Participatory mapping and counter-representations in wind energy planning: A radical democracy perspective

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Abstract

Participatory mapping for landscape planning is gaining in popularity. With a participatory geographic information system, the local spatial knowledge of the affected public can be collected and included in planning decisions. For its proponents, participatory mapping is deemed useful not only for rendering planning more inclusive but also for facilitating consensus in planning. Here, we present a case study of wind energy planning in a region in Switzerland in which we applied a participatory mapping approach that resulted in providing spatial data not for consensus-making but for creating counter-maps. Using a critical cartography approach, we identified from our sample data the distinct wind energy discourses of supporters, opponents, and people who were indifferent; these revealed three different representations of the same place, which leaves little room for reaching a consensus. Drawing on the agonistic planning theory of radical democracy, however, we could demonstrate why this outcome is not necessarily problematic but rather bears potential for more democracy and pluralism in controversial landscape planning. This case study builds the foundation for discussions about how to implement energy transition in the face of the climate crisis and touches on other cutting-edge issues, including the handling of dissensus, conflict, and polarization in planning.

Keywords: critical cartography, meaningful places, wind energy, PPGIS, radical democracy

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Introduction

Landscapes are associated with a multitude of meanings. Thus, the same landscape can be perceived in various ways [1, 2].For some, a landscape could represent a source of livelihood resources, while for others, the same landscape is perceived as a space for recreation or cultural heritage that must be protected.

To include these diverse meanings in landscape planning, participatory mapping with a public participatory geographic information system (PPGIS) is enjoying increasing popularity [3, 4]. With a PPGIS, residents can express their own experience and knowledge of a specific landscape and render these spatially explicit. Doing so not only supports planners or responsible authorities in extending conventional planning with social dimensions and enables residents to be included in planning processes concerning their living environment, it is also understood to facilitate consensus on interventions [4].

However, landscape planning is also highly political, given the multitude of meanings that are associated with landscapes [1, 2, 5]. As a result, the spatial data collected with a participatory mapping approach is much more than a source of information to make planning more inclusive and the consensus-finding process more efficient: The collected data can also provide counter-representations, particularly in conflict situations such as controversial wind energy planning. In such cases, the maps intended for inclusive public participatory decision-making can become counter-maps that do not necessarily support participatory planning in finding consensus. Instead, they may fundamentally challenge planned projects and their planning procedures [6].

Participatory mapping approaches for landscape planning processes and counter-mapping approaches have complementary but also often incompatible purposes. Both aspire to provide alternative spatial data for inclusive decision-making. While spatial data collected with participatory mapping approaches is often used to render planning decisions socially more acceptable in order to facilitate consensus, the original planning decisions are seldom intended to be challenged. This is different from counter-mapping approaches that aim to explicitly challenge planning decisions [4, 7–10]. In post-colonial contexts of the Global South, for example, counter-maps are, therefore, often framed as positive steps that can challenge prevailing unequal power dynamics. In most planning contexts of the Global North, by contrast, counter-maps are often seen as problematic in planning, as they are understood to hinder consensus and foster conflict [4, 7, 11, 12].

In this article, using a critical cartography approach, we aim to demonstrate how participatory mapping intended for public participatory decision-making in landscape planning resulted in providing data not for consensus but for creating counter-maps. Furthermore, by drawing on an agonistic planning theory of

radical democracy, we aim to question the problematization of counter-maps for participatory decision-making in planning settings. Additionally, we suggest why counter-maps are essential tools for disrupting polarized discourses around landscape and planning proposals and why the participatory mapping community's research could profit from focusing more on tools or approaches that emphasize conflict instead of consensus.

We illustrate our approach with a case study in which we applied a participatory mapping approach within a communal wind energy planning context in the midlands of Switzerland.

Case Examination

Theoretical background

Participatory mapping versus counter-mapping

Behind the idea and practice of participatory mapping and counter-mapping stands the assumption that maps are not simply objective representations of place and space. For scholars and practitioners who practice participatory mapping or counter-mapping, maps are always vehicles that transport a particular perspective of place and space that extends beyond the representation of where something is located [3, 4, 8, 12–14].

Drawing on this, the practice of participatory and counter-mapping is explicitly applied to (re)introduce alternative representations of place and space in planning or decision-making processes, for example, with the use of complementary or alternative categorizations (e.g., traditional or spiritual symbolism) or geometric representations other than conventional ones (e.g., point, line, polygon) [3, 8, 12, 14, 15].

However, while counter-mapping approaches use the practice of mapping explicitly to challenge planning practice or decision-making processes, participatory mapping approaches are mostly not applied for political purposes [4, 11, 16, 17]. Instead, most participatory mapping approaches predominantly map alternative representations of place and space to integrate these into planning practice or decision-making processes and not to directly challenge these practices and processes with them. Rather, most participatory mapping practices are explicitly applied to make planning less political and to mitigate the conflicts that accompany it [3, 4, 13, 14].

Participatory mapping from the perspective of radical democracy

As planning practice indicates, most planning contexts are inherently political [2, 5, 18–21]. Scholars who draw on radical democracy (see literature from Jacques Rancière, Chantal Mouffe, and Erik Swyngedouw),

therefore, perceive participatory planning practices that are applied predominantly to make planning less political very critically. These critics argue that in most of these participatory planning practices, instead of mutual and "peaceful" agreement, a post-political condition is created, in which no real encounter takes place [21–24].

In the perspective of radical democracy, the quest for consensus of most of these participatory planning practices is particularly understood as one of the main triggers for such a post-political condition. While consensus-oriented participatory practices are believed to be legitimate in planning settings where participants already share fundamental beliefs and values, in conflictive or highly political settings, these are perceived as provoking pseudo-participatory conditions, or tokenism, because of their handling with dissensus [5, 21, 22, 25]. Instead of performing genuine participation by actually considering alternative ideas, consensus-oriented participatory planning practices are suspected to implicitly silence dissent by the attempt to eliminating or weakening antagonism between actors —a situation in which people or groups of people encounter each other as enemies by questioning the legitimacy of the other's position—"through rational argumentation to reach the best possible agreement" [22, 23]. For radical democrats this handling with dissensus does not induce real encounter. Rather, it perpetuates established power dynamics, or it makes conflicting discourses even more solid, if those who are against the status quo, refuse to surrender [5, 21, 22].

Therefore, critics argue that participatory planning practices and most participatory mapping approaches must become radically (re)politicized [11, 16, 18, 21, 23]. A proposal for how to (re)politicize participatory planning practices has been introduced by the agonistic planning theory. This theory also draws on radical democracy and presupposes that "the political"—or the antagonistic dimension—is inherent in planning and that it cannot be sidelined or neglected by consensus-oriented participation [11, 22–24]. Rather, "the political" must be recognized and acknowledged, because only then antagonism can transform into agonism—a situation in which people or groups of people position themselves within contrasting poles but, nevertheless, are capable of encountering each other as adversaries—discourses will remain fluid, and problematic power relations can become disrupted [22–24]. The agonistic planning theory, therefore, proposes to design "conflict-oriented" participatory planning practices. In conflict-oriented participation, the engagement with dissensus should be fostered actively, and open-ended outcomes should be promoted rather than consensus [11, 16, 23, 26, 27].

Concepts and applied procedures of our participatory mapping approach

This case study chronicles our experiences with a participatory mapping approach. This approach involved the mapping of *meaningful places* using a PPGIS together with an online survey (Maptionnaire); it was applied with the intention to facilitate widely accepted consensus on suitable sites for wind energy turbines.

The prospects of mapping meaningful places

The concept of meaningful places is similar to the concept of *sense of place,* which commonly is understood as being a composite of *place attachment* and *place meanings,* but it does differ as well from sense of place [28–35]. Meaningful places can be conceived of as being similar to sense of place, insofar as individual processes (e.g., individual experiences at a particular place) and processes that are of collective nature (e.g., cultural transition or political discourses about a particular place, such as for Fukushima) are involved in how a meaningful place emerges (Figure 1). As an example, a place can become meaningful because a person regularly visits or often passes this place. According to the concept of sense of place, the person may begin to ascribe meanings to this place, also called place meanings, and may start to develop a personal relationship to this place, also known as place attachment. Depending on the type of place meanings that have been assigned to this place, this place attachment can be emotional, also called *place identity,*[1] and/or functional, also known as *place dependence*[2] [29, 36, 37].

Meaningful places do differ from sense of place, to the extent that place attachment or the very personal and emotional component of sense of place is not required for a place to be meaningful (Figure 1). Conversely, a place can be, and become, meaningful only because of the meanings that are ascribed to this place, such as through political discourses, without a person or a group of people necessarily feeling attached to this place [6, 35, 37–40].

Given these characteristics of a meaningful place, the participatory mapping of meaningful places for consensus-finding on wind turbine siting does have certain advantages. For example, the dynamic processes of local wind energy planning that often influence how people perceive and assign meaning to the places in their living environment, can be rendered visible with the mapped meaningful places [37, 41–43]. Additionally, the meaningful places as a dynamic and discourse-influenceable mapping category can

[1] Understood to contribute significantly to the development and stability of people's identity (e.g., places that represent *Heimat*) [36, 29, 37].

[2] When (physical) features of a place contribute to meeting people's needs and enable them to reach their goals (e.g., places used for recreation) [29, 37].

provide the basis for deliberative negotiation, which a mapping category that builds only on personal or individual place attachments cannot provide.

However, the mapping of meaningful places for wind turbine siting can also have certain disadvantages. If a specific wind energy project is already too contested, the discourses around it may become polarized. People's meaningful places, then, may no longer display a differentiated representation of their living environment that is influenced by multiple (or individual and collective) processes but, instead, might display a biased representation, where the wind energy discourses exclusively steer how people assign meaning to their environment. Places that previously were not meaningful may then become meaningful, or places that have been considered meaningful may become less so. If these discourses become hegemonic—hegemonic discourses are naturalized discourses that factually deny the existence of different perspectives—meaningful places will no longer be fluid and negotiable but be static [44, 45].

Research site and research procedure

The participatory mapping of *meaningful places* using a PPGIS and the online survey was intended to be conducted in the context of the wind energy project of Vechigen. Here, we also intended to use the mapped meaningful places for participatory wind turbine siting.

Vechigen is a municipality located in the midlands of Switzerland (Figure 2). The notion of installing wind energy turbines there was initiated in 2007 by locals and was further promoted by a regional planning authority.

We chose this research site based on a qualitative multi-criteria decision analysis and several expert interviews [6]. The criteria for selecting an appropriate wind energy project were: (i) an early stage in planning,[3] (ii) a large planning area,[4] and (iii) a suburban area.[5]

Based on our conception of meaningful places, as outlined above, and preparatory interviews [6] with 20 stakeholders (planners of local and regional scale, members of the municipal council, landowners) and residents of Vechigen of various backgrounds and ages, we developed and prepared the PPGIS and the

[3] Most literature about participation points to the evidence that participatory practices are better conducted early in a planning process, when substantive involvement and influence is still possible [46, 6].

[4] For participatory wind turbine siting, the designated planning area must be relatively large (Figure 2). If this is not the case, deliberations around alternative siting decisions are almost impossible.

[5] Suburban areas may provide a greater variety of different place types, which might yield more potential for acceptable locations for wind turbines.

survey. The survey was designed to include not only random samples of residents from Vechigen but also ones from the 11 neighboring municipalities of Vechigen: Arni (BE), Biglen, Bolligen, Hasle bei Burgdorf, Krauchthal, Landiswil, Lützelflüh, Oberburg, Stettlen, Walkringen, Worb (Figure 2).

Due to the characteristics of meaningful places, the PPGIS and the survey involved not only the inquiry to map the meaningful places but also a set of statements derived from the local wind energy discourse, in which the participants were asked to describe their personal views. Further mapping tasks that included the separate mapping of additional place types were also considered: Places that usually are strongly discourse-dominated, such as (i) places that people perceive as suitable for wind turbines, or (ii) places that people perceive as unsuitable for wind turbines; and places that predominantly hold very personal and individual meanings, such as (iii) places to which people feel attached; (iv) places that people visit for their own recreation, as a representative of the functional dimension of place attachment; and (v) places that people consider as *Heimat,* as a representative of the emotional dimension of place attachment.

With these additional PPGIS and survey contents, we planned to appraise—through the comparison of the spatial pattern of the various place types with each other and through the group-wise (supporters, indifferent inclined persons, opponents) comparison of the mapped places based on the participants' personal opinions about the local wind energy project—whether the mapped meaningful places are influenced or already dominated by the wind energy discourses and whether the mapped meaningful places can be used for the participatory siting of wind turbines.

Shortly before we intended to conduct the PPGIS and the survey, the local wind energy project became increasingly contested. In particular, the residents of the rural, hilly part of the municipality, where the largest part of the designated wind energy planning area was located, felt disregarded and began to mobilize themselves for resistance. Although the PPGIS and the survey had already been prepared, we were, consequently, forced to postpone the start of our survey twice, for a total of nine months.

In the meantime, moreover, the local public was informed in a municipality assembly about the results of the wind speed measurements and the concrete sites predefined for the wind turbines. Finally, because the wind speed measurement data appeared to be lower than expected, and because of the intense local conflicts, the municipal council suspended further planning on the wind energy project for at least two years (Note: To date, planning has not been resumed.)

Since every step of our research project had been discussed with the municipal council of Vechigen and there had been no objection against the procedure, we conducted the PPGIS and the survey in autumn 2018.

Methods

The PPGIS and the online survey (Maptionnaire) were started by 534 participants (a response rate of 8%), but only 428 of them fully completed the survey and the mapping tasks and, therefore, were included in the analysis (Table 1). A total of 36.81% respondents were residents of Vechigen, 58.88% were residents of the neighboring municipalities, and 2.31% did not state their place of residence (Table 1). In total, 3,639 polygons were drawn to indicate the inquired place types: 572 to indicate meaningful places; 414 to indicate suitable sites for wind turbines; 311 to indicate unsuitable places for wind turbines; 391 to indicate places to which people feel attached; 889 to indicate places that people visit for their personal recreation, or the functional dimension of place attachment; and 476 to indicate *Heimat,* or the emotional dimension of place attachment (Table 2). The high number of polygons for the recreational places in relation to the other categories is due to the order of the mapping tasks of different place types, with the recreational places being mapped first.

Although we could not make use of the mapped meaningful places for participatory wind turbine siting—due to the suspension of the wind energy project—we nevertheless aimed to reveal the potential of the participatory mapping approach. For this, we applied a critical cartography approach.

Critical cartography

For critical cartographers, maps should be understood not only as representations of space and place but also as means that create them. For these cartographers, map-making should never be considered neutral but always as a practice that is tied to power [7, 15, 47–51]. Applying a critical cartography perspective, accordingly, means to explore and make these hidden power dynamics in maps and map-making visible. Critical cartographers accomplish this by applying two different modes: (i) critiquing cartography as a method and (ii) critical map-making in practice [48, 52, 53].

Drawing on Foucault's concept of *governmentality,*[6] early critical cartographers predominantly attempted to disclose the power embedded in maps and map-making to demonstrate how elites, often the state, have used maps and map-making as tools for enforcing their perspective on space and place [56, 57]. Only through maps, critical cartographers argue, can territories and boundaries "come into being" [15, 50]. In doing so, early critical cartographers contributed significantly to the historic reappraisal of imperialism, by

[6] Governmentality describes a way of ruling over people that makes citizens act in accordance with (state) priorities without them being actively aware of it [54, 55].

demonstrating how mapping was used as the dominant technique of powerful political actors to claim ownership over a piece of land [7, 12, 56].

More recent contributions of critical cartographers attempt to disclose the power embedded in contemporary maps and map-making [48, 58–64]. This involves critical engagement with the cartographic norms and rules of professional maps and map-making practice—for example, the use of points, lines, or polygons for the representation of space and place—as well as maps and map-making by lay persons—for example, at platforms such as Open Street map or with PPGIS or other mapping applications. Although these map-making practices and the maps that result from them are most often not intentionally used for political reasons, nevertheless, critical cartographers argue that they are entangled with power [58, 60, 61]. To prevent their misuse, critical cartographers find it is important to disclose the power embedded in these maps and the map-making practices that are involved therein [62, 63].

While explicit in its aim, critical cartography is highly unspecific in its methodology. Therefore, various methods have been applied to explore and render visually the power that is embedded in maps and map-making [52].

Since in our case study, *discursive power*[7] was expected to be especially visible in the mapped meaningful places, as indicated by our conception of meaningful places, we applied methods accordingly. Therefore, we first built three clusters (supporters, indifferently inclined persons, opponents) using the responses to the statements around the wind energy discourse. On that basis, we assigned the spatial data and mapped them for each cluster. To answer questions arising during the analysis, we also applied statistical methods using parts of the remaining data of the survey.

Cluster building

To detect and expose the discursive power embedded in the meaningful places collected with the PPGIS and the survey, we first disaggregated our sample into three clusters: (i) supporters, (ii) indifferently inclined persons, and (iii) opponents. We used a k-means cluster method and the statements around the local wind energy discourses to build our cluster (Table 3). To validate the cluster, we applied mean value comparison and qualitatively estimated their plausibility [65]

[7] Discursive power is the production and reproduction (intended or unintended) of discourses around a specific topic, so the social reality constructed around it becomes naturalized and lacking in alternatives ([54]).

Map-making

Based on these clusters, we made our maps. For each cluster group, the spatial vector data sets (the polygons as described above) were rasterized based on a fishnet of 100x100m (a trade-off between accuracy and the capacity of computing power), and overlays (the number of intersected polygons per raster cell) were calculated. The mapped meaningful places were then visualized for each cluster group as thematic maps using a relative scale in relation to the highest number of overlays.

The mapped meaningful places were then compared with the other five place types that were mapped by the respondents: (i) suitable wind energy sites, (ii) unsuitable wind energy sites, (iii) places to which people feel attached, (iv) recreational places, and (v) places that represent home (*Heimat*).

In doing so, we calculated the spatial correlation of each pair, using Spearman's rho correlation coefficients and Kruskal–Wallis H tests [66, 67] and visualized their spatial correlation using two different classification approaches: (i) calculation of difference and (ii) calculation of ratios. For the first approach, we subtracted the number of overlays of each place type from the overlays of the meaningful places. Positive values in certain raster cells indicate that the map from which overlays were subtracted has higher values at these raster cells than the raster cells of the map that was subtracted. Negative values at certain raster cells indicate that the map from which overlays were subtracted has lower values at these raster cells than the raster cells of the map that was subtracted. Zero values at certain places indicate that both maps exhibit the same value at these places.

For the ratio classification, we adopted a method developed by Brown et al. [68–70]. For the negative values that resulted by the calculation of difference, the maps with the higher values were divided by the maps of which values were lower. All 0 values of the maps with the lower values, therefore, were set beforehand to 0.1. This resulted in a scale of four different agreement ratios:

i. 0–0.10 = low agreement
ii. 0.11–0.25 = low to medium agreement
iii. 0.26–0.50 = medium to high agreement
iv. > 0.51 = high agreement

For the positive values, the same scale was calculated. For the zero values, for numerators and denominators of positive numbers, the ratio was set to 1. For numerators and denominators of zero value, the ratio was set to <NULL> and, hence, was not considered further.

Further statistics

Whenever new uncertainties and questions appeared during the analysis process that might have been answerable with the use of the additional survey data, we conducted additional descriptive statistical calculations.

Results and discussion

Meaningful places

The maps that resulted from our critical cartography approach confirmed the assumptions we made about the dynamics of meaningful places before we had conducted the PPGIS and the survey. They visibly illustrate that both, processes of individual and processes of a collective nature, are involved for a place to become meaningful. Furthermore, they prove that unlike with a sense of place, for a place to be meaningful, a person does not have to feel attached to this place (Figure 1). As presumed, meaningful places certainly do correlate with those mapped places to which residents indicated they feel attached (Table 4). The emotional dimension of place attachment (*Heimat*), therefore, seems to be more important than the functional dimension (recreation) for a place to be designated as meaningful (Table 4). Nevertheless, meaningful places do also involve places with meanings derived only through collective processes. Such places can particularly be found in the settlement areas (e.g., Vechigen, Boll-Utzingen, Utzingen, Worb) or at places with a specific infrastructure such as a historic castle, an ice-skating rink, a church, a school or a train station (Figure 3; Table 5).

However, the maps that resulted from our critical cartography approach also revealed that, in the specific wind energy planning context of Vechigen, meaningful places are not only influenced by the political discourses around the local wind energy project, but they are even dominated by them. This is particularly visible if the mapped meaningful places are compared group-wise, based on their group-specific wind energy discourses (supporters, indifferent inclined people, opponents (Table 3)), and if they are compared with the mapped suitable or unsuitable places for wind turbines.

The opponents, for example, drew an entirely counter wind energy picture and mapped the meaningful places accordingly. For them, wind turbines were seen as unsuitable for both the designated wind energy planning area and the entire local area (Figure 4; Figure 5). The spatial pattern of the meaningful places that the opponents mapped looks similarly: Meaningful places are concentrated mainly at the local scale; at the regional or supra-regional scales, they only mapped a few additional places (Figure 3; Table 2). Most of their meaningful places were located inside or close to the designated wind energy planning area (Figure 3). These areas were denominated by opponents as important places for social interchange and recreation

but were considered especially meaningful because of their high ecological value and their scenery (Table 5).

For the supporters, in contrast, wind energy is suitable for large parts of the local area and, in particular, for the designated wind energy planning area (Figure 4; Figure 5). In contrast to the opponents, whose meaningful places spatially correlated with unsuitable sites and not with suitable sites, for the supporters, even places they appraised as meaningful were suitable for wind turbines (Table 4). Accordingly, the spatial pattern of the mapped meaningful places of the supporters looks not much different from the one of the opponents: For the supporters, meaningful places also appeared to be mainly concentrated at the local scale, similar to those of the opponents (Figure 3, Table 2). Moreover, meaningful places for the supporters, even such types of meaningful places to which they indicated feeling emotionally and functionally attached, were located inside the designated wind energy planning area, despite the fact that this planning area was seen by supporters as a place that is particularly suitable for wind turbines (Figure 4; Figure 5).

Only the meaningful places of the indifferently inclined people seemed to be less discourse-dominated than the ones of the supporters and opponents. For those who are indifferent, meaningful places correlated with both unsuitable sites and suitable sites (Table 4). Furthermore, for the indifferent, the spatial extent of what is perceived as meaningful was not limited to the local scale and, specifically, not to the designated wind energy planning area, as it was for the supporters and the opponents. On the contrary, meaningful places for the indifferently inclined people were also located at the regional and supra-regional scales (Table 2; Figure 3). At the local scale, the meaningful places with the highest number of overlays of the indifferently inclined people were located within the settlement areas and were associated mainly with cultural and historical meaning as well as places for meeting and recreation (Figure 3; Table 5). The indifferent people seemed to map the meaningful places less strategically, neither exclusively inside the designated wind energy planning area to denote its unsuitability, nor to accentuate the compatibility of wind turbine sites with meaningful places.

Mapping meaningful places and the solidification of the wind energy discourses

Against our original intention to map meaningful places for participatory wind turbine siting, our mapping approach resulted in providing data not for consensus but for creating counter-maps. Overall, the mapped meaningful places do, indeed, indicate a certain agreement related to the suitability of the designated wind energy planning area. Particularly, displaying the lower part of the wind energy planning area as more meaningful than the upper part suggests that wind turbines would be more accepted in the upper part (Figure 3). However, the clustering of the survey participants into three groups based on their personal opinions related to the wind energy discourses—supporter, indifferently inclined people, and opponents—visibly

demonstrates that the mapped meaningful places leave little room for reaching a consensus. Rather, they contain three completely different representations of the same place (Figure 3; Figure 4; Figure 5).

These findings confirm critics, who object to the use of participatory mapping because of the post-political condition it can produce, particularly if it is used for consensus-finding in highly political planning practices or decision-making processes [21–24]. If applied in a political context, as this case study suggests, participatory mapping approaches can also induce the solidification of the group-specific wind energy discourses. Consequently, it can be assumed that attempting to build consensus on the basis of these strong discourse-dominated mapped meaningful places would likely result into a disregard for the opposition or, more likely in this case study context, to a further solidification of the contrasting positions instead to widely accepted wind turbine sites [5, 21, 22].

Mapping meaningful places for agonistic participatory planning instead

At first sight, these results may reflect the methodological difficulties of our participatory mapping approach. The planning process may already be too advanced and too contested for the participatory mapping approach. Our approach might have produced different results had we been able to conduct it before the wind energy sites were revealed and communicated.

However, with respect to the specific results of this case study and to the wind energy planning context in general, we argue that even if we had conducted our participatory mapping approach earlier, the biased and subsequent fixation of residents' meaningful places through polarized discourses may have been impossible to avoid. As our results visibly indicate, a decisive factor that strongly contributed to the discourse-dominated meaningful places was the designation of the wind energy planning area. Although we did not display that designated area in the survey, the spatial matches of the boundaries between the designated area and the mapped meaningful places indicate that participants seemed to be aware of the planning area dimensions and mapped their meaningful places accordingly (Figure 3; Figure 4; Figure 5). Although the designated wind energy planning area was thought to be only preliminary, it had already deeply affected residents' representations of this place and had transformed it into a political place, if not even a *frontier* [55, 71–73]. The wind speed measurements within the designated planning area may have reinforced these processes by unintentionally functioning as materialized practices of demarcation. The designation of the wind energy planning area and the wind speed measurements, however, are a minimal formal planning step in most renewable energy planning regimes and must be conducted to guarantee legal implementation [6]. The political situation that results, therefore, is not something than could be avoided if the mapping is conducted earlier. The mapping of meaningful places, nevertheless, would result in counter-mapping.

Drawing on the agonistic planning theory of radical democrats, we argue that the participatory mapping of meaningful places for wind energy siting should not necessarily be viewed as a failure caused by methodological problems. Rather, it illustrates that participatory planning practices, particularly for wind energy, may require a different approach than conventional ones, because of "the political" that is inherent in wind energy planning [21–24]. Instead of applying participatory planning practices that are designed for facilitating consensus or for finding suitable sites for wind turbines, participatory planning practices should be designed to actively foster conflict or the active engagement with the dissensus and the political dimension of wind energy planning [11, 22–24]. Consequently, as proponents of radical democracy argue, only if "the political" in planning becomes recognized and acknowledged can real encounter take place and discourses prevented from becoming hegemonic [22–24]. By understanding that the mapping of meaningful places can render "the political" of wind energy planning visible and tangible, we suggest that it may be precisely this potential that can make the mapping of meaningful places approach into a powerful tool for local renewable energy planning.

Making use of the power of mapping meaningful places

Making use of such a tool, however, requires a substantially different understanding of planning and decision-making if conflict is something that must be reckoned with rather than prevented. This is true not only in the participatory mapping practice but in the planning practice, generally, and in wind energy planning, specifically. Instead of understanding dissensus and conflict as barriers to overcome, these must be perceived as productive, because only they can ensure that discourses remain fluid and prevent them from becoming hegemonic.

Indeed, the prevailing institutional settings of most planning contexts and the fear of falling short of the goals of urgently needed policy programs (e.g., the energy transition), may be the reasons why planners and responsible authorities would prefer to avoid conflict-oriented participatory planning approaches. However, considering how political most planning contexts are, and particularly so for wind energy, potentially agonistic participatory planning approaches may be the only way in which democracy and pluralism can be maintained in these contexts and in which a post-political condition can be prevented.

Since our engagement with agonistic participatory planning approaches and counter-mapping remained mostly theoretical, further experiences with our proposals are required. This could be an opportunity for the participatory mapping community: Instead of focusing on participatory mapping practices that are designed to build consensus, participatory mapping practices should be designed to embrace counter-maps, dissensus, and conflict in participatory planning and decision-making processes.

Conclusion

For sustainable landscape planning, neither the social nor the political dimensions can be ignored. Participatory mapping can be a powerful tool for grasping social and political dimensions and making them visible. While the mapping of the social dimension has been widely applied in participatory mapping approaches, the political dimension is commonly perceived as problematic, especially within planning contexts where urgent decisions are required. In most of these planning contexts, such as wind energy planning, however, "the political" is inherent, and an active engagement with dissensus and conflict cannot be avoided. With our case study—which illustrates our experiences with a participatory mapping approach in the planning of a local wind energy project in Switzerland, the use of critical cartography, and the use of the agonistic planning theory of radical democracy—we were able to demonstrate the need for acknowledgment and deep engagement with the political dimension in planning. Instead of focusing further on the development of consensus-oriented methodologies, the participatory mapping research community should urgently consider the political dimension of the mapping practice itself. Rather than understanding dissensus, conflict, and polarization as barriers to solutions to be overcome, they should be viewed as essential to keep discourses fluid and to avoid deadlock.

Case Study Questions

- How might counter-maps be problematic for a planning context? Please provide at least three arguments.
- How might counter-maps support planning? Please provide at least three arguments.
- What drivers made the participants draw entirely different maps of the same case study area? Are there other drivers that were not mentioned in the text but that may emerge from a further interpretation of the provided figures and tables?
- What further maps (e.g., different classification systems) would you envisage to render visible the dynamics that are inherent in meaningful places?
- What mapping categories (other than meaningful places) would you use for the illustrated planning context?

Author contributions

SMü and MB conceived of the superordinate research project. SMü conducted the research, had the idea for the presented article, wrote the initial and final drafts, and produced the maps and tables. MB advised the work of SMü, and, together with JF, reviewed and edited the final draft.

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Competing interests

The authors have declared that no competing interests exist.

Data accessibility statement

The anonymized data sets generated and/or analyzed during the current study are available from the corresponding author on request.

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Figure and figure legends

Figure 1: This diagram visualizes the concept of meaningful places and how they relate to and differ from a sense of place. Similar to a sense of place, for a place to become a meaningful, both individual and collective processes are involved. While, for a sense of place, a person must have a personal relationship to this place (also called place attachment), it is not a must for a meaningful place designation. The list of meaningful place types (1–12) was defined based on the results of preparatory interviews and the landscape value typology from Brown et al. [35] and Raymond and Brown [74]. The list of places where people have developed a sense of place were derived from the concept of sense of place.

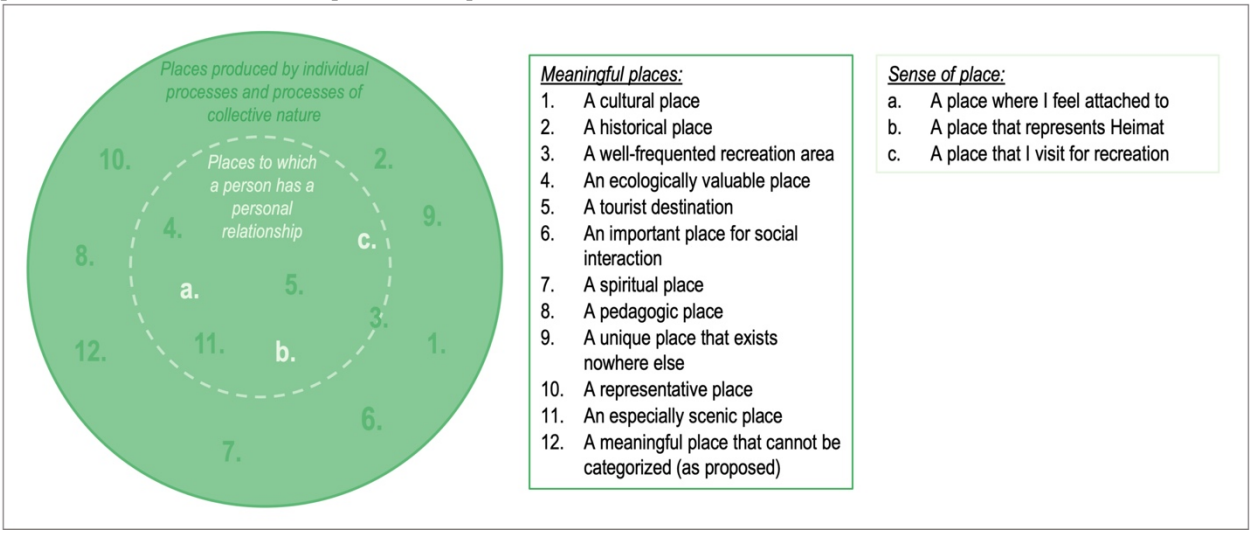

Figure 2: This map of the research site illustrates the municipality Vechigen and the designated wind energy planning area as well as the 11 neighboring municipalities of Vechigen, whose residents were also asked to participate in the PPGIS and the online survey. The extent of the fishnet indicates the area that was considered for the analysis (trade-off between accuracy and capacity of computing power). **Sources:** The spatial data for the base map is from Swisstopo. The spatial data for the designated planning area is from Stiftung Landschaftsschutz Schweiz SL-FP [75].

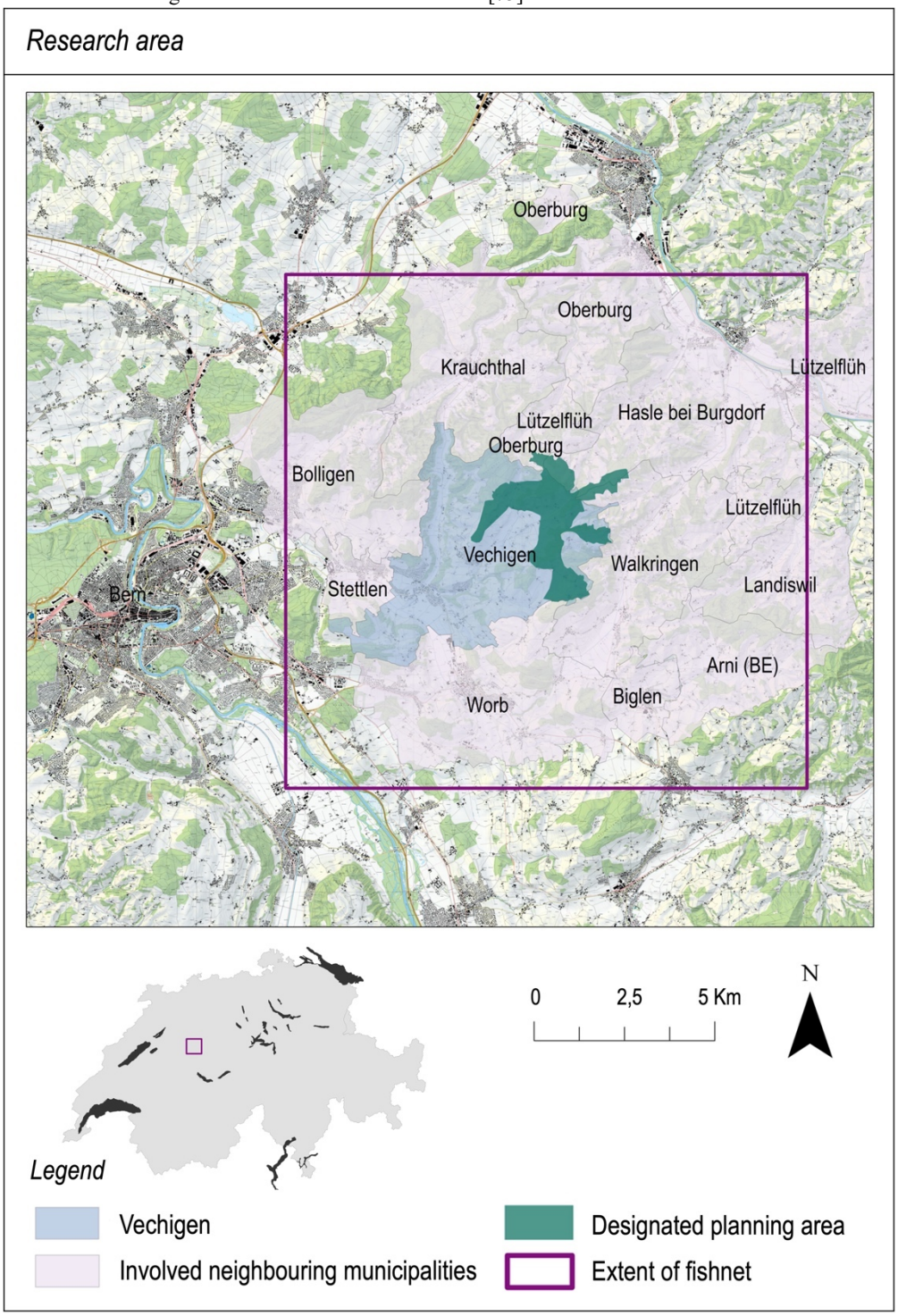

Figure 3: This illustrates the designated wind energy planning area and the mapped meaningful places of all participants, distinguishing between supporters, indifferently inclined people, and opponents. The first numbers of the classification refer to the map of all participants (large map) and the second numbers refer to the maps of supporters, indifferently inclined people, and opponents (small maps). **Sources:** The spatial data for the base map is from Swisstopo. The spatial data for the designated planning area is from Stiftung Landschaftsschutz Schweiz SL-FP [75].

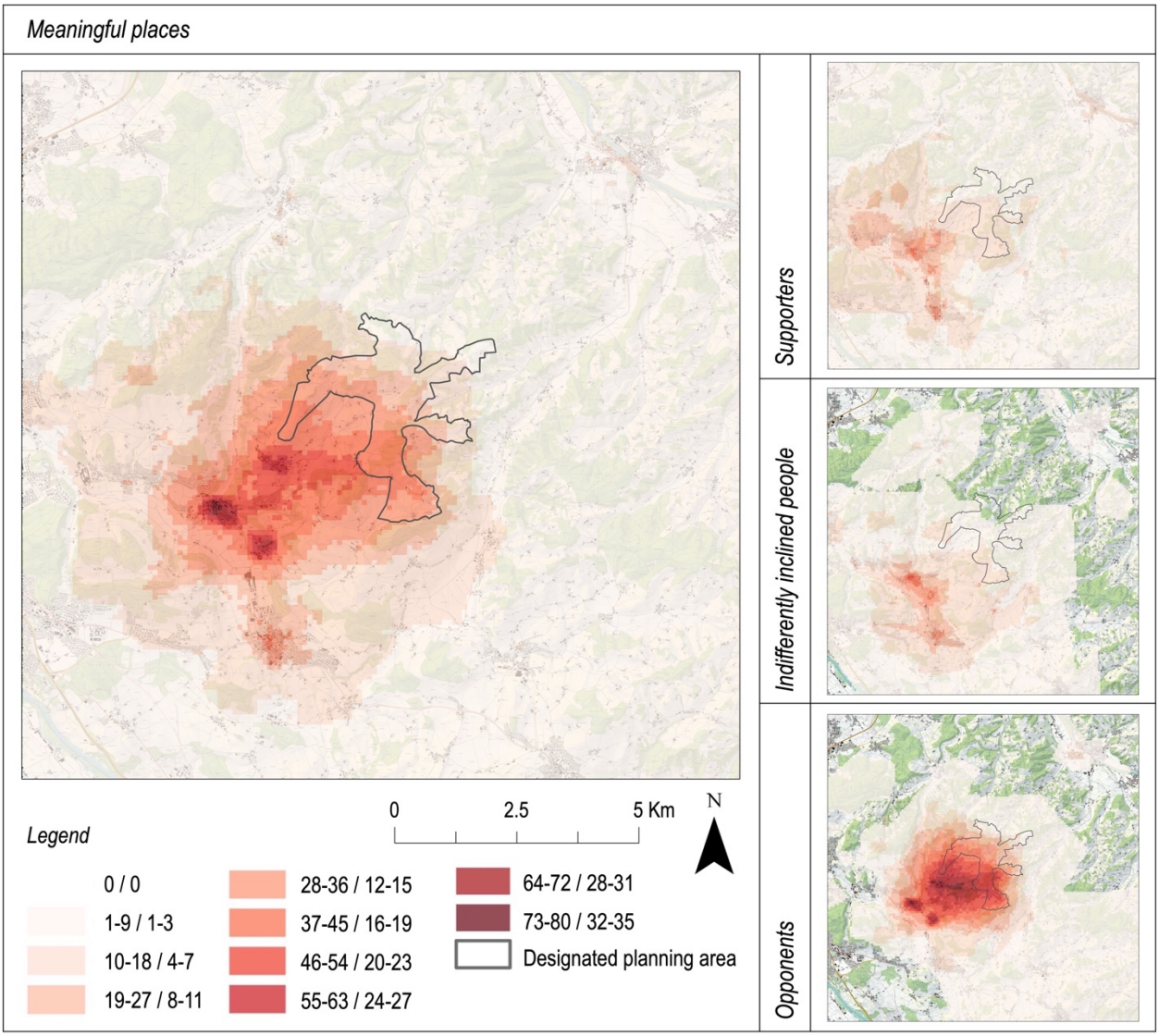

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Figure 4: This illustrates the first step of the agreement analysis involving the calculation of difference between the mapped meaningful places and the other mapped place types that were indicated as (i) suitable wind energy sites, (ii) unsuitable wind energy sites, (iii) place attachment, (iv) recreation, and (v) *Heimat* for each attitude group. Zero values indicate all mapped areas where the compared layers have the same value. Positive values indicate all mapped areas where the layer of meaningful places indicates higher numbers of overlays than the compared layer. Negative values indicate all mapped areas where the layer of meaningful places indicates smaller numbers of overlay than the layer with which it was compared. **Sources:** The spatial data for the base map is from Swisstopo. The spatial data for the designated planning area is from Stiftung Landschaftsschutz Schweiz SL-FP [75].

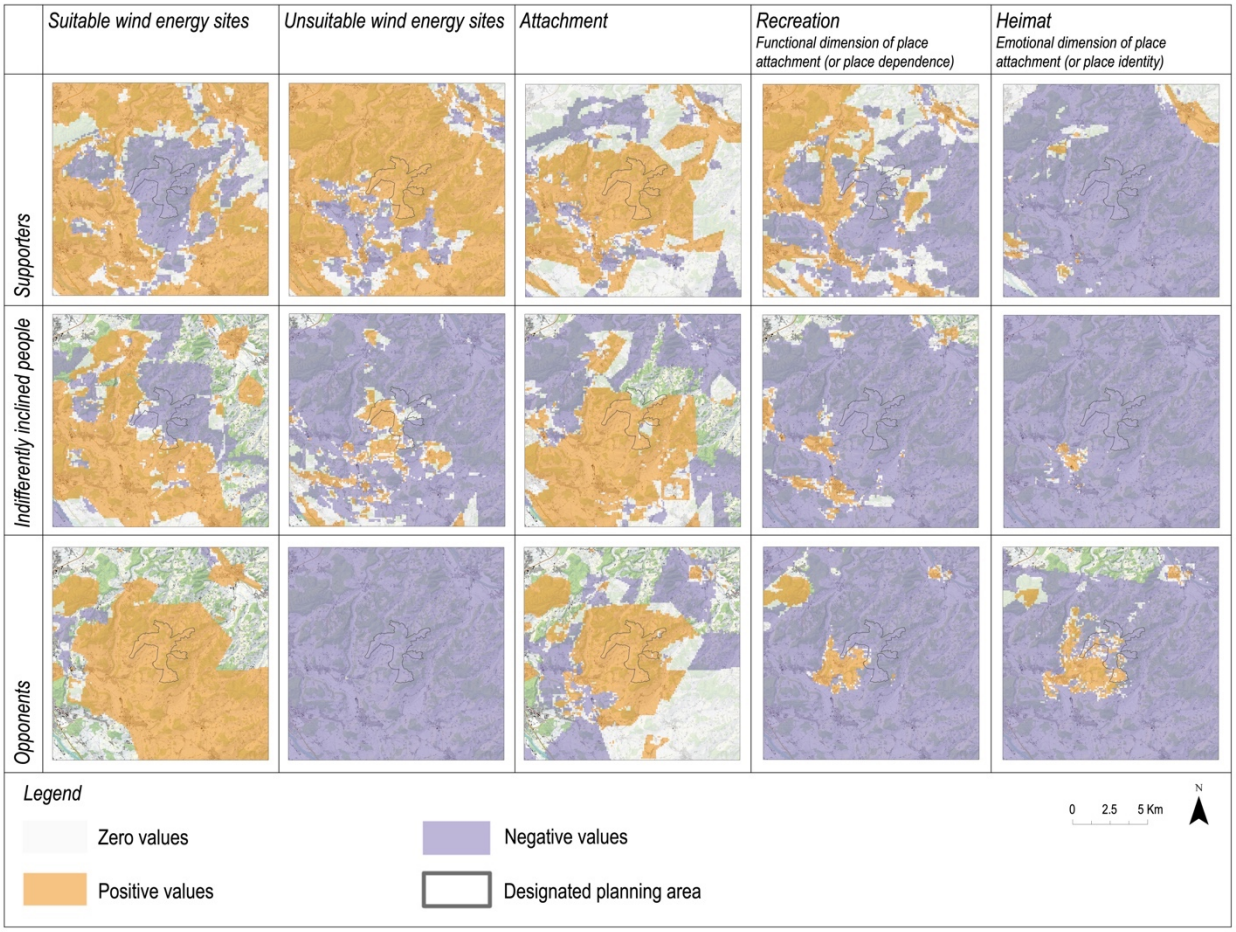

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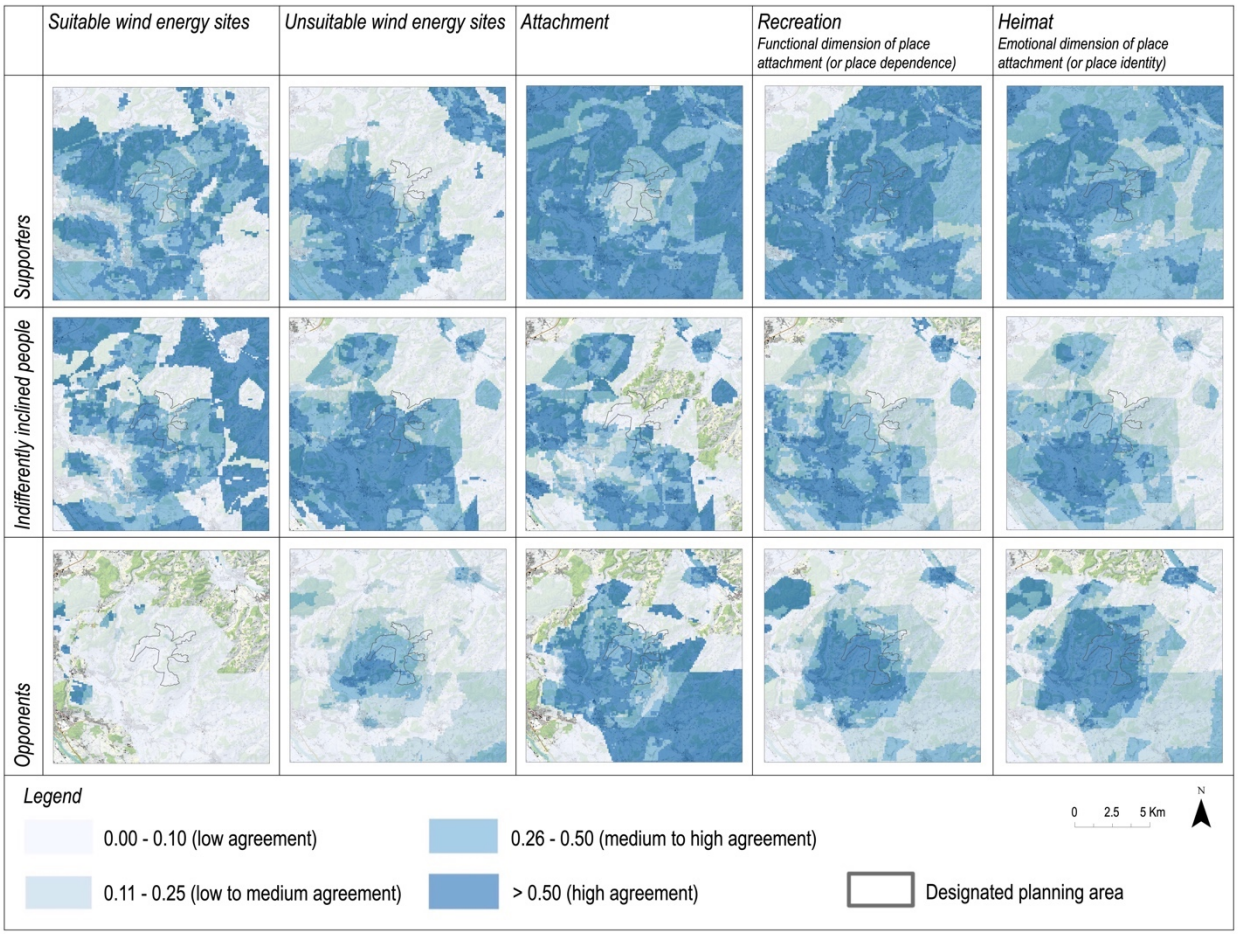
Figure 5: This illustrates the second step of the agreement analysis involving the calculation of ratio of the mapped meaningful places and the other layers for each attitude group. The darker the mapped area, the higher is the agreement ratio between the compared layers. Alternatively, the higher the agreement ratio, the more the indicated meaningful places correlate with the other mapped areas, identified as (i) suitable wind energy sites, (ii) unsuitable wind energy sites, (iii) place attachment, (iv) recreation, (v) *Heimat*. **Sources:** The spatial data for the base map is from Swisstopo. The spatial data for the designated planning area is from Stiftung Landschaftsschutz Schweiz SL-FP [75].



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626 # Tables

Table 1: This indicates the percentage of participants for each group differentiated by their place of residence: (i) In = place of residence is inside the municipality area of Vechigen, (ii) Close = place of residence is close (within 2.5 km distance) to the designated wind energy planning area, (iii) Out = place of residence is outside the municipality area of Vechigen, and (iv) Far = place of residence is far (within 5.0 km distance) from the designated wind energy planning area.

	In/ Close (%)	**In/ Far (%)**	**Out/ Close (%)**	**Out/ Far (%)**
Supporters	26.14	0.65	18.95	46.41
Indifferently inclined people	21.97	1.52	15.15	52.27
Opponents	53.85	0.00	13.99	30.99

627

Table 2: This indicates the number of overlays, number of polygons, and number of respondents inside the fishnet as well as the total number of polygons and total number of respondents for each type of mapped place and for each attitude group for data plausibility and data comparison.

	Meaning	**Suitable sites**	**Unsuitable sites**	**Attachment**	**Recreation**	**Heimat**
Number of overlays inside the fishnet						
All	1-80	0-46	2-74	1-40	1-72	3-67
Supporters	1-19	0-31	0-20	0-13	1-18	1-22
Indiff. inc. p.	0-23	0-13	0-15	0-8	0-23	2-16
Opponents	0-35	0-2	2-54	0-22	0-41	0-30
Number of Polygons inside the fishnet						
All	546	395	317	391	814	526
Supporters	173	225	110	139	242	173
Indiff. inc. p.	168	136	86	128	244	137
Opponents	179	21	104	113	265	147
Total number of polygons						
All	572	414	311	495	889	476
Supporters	187	229	115	162	271	155
Indiff. inc. p.	180	145	87	165	269	153
Opponents	179	26	104	126	279	155
Number of respondents inside the fishnet						
All	285	213	208	277	337	331
Supporters	88	112	74	90	100	106
Indiff. inc. p.	91	77	62	83	94	96
Opponents	90	14	63	81	107	101
Total number of respondents						
All	289	221	209	301	341	346
Supporters	91	113	74	102	102	111
Indiff. inc. p.	92	79	63	94	96	101
Opponents	90	18	63	82	107	102

628

Table 3: This indicates clusters based on local wind energy discourse and k-mean algorithm that resulted in three attitude groups: (i) supporters, (ii) indifferently inclined people (indiff. inc. p.), and (iii) opponents. The responses were coded as follows: 1=Strongly disagree, 2=Rather disagree, 3=Cannot decide/Don't know, 4=Rather agree, 5=Strongly agree.

Variable	*Supporters* *N = 153* *M±SD*	*Indiff. inc. p.* *N = 132* *M*±SD	*Opponents* *N = 143* *M*±SD	*Chi2*
Wind energy would perfectly correspond with the image of my municipality.	3.80±0.932	2.55±1.036	1.25±0.496	266.867***
My municipality's value would increase strongly from the implementation of this wind energy project.	3.92±0.932	2.48±0.904	1.24±0.559	289.608***
The wind energy project should absolutely be implemented if wind potential is positive.	4.59±0.543	3.74±0.853	1.53±0.794	307.114***
It makes sense to foster wind energy in my municipality, because it will certainly make economic profit.	4.16±0.926	2.72±1.036	1.62±0.919	235.863***
I don't fear that the place will be destroyed forever.	4.58±0.604	3.36±1.114	1.43±0.755	298.900***
The landscape of my municipality is not too precious for wind energy installations.	4.44±0.606	3.13±1.149	1.29±0.667	299.609***
I can see how my municipality could profit from this wind farm.	4.35±0.921	3.07±1.140	1.50±0.821	256.759***
A wind farm would not have a negative impact on my well-being.	4.54±0.679	3.58±1.020	1.49±0.821	287.804***
The impacts on the environment would not be severe, therefore I support the wind energy project.	4.52±0.608	3.42±0.865	1.39±0.831	308.247***

*** $p < 0.001$; Kruskal-Wallis-Test

Table 4: This indicates the correlation matrix of mapped meaningful places and the other mapped place types using the Spearman's rho correlation and the Kruskal–Wallis H test. Gray fields indicate medium to low correlation values (> 0.500).

		Suitable sites	Unsuitable sites	Attachment	Recreation	Heimat
Meaning	**Supporters**	0.618**	0.701**	0.607**	0.626**	0.746**
	Indiff. inc. p.	0.486**	0.645**	0.379**	0.621**	0.818**
	Opponents	0.083**	0.705**	0.663**	0.725*	0.730**

630 * $p < 0.01$, ** $p < 0.001$

Table 5: This indicates the types of meaning for all attitude groups differentiated by low numbers of overlays (1–27 for all, 1–11 for the attitude groups); medium numbers of overlays (28–54 for all, 12–23 for the attitude groups); and high numbers of overlays (55–80 for all, 24–35 for attitude groups) of mapped meaningful places as illustrated in Figure 2. The list of types of meanings were predefined based on the results of preparatory interviews and the landscape value typology from Raymond and Brown [35, 74]. The participants in the PPGIS and online survey could choose the most suitable among this list for each of the mapped meaningful places.

	Low overlay (%)	**Medium (%)**	**High (%)**
This is a cultural place			
All	8.10	10.50	10.00
Supporters	13.11	16.47	-
Indifferently inclined people	8.58	14.55	-
Opponents	5.00	5.26	5.75
This is a historical place			
All	7.75	9.85	11.28
Supporters	12.13	14.71	-
Indifferently inclined people	10.07	11.82	-
Opponents	5.36	6.77	7.66
This is a well-frequented recreation area			
All	19.07	17.45	14.87
Supporters	14.43	8.82	-
Indifferently inclined people	19.03	15.45	-
Opponents	19.64	20.30	18.39
This is an ecologically valuable place			
All	8.94	8.24	7.95
Supporters	5.57	4.12	-
Indifferently inclined people	7.09	5.45	-
Opponents	12.14	11.65	11.11
This is a tourist destination			
All	5.13	3.39	2.56
Supporters	4.26	1.76	-
Indifferently inclined people	3.73	0.00	-
Opponents	5.36	5.26	4.98
This is an important place for social interaction			
All	13.23	13.73	14.62
Supporters	15.41	18.82	-
Indifferently inclined people	15.67	18.18	-
Opponents	11.79	11.28	11.88
This is a spiritual place			
All	3.34	4.04	4.62
Supporters	3.93	3.53	-
Indifferently inclined people	4.10	3.64	-
Opponents	3.57	4.14	4.60
This is a pedagogic place (Lernort)			
All	4.53	2.91	3.59
Supporters	2.95	2.94	-
Indifferently inclined people	5.60	1.82	-
Opponents	5.00	1.88	2.68
This is a unique place that exists nowhere else			
All	4.53	3.39	3.85
Supporters	3.28	2.35	-
Indifferently inclined people	4.10	3.64	-
Opponents	5.36	4.89	5.36
This is a representative place			
All	7.03	7.59	7.44
Supporters	7.54	10.00	-
Indifferently inclined people	6.72	6.36	-
Opponents	6.79	7.52	6.90
This is an especially scenic place			

All	13.95	14.22	14.10
Supporters	12.46	10.00	-
Indifferently inclined people	9.33	6.36	-
Opponents	17.14	19.55	18.01
None of these propositions is suitable			
All	4.41	4.68	5.13
Supporters	4.92	6.47	-
Indifferently inclined people	5.97	12.73	-
Opponents	2.86	1.50	2.68

631