atlases and maps and who (can) prevent “revolutionary” innovations through their purchasing decisions.

Our examination of maps and atlases combined with the aforementioned thoughts as a context of the map analysis allowed us to identify a preliminary set of non-territorial spatial formats, that is not intended to be complete but should serve as starting point for further discussion.

Before the First World War, common non-territorialized formats were cultural and intellectual networks, as well as the expansion of trade. It is also important to note that during these decades, international institutionalisation was relatively low. Therefore, small groups of actors aiming for trans-territorial connections played a significant role. With the rapid development of capitalism and global markets at the end of 19th and beginning of 20th century, individual actor networks were gradually but never completely replaced by transnational corporations and cooperation (e.g. the League of Nations after First World War). The development of digital spaces and the increasing accessibility of the internet shifted this once more, restoring the power of individuals respectively of large firms (monopolists) over organisations and institutions.

Complementary to further non-territorial formats already discussed by Middell and Engel⁶⁹, like places, networks or value chains we would like to focus and further analyse spatial formats beyond territoriality that seem to have a more planetary expression. While discussing non-territorial formats we observed, that such spatializations often, if not always, need to deal with actors and institutions from territorialized formats and their respective rules, with state regulations and transnational contracts. Such relations we see in international organisations, regions, regionalism and regional organisations⁷⁰ as well as special economic zones as portals of globalisation⁷¹ and still have to be analysed more closely. On the level of mapmaking we observe this phenomena when it comes to data: even maps which visualize transnational connections or physical features in a non-territorial way are mostly build on information collected, processed and provided by government institutions.

69 see e.g.: Middell, Matthias (2019): Category of Spatial Formats: To What End? In: Steffi Marung und Matthias Middell (eds.): *Spatial formats under the global condition*. Berlin, Boston: Walter de Gruyter (Dialectics of the global), pp. 15-47; Engel, Ulf; Middell, Matthias (2005): Bruchzonen der Globalisierung, globale Krisen und Territorialitätsregimes – Kategorien einer Globalgeschichtsschreibung. In: *Comparativ* 15 (5/6), pp. 5–38, here p. 11; Engel/Middell 2005: p. 12.

70 see Engel, Ulf (2019): Regionalisms and Regional Organizations. In: Steffi Marung und Matthias Middell (eds.): *Spatial formats under the global condition*. Berlin, Boston: Walter de Gruyter (Dialectics of the global), pp. 310–333; Engel, Ulf (2018): *Regionalismen*. München, Wien: De Gruyter Oldenbourg (Dialektik des Globalen).

71 see Maruschke, Megan (2019): *Portals of Globalization. Repositioning Mumbai's Ports and Zones, 1833–2014*. Berlin, Boston: De Gruyter Oldenbourg (Dialectics of the global, volume 2).

3 Recognizing non-territorial spatial formats in maps / atlases

Maps as cultural objects and decision-making instruments first and foremost enable to see territories and to think about the planet through a territorial optics. This originates from a long tradition of learning through and with maps, but is also due to the visual possibilities of representation in maps. According to Espenhorst⁷² German school cartography developed at the beginning of the 19th century two distinct strands: one producing maps that sought to achieve a realistic and also plastic map image through the greatest attention to detail; the other preferring a plastic representation of landscapes and mountain shapes as a general overview focussing on needs of schools (especially in the case of the “Volksschulen”) instead of exact maps. For the representatives of the latter, political-topographical information was in the background. “Political boundaries were only included because neither teachers nor children at that time knew what to do with purely physical maps. So one was forced to combine both aspects somehow.”⁷³ Consequently the idea was developed to offer both physical and political maps for countries.

The following chapters will focus on our suggestion for non-territorial spatial formats as a result of our observations of the field of cartography during the last about 100 years, the structured map analysis and with view on the evolution of geographic thought and the emergence of a new ecological consciousness, both of which have redefined the nature-human relationships. This mode of thinking about the earth and questioning the anthropocentric worldview developed a specific way of spatial thinking and approaching, which include universal ethical and civilisation questions of the humans and discuss the interconnections of the world’s various processes. Based on our empirical work we would like to propose three non-territorial concepts (spatial formats) as analytical categories, which we name and define as the planetary, the ecological and the universal spatial format. In what will follow we aim to explore how the different spatial formats have been produced through different theories, but most importantly how those were developed through the maps and atlases. The non-territorial spatial formats that we aim to focus on all are connected to global thinking, interconnections, and human nature relationships. However, depending on the primary theory that underpins spatial orders and / or representations developed through maps they still differ. The scheme below aims to show our understanding on their interconnection. (fig. 2)

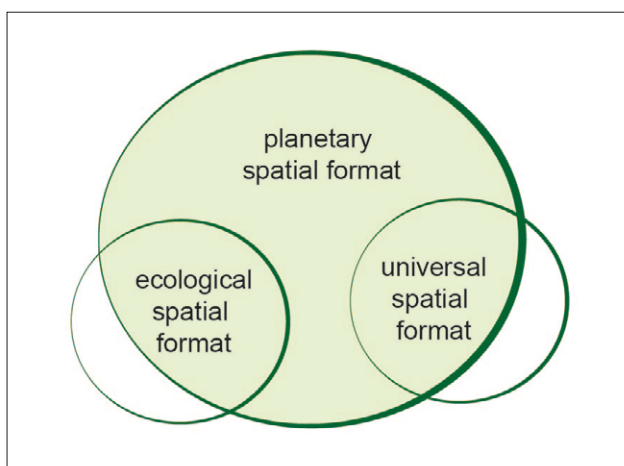


Figure 2: Our understanding of how non-territorial spatial formats as described below might relate to each other (graphic: J. Moser, 2023).

72 Espenhorst, Jürgen (ed.) (2005): Die Entstehung moderner Schulatlant in einem Berliner Netzwerk der Atlaskartographie in der ersten Hälfte des 19. Jahrhunderts. Schwerte: Pangaea-Verlag, pp. vi–vii.

73 Translated after Espenhorst 2005: pp. vi.

3.1 Spatial formats and maps

When investigating how atlases and maps represent and produce the non-territorial spatial formats we speak about two very much connected processes – the one of depicting and decoding the information, encoded in maps by the authors, and the other of reading information as users. So, this creates the constant duality in the research of the maps, which we tried to overcome by implementing a combination of quantitative and qualitative approaches towards the map decoding.

Our research on the definition of the ecological and planetary spatial formats came through our empirical work, the analysis of maps. Therefore, our enquiry was to see which cartographic characteristics could be treated as signs of non-territorial spatial formats. Our initial request originated when we saw through our methodological approach of coding the maps and atlases, that not all maps could be easily fit into the conceptually already given territorial orders, or that there are cartographic signifiers for other spatial formats that we can't ignore. All these signifiers were reflecting the non-territorial, global spatiality both in terms of contents and visualizations. That has provoked our ideas to formulate and describe those formats. We have been aiming to formalize them in the framework of existing methodology of coding maps and atlases, but also to use the qualitative methods to be able to define those formats. We have come up with some main characteristics of how these formats could be represented in the maps:

1. First and the most important trait is that there are maps without any territorialisation, in other words, the data is not tightened up to administrative divisions such as state, regions, or cities
2. The second trait is that we observe combinations of maps and visual signs that highlight human nature relationships, and which includes consideration of impacts in other areas of the world and is typical for the time and society it has been produced
3. Third important trait is that aspects of human nature relations, that we connect to the non-territorial spatial format, does not necessarily address the scale of the whole planet; instead, it can address a small piece of the earth if they reflect the ideas listed in the second point.

3.2 Planetary spatial format

Towards an understanding of the planetary spatial formats

“Only with the transport-technical connection of all parts of the earth populated in considerable extent the possibility conditions of planetary functional systems were created, which carried in principle the characteristic of the circulation, which went supplementing beyond the expansion prevailing up to then.”⁷⁴

Connection and circulation are important aspects that we apply to our understanding of the planetary spatial formats and that shape our view of the world in addition to territorialized ideas. Beside interconnections and circulation the connection of the managing human being with the living / natural space is a main feature of this proposed format. We believe that exactly the latter aspect points beyond

74 Osterhammel, Jürgen (ed.) (2017): Die Flughöhe der Adler. Historische Essays zur globalen Gegenwart. München: C.H.Beck. p. 40. (Original: „Erst mit der verkehrstechnischen Verknüpfung aller in nennenswertem Umfang besiedelten Teile der Erde wurden die Möglichkeitsbedingungen planetarischer Funktionssysteme geschaffen, die im Prinzip das Merkmal der Zirkulation trugen, das über die bis dahin vorherrschende Expansion ergänzend hinausging.“)

the definition of the global condition and thus determines the planetary space format. Engel / Middell argue that “the experience of the first closed ‘planetary context’” was accessed via news of distant countries or even one’s own view through tourist visits.⁷⁵ Since “planetary globalization is inconceivable before the beginning of regular contact between continents on both sides of the Atlantic and the Pacific,”⁷⁶ it is linked to technological developments: of means of transportation, of communication media such as telegraph and submarine cables, and of media and printing technologies. And this way of understanding the world links to a need, arising from and driven by the possibilities, to receive information about ‘the world’. Newspaper media serve this need, as do geographic societies with their journals, which combine texts with maps and images and report about ‘foreign countries’ in the truest sense of the word. But atlases also contribute to this by making commonalities, connections and dependencies ‘visible’ and ‘handy’.

From our point of view, world atlases, especially regionally and thematically structured school atlases, always offer a planetary approach primarily by their structure. By combining global and local maps, interdependencies, relationships, and circulation are visualized. Generalization enables the simultaneous representation of similar but not identical phenomena, which are nevertheless grasped and stored as identical in the reader’s perception. This indicates that a planetary spatial format does not necessarily always have to focus on the entire world; rather, it is about conditions, e.g. living conditions in one place, which are influenced by natural and man-made processes in other places.

The various atlases we have examined express the planetary format to varying degrees. In particular, planetary views are already expressed in school education in the 19th century, without being called as such (fig. 3). Social and political developments under the global condition in the first half of the 20th century become evident in atlases, as increasing networking generates more data, which in turn is visualized in an increasing number of maps.

Representation of planetary spatial formats in maps and atlases

As we said, the definition of the non-territorialised formats goes beyond just content. We have identified some map design element that refer to planetary thinking: arrows, flowlines, combination of map scales at one atlas page. That does not mean that these elements of design only and solely reflect the planetary spatial format, but rather are indicators that with the specific contents and scales these maps could do so. First we argued, that borders lines could not be present on these maps, as they are one of the most prominent indicators of the territorialised formats. However, the state borders have become an important feature of the spatial culture and visibility, and quite often are inseparable from today’s maps as they function mainly for the orientation purposes. Therefore, we have decided not to exclude the maps with state borders only based on this criterium.

As already briefly described in the section on the development of geographic thinking, the earth was already viewed by general geography in the 19th century as a complex, interrelated totality. As shown in fig. 4, there are standard combination of map topics in various atlas production regions such as vegetation and ocean currents that visualise areas of vegetation classes depending on latitude and altitude. Dynamic elements and developments were also taken into account (theory of evolution, theory of continental drift around 1910). Relationships between humans and the environment were intensively researched. For example, Diercke school atlases contain world maps on climate and on cultural forms, i.e. the form of agricultural cultivation.

75 Engel, Ulf; Middell, Matthias (2005): Bruchzonen der Globalisierung, globale Krisen und Territorialitätsregimes – Kategorien einer Globalgeschichtsschreibung. In: *Comparativ* 15 (5/6), pp. 5–38, here p. 7.

76 Osterhammel, Jürgen (ed.) (2017): *Die Flughöhe der Adler. Historische Essays zur globalen Gegenwart*. München: C.H.Beck, p. 27.

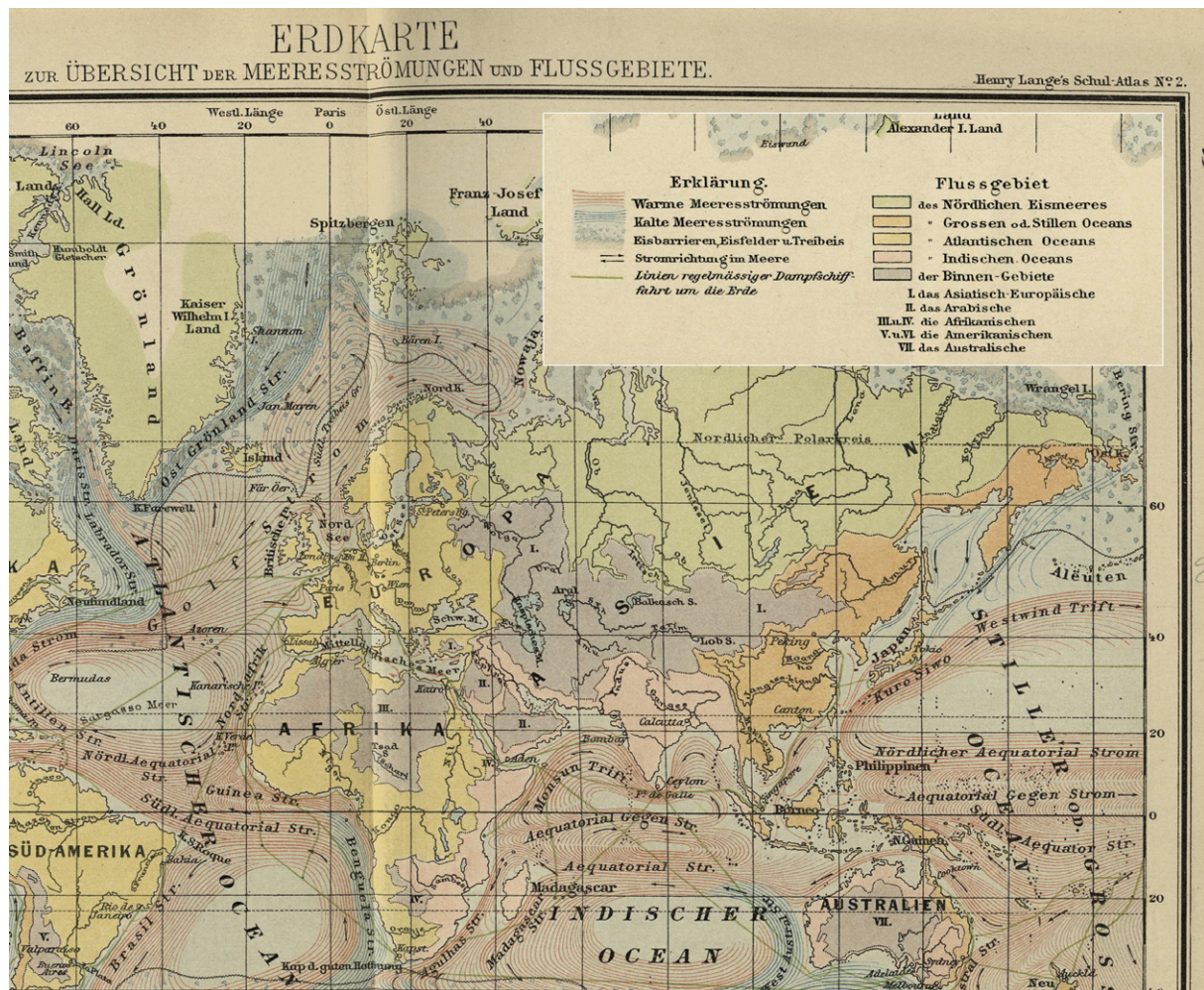


Figure 3: Extract of a map that combines ocean currents as natural feature with regularly used shipping routes. As such shipping routes made use of ocean currents in terms of being faster and more economic, the map can be seen as example showing a planetary spatial format (Erdkarte zur Übersicht der Meeresströmungen und Flussgebiete, No. 2 in: Th. Von Liechtenstern und Henry Lange's Schul-Atlas zum Unterricht in der Erdkunde, 1889, Braunschweig: George Westermann). Earlier examples from the beginning of 19th century are not that impressive as they often show only few arrows for ocean currents because their directions needed longterm and elaborated measurements at sea.

Nevertheless, human-environment relations have often been thought of in one direction, namely in terms of how nature is and could be a limitation or enabler of human life forms and its progress. Therefore, we can find maps of areas of economic insecurity in the mid-20th century (fig. 5), which can be seen as predecessor of today's maps that visualize climate impacts. Human impact on nature remained severely underexposed. An important reason for this was the dichotomous separation of nature and culture. The two, while interacting, were nevertheless conceived as complementary, opposing spheres, with indigenous peoples as "Naturvölker" placed on the side of nature, either romanticizing or claiming them as in need of development, equally diametrically opposed to European cultures.

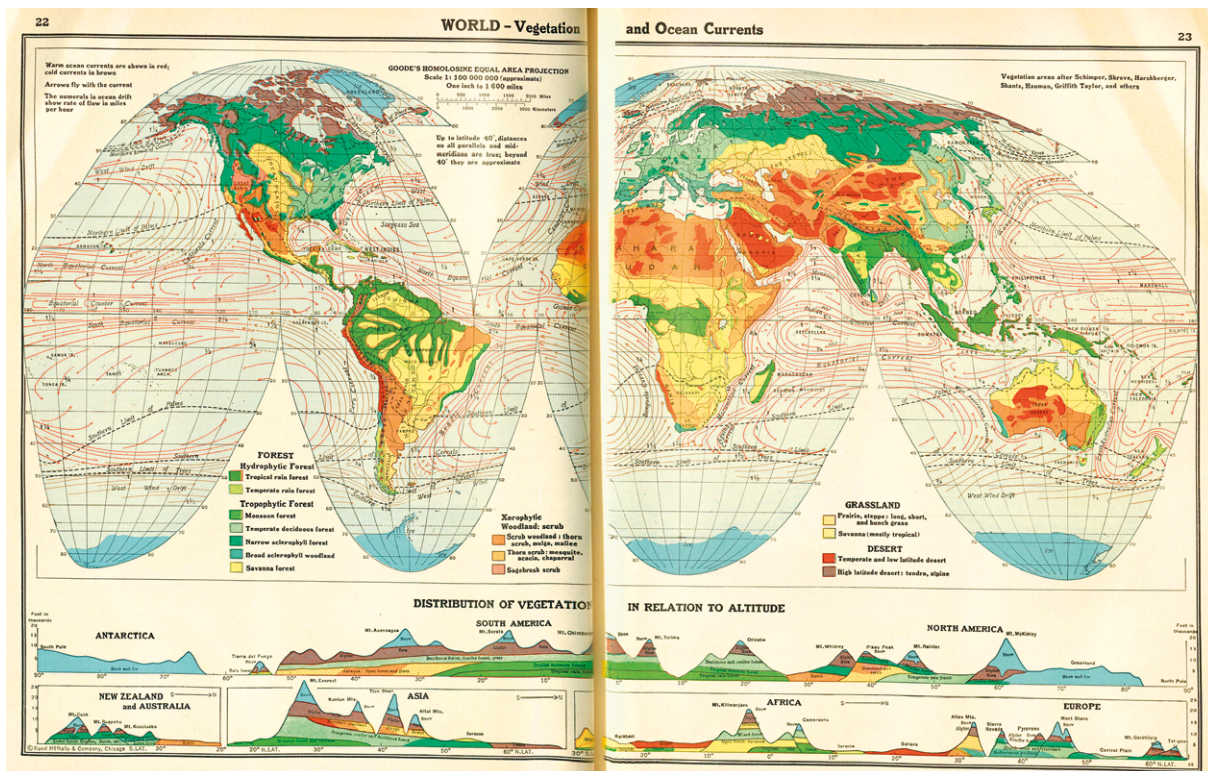


Figure 4: WORLD – Vegetation and Ocean Currents (Goode, J. Paul (eds.): Goode's School Atlas, Chicago: Rand McNally, 1939, pp. 22–23)

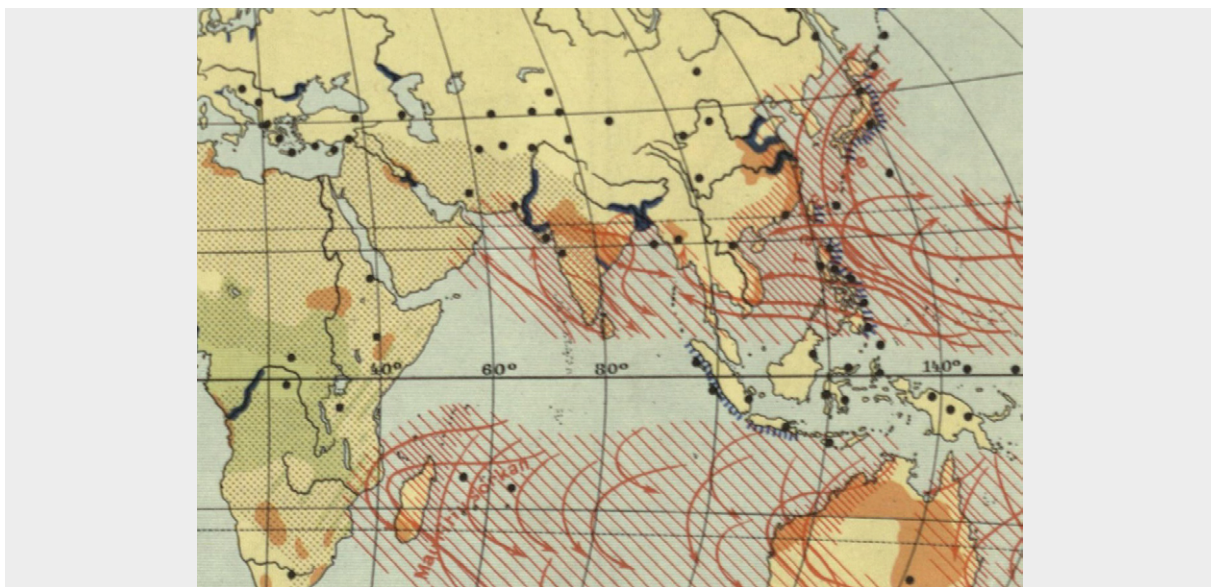


Figure 5: Extract of ‚Gebiete wirtschaftlicher Unsicherheit‘ authored by K. Hassinger, N. Fischer et al. (Dehmel, Richard (ed.): Diercke-Weltatlas, 10th ed. of the revised edition (98th ed.), Braunschweig et al.: Westermann, 1959, p. 159). With the depiction of epicenters of earthquakes and seaquakes (black dots), areas of tropical cyclones (brown hatched, the narrower the higher the damage), migration paths of irregularly recurring devastating storms (brown arrows), areas of frequent floods (blue areas), areas of frequent droughts (brown areas), the spread of the tsetse fly (green areas), and the areas where locust swarms invade (black dotted areas), the map symbolizes above all danger regions for human management. Against the background of the experience of potential (German) map readers, it is conceivable that the global spread of the phenomena is to be represented on the one hand, but also the supposed concentration of the “problems” in “inferior” areas. There is a quite similar map in more recent editions.⁷⁷ This map is placed at one atlas spread together with other visualisations, e. g. on the impact of the nuclear disaster of Fukushima (Japan) in 2011. Therefore, the human influence on nature becomes more obvious than before.

77 e.g. Diercke Weltatlas 2015, p. 252: <https://blickinsbuch.westermann.de/978-3-14-100900-2/index-h5.html#page=272>



Figure 6: Extract of “Länder des RGW (Ausschnitt) – Industrie und Bodennutzung” (Atlas der Erdkunde für die 6. bis 11. Klasse. Gotha / Leipzig: VEB Hermann Haack, Geographisch-Kartographische Anstalt, 1976, pp. 70–71). Economic aspects are represented by symbols for various industrial sectors (signatures) and infrastructures (line elements) as well as by area colors (agricultural areas – brown, oases and irrigation areas – gray, meadows and pastures – light green, forest – dark green, unproductive areas – white). The planetary spatial format of such maps can be interpreted in particular via the spatial section shown, in the form of networking between regions or the presentation of a networked economic area.

It was only through the emergence of an integrative paradigm of human-environment relations that these became visible, including at the planetary level, which have been on everyone’s lips since the Anthropocene debate. But it was a long road to get there. It was not until 2008 that in the German Diercke Atlas a world map entitled “Climate Change in the 21st Century” appeared in the new section “Earth – Climate Dynamics”.⁷⁸ While until the 2000s climate maps still dominated that did not take general climate change into account and represented it as an essentially permanent, unchanging system.⁷⁹

What we find important to look at in the view of the planetary spatial format is to go beyond the physical-geographical aspect of human-nature-relation. We recognize this spatial format particularly in maps of economic interconnectedness associated with the exploitation of raw materials. This is a thematic complex that is typically visualized together in maps (fig. 6). Especially, but not only, in Eastern European and Soviet / Russian atlases the connection to the above described way of thinking of the Russian school of geography can be made: ‘Nature’ as an objective reality that can be studied, described by laws, and used for socialist purposes.⁸⁰ The “conquest of nature” and the collective coining of the term landscape with a very specific connotation, for example in the German Empire, are also part of this history.⁸¹

78 The map „Klimawandel im 21. Jahrhundert“ was published first 2008 in: Michael, Thomas; Gehring, Wiebke (eds.): Diercke-Weltatlas, 1st newly revised ed., Braunschweig: Westermann, 2008, p. 232, fig. 3: <https://diercke.westermann.de/content/klimawandel-im-21-jahrhundert-978-3-14-100700-8-232-3-0>. This map might be compared to the 2015 version: <https://diercke.westermann.de/content/erde-klimawandel-im-21-jahrhundert-978-3-14-100800-5-250-3-1>. In the most recent still unpublished (03/2023) edition there is a page with eight maps on the topic of climate change (pp. 264–265). Still, the connection of these phenomena to human activities become only clear, when taking the following pages into account: <https://blickinsbuch.westermann.de/978-3-14-100900-2/index-h5.html#page=268>.

79 A way of thinking whose roots can be traced back to the Christian doctrine of the immutability of God’s creation. Until the 19th century, there were debates about whether it was possible for animal species to become extinct.

80 see chapter 1: Russian school of geographical thought connected to ecological and planetary thinking.

81 Blackbourn, David (2006): The conquest of nature. Water, landscape and the making of modern Germany. London: Cape.

But interdependencies also go beyond the economic and environmental aspects. The “circulation” term points to numerous topics that could be negotiated here, e. g. that climate damage from emissions of fossil fuels does not only occur at the place of their production but worldwide. Political-military issues are also up for discussion because “no development and no place can be considered a priori and forever uninteresting for certain powers’ and ‘all sides see themselves forced to determine their political behaviour more or less, directly or indirectly mindful of the constellation of forces on the whole planet.”⁸²

3.3 Ecological spatial format

Towards an understanding of the ecological spatial formats

“A human ecology perspective reminds us that we really are part of a complex living world. It seeks new relations – not instead of disciplinary ones, but in addition to them. Its interdisciplinary mandate invites crossing boundaries. This requires a different kind of imagination, in pursuit of fresh combination of ideas”⁸³

Lucy Sprague Mitchell, an early proponent of progressive education in the United States, was the pioneer of age-appropriate geography instruction for children. *Young Geographers*, Mitchell’s 1934 teacher’s guide, emphasised the creative process in contrast to the nineteenth-century pedagogical emphasis on laborious copywork. Mitchell suggested different types of maps for each age group, beginning with protomaps or map-like forms utilising toy blocks in kindergarten. As children’s understanding of symbols developed from pictorial to abstract, they moved on to three-dimensional clay or sandbox models or large floor maps painted on oilcloth. The 1963 reprint of Mitchell’s book facilitated the discovery of her ideas by the then-emerging human ecology movement. Proponents of community-based environmental education shared her view of the world as a small place and encouraged children to depict emotionally significant objects in their neighbourhoods. Mitchell’s approach of involving children in fieldwork in place-based education and ecological literacy programmes helped to instil ecological concepts through hands-on production of desktop terrain models, three-dimensional wall murals, and collage maps of their environment (Sobel 1998).⁸⁴

In the attempts to define which theories and representations develops the ecological spatial format, we tent to limit the latter to the primarily focus on the human nature relationships and ecological concerns. From our point of view the concept of the ecological spatial format is connected to human-nature relations especially. We think of the ecological format as large sub-set of the planetary format (see fig. 2). Therefore, they share many features and definitions. From the historical development of geographical thought emerged ecological and planetary spatial formats, which not only shaped scholarship, but also influenced policies and social awareness of the effects of industrialization and modernization.

Before the 1970s and the global rise in climate change awareness, and before the emergence of the Anthropocene discourse, it was possible to distinguish ecological spatial format. As a reflection of mid-century geographical thought, the ecological spatial format is more concerned with preservation, the connections between economy, ecology, and sustainability (sustainability triangle). During

82 Panajotis Kondylis cited after: Hanusch, Frederic; Leggewie, Claus; Meyer, Erik (2021): *Planetar denken. Ein Einstieg* (X-Texte zu Kultur und Gesellschaft), p. 94.

83 Borden, Richard J. (2008): A Brief History of SHE: Reflections on the Founding and First Twenty Five Years of the Society for Human Ecology. In: *Human Ecology Review* 15 (1), pp. 95–108, here p. 106 f.

84 Yolanda Theunissen (2015): *Children and Cartography* (The History of cartography, vol. 6), p. 216 (https://press.uchicago.edu/books/HOC/HOC_V6/HOC_VOLUME6_C.pdf) [25.02.2022].

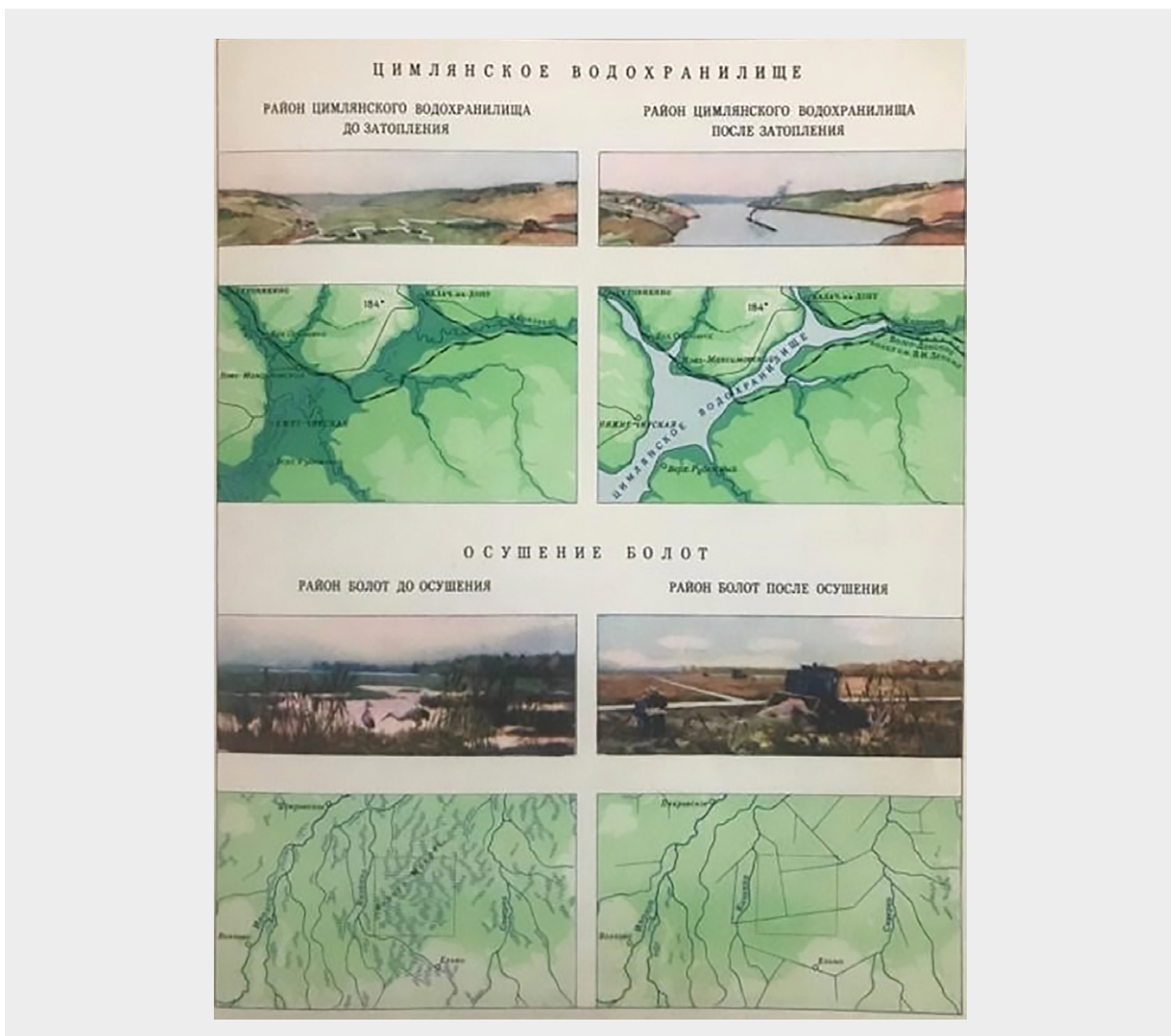


Figure 7: The change of the nature by humans is made visible in educational atlases in maps and images (Soviet Geographical Atlas for the 5th grade, 1957 and in the following editions, p. 15)

these years, ideas of environmental preservation and protection prevailed, but they were sometimes misapplied by various actors, e.g., nature reserves as part of colonial thinking.⁸⁵ The start of the Anthropocene and the change of the discourse to less anthropocentric perspective gave a rise to the more ethical approach to the nature, which includes taking responsibility for the environment and enabling non-territorial nature conservation.⁸⁶

Representation of the ecological spatial formats in maps and atlases

The representation of the ecological and planetary spatial formats in USSR have been reflecting the Soviet approaches in geography and the Soviet marxist-leninist theory in the relationships between man and nature, constructed by Soviet academia. As outlined above, Soviet school of geography has its own particularities, that has been reflected in maps and atlases produced.

85 Flitner, Michael (2019): Platz für Tiere: Naturschutz und Kolonialismus. In: Geographische Rundschau (5), pp. 34–35.

86 Egner, Heike; Jungmeier, Michael (2019): Non-Territorial Nature Conservation? On Protected Areas in the Anthropocene. In: Moegg 1, pp. 115–142.

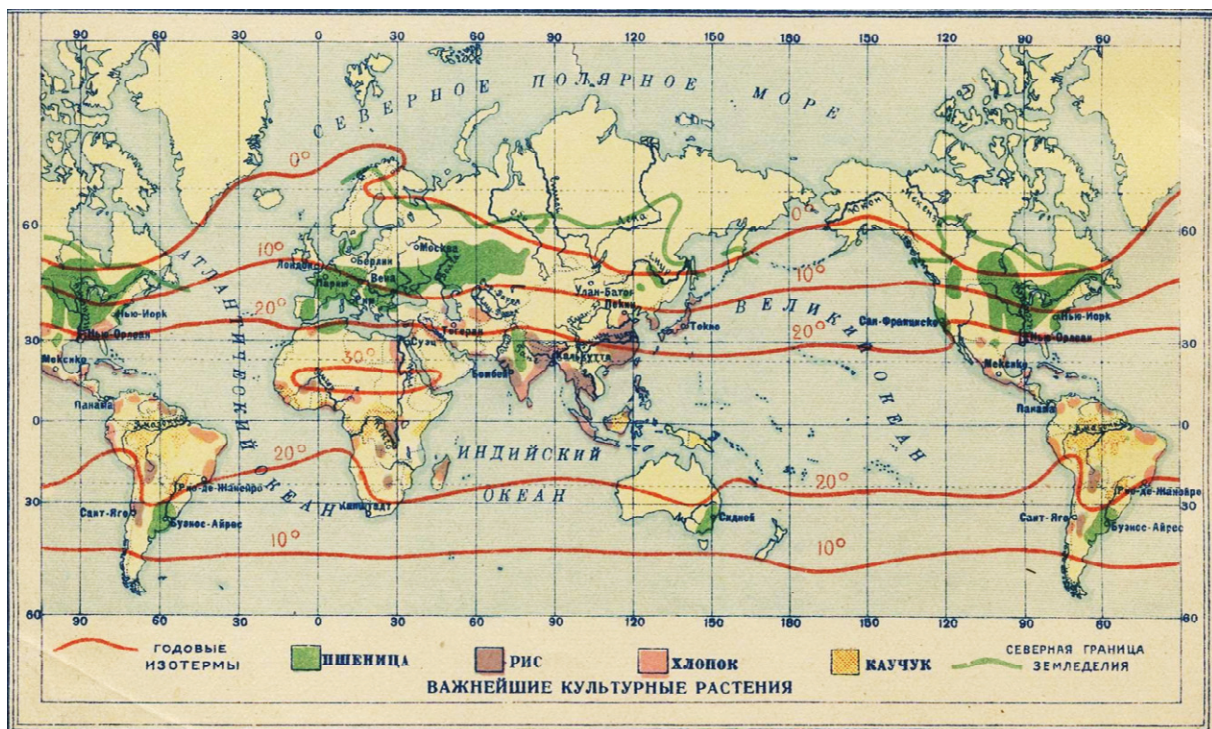


Figure 8: The main agricultural plants (Soviet Educational Atlas for the 6th grade, 1937, p. 7)

For example, the ecological spatial format has been heavily dominated with the Soviet ideas about the way the socialist man interacts with nature. In that regard, as we can see in the fig. 7 the “nature” quite often has been depicted as material for man to change, to adopt for the needs of the socialist country. Fig. 7 shows two sets of pictures, each of those showing the way a “virgin nature” has been transformed by a socialist man. As been placed in the educational school atlases such representations were supposed to show the force of a socialist man in transforming landscapes, in these particular cases, turning the valley into a human made water reservoir and in drying up swamps.

Similar, on fig. 8 we see the map of “economical activities” based on the usage of agricultural vegetation, which is one of the very “Soviet” utilitarian approach towards nature, when the economic activities are tighten up to the geographical conditions and vegetation.

However, some of the cases are confusing. For example, the map of the biological diversity from the school atlas in Russia, 2017 is clearly sending the message about the state of ecology worldwide, however it still has the boundaries on it (fig. 9). In that sense it is unclear whether these boundaries are part of the conscious decision of the editors to preserve as map contents, or they are just embedded as part of the culturally accepted spatial literacy. Therefore, it sends a mixed message about the spatial format it represents, and to which extent we can assume it to be non-territorial. This map is an interesting case for the further research on the possibilities, challenges and limits of visual research on spatial formats and to which extent we can decode them in the maps.

In German geographical thinking as already mentioned, a profound change in the human-environment relationship takes place during the 20th century. Such changes often start in various branches of societies, including sciences, are transformed into school curricula when reaching societal consensus, learned by pupils and further developed or challenged in their later professions. Therefore, we argue that spatial knowledge as every knowledge is part of an intergenerational knowledge production cycle. As mapmakers, especially in the field of school map production, mainly adapt to new scientific knowledge including Geography, to social conventions and to market logics in order to sell their products profitably it is the more important to contextualise pure map analysis. Until the 1970s, nature in the human-environment relationship was mostly understood as a pure potential or reservoir of resources,

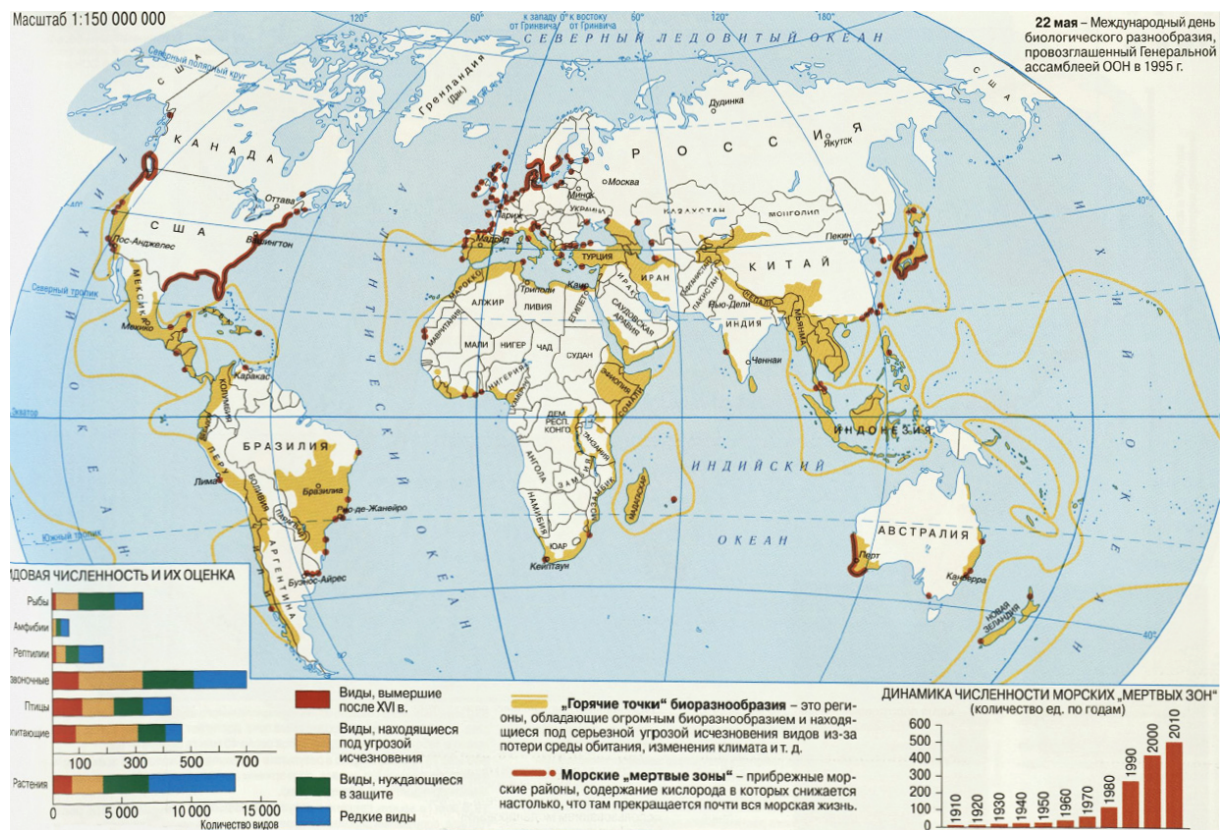


Figure 9: Map of the biodiversity (Russian School Atlas 2017, p. 135)

which became more and more available to the ever evolving possibilities of humankind (after which nature as a determinant receded step by step, up to the utopias of complete mastery). Only with developments such as population growth and the increase in human-caused environmental catastrophes did a rethinking occurred that increasingly took into account the influence of humans on the environment. This development can also be traced in school atlases.

While an Africa map of “Land Use and Mineral Resources” from the Diercke School Atlas of 1955 depicts nature exclusively as a passive object of economic development by humans⁸⁷, the map “Population Carrying Capacity Using the Example of the Highlands of Kenya” (fig. 10) from the Diercke-Atlas of 1974 already establishes an interaction between population growth and cultivation capacities, even if here the problematic human-environment relations are still outsourced to the so-called Third World and Europe continues to function as an unquestioned role model in the sense of modernization theory.

Map ensembles like “Serra dos Carajás (Brazil) – raw material development 1981 and 2006” (fig. 11) from 2008 show in a complex way the interactions of human intervention and environment in its development, both in ecological and social terms. Against the backdrop of the discourse on rainforest destruction and its global impact, the planetary space format also shines through here.

Despite the shift in perspective from an exploratory human-environment relationship to a more integrative, reciprocal human-environment approach, growth- and resource-oriented economic maps continue to be found in school atlases.⁸⁸ Here again, reference should be made to the contradictory collection of maps in atlases, which allows for various perspectives on the world depending on which maps are viewed and combined.

87 Bodennutzung und Bodenschätze. In: Diercke Weltatlas, 88th ed., Braunschweig et al.: Westermann, 1950, p. 39.

88 see e.g. map on drinking water (Trinkwasser) in Diercke Weltatlas 2015, p. 256: <https://diercke.westermann.de/content/erde-trinkwasser-978-3-14-100800-5-256-2-1?&stichwort=Trinkwasser>.

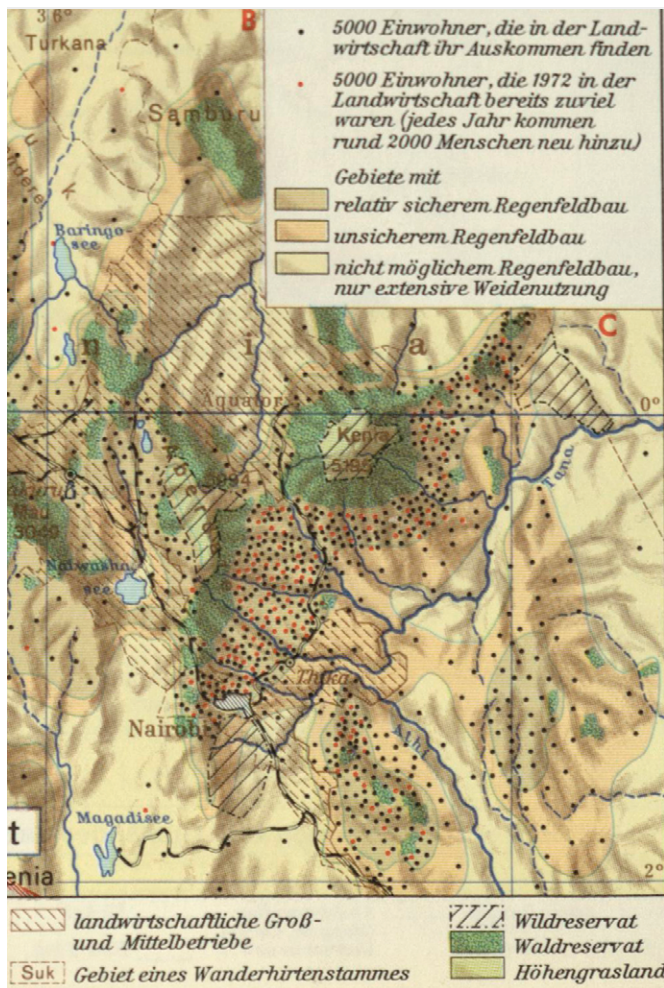


Figure 10: Extract of „Bevölkerungstragfähigkeit am Beispiel des Hochlandes von Kenia“ (Mayer, Ferdinand (ed.): Diercke-Weltatlas, 2nd ed. of the revised edition (186th ed.), Braunschweig: Westermann, 1974, p. 184). The map combines economic and ecological aspects of the carrying capacity of an area, with black dots symbolizing 5,000 inhabitants who make a living from agriculture and red dots also symbolizing 5,000 inhabitants who were already too many in agriculture in 1972, combined with the indication that around 2,000 new people are added every year. Whether subsistence farming is taken as a basis here or how much of the products of large and medium-sized agricultural enterprises (striped areas) is exported to countries in the “Global North”, for example, and is therefore not available to supply the local population, becomes not clear.

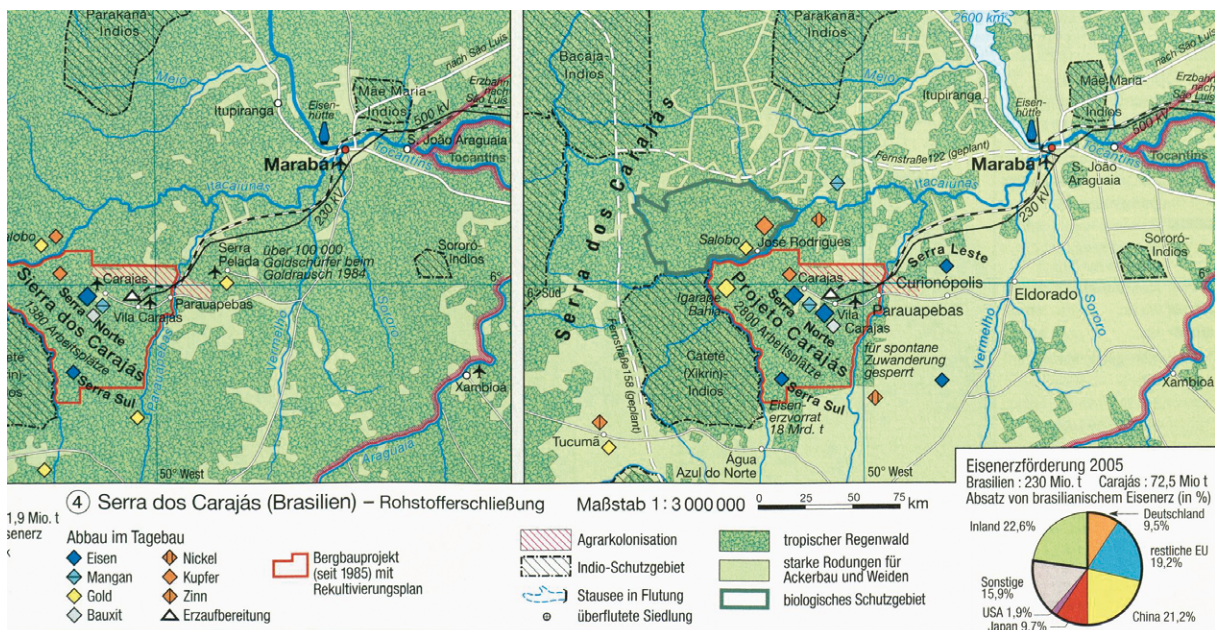


Figure 11: Extract of „Serra dos Carajás (Brasilien) – Rohstofferschließung“. The map ensemble shows the development of resource exploitation as well as the change of the landscape between 1981 (left) and 2006 (right). From our point of view not only the map ensemble itself hints to an ecological (and planetary) spatial format but also the fact that it cannot be found in in the South America section of the atlas but in the world map section under the heading “Energy and Environment”. In: Michael, Thomas; Gehring, Wiebke (eds.): Diercke-Weltatlas, 1st ed., Braunschweig: Westermann, 2008, p. 243.

3.4 Universal spatial format

Towards an understanding of the universal spatial formats

We propose the universal spatial format to be connected to the emergence of the Anthropocene debates and theories, following Kotzé who sees “sufficient evidence of the existence and gradual emergence of constitution-like features and elements in the global regulatory space.”⁸⁹ From our point of view this spatial format can be distinguished from the spatial formats previously discussed as it reflects the establishment of universal laws and regulations of inter- and transnational, multilateral relations and regulations. This term is cosmopolitical in the sense of established or establishing institutions of a global governance and leads to a transnationalisation of liberal constitutional principles of welfare states.⁹⁰

The universal spatial format includes the development and consolidation of a basic set of internationally accepted standards.⁹¹ The way we interpret those and how we connect them with the global condition we can start seeing the traits of the universal spatial format quite early in the history of the educational map production, and in the history of cartography in general. One such example might include the establishment of an almost worldwide reporting system of the Jesuit organization in the late 16th century as latest⁹² which connects to a specific kind of global spatial thinking, knowledge but also claims. However, if we adopt the concepts of the global condition according to the CRC 1199 concept we start to trace the development of international negotiations and standardizations in mid-19th century. Such process that we can consider on maps or in atlases include, but is not limited to:

- scientific processes of standardization such as survey methods (measurements of earth size), the implementation of unified measurement units (Ur-Meter), definition of a common grid system or zero meridian (decision on Greenwich in 1884 Washington D.C.⁹³) or standardisation of colours for geological maps.
- unification in the trade or commerce: decisions on uniform units, e.g. definition of units of length or weight
- shared ideas about state governance and norms as laid down by the league of nations (Völkerbund) after First World War and the United Nations after Second World War.
- Development of military alliances and (international) definition of norms of forbidden military systems and the protection of civilians and prisoners of war (Hague Conventions in 1899 and 1907)

At the end of 19th century representatives of national or disciplinary organisations attended conferences where such norms were developed, discussed and the decisions were made. Later on, nation state representatives took over. Nation states decided (and decide until today) to accept or decline such norms, thus to sign or not such regulations. Due to changing political situations it is always possible that once signed international contracts are no longer respected and partners can be excluded or do not work anymore in the respective bodies – as we can currently see explicitly with Russian government representatives due to the Russian aggression in Ukraine. Norms and laws

89 Kotzé, Louis J. (2019): Global environmental constitutionalism in the Anthropocene. Oxford: Hart Publishing, p. 131, cited after: Hanusch, Frederic; Leggewie, Claus; Meyer, Erik (2021): Planetar denken. Ein Einstieg (X-Texte zu Kultur und Gesellschaft), p. 113.

90 „Institutionen ‘globalen Regierens’“, Hanusch, Frederic; Leggewie, Claus; Meyer, Erik (2021): Planetar denken. Ein Einstieg (X-Texte zu Kultur und Gesellschaft), p. 109.

91 Osterhammel, Jürgen (ed.) (2017): Die Flughöhe der Adler. Historische Essays zur globalen Gegenwart. München: C.H.Beck, p. 36.

92 Ibid, p. 40.

93 Withers, Charles W. J (2017): Zero Degrees. Geographies of the Prime Meridian. Cambridge, Massachusetts, London, England: Harvard University Press.

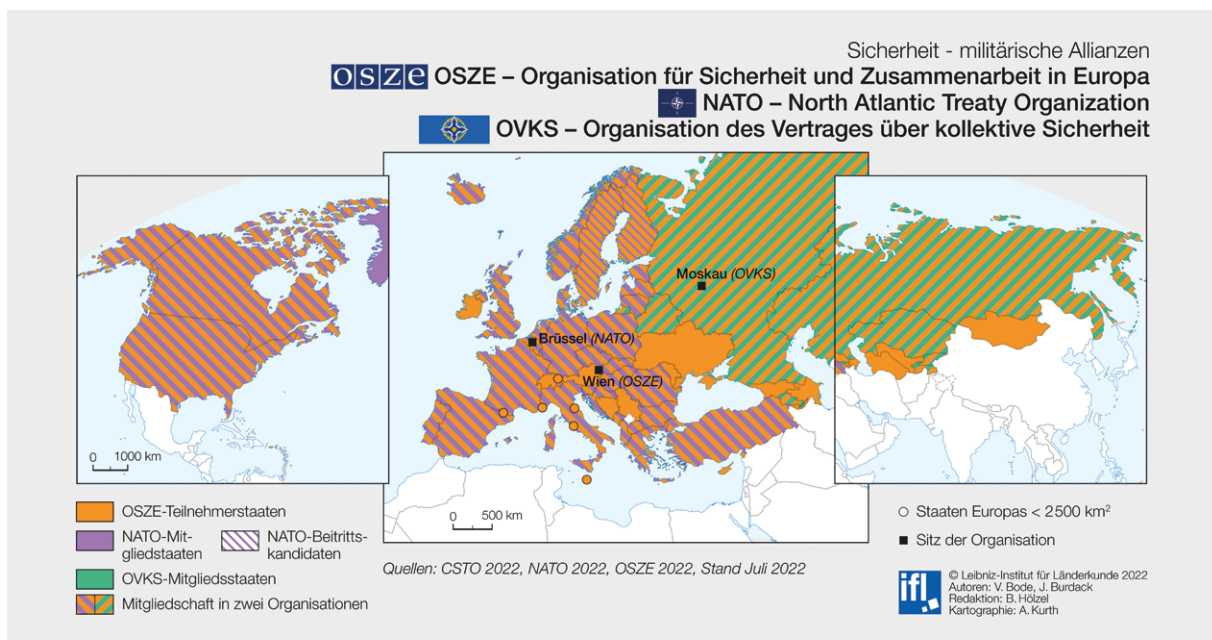


Figure 13: Membership in military alliances. The map in our view shows the universal spatial format, because spaces of the same or very similar legal concepts emerge, which are reflected in mutual military protection. At the same time, however, it also becomes clear that cooperation in other organizational forms and at other thematic levels is still conceivable and possible. Once again, it must be remembered that it is a nation-state decision to join international alliances. However, since the positioning of the surroundings always plays a role in decision-making, the “external pressure” should not be underestimated in such decisions (Burdack, Joachim und Volker Bode (2022): Was heit Europa? In: Nationalatlas aktuell 16 (08.2022) 6 [25.08.2022]. Leipzig: Leibniz-Institut fr Lnderkunde (IfL). URL: https://aktuell.nationalatlas.de/Europa-6_08_2022-0.html)

of militarized nation-states was not constrained by any normative consensus on peace.⁹⁵ Therefore, even if we call it standardisation, the acceptance rate differs as such norms and regulations always produce inclusions and exclusions.

Representation of the universal spatial format in maps and atlases

Processes of the standardisation of regulations and norms become visible especially at the end of the 19th century. Throughout various production regions we can follow changes in the zero meridian from regionally used ones such as Paris for France, Berlin for Germany or Beijing for China towards Greenwich (Great Britain) as internationally defined zero meridian.

On the other hand, legal systems are rather rarely visualized in maps, especially for school media. One more common example of international standardisation is the definition and visualisation of time zones (fig. 12).

Much more common maps in educational atlases but also in other visualisations are such of political, trade-oriented or military alliances (fig. 13) as well as member states of the United Nations or sites to be secured after regulations of UNESCO (fig. 14). Especially such sites point to the fact that the universal spatial format should not only be thought globally covering the whole space, but at the same time related to individual places.

95 Osterhammel, Jrgen (ed.) (2017): Die Flughhe der Adler. Historische Essays zur globalen Gegenwart. Mnchen: C.H.Beck, p. 33.

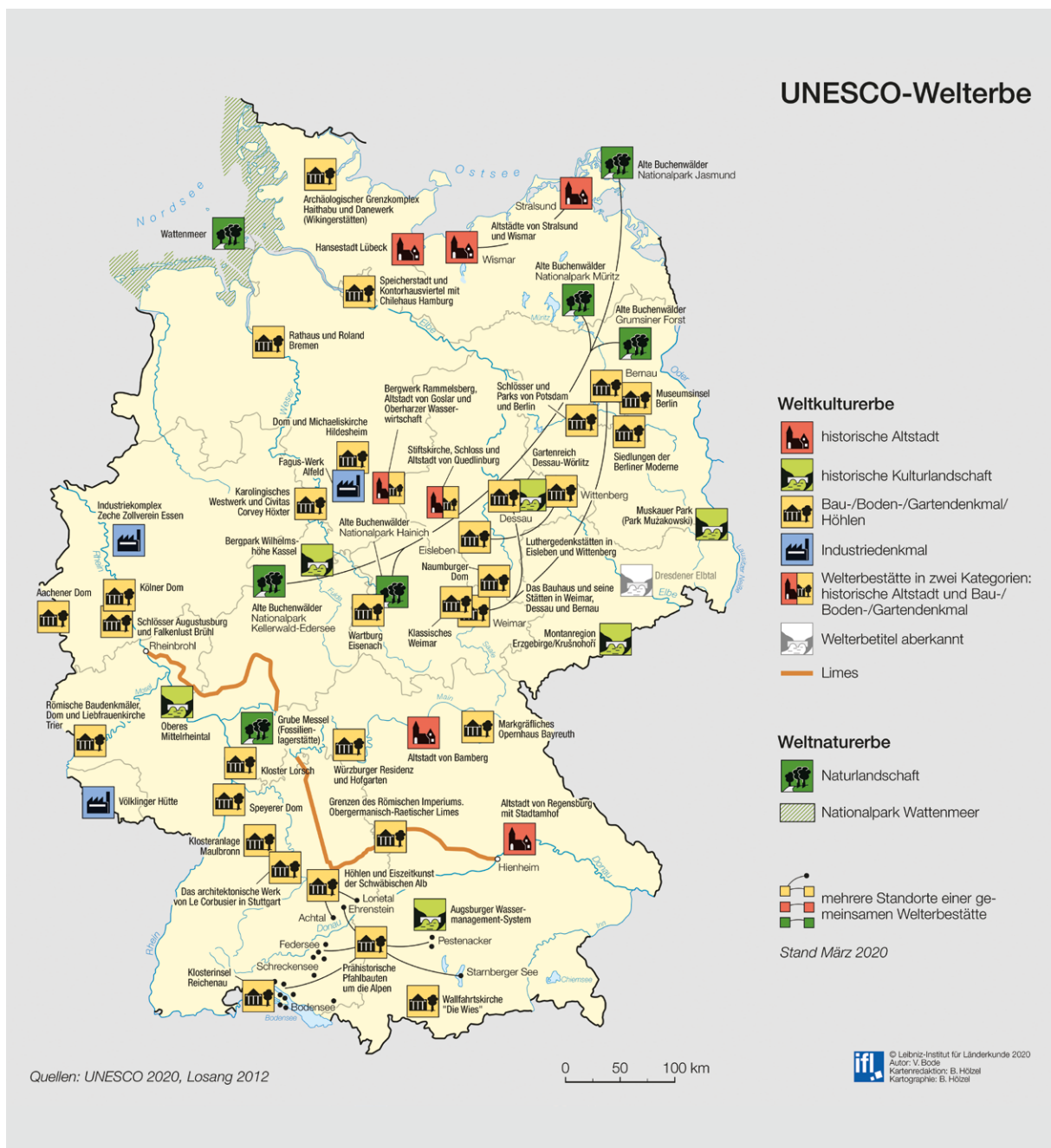


Figure 14: The map of UNESCO World Heritage Sites in Germany illustrates that maps need not necessarily represent a common legal or understanding framework only at the global level. The universal spatial format should therefore not only be thought of on a global level. Rather, it is places that have a global or transnational framework that offer a good example of this spatial format. (Schmitt, Thomas M. (2020): Das UNESCO-Welterbe in Deutschland. In: Nationalatlas aktuell 14 (03.2020) 2 [30.03.2020]. Leipzig: Leibniz-Institut für Länderkunde (IfL). URL: http://aktuell.nationalatlas.de/welterbe_2_03-2020-0.html)

4 Discussion and further research possibilities

Our starting point for suggesting and defining three non-territorial spatial formats as planetary, ecological and universal spatial format was our empirical work with discourse analysis and content analysis of maps and atlases. Our aim was to provide a starting point for further discussion by connecting ideas of geographical thinking with changes in map production, map contents and map design, even though not all aspects of such formats might be able to be represented in maps.

Planetary thinking seems to be a very new “fashion”. As introduced above there are precursors for this kind of spatially and thematically connected thinking and viewing. It relates to the conscious perception of living conditions in different places on earth and their consideration in spatial decision-making processes. We also showed how these concepts appear and become visible in the material of our subproject, how maps as medium of communication have contributed to an awareness of ecological (human ecological as well as environmental and its connections) knowledge and action, and how we methodically deal with such concepts like spatial formats in TP C05. What is most important is not to discuss the appearance of non-territorial formats as a linear process or as replacement of territorial ones. Rather, we recognize a parallel representation of territorial and non-territorial formats in maps and atlases, focusing more on the one or other side depending on target group, focus or time of production.

In order to further specify the spatial formats, we suggest to discuss references and possible delimitations to concepts such as globalization and spatial literacy as well as connections to current debates, e.g. the concepts of Anthropocene or Plantationocene. But we are also interested in a possible appearance of such spatial format in other contexts, e.g. disciplines or decision-making processes. There are some aspects that we discussed in the project group but could not include here, including critical questions for defining and using such spatial formats, such as:

- Use of non-territorial spatial formats for colonialization purposes. How do they support practices of discovery and conquest?⁹⁶
- Shaping of thinking about the globe and about dependencies; How does territorial or non-territorial thinking influences decision-making?
- What kind of spatial formats does new media, especially social media provide? Are that own spatial formats or can they be connected to international standards under the universal spatial format?
- What about current forms of protest and their influence in decision-making?⁹⁷ Such potentially non-territorial spatial thinking is not visible at maps right now, nevertheless, they should be taken into account.
- How are international standards used to pursue nation-state or even imperial objectives?⁹⁸

From our perspective it is worth to think natural and cultural phenomena closer together. From the analysis of school atlases we can see similarities as well as differences between the products of various nations. For example, we can see that over the last 50 years, state borders have become THE standard symbol. This can be seen in the topics presented themselves, whose data often refer to nation-state statistics. But even more interesting are the maps in which borderlines actually play no thematic role and are used only for purposes of orientation. These occur in all of our sample atlases,

96 See Maier, Charles S. (2016): *Once Within Borders. Territories of Power, Wealth, and Belonging since 1500*. Cambridge, MA: Harvard University Press, p. 8.

97 Fridays for Future, Letzte Generation (Last Generation) In Germany or Extinction Rebellion or thinking back to activism protest by Greenpeace some years ago, just to name few.

98 See e.g. Geering, Corinne (2019): *Building a common past. World heritage in Russia under transformation, 1965–2000*. Göttingen: V&R unipress (Kultur- und Sozialgeschichte Osteuropas Cultural and social history of Eastern Europe, Band 11).

and it is precisely through them that our thinking and ideas about the world in terms of territorial units have been shaped. In contrast, curricula and even textbooks refer much more strongly in their texts to issues of international cooperation and interdependence. That these aspects are likewise laid down in maps via non-territorial spatial formats has only gradually become apparent to us, and we are still in the process of learning what visual language is associated with it. In that regard, our attempt to define non-territorial spatial formats is also a methodological effort; we still have a way before us to go in that regard.

At this stage, however, we can state that the non-territorial spatial formats are usually only recognizable at second glance in maps. However, due to our social training to read maps in a certain way and the respective formatting of the gaze (perceptual dressage / Wahrnehmungsdressur⁹⁹), we find it particularly difficult to recognize them. Often, a map itself does not offer a sufficient clue to a certain non-territorial spatial format, but this is only revealed through its contextualisation and interpretation. In our opinion, maps and visualizations that irritate the gaze and thus stimulate reflection offer fruitful possibilities here.

99 Wardenga, Ute (2006): Zwischen Innovation und Tradition: Geographische Siedlungsforschung in den 1960er Jahren. In: Siedlungsforschung 24, pp. 35–49.

Leipzig Research Centre Global Dynamics

Working paper series des SFB 1199 an der Universität Leipzig No. 35

ISBN: 978-3-96023-537-8

ISSN: 2510-4845

Universität Leipzig
SFB 1199

E-Mail: sfb1199@uni-leipzig.de

<http://research.uni-leipzig.de/~sfb1199>



UNIVERSITÄT
LEIPZIG

Leipzig Research Centre Global Dynamics

Leibniz-Institut
für Länderkunde 

 öwzo

Leibniz-Institut für
Geschichte und Kultur
des östlichen Europa



TECHNISCHE
UNIVERSITÄT
DRESDEN

Funded by

 **DFG** Deutsche
Forschungsgemeinschaft