Mapping Together: On collaborative implicit cartographies, their discourses, and space construction[1]

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It is 2011: *maps* are everywhere. Web mapping and mobile mapping have become killer applications on iPhone and Web 2.0. Many, and with them the most popular, cartographic tools and widgets have not been created by cartographers. This also means a vast absence of normative standards set out by the cartographic research community over the last century. This paper examines whether the typical characteristics of these "implicit" cartographies, and especially collaborative mapping, have distinct influence on the type, style and outcome of mapping discourses, bringing together a critical cartography and a contemporary action-centered social geography. Finally, an outlook on the planned empirical verification is given.

Keywords: discourses in cartography, implicit cartography, collaborative cartography, VGI

1. Maps are everywhere – is every *Where* influenced by maps?

Only recently, scholars have discovered this special type of cartographies. Hruby and Miranda Guerrero (2008, p. 9) refer to them as "implicit", Crampton and Krygier (2006, p. 12f) write of "undisciplined" cartographies. Eisnor (2006) in turn coined the term "Neogeography" for the same phenomenon. She considers the development an enrichment, a liberation of constricting scientific practices and normative structures. Crampton and Krygier (2006) take the same line, when they state: "[…] cartography is being undisciplined; that is, freed from the confines of the academic and opened up to the people".

Contrarily, e.g. Goodchild (2007, p. 219) sees an "issue" with "[a]uthority and assertation", and brings up the example of severe misalignments in Google Earth's imagery, which is nevertheless relied upon by many users – and also map content creators. Other authors again state challenges for a traditional cartography, when "without doubt technology is clearly ahead of theory" (Koch, 2004, p. 5; translation mine).

Whether or not the position of "implicit"/"undisciplined" cartography/neogeography[2], outside an established tradition, is seen in a more positive or negative way, one has to acknowledge at least two things: first, that there undoubtedly is an "explosion of new 'spatial media'" (Crampton, 2009, p. 91), which consequently makes it a significant part of cartography and thus an important subject of cartography research (and meta theories). Secondly, the conditions of map (and space) production applicable in implicit cartographies, especially in their collaborative forms, can be assumed to be distinctly different from those in "classic" cartographic production environments. It is these differences, and their consequences, that shall be discussed in this article.

[1] This contribution is for the better part based upon my diploma thesis (Fink, 2011)

[2] In the following, primarily the term "implicit cartography" will be used. It best resembles, that it is the map authors' inner identities, which make the difference: whether actors see themselves as inside or outside cartography determines for the better part, whether they adhere to its normative standards or not.

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2. Outline

First, I will shortly recap the history of cartography – as an academic discipline and as a craftsmanship –, and outline the emergence and roles of implicit cartography.

Then, examples of such implicit cartographies will be shown and thoroughly described; this includes a short history of the development of a general implicit cartography. Among the discovered examples and definitions, several "common denominators" are identified. In contrast to e.g. Hruby & Miranda Guerrero's work (2008, p. 9), I thereby focus on the *applied* implicit cartographies. Academic fields, in which cartography topics are being dealt with, are seen as rather contemplative than competing to cartography and its traditional actors; in professional cartography often the opposite is valid.

Next, I will examine the roles of traditional cartographies in an age of information and media technology, and point out their challenges and possibilities. I will also elaborate on the reasons, why implicit cartographies are perceived as a threat by some members of an explicit cartography, and what reactions are thought about and sought for.

Eventually the findings are put into context with each other, explicating differences between explicit and implicit cartographies. These differences then are used to identify conditions which are unique to the mapping discourses of implicit cartographies.

Therefore, in a next step, I present contemporary approaches in action-centered social geography, adapt them to cartography, and make them usable for the particular task. I show, that and how maps can be treated as texts, when it comes to analyse mapping discourses; how collective and collaborative mapping can influence and be influenced by everyday regionalisations (cf. Werlen, 2007a); and how stigmas of places are established or stabilised thereby.

Finally, a direction of empirical research on particular cases is proposed.

3. Implicit Cartographies

3.1 The roots of implicit cartographies

Maps have been around for several thousand years: while it was recently proved wrong, that the wall paintings of Çatal Höyük (6,200 B.C.) are maps (cf. Meece, 2006), the oldest cartographic depictions can still be dated to 3,500 B.C. (cf. Thrower, 2007; Robinson et al., 1978). Even if considering Wood's (2010, pp. 21ff) critical argumentation on early maps, first cartographic practice can be observed from the 12th century on. The dawn of modern cartography comes with the Enlightenment in the 1600s, and in the 18th, 19th and early 20th century map publishers and national institutes foster throughout. (Robinson et al., 1978, pp. 22f; Wolter & Grim, 1997, passim)

The scientific discipline "Cartography" forms only in the 20th century (cf. Eckert, 1921); in the 1950ies the step from a "meeting place of science and art" (Robinson, 1952, p. 17) with an "assumed subjective aesthetic and artistic content" (ibid.) to a "scientific object" as a "functional object" (p. 19) is made. The *map reader* and the process of communicating spatial phenomena move into the focus of research at latest with the Map Communication Model (MCM, cf. e.g. Robinson et al., 1978, pp. 2f); cartographers draw upon neighbouring disciplines such as communication theories and psychology. With its variety of international and national, academic and professional organisations, cartography can be seen as a solid scientific discipline and a well-established trade.

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In an essay from 2008, Hruby and Miranda Guerrero observe an "implicit" cartography besides this "explicit" cartography:

> "[E]xplicit cartography we oppose an implicit cartographic community, whose members don't define themselves as cartographers, but nevertheless discuss questions, which would be interesting from the perspective of a traditional-explicit cartography." (Hruby & Miranda, 2008, p. 9; translation mine)

Crampton (2010, p. 26) makes similar observations, and sees the "sovereign map" and with it "traditional expert-driven GIS" challenged by a new "people's cartography".

3.2 Technology as a driving force

Where does this new "None-Cartography" come from? One quite plausible answer lies in the rapid technological developments of the last decades: As late as 1978 the at that time most important English language text book states, that "today most maps are printed by lithography" (Robinson et al., 1978, p. 347) and elaborates extensively on mechanical and photographic reproduction (pp. 355ff), while only marginally noting "computer-assisted cartography" (pp. 259ff). By the late nineties – not even twenty years later – GIS is widely used, the available technological capabilities are more or less exploited, and the average GIS user has had in-depth training. A few "internet cartographies" already exist, they are run by specialised mapping companies (e.g. *MapQuest*) or by national agencies (*Ordnance Survey*, *IGN*); some of them even demand expert knowledge from their users (e.g. USGS data). In short: (Computer) cartography is an experts' domain.

It is Google to open it up to a wider user circle: with its Google Maps from 2005 and the subsequent Google Earth it provides the right technology (and financial powers) at the right time. Döring and Thielmann (2009, p. 10f) refer to Google Maps and Google Earth as the most influential projects in the web mapping boom. Novel features are mainly the integration into the world's most popular search engine and the possibility to save and distribute own annotations and views.

What *really* changes, behind the scenes, are the actors in cartography: Suddenly it is marketing experts planning and deciding, programmers designing the maps (and their looks), and users contributing to the maps' contents. Cartography is no longer leading in its own fields, and mapping practices are way ahead of normative adoptions.

3.3 Examples: the actors of implicit cartography

Hruby and Miranda Guerrero (2008, pp. 7f) provide a list of sciences, which they consider implicit cartographies. Some seem to be "already accepted by mainstream cartography" (p. 9; translation mine), such as semiotics, information science or linguistics; others are perceived as more strongly competing with cartography: e.g. *Visual Analytics*, or *Spatial Information Theory*. Rather as a side note, they extend their concept to the "commercial sector", where Google Earth resembles an "example with increasing success" (ibid.). Here, we want to concentrate on these professional cartographies, as they certainly are more relevant to the addressed questions.

When *Google Maps* was presented to the public in 2005 (cf. Pegg, 2010), it put forward online mapping significantly. The map metaphor as a search engine user interface, an uncompromising commitment to cutting-edge technology, and the soon following public application program interface (API) revolutionised the web mapping world. Together with

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the stand-alone application *Google Earth*, Google Maps was and *is* one of the – if not the most – important drivers behind the *Where-2.0* boom (cf. e.g. Döring & Thielmann 2009; Turner & Forrest, 2008).

Although Microsoft had had ambitions in a general geoinformation direction for a longer period of time (Encarta, MapPoint, Maps & Directions, the acquiration of Vexcel), and their *Bing Maps* have long been offering functionalities beyond their competitors', only after Google Maps' breakthrough Microsoft's Mapping services grew really popular.

Besides these two purely commercial players, there is another project worth mentioning, which also is special for several reasons: *OpenStreetmap* is driven by volunteers, has the goal to generate a global-coverage map from scratch in order to provide it free of any copyright claims, and – most astonishingly – is successful with this concept. OpenStreetmap, of course, has an unequalled number of map authors, which again makes it a particularly interesting case to study discourses in mapping practices.

The mapping enterprises or community projects given as examples have to be attributed to an implicit cartography, as virtually none of the involved actors count themselves to a cartographic community.

The vast majority of artefacts of an implicit cartography, in fact, can be found in a different field: *Geo-mash-ups* (cf. Leiler, 2008; O'Reilly, 2005) are combinations of multiple data sources, most of the time using APIs, to achieve a more valuable outcome than the individual data. To put it (loosely) with Aristotle: "the whole is more than the sum of its parts". Using at least one component with a spatial context puts the "geo" into a mash-up. Synonymously with Geo-mash-up, sometimes also the terms *neogeography* (Eisnor, 2006) and *montage cartography* (Cartwright, 2006) are used. It has to be stressed though, that these carry distinct connotations: The first (also) means the general trend towards ever more and ever more easily operated map tools (providing access to mapping APIs transparently for the user); the latter (in a quite pejorative view) stands for the products of such a neogeography, i.e. simple maps made by cartographic laypersons by pasting together different pieces like in a collage.

There is one more phenomenon, which has to be taken into account thinking of implicit cartographies: A steadily growing share of the entries in Wikipedia, the photos uploaded to flickr and Picasa, the posts on Twitter, and the messages and status updates on Facebook contain locational information in the form of a geotag. These point clouds in themselves create an own geography of societies respectively of knowledge. They certainly are mapping the world, and therefore are considered a simple form of cartography.

For all of these examples one thing is true throughout: the mapping processes involve a comparably high number of involved actors. Consequently, the discourses carried out most likely are more complex and thus potentially have a higher influence on the mappings' outcomes than in traditional cartographies.

3.4 Traditional cartographies and media technology

In 2008, Meng analysed the position of traditional cartography in an age of information and media technology. In her subsequent essay (Meng, 2008), two core claims are on her agenda: First, with the continuing technical evolution the spectrum of cartographic products enlarges. Second, despite a stronger "multidisciplinary interconnection" (Meng, 2008, p. 10; translation mine), she sees the role of cartographers unconditionally confirmed. Not quite as confident is

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Mary Spencer, head of the British Cartographic Society, who in a BBC-Interview expresses her fear, that online maps in general, and such ones made by cartographic laypeople in special, could negatively influence the quality of future maps. (Crampton, 2010, pp. 35f; BBC, 2008)

Back to Meng: she recognizes an "omnipotence" of "pre-digital maps" (p. 3): gaps in cartographic knowledge could be easily filled with thought-up content[3] or illustrations; maps could be used to convey ideological views and were connected with "privileges and power"[4] (ibid.). She sees these powers lost in "a digital age", replaced by "ubiquity" (p. 4).

Interpreting the issue in an understanding of "power" closer to Foucault's, it can be asserted, that in the cartographic discourse, power, while formerly concentrated, has been distributed more equally. Consequently, more people are able to take part in this discourse, more opinions are present, and more topics arise. This is further supported by the vastly increasing technological possibilities, and in turn leads to a wider distribution (also spatially) of the discourse and a greater variety of its artefacts (maps).

Of course, such an "increasingly multidisciplinary working environment" (p. 10) also alters the role and job description of cartographers: They are usually the only ones with insight into all steps of map production, Meng claims, and are also the ones made responsible for any errors in the communication process *map* (cf. pp. 8f) . With an increasing division of labour, and higher automation, cartographers moreover become "more and more invisible" (ibid.) Gartner raises the same claim, already focussing on collaborative web cartographies:

"However the collaborative and participative nature of Web Mapping 2.0 will lead to a change in research priorities. […] Cartography […] will be challenged to define and offer rules, methods and techniques, which can be applied to the collaborative data input." (Gartner, 2009, p. 238)

Kriz (2001, pp. 228f; translation mine) demands that cartography should develop "innovative, independent and methodological concepts" instead of "being geared by technological advancements".

All three cited authors are consistent with each other, when they (re)define the future cartographers' tasks as not so much carrying out cartographic visualisation, but rather providing recipes, which can both be implemented in a technically-automatic style and serve as a basis for enabling laypeople to create meaningful maps.

3.4.1 Reactions

This concentration on an over-all competence is one of a number of responses on the development of implicit competitors, that can be observed in traditional cartography. Already briefly noted in Kriz' statement above, another noticed strategy is the development of respective normative theories for new developments, thus bringing the according fields "home into cartography"[5]. Others, e.g. Cartwright (2006) take a more radical line of argumentation and propose an own category of "'cartographic outliers'" (p. 139), to accommodate "artefacts produced *outside* conventional Geo-Cartographic 'rules'" (ibid.; emphasis mine).

[3] Compare also the "deductive" cartographers of the *Académie Royale des Sciences*, who in the 17th century filled in gaps in maps with content "to be confirmed" by explorers. See Belyea (1992, pp. 5f).

[4] Note that Meng's usage of "power" does not conform with the definitions widely used in contemporary critical cartography, which generally follow Foucault's conceptions of power being (almost always unequally) distributed over the interaction partners. In the cited text, Meng treats "power" as purely top-down.

[5] Kriz proposes to no longer separate maps from map-like depictions, as it is done in the German-speaking community since the famous Swiss cartographer Imhof introduced his taxonomy in the 1960ies. (Kriz, 2001; see also Meng, 2008, p.6)
Existing typologies and taxonomies of maps are constantly expanded, see e.g. Meng (2008, p.6) for MacEachrans (2004) famous "cube" illustration, modified first by Freitag (2001), then by Meng herself.

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But there are examples dealing with the newly emerged competitors in a much more positive and competitive way: one of the most obvious reactions is the adoption of technological skills by traditional actors of cartography. Especially on the long term, this promises to be a sustainable strategy to remain competitive. The recent reprint of a well-established, traditionally rather conservative Austrian school atlas is a perfect example: It comes with a great variety of surplus online offers, which not only includes worksheets and blind maps, but also interactive maps and downloadable KMZ-files, in an attempt to regain a share from Google Earth and -Maps.[6]

Another common-found strategy is to accept the "outsourcing" of certain fields of competence to new disciplines. Today, it is perfectly natural to view geoinformatics as an own discipline, in the cross-section of computer science, mathematics, geography, and cartography. The – scientific – collaboration with neighbouring fields is seen as clearly positive, and the connection to its "parent" sciences is close as ever. The same applies for some branches of a professional cartography: data acquisition nowadays is almost always carried out by specialised companies, and the formerly inevitable in-house print shops have vanished from nearly all map publishing houses.

4 Drawing the line: differences between implicit and explicit cartographies

We have seen, that both implicit and explicit cartographies have their distinct characteristics. Putting them in contrast, several general differences can be delineated:

4.1 Normative guidance

The *Where 2.0*-movement (cf. Turner & Forrest, 2008) developed vastly without the involvement of any actors from traditional cartography or geoinformation. The new *global players* of web cartography buy the base data; the technical developments are made generally in-house. Consequently, also graphic design and aesthetic issues of visualisation are dealt with in the development studios, which are usually dominated by software experts. When the first web mapping applications of the later market leaders came out, already a plethora of standards had been set out by the Open Geospatial Consortium (OGC).[7] Nevertheless, most of the new players set out to reinvent the wheel. Although nowadays also Googles *Keyhole Markup Language* (KML) has been accepted as an OGC standard, and the *Tile Map Service* (TMS) has been implemented as *Web Map Tile Service* (WMTS) resp. WMS-C, at the time they were conceived, there had already existed freely available and highly elaborated norm coded formats and protocols; for KML and TMS, GML (Geographic Markup Language) and WMS (Web Mapping Service) would be the respective examples.

Why have these specifications not been implemented, although it would deem obvious? There indeed are a number of plausible reasons:

- *Different technical requirements*: the pre-existing norms were designed to universally fit into a broad variety of applications. E.g. WMS' sophisticated features challenge the server-side implementation, demanding high resources. TMS, on the other hand, was devised to provide "scalable, high performance services for web based distribution of cartographic maps" (Masó et al., 2010, p. 10). Similar thoughts guided the

[6] Which took over class rooms easily over the last years, given that no real alternative was available for teachers using up to date didactic concepts (cf. e.g. Zumbach & Jekel, 2006).

[7] As of today, the most important remain Simple Feature (1997), WMS (2000), and WFS, GML and SLD (2002). (cf. OGC, 2011)

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OpenStreetmap (OSM) project: "OSM's developers [...] felt that most such tools and standards are hard to use and maintain, citing performance issues with, for instance, MapServer and a lack of adaptability of OGC compliant software packages to support wiki-style behaviour." (Haklay & Weber, 2008, pp. 14f)

- *Deliberate proprietary design*: being ahead of competitors is a key issue for companies financed by advertisement. Therefore, playing one's cards close to the chest seems reasonable – even it means additional effort. Besides that, geodata copyrights have to be enforced; keeping people from abusing open interfaces is most probably harder than obscuring the own technologies.

- *Lacking awareness*: At the beginning, in none of the leading *Where 2.0* projects a significant number of geoinformatics or cartographers were employed. As recently observed at the local "Linux weeks", graphic designers and programmers don't always search for existing solutions when approaching cartographic questions (see Fink, 2011, pp. 46f for more details)

This list of course cannot be exhaustive. Nevertheless it can observed, that implicit cartographies tend to gear towards different criteria than traditional map makers. Freely adopted from Kant's *Categorial Imperative*, a technological – in parts also a capitalist – imperative can be postulated as a prevailing sentiment: the question "Shall everything technically possible be realised?" in some cases even pushes back economic considerations.

4.2 Financial and technological resources

In 2010, Google earned a net revenue of US$ 8.5bn, Microsoft gained US$ 18.8bn (cf. Google, 2011; Microsoft, 2010). While no sums were reported from the various buyouts of web mapping start-ups, in every case the number of employees was drastically increased soon thereafter (see Apostolou (2008) for the example Where 2 Technologies/Google). In comparison Kompass, one of the largest privately owned map publishing houses in Central Europe, employing 35 people, reached a turnover of € 12m in 2008 (cf. Kompass, s.a.).

With such huge financial resources comes a higher diversified workforce with specialised employees, such as programmers, graphic designers or marketing experts. R&D departments in implicit cartographies are faster in their (re-)actions – their innovative technological resources and possibilities are without comparison.

Comparable to city maps, web cartographies draw most of their fundings from advertising clients. What is different, though, is, that also the owners of the "virtual billboards" earn their share: website operators can make money from integrating maps into their products. Consequently, this means a further motivation to use and distribute web maps.[8]

4.3 Degree of specialisation

All discussed examples operate in niches of cartography.[9] This stands in contrast to most traditional cartographies: The latter usually try to reuse their tediously gathered data bases in as many products as possible. No rule without exception: specialised outfits also exist in tradtional cartographies; nevertheless they are much more prominent in implicit cartographies.

[8] cf. Black (2007a, 2007b), who discusses the "democratizing" of access and income.
[9] That is, here, interactive 2D-/3D-map applications; I can imagine a multitude of other examples without leaving behind the concept of implicit/explicit.

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4.4 Number of processors, number of interstage products

Generally speaking, nowadays it is hard to estimate how many people are involved in the production of any good. From my own experience working at a map publishers' house, I can report that in traditional cartography, usually only a very small team is associated with a particular project, managing all nevessary steps – on-site research, map edits, print preparation – among themselves.

In the discussed implicit cartographies, a stronger division of labour can be attested. On the one (the commercial) side this is entailed by multi-stage production processes and numerous interstage products.[10] On the other side – at collaborative cartographies as OSM – the huge number of contributors brings about a multitude of opinions, biases, and sub-discourses.[11]

4.5 Open structures

In Web 2.0 it is common business practice to provide well-documented application programming interfaces, allowing others to transparently integrate popular services. Virtually all web cartographies provide and/or use APIs. Some do not only open their output to the public, but provide "input facilities" as well. Google Maps allows to "report problems", and lately also to propose changes directly (through its MapMaker application, cf. Kühn, 2011). OpenStreetmap, which of course also has its own "bug tracker" *MapDust*, has one outstanding feature: Every bit of information stems from voluntary contributors.

4.6 Mapping quality

Crowd sourcing, i.e. commissioning data acquisition to laypeople, one may argue, could have implications on data quality.[12] Even though I consider myself a most optimistic observer, I remain slightly uncertain talking about the quality of Volunteered Geographical Information (VGI). It is not that I did not trust cartographic and geodetic laypersons to care enough about accuracy. The point is rather, that contemporary quality assurance concepts are in no way applicable to community projects in a comparable dimension. Criteria for the quality of a map have been set forth in the ISO standard 19113, a good overview can be found by van Oort (2006).

Haklay (2010, pp. 690f) evaluated the positional accuracy and completeness of OpenStreetmap data against maps of the British Ordnance Survey. One of the surprising results: in a quarter of the examination grid cells, the community data contained more features, i.e. was more complete, than the governmental map. In a later contribution (Haklay et al., 2010) the *Linus-Law* is confirmed for VGI: the number of contributors per map area correlates with the measure of positional accuracy and feature completeness.

As we will see later, the mapping quality of OpenStreetmap depends largely on the composition of the resident population.

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[10] cf. Barret & Griffin (2007) for an example of Tele Atlas' multi-stage production process (which I do not consider belonging to an implicit cartography, but gives an idea of the complexity of specialised labour division)

[11] Haklay & Weber (2008) and Haklay et al. (2010) report a tenfold increase of OSM contributors from mid 2008 to late 2010 (30,000-300,000).

[12] see the example of the British Cartographic Society earlier mentioned

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5 Understanding maps and mapping

5.1 Understanding maps

Cartography has long been set in a distinctly behaviouristic tradition. For instance the famous map communication model (MCM; cf. Board, 1967; Koláčný, 1969) describes the cartographic process as merely a number of reactions to external stimuli, which can be carried out better or worse[13]. Along the same line, implicitly a positivist position is taken, and objective "reality" is taken for granted – the ultimate yet unreachable goal being to adequately represent this universal truth in a map.

I do not want to discredit the MCM, and acknowledge the indispensable value it brought into cartographic conceptual design processes. For certain fields, such a model might be the ideal meta narrative. When it comes to questions such as "how are social realities reproduced in maps?", though, the MCM is definitely the wrong paradigm to start with: it would not even allow to ask said question.

Table 1 lists some of the more widely used conceptions of "map". It is especially J. Brian Harley, who in the 1980ies dared to step away from seeing maps as "scientifically exact" and who considered society, politics, and personal circumstances as influential on mapping and map making processes. Central notion to his ideas was the concept of "inner and outer voice" struggling inside a map authors head (cf. Harley 1989). But – as Belyea (1992) and Wood (1993) exemplify – Harley went only half way: he still strongly believed in the map as an ideally identical representation of an objective reality.

Several scholars have since tried to elaborate on the constructed nature of maps. Common grounds for the different concepts is the general assumption, that the map was a sign system (similar to language), and that either map authors are speech-acting subjects with specific social *Backgrounds* (cf. Searle, 1983, pp. 141ff), or – in not focussing on subjects – a certain representation of world is (re-)constructed internally to the discourse of map communication.

My later conclusions draw on the work of Schlottmann (2005) and Gryl (2009). The formers internationally well-received concept further develops Werlen's (2007a) theory of "everyday regionalisation", which in turn is a thorough re-adaption of Gidden's structuration theory to contemporary spatial concepts. The latter brings about a discourse-analytic approach towards deconstructing maps. Werlen's key message is that "reality" is (re-)produced in everyday actions and speech-acts, and that it thus is influenced by pre-existing subjective, inter-subjective and societal constitutions of realites (cf. Werlen, 1995, 2007a, 2007b). Werlen focusses no longer on space itself, but on the "world-view" of a subject: "World-attachments are realised through naming, categorizing, and adding symbolic meaning to things" (Werlen 2010, p. 12; translation mine) – it only exists, what is contained in a subject's world-view.

Schlottmann (2005) adds a strong linguistic component to those assumptions, expressing her conviction that speech-acts contribute the largest share to constituting and reproducing social realities.

[13] In a sense, the MCM implies that the optimum can not ever be reached.

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Table 1: contemporary concepts of map[14]

"map"	implications	examples
objective representation of a real world	true, "natural"	"everyone except those few whose job is to think about and make maps" (Edney, 1996, p. 186)
Multi-stage model of a real world	Scientifically exact, as accurate as possible, constrained by the communicative and/or imaginative shortcomings of cartographer, map and map reader	"Map Communication Model" (e.g. Board, 1967; Koláčný 1969) *still in common use throughout academic cartography*
Medium to deliberately communicate forged information	Misused by "evil-doers"	First emerged during/after WW II, describing Propaganda maps – as a counterexample for the new "scientific" cartography (Robinson, 1952); later adopted to a wider range of "malevolent, naïve, or sloppily expedient authors" (Monmonier, 1996)
Representation of a real world, influenced by social, political and personal situation	Exterior "power" (from above), outer vs. inner voice of the cartographer	Harley (e.g. 1989) Schlichtmann (2008)
Representation of socially constructed realities	Entire content is constituted from the "world-view" of the map author and/or in the discourse of mapping, map making and spatial communication	Wood (e.g. 1993) Gryl (2009)

5.2 Making cartographies: mapping as discourses

Map(ping) can be considered a set of space representations postulated in communication, a set of utterances about space. Especially in collaborative and collective mapping projects, I consider *mapping* close to *speech-act*. Comparable to words for a language, signatures can be assumed the atoms of a map. As has already been discussed on numerous occasions (Harley, 1989; Schlottmann, 2005; Crampton, 2001; Searle, 1980), not only the "literal" meaning is important, but also the "extra-textual field[s] of reference" (Schlottmann, 2005, p. 166) influence a map's information. Schlottmann employs Searle's Background theory and considers the literal meaning relative to a Background of variable implicit knowledge (p. 120). She adopts Searle's findings and names four levels of *Backgrounds*, which influence space constitutions: a deep Background, which is trans-subjectively available and enables basic spatial concepts such as indexicality and navigation; a cultural Background, which manifests inter-subjective structures such as space abstraction or projections; an individual network carrying e.g. emotional values; and finally the distinct situation and context of the interaction.

Volunteered Geographical Information (VGI) is considered a special case of an intermediary discourse: information is not fixed, it can be extended, altered, or even deleted at any time. This multi-stage, reflective character has to taken into consideration in a discourse-analytical approach.

[14] In this context "map" is used solely in the meaning of "cartographic representation" (whatsoever specific kind) and not in its numerous other variants.

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The communicative task "mapping" leads to the following questions:

- How much do individual *Backgrounds* influence maps?
- Should this influence be considered positive ("local culture") or negative ("inhomogenous 'language'") for the significance of a map?
  - If positive: should mapping be restricted to locals?[15]
  - If negative: How could such influence be eliminated? Where is the common denominator for a global map? Which cultural *Background* should be made "standard"?
- Does a map lose value or gain another meaning, if map author and map reader do not share a common *Background*? See Schlichtmann (2008, p. 3) for a discussion on deriving connotations, resorting to Edney's "meaning is *read* into the map" (2005, p. 79).
- According to Werlen, a "at least partly homogenous knowledge base" (2007, p. 259; translation mine) is needed for successful communication. Can such a common ground be built up in a collaborative community such as OpenStreetmap?
- What, if collaborating map authors have distinctly different Backgrounds? Will one dominate, or will there be a compromise? Will meaning be distorted altogether?
- What if collaborating map authors have very similar Backgrounds? Does collaborative mapping offer higher potential to reproduce established spaces than conventional cartography?

As of today, at least one aspect has been thoroughly discussed: Haklay (2009, 2010) shows, that the concept of the "Digital Divide" is applicable to VGI. Volunteer mappers need to bring up time, (a bit of) money, education and motivation. Haklay shows, that the completeness of OpenStreetmap depends on the composition of the local residents, and that thereby deprived places are further marginalized. The inherent anarchic structures of an open community lead to a stronger reproduction of social marginalisation and stigmatisation than in traditional cartographies (who are subject to stricter regulations).

6. Discussion

I demonstrated the advantages of action-centered or discourse-analytic approaches for research on the newly developing implicit cartographies, and showed which exciting questions are made possible and meaningful only from such a point of view.

Therefore, I first had to introduce and clarify the term *implicit cartography*, which was coined by Hruby & Miranda Guerrero (2008). In direct comparison to an oposed *explicit cartography*, the development of implicit cartographies could be traced, and its specific characteristics worked out. I focussed on aspects relevant for mapping discourses.

In order to treat "making cartographies" in a similar sense to "making geographies", contemporary discussions of an action-centered social geography were elaborated on, and methodologically equating *Map* with *Text* was advocated. I further explained, why mapping – especially in collaborative settings – should be regarded as discourses, and how collective mapping practices contribute to everyday regionalisations and stigmatisation of places.

The next logical step, and already in preparation, is an empirical study. On the basis of OpenStreetmap change logs, I will carry out a microanalytic linguistic discourse analysis of individual "map edit wars" (cf. Maron et al., s.a.).

[15] For example at GeoCaching.com, only locals are allowed to add new GPS riddles.

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