

On the new generation of digital mini-atlases

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ABSTRACT: Each atlas is a main object of the atlas semiotics. Digital atlases on smartphones (mini-atlases on screens with 3"- 5") are considered as a new generation of semiotic models of knowledge. These atlases still are an "exotic" subject of research on atlas design and atlas semiotics.

KEYWORDS: digital mini-atlases, semiotic classification of atlases, semiotic meta-variables, atlasing, atlas semiotics

0. Preamble

User-oriented creation and acquisition of space/time/theme-related knowledge is an important challenge of the 21st century. Digital atlases can play a decisive role in meeting this challenge. These atlases are an object of study and research of many disciplines, not just cartography. During the last year, the map has lost its monopoly position in communication geospatial information. It is still an important but no longer the only source of spatial information. Google Maps exemplifies this situation: map, satellite image and terrain are presented as equivalent space-related products. Unfortunately, alternative space-related applications such as "Google Thematic-Atlases" or "Google Mini-Atlases" are not yet available.

1. On atlas cartography and atlas semiotics

1.1. Terminological aspects

The term "atlas cartography" has been introduced in the 1960s into traditional cartography's literature. The following definition of atlas cartography was proposed by Denk (2001): "The atlas cartography is a part of cartography, which deals with planning, organizing, production and actualization of atlases." According to Churkin (1974), atlas cartography focuses on theory and practice of atlas creation. In the realm of cartography, atlases often are considered as map systems or systematic collections of various maps.

The term "atlas cartosemiotics" is a new concept for cartography and cartosemiotics. Wolodtschenko (2006) describes atlas cartosemiotics as a part of applied cartosemiotics, which is engaged in research, interpretation and thematic/modular analysis (T-M analysis) of analog and electronic atlases.

The term "atlas semiotics" is another new concept for cartosemiotics, semiotics and cartography (Wolodtschenko 2010c). It deals with all analogic and electronic atlases with both cartographic and non-cartographic traditions.

1.2. Semiotic classification of atlases

Every atlas is a main object of atlas semiotics. How can one classify atlases semiotically? From a semiotic model-building point of view, atlases can be classified into four groups based on the definitions of three semiotic meta-variables (Wolodtschenko, 2007): text, image and map. These three visual meta-variables (text, image, and map) can be complemented by accordant acoustic variables (text, music, sounds, etc.). Table 1 shows four sets of atlases where the following groups of semiotically classified atlases can be distinguished:

- Map-based atlases (maps dominate over 50%)
- Picture (illustrative) atlases (images dominate over 50%)
- Text-based atlases (texts dominate over 50%) and
- Mixed atlases (text, images and maps are combined).

Table 1: Semiotic classification of atlases, after Wolodtschenko (2010)

Semiotic groups of atlases			
Map-based atlases	Picture-based atlases	Text-based atlases	Mixed atlases

2. Why do small screen atlases move into the focus of semiotics?

Modern users of mobile spatial knowledge models have experience primarily with maps and atlases on mono-display. Traditional information architectures for maps and atlases on mono-displays are based on sequentially ordered pages and page layouts. From an atlas semiotic and atlas cartographic point of view, such atlases on mobile small screen devices (smartphones, media-players etc.) are special media models that have been hardly examined so far.

2.1. Mobility, minimality, multimedia and multidisplaying as “4M-comfort”

Mono-screen smartphones are and will be the classic device for many users. Mobility, minimality and multimedia are traditional features of single-screen smartphones. However, double-screen smartphones like the “Kyocera Echo”, which has entered the mass market in 2010 have the potential to revolutionize the information comfort for many users. As a new feature for mobile devices, multidisplaying has caused great interest, for example, among cartographic semioticians. But the user has not yet been able to evaluate new semiotic advantages of multidisplaying for mini-atlases. Customized applications for mini-atlases on multi-display smartphones are still missing.

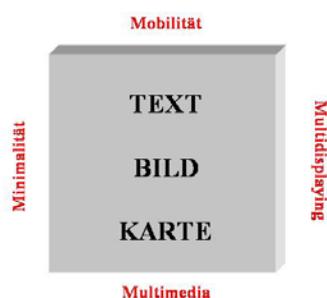


Figure 1: Semiotic model of „4M comforts“(Wolodtschenko 2011a)

The three semiotic meta-variables: text, image (“Bild” in German) and map promote a new semiotic-organized form of space-related analytical, complex and synthetic information. It is also a new model of 4M-comforts for mobile users of mini-atlases (Fig. 1).

2.2. Mini-display atlases for students

Mini-display atlases on mobile devices are still “exotic”. But not for long! Personal research and experience with students of cartography, geography, geodesy and computer science in Dresden, Vilnius, St. Petersburg, Barnaul, Kyiv, Tokyo and Hong Kong show that smartphones are convenient and popular among students (Wolodtschenko 2010 a, b).

A first training project and crash course “Conceptions of mini-atlases for smartphones” at the Dresden University of Technology (TU Dresden) has demonstrated an interdisciplinary interest. The course was organized for students of informatics and geography for the summer semester 2011. First results have been already published (Koren, Wolodtschenko 2011, Koren,

Wolodtschenko 2012) and demonstrate that development and creation of miniatlas-oriented applications are not only tasks of specialists of informatics. Joint work of IT-specialists, media designers, cartographic semioticians, cartographers, geographers, surveyors, etc. will promote the optimized and rapid solutions of problem tasks of atlas semiotics. But where can we learn map languages and the languages of images, atlases or geoportals? Where does a university with professors or departments for atlas semiotics as an interdisciplinary field of research in the realm of GIS orientated faculties exist?

An atlas-semiotic department or laboratory as an interdisciplinary interface for the Faculty of Forest, Geo and Hydro-sciences was proposed at the Dresden University of Technology (Wolodtschenko 2010). Until now, there seems to be no respond and interest to discuss these themes at the TU Dresden. Hence, the interdisciplinary atlas semiotic discipline is still missing in geographic, geodetic, cartographic education and training both at the University of Technology in Dresden and other universities.

2.3. Illustrated mini-atlases for wider use

In the future, a particular interest of users will be dedicated to illustrative mini-atlases (Mini-Bildatlanten in German). In modern cartography, the concepts of “illustrated atlases” or “atlases of images” are related with the usage of aerial photos or satellite images. This limited view can be semiotically reinterpreted in a broader way. Any illustrated atlas (i.e.: any collection of icons, aerial photos or satellite images, etc.) with or without cartographic traditions has its own cultural and / or scientific importance. Hence, these atlases and atlas information systems are of main importance in modern society, not only as information and research media, but also as cultural assets of civilizations. Figure 2 shows a cover of the illustrative atlas “ICA Presidents 1961-2011” as cultural-historical atlas. This mini-atlas is also available online in the e_journal <meta-carto-semiotics>, volume 4/2011, in rubric: New publications.



Figure 2: Illustrative mini-atlas “ICA Presidents 1961-2011” (German version).

2.4. On the “semiotic evolution” of triple or quadruple touch screens

As we have mentioned above, first smartphones with dual touch screens are already available.

Hence, practical questions arise for many users, such as: What benefits have the multi-display smartphones compared with one-screen mobile phones? How easy are they to use?



Figure 3: Combinations of meta-variable image (Bild in German) with text and map (after Wolodtschenko 2010b)

Combinations of three displays and three semiotic meta-variables (text, image and map (Figure 3) allow for new semiotically organized forms of presentations of space-related analytical, complex and synthetic information. Figure 4 demonstrates diverse models of illustrative mini-atlases on one, two and four screens.



Figure 4: Diverse models of illustrative mini-atlases (Koren, Wolodtschenko 2011)

From a semiotic-pragmatic point of view, the trend from pocket to mini-display atlases is evident. Mini-atlases address a different user-group, e.g. in science, tourism, culture, media, ecology, military, etc.. However, it is difficult to predict, how and when IT developers will build the next generation of smartphones with three or four screens.

From a theoretical point of view, the three meta-variables (text, image and map) seem to be suitable to describe and guide the “semiotic evolution” from single- to multiple-screen devices since every (printed or digital) page-related atlas, encyclopedia, dictionary, journal (or journal articles), newspaper, etc. can be characterized by means of the these meta-variables quantitatively, comparatively and analytically. The quantitative method is based on the semiotic tri-axial system of meta-variables (Wolodtschenko 2007). Figure 5 exemplifies the semiotic potential of an ecological atlas compared with an illustrative atlas and an encyclopedia. Here, the semiotic potential is demonstrated in quantitative form (in %) as a media "barometer" of any atlas, encyclopedia, book etc.

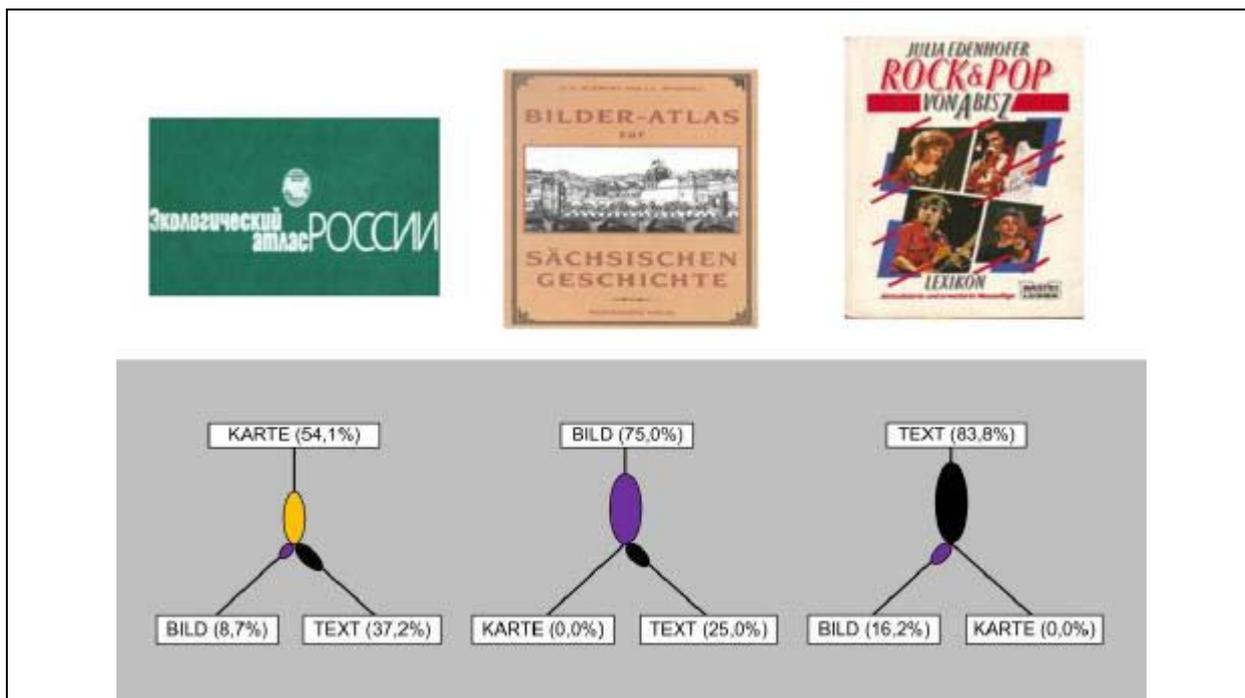


Figure 5: Semiotic potential of three different semiotic documents (Wolodtschenko 2011)

3. Contrasts as “driving forces”

As "driving forces" of modern cartography, various striking contrasts or contradictions characterize trends in the last 20 years' cartography (Wolodtschenko 2011). Two semiotic opposites are presented here only briefly, showing new perspectives for atlas semiotics.

3.1. Atlas semiotics vs. atlas cartography

Atlas cartography is a part of cartography and deals with theory and practice of atlas creation. In cartography, atlases are presented as a system of various maps. However, not all atlases include maps. Regarding these atlases with non-cartographic traditions, cartography has no competence. In contrast, atlas semiotics has competence for all atlases since it is not limited to maps. Instead, atlas semiotics deals with all analogic and electronic atlases with cartographic and non-cartographic traditions.

What is the significance of atlases for the International Cartographic Association (ICA)? One can answer this question by analyzing the focus of the 28 ICA Commissions during the 2011-2015. The term "atlases" is mentioned only once in the Commission on Atlases, which forms part of the varia-related group of ICA commissions in table 2.

My proposal to form a new ICA Working Group on "Mini-atlases and atlas-semiotics" for the period 2011-2013, was not accepted by the ICA Executive Committee.

Table 2: ICA- Commissions (2011-2015)

Cartography-related Commissions (9)	Map-related Commissions (8)	Varia-related Commissions (11)
Commission on Art and Cartography Commission on Cartography and Children Commission on Cartography in Early Warning and Crisis Management Commission on Digital Technologies in Cartographic Heritage Commission on the History of Cartography Commission on Mountain Cartography Commission on Neocartography Commission on Planetary Cartography Commission on Theoretical Cartography	Commission on Map Design Commission on Map Production and Geo-Business Commission on Map Projections Commission on Mapping from Remote Sensor Imagery Commission on Maps and Graphics for Blind and Partially Sighted People Commission on Maps and Society Commission on Maps and the Internet Commission on Ubiquitous Mapping	<i>Commission on Atlases</i> Commission on Cognitive Visualization Commission on Data Quality Commission on Education and Training Commission on Generalisation and Multiple Representation Commission on Geoinformation Infrastructures and Standards Commission on Geospatial Analysis and Modeling Commission on Geovisualization Commission on GI for Sustainability Commission on Open Source Geospatial Technologies Commission on Use and User Issues

3.2. Atlasing vs. mapping

"Atlasing" is a new term in atlas semiotics and atlas cartography. It includes a semiotic analysis and portraying of selected atlases and, if necessary the creation of new atlases with cartographic or non-cartographic traditions (Table 3).

Table 3: Structural model of atlasing

Atlasing		
Semiotic (T-M) analysis	Semiotic portraying	Creation
Selected existing atlases		New atlases

The confrontation “atlasing vs. mapping” does not mean that atlases should replace maps. Rather, the map as a meta-variable is a basic component of each map-based atlas. Today, designing and creating an attractive mini-atlas is not only a question of technology and, therefore, not only a task for IT-developers. Mini-atlases have different purposes of use. Hence, semiotic analysis and evaluation of existing mini-atlases is part of the design and conception for new atlases.

4. Conclusions

Analogue and digital atlases as semiotic models of knowledge (i.e.: space, time and thematic knowledge models) take an important place in the modern information society. Electronic atlases probably won't replace analogue atlases completely, but they will dominate more and more in modern society. From a semiotic point of view it is important to consider not only technical issues but also take into account and develop theoretical and conceptual aspects. A new generation of mini-atlases has been outlined for mobile devices with double-displays; mobile devices with three or four displays are still in a prototype phase and special apps for mini-atlases are still work in progress. Beside technical restrictions, also conceptual-semiotic

deficits need to be taken into consideration: Mini-atlases could offer a new atlas culture or atlas-semiotic culture to the user – but which one?

The new generation of mini-atlases represent the new semiotic conception of “meta-cartosemiotics” (Wolodtschenko 2011b). Now this conception has a formation phase.

While cartography's competence for atlases is limited on map-related atlases, cartosemiotics has competence for all atlases as semiotic models. Atlases are an object of study for many disciplines, not just cartography. The new generation of mini-atlases has a semiotic base reflecting the following informational-semiotic characteristics:

- new **semiotic classification** (with four types of atlases: map-based, image-based, text-based and mixed atlases)
- 4M (mobility, multimedia, minimality, multidisplaying)-categories of **information comfort** or convenience.
- **semiotic architecture** with meta-variables (text, image, map) in static and dynamic forms
- **semiotic portraits** (with diagrams, tables and text-forms)
- **semiotic potential** (in quantitative and qualitative forms)
- 3x3 combination (3-displays/3-metavariablen) as a new **semiotically organized presentation form** of space-related analytical, complex and synthetic information
- compatible with cartographic and non-cartographic **traditions**.

Current users need compact, qualitative and ubiquitous space/time/theme-related knowledge or information. The need for such information in modern communication society is both urgent and increasing. As geographical, historical, statistical, encyclopaedical etc. informational-semiotic models, digital mini-atlases form a new approach to meta-knowledge of the 21st century.

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