

AHAMER, Gilbert (2019)

Mapping Global Dynamics, Geographic Perspectives from Local Pollution to Global Evolution

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Mapping is caring. Ironically, this one-liner inspired by social networks could summarize the key focus of this book. Building upon decades of work, the author, Gilbert Ahamer, offers an in-depth analysis of different mapping strategies guided by a fundamental vision of acting on the world or “*steering while living*” in the author’s own words. More precisely, the objective of the book is to answer the question: “*What are the most suitable mapping strategies when detecting patterns of global dynamics?*” In this task, Ahamer invites us to conceive mapping strategies as “*endeavours of pattern recognition in geo-spaces but also in functional, social and other spaces*”. As such, the scope of traditional cartography is considerably broadened and imaginative maps are created to help us understand not only patterns in space but also processes of structural transitions, functional relationships or even more abstract networks of connections between people and institutions.

This well-structured book delves into eight case studies to illustrate how different mapping strategies can be applied at various scales – local, regional and global – to traditional issues of environmental concern as well as global issues. Mapping of air emissions in Salzburg, Austria (case study 1) is used to describe basic strategies where facts are geo-referenced on static maps. Country-analysis of the Slovak Republic air quality measurement system (case study 3) and Slovenia’s water quality assessment (case study 7) offer insights into how to comply with EU environmental protection directives. They also show case mapping strategies which (i) either reduce spatial complexity by mapping one fact to one site (case 3) or (ii) geo-reference a political strategy through a set

of maps (case 7). The assessment of the influence of mineralogical and soil properties on uptake of radioactive caesium into plants in the Austrian Alps (case study 2) is used to detail “functional maps”. Functional maps no longer focus on depicting facts or single data but on comparing and correlating many data patterns containing the driving factors of the assessed parameter (in this case uptake of radioactive caesium).

Case studies 4 and 5 adopt a dynamic approach and deal with the major drivers of Greenhouse Gas Emissions (GHG) at the global level, namely deforestation and land use change, on the one hand, and fossil fuel production and demand, on the other. By plotting various timelines of developments in different regions of the world, the author underscores the time-dependencies and potential “development phases” of global deforestation. Similarly, different energy transition scenarios are mapped to demonstrate the strengths and limitations of biomass combustion and the constraints involved in transport – highlighting how to project future dynamic patterns of change. An in-depth analysis of the food and agricultural sector is also conducted (case study 6). It shows how food potential reaches “saturation states” of supply and demand at different times. Interestingly, in this case study a detailed methodology is provided to develop a graphic representation of geo-referenced dynamic development of a multitude of parameters by means of aggregated time series. Case study 8 concludes the first section of the book with a different kind of mapping exercise focused on depicting dynamic social interactions to examine the effectiveness of the learning processes.

In the second part of the book, the author usefully summarizes the case studies and discusses from a theoretical point of view the lessons learned while mapping. The two mapping strategies that have been combined in each case study are highlighted: geo-maps that show spatial patterns (e.g. spatial distribution of emissions) have been mobilized to facilitate the perception of spatial autocorrelation; functional maps that display functional patterns or causal relationship (e.g. radioactive uptake as a function of soil properties) have been used to facilitate the perception of autocorrelation in time. Depending on the case study selected, the direction of reasoning can start out from known causal relationships and inferring spatial patterns or go the other way around. More importantly, when assessing the explanatory power of the paradigms of spatial autocorrelation and temporal autocorrelation, which could represent the approaches of geography and economy respectively, Ahamer shows how it becomes visible that both paradigms are needed to explain reality. Spatial patterns are viewed as “*systemically co-determined*” (in the sense that they determine and are determined) by mutually influencing functional patterns. In this setting, the author shows that the combination of both approaches may suggest mega-trends and structural transitions in global evolution.

Another primordial feature of the investigations detailed in *Mapping Global Dynamics* is that they are based on real-world cases – as opposed to laboratory experiments. The book actually compiles different professional endeavours conducted by the author during his life. In this context, one of the key takeaways is that in real-world situations the change rates of structural parameters describing a complex system (e.g. population, deforestation, energy demand...) are not constant but rather these change rates change in themselves and are a function of evolu-

tionary time. In other words, the author claims and successfully demonstrates that systematic changes cannot be described by fixed formulae with parameters but depend on the system’s stage in its evolutionary process. Going a little further, the book details how “reality” as such can also be viewed as an evolutionary entity, which can be co-produced and co-created by consciousness.

Very usefully, the author then classifies the mapping strategies detailed above on a “methodological cube” and “methodological landscape”. Taken jointly, these graphically compelling representations help understand the path of improvements from one mapping procedure to the next. From this methodological framework, it clearly appears that the deeper structures of long-term economic developments are not easy to identify when solely using classical geographic maps (i.e. the paper plane representing the Earth’s surface). Consequently, the author provides options to search for alternative methods when “mapping” the dynamics of geo-referenced patterns. In my view, the main innovation in this regard is to use transformed “coordinates” – hence transformed metrics – to recognize structural and functional patterns and their shifts during global change. One suggestion is for example to change coordinates of space and time into space and evolutionary time – evolutionary time being for example proxied by GDP/cap at the global level. Essentially, detecting time-space patterns requires selecting a suitable and relevant representation space, be it geo-space, time-space or functional space. The author concludes that “*any (spatial) metric depends on the selected functionality constituting that space*”.

Overall, the book is well-written, full of practical graphical representation and can prove to be useful reading for experts and non-experts alike. However, in the ambitious task of providing an overall frame to comprehend the world, the

author leverages a plethora of concepts – ranging from physics to economics, sociology or philosophy – accumulated over the years. The large array of notions mobilized and the complexity this entails may sometimes come across as dense. Various readings of this book are probably required to grasp the full scope of the author's reflections. This is nevertheless a nourishing reading, which underscores that geography should be understood as a structural discipline, namely as a science of pattern recognition regarding space, time and function, and further as a discipline of recognizing pattern dynamics in all three of these aspects. Written by a person with a background in physics,

this book is also a call to go beyond the classical geographic paradigm to understand the complex spatial issue. In *Mapping Global Dynamics*, geography is defined as a multi-paradigmatic science labelled a “*meta-geography*”. Hopefully, this meta-geography will be one of the building blocks of scientific knowledge in the Anthropocene era.

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