

**Responses to Reviewer 2 (EGUSPHERE-2025-475):**

RC2	
2.01	<b>Reviewer comment</b>
	<p>The paper addresses an important issue of how local residents perceive the impact of climate change and what kind of actions they would prefer to cope with the present challenges.</p> <p>The paper uses a triangulation of methods (without using the word triangulation which was surprising to me) combining quantitative surveys, qualitative interviews, and stakeholder workshop results. In addition, they processed official documents of several water authorities.</p>
	<b>Author response</b>
	<p>Thank you for this valuable comment. We want to highlight here that all line numbers mentioned in our comments refer to the preprint version of our paper, and proposed changes to the manuscript are written in red font.</p> <p>In line with our approach, which is not to validate the results of our studies but rather to “deepening and widening” our understanding, we added the following sentence in line 181: “<b>We thus used the method of triangulation, although not primarily to cross-validate our empirical findings, but rather to deepen and widen our understanding of the socionatural phenomena at and around the lakes in the sense of Yeasmin and Rahman (2012).</b>”</p> <p>Reference to be added:</p> <p>Yeasmin, S. and Rahman, K. F.: 'Triangulation' Research Method as the Tool of Social Science Research, BUP JOURNAL, 1, 154–163, 2012.</p>

2.02	<b>Reviewer comment</b>
	<p>The introduction provides a clear and convincing argument for using quantitative and qualitative methods for assessing the public responses to a dramatic decline in water level associated with climate change. However, the introduction is quite long and often redundant stating the main messages several times.</p>
	<b>Author response</b>
	<p>We agree that the introduction is rather long, but we believe this is justified given the dense and complex subject matter considered in the paper as well as the diversity of research methods used. However, we would agree to make minor adjustments to the introduction to improve the readability and prevent repetition of the main messages.</p>

2.03	<b>Reviewer comment</b>
	<p>The theoretical concept of the study remains fuzzy. The authors seem to base their arguments on the social constructivism school of thought but oscillate between framing the issue in terms of “real” problems and “perceived” problems (Thomas Theorem). Some</p>

	expressions in the text are complete nonsense: “In this context, the declared hazard of lake level loss shapes and is shaped by perceptions”. This sounds like magic: the water level can certainly not be changed by perceptions. What the authors probably try to say is that the assessment of water decline depends on how observers perceive and evaluate the physical changes that they observe.
	<b>Author response</b>
	<p>Thank you for raising the concern about the fuzziness of the theoretical concept. You are exactly right in your interpretation and we will make changes in the introduction to improve the clarity of the frame of analysis.</p> <p>What we are investigating here are the perceptions of the environment that generate a discourse of "hazard." It is only through politicized human-environment interaction that the sinking water level is perceived as a hazard. This discourse entails certain practices, which in turn influence the perception of the lake and its changes. As the reviewer points out, we want to challenge an objective perception and at the same time show that the hazard is much more than an environmental change that then affects social processes, but must be understood as a common, socionatural process. That does, of course, not mean that the physical water level is changed by the human perceptions of said water level. We will further clarify our approach in the introduction and adjust the wording and explanations in the sections mentioned and throughout the manuscript.</p>

2.04	<b>Reviewer comment</b>
	Later on, they introduce the concept of socio-natural phenomena which emphasize the coupling between natural dynamics and human perception. There is a vast tradition in the social sciences using the concept of socio-ecological systems which is based on the same line of thinking, but this popular concept is not mentioned in the paper.
	<b>Author response</b>
	<p>We appreciate the comment about the lack of clarity about the theoretical underpinnings. We agree that there is a rigorous scientific basis for social-ecological hazards and systems. This line of understanding focuses on how social and environmental factors interact and may be at risk in the context of the vulnerability to natural hazards. We have chosen to consider socionatural hazards because of a slightly different focus and scope, given that speaking of socionatural hazards emphasizes the inseparability of nature and society when it comes to “natural” hazards. In doing so, we examine not only the interactions between human society and the natural environment in relation to the hazard of lake level loss, but also how the hazard itself is defined through the perceptions of people, including those living in and around the lakes, as well as other stakeholders.</p> <p>We will conduct a thorough review of the paper as a whole with a view to conceptual coherence and add a clarifying sentence in the introduction (also related to the previous comment): <b>“Socio-ecological” approaches treat society and nature as interacting but separate systems. In contrast, “socionatural” perspectives emphasize their inseparability—seeing nature as socially produced and society as materially embedded. In this paper, we therefore adopt a socionatural perspective in order to avoid reifying the nature/society</b></p>

	<p>divide and to better grasp and understand the relationality and dynamics of human–nature entanglements (West et al., 2020).”</p> <p>Reference to be added:</p> <p>West, S., Haider, L.J., Stålhammar, S., Woroniecki, S., 2020. A relational turn for sustainability science? Relational thinking, leverage points and transformations. <i>Ecosystems and People</i> 16 (1), 304–325.</p>
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2.05	<b>Reviewer comment</b>
	<p>The methodology section includes an impressive list of research methods that have been used to assess attitudes, values, traditions and policy preferences. An interdisciplinary array of research traditions has been included in the study. (ethnographic, survey, stakeholder workshops) However, it was not quite clear to me which of the three research questions was addressed by what methods and how the results were integrated.</p>
	<b>Author response</b>
	<p>Thank you for the assessment of our research methods. In many cases, the boundaries between the research methods were fluid in that findings from one method helped to directly interpret results from another method. Therefore, we did not structure the results section to explicitly separate the results among the three methods. This may make it difficult for readers to understand which questions were addressed by which methods. However, we have described our integration process in the methods section (i.e., starting on line 180). Not all research methods were used to address all thematic blocks, and more than one research method was always used in a thematic block. In addition, we have described the connections between the research methods through the description of the results, such as in lines 240-245 where all three research methods are cited, or at the beginning of many paragraphs (e.g. in line 264 describing both the survey and stakeholder workshops).</p> <p>In order to make it easier to understand which main results are derived from which research method, we will make improvements in several areas of the results section, as described below:</p> <p>Line 193: <b>People living around the lakes are very aware of the obvious decrease in water. In initial conversations during ethnographic research on the street, in interviews around kitchen tables and at events, the lack of water was the first thing to be emphasised. This was not only the starting point for conversations initiated by the researchers, but also the linchpin of the lake residents' own problem analysis. This local problem analysis has created a public that sees itself as divided between people who say that they are very concerned about what is happening in their environment and about the causes and possible solutions that are being developed in political arenas, who ask questions and build up political pressure, and residents who see the problem but feel unable to do anything about it. In general, discussions and practices start with this narrative of the danger of the sinking lake level. However, the challenges associated with this first narrative point to a more complex picture of this hazard.</b></p> <p>Line 200: <b>“During the joint exploratory phase with joint interviews to prepare the survey questions, the topic of lake level loss very quickly opened up discussions about further</b></p>

problems of everyday life in this area, putting into context the other challenges mentioned in close relation to the falling lake level (also in the initial interviews with residents)."

Line 203: "In the survey, strong majorities perceived that the number of visitors (> 80 %), vehicles (> 80 %), and litter (65 %) had increased slightly or greatly."

Line 207: "Figure 2. Perceived awareness of changes at Groß Glienicker Lake from the survey (N = 644)."

Line 213: "Further responses in the interviews indicated a certain ecological understanding and means of anthropogenic impact among the residents, how important the water level as well as the natural vegetation along the shore are for maintaining good water quality. Here, residents see pressures from the population and rising number of visitors and highlighted the ecological challenges with people not taking care of their surroundings (i.e., trampling of reed vegetation along shore by the increasing number of visitors). The ecosystem was one of the main concerns expressed in conversations. However, these are weighed against the utility value that residents in this region derive from them. This leads them to develop an appreciation for their surroundings, which they then prioritise preserving. We will go into further detail about this in section 3.4."

Line 221: "Interestingly, the risks perceived expressed in the survey that are associated with climate-related changes may not be consistent with the overall perception of climate change risks in the region."

Line 220: "Figure 3. Perceived challenges or dangers for Groß Glienicker Lake from the survey (N = 644)."

Line 232: "Figure 4. Climate change skepticism among residents from the survey (N = 644)."

Line 266: Participant observation revealed that both lakes are open to the public in places, and restricted in others, either by private ownership or environmental protection zones ...

Line 290: "Figure 6: Ranking of essential functions of the social-hydrological system of the lakes from the stakeholder workshops (N = 8)."

Line 300: "Figure 7. Preferences for future changes at Groß Glienicker Lake from the survey (N = 644)."

Line 341: The demographic development and social structure of the region has developed from a rural area with a settlement history that dates back to the 13th century, to a village structure mixed with middle-class city dwellers at the beginning of the 1920s, and then has been shaped by separation and finally German reunification. This history has been raised both in interviews as well as in workshop group discussions.

Line 347: "As made apparent in the ethnographic research, this had a significant impact on everyday life surrounding the lake, especially on the geographically western (politically eastern) side of the lake as the wall cut off Groß Glienicke residents from access to the lake who had to go to Sacrower Lake instead."

Line 417: "Figure 8. Indicated willingness to contribute among the respondents to the improvement of the situation at Groß Glienicker Lake from the survey."

Line 431: "Table 1. Willingness to pay (WTP) estimated through the conditional logit model including interaction terms from the survey."

	<p>Line 450: “Figure 9. Perception of responsibility by the residents concerning who should implement improvements at the Groß Glienicke Lake <b>from the survey.</b>”</p> <p>Line 461: “Despite its relatively small size and population, <b>the ethnographic research revealed</b> a flurry of citizens’ initiatives in the three residential areas around the lakes concerned with the lakes and their ecosystems.”</p> <p>Line 457: <b>In this context, while some ask themselves what their contribution could be, others got active and organised themselves in several initiatives. How do the different actor groups, especially the latter, practically deal with the perceived challenges and responsibilities? In the following we refer to citizen initiatives we worked with in workshops and met during site visits and their practices in dealing with perceived challenges connected to the declining water levels.</b></p> <p>Line 459: <b>In the following we refer to citizen initiatives we worked with in workshops and met during site visits and their practices in dealing with perceived challenges connected to the declining water levels.</b></p>
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2.06	<b>Reviewer comment</b>
	<p>The results section starts with an overview of what the authors learned about perception. This section is highly dominated by the survey results while the results of the qualitative interviews seems to be almost lost; at least the striking advantage of triangulation combining proportional results from quantitative data with more in-depth-results from the interviews was not adequately delivered.</p>
	<p><b>Author response</b></p> <p>Thank you for this comment. We will provide a more detailed presentation of the contributions from the studies in the relevant sections (see also the previous comment), so that the contribution of the different empirical approaches, especially of the ethnographic fieldwork, as well as their combination will become clearer.</p>

2.07	<b>Reviewer comment</b>
	<p>The second section on social structures was informative but confusing in terms of organization. Results from the surveys were mixed with background information on the politics and history of the area (which definitely belongs into section 2.1: Case study description), It also seems quite awkward to switch from perceptions to social history, to administrative governance and back to preferences. All information that is being presented is valuable, but it would need re-organization. I would place the history, the administrative arrangements and the social structure of the residents in the Case Study description and focuses on the empirical results in section 3.2 and 3.3. The description of the discrete choice experiment seemed like an add-on to the study and the relationship to the other results were only briefly mentioned on a rather superficial level.</p>
	<p><b>Author response</b></p> <p>We agree with the reviewer that some of the information in section 3.2 describes the case study situation. However, several parts of Section 3.2 also describe empirical results</p>

	<p>obtained through the three different research methods. To provide a coherent and fluid depiction, we opted to keep the topics in subsections 3.2.2, 3.2.3 and 3.2.4 together in the results section, thus avoiding the need for continuous back-references to the case study description. Therefore, we propose maintaining the original structure to provide readers with a concise and coherent description. However, we would propose to more clearly differentiate between purely descriptive and empirical/analytical parts and therefore move some parts from sections 3.2.2, 3.2.3 and 3.2.4 – especially the ones that are clearly descriptive and of no or little analytical value in relation to our empirical work – to the 2.1 case study description. Additionally, we will indicate that further information on the social structure, political history and administrative fragmentation of the lakes/of the area can be found in the corresponding sections (also see response to comment 1.05) and make minor adjustments throughout the text to make it clear where the information stems from.</p> <p>Regarding section 3.3, the discrete choice experiment was an equally important method in the research to understand the willingness to act in the form of a financial contribution and how such preferences might change in light of differences in climate change skepticism. To provide a better indication of how the choice experiment results tie into the wider insights of the paper, the discussion will be updated as described in comment 2.08.</p>
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2.08	<b>Reviewer comment</b>
	<p>The discussion highlights the main results and tries to infer some major messages from the mixed method approach. This is well done in my view although, similar to the introduction, quite redundant and wordy. What I miss was a comparison of the results with similar studies or interpretative frameworks. The insights that residents are skeptical about newcomers which may challenge their privileges by overusing the finite pool of resources is a common theme in positional economics (F. Hirsh) or group theory in social psychology. The preference for low-cost policies is well documented in the literature on climate change adaptation (for example A. Diekmann). I would advise the authors to add a section on how their results fit into the present status of knowledge about the phenomena that they describe. Where do they confirm what is already known and where do they add something new?</p>
	<b>Author response</b>
	<p>We appreciate the suggestion to better compare the results with similar studies. We have supported our findings in the discussion section with several references to the literature, but we will provide a further basis in a paragraph of the discussion to reflect the skepticism of tourism and climate change starting at line 569:</p> <p>“Several of the main findings of our approach also reflect insights gained from other areas of literature in different contexts. For instance, skepticism toward tourists and towards climate change impacted both the perceived challenges and the resulting perceptions of actions to address these challenges. First, in line with the postulations of positional economics, residents were concerned that increased tourism produced or exacerbated these challenges due to the overuse and degradation of limited environmental amenities. This aligns with the idea that competition over positional goods (i.e., access to aesthetically pleasing and recreationally important landscapes due to proximity) can generate social</p>

	<p>tension (Hirsch, 1976). Despite such social tension and the emergence of citizen initiatives to address these challenges, skepticism toward climate change may limit individual behavioral changes that could improve outcomes. Although the translation of environmental concern into behavior may depend on low costs (Diekmann et al., 2003), the survey results revealed a low, but very apparent, level of climate change skepticism among the sample population, with increasing skepticism being associated with a reduced willingness to pay for various improvements at Groß Glienicker Lake. Diekmann and Faist (2025), drawing on the "Imperative of Responsibility" framework from Hans Jonas, also found that perceiving climate change as a threat and assuming responsibility for current impacts were significant predictors of environmental responsibility toward future generations. Through our mixed-methods approach, it became apparent that residents perceive responsibility for the socionatural challenges differently, and that while governance structures are fragmented, personal actions may not always emanate from personal responsibility, such as in reducing water consumption, but rather collective actions emerge such as the citizen initiatives. This insight addresses at least one condition of the recently proposed motivation-capacity-ownership framework for explaining why citizens join environmental initiatives in the energy sector in that not only is self-efficacy necessary (i.e. whether one believes in being capable of providing a public service) but also response efficacy (i.e. whether a one thinks actions are effective in delivering a service) for deciding to join such initiatives (Mees, 2022). Subsequently, further extensions on environmental psychology from group theory suggest that collective efficacy (i.e. believing that the group is capable of effecting change) can further promote feelings of self-efficacy (Jugert et al. 2016). In this light, it is possible that further success of citizen initiatives helps to promote the identification of self-efficacy and individual responsibility for actions to address the socionatural challenges at the lake."</p> <p>Diekmann, I., &amp; Faist, T. (2025). Does the future have a lobby? Environmental degradation and perceived environmental responsibility towards future generations. <i>Environmental Sociology</i>, 11(2), 259-272.</p> <p>Hirsch, F. (1976). <i>Social Limits to Growth</i>. Cambridge, MA: Harvard University Press.</p> <p>Jugert, P., Greenaway, K. H., Barth, M., Büchner, R., Eisentraut, S., &amp; Fritsche, I. (2016). Collective efficacy increases pro-environmental intentions through increasing self-efficacy. <i>Journal of Environmental Psychology</i>, 48, 12-23.</p> <p>Mees, H. L. (2022). Why do citizens engage in climate action? A comprehensive framework of individual conditions and a proposed research approach. <i>Environmental Policy and Governance</i>, 32(3), 167-178.</p>
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2.09	<b>Reviewer comment</b>
	The conclusions are partially redundant with the discussion. However, if the discussion is more focused on comparing the results with the literature, the conclusions can be kept as they are.
	<b>Author response</b>
	Thank you for highlighting this.

	We will adjust the discussion as suggested in the previous comment, and we will leave the conclusion as it is (apart from the references to the four research questions mentioned in the introduction; see comment 3.25).
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2.10	<b>Reviewer comment</b>
	The paper needs a thorough language editing (grammatical errors, misleading expressions, and awkward wording).
	<b>Author response</b>
	<p>We will subject the paper to thorough language editing and, inter alia, make the following specific changes:</p> <p>Line 464: “For example, as one of the smallest parts of Potsdam, the remote Sacrow has a very active and influential citizenry for all matters relating to this neighborhood, <b>and stakeholders</b> underlined the importance of taking care of their lakes.”</p> <p>Line 468: “Popular topics became, <b>for example</b>, the water transfer from rivers to lakes, using the lakes as water storage in order to provide freshwater for the metropolitan region.”</p> <p>Line 470: “For immediate results, especially water use and water extraction <b>by</b> residents and the nearby waterworks were put in focus.”</p> <p>Line 471: “Although private consumption is difficult to track, the stakeholders were surprised that figures from the waterworks were not available (<b>although</b> numbers show that these have a minor effect on water levels).”</p> <p>Line 571: “These lives are connected to the water: social relations are created through and over the water, <b>economic factors influence</b> decision-making, <b>and</b> private and common interests have to be negotiated <b>alongside it</b> (Krause and Strang 2016).”</p> <p>Line 621: “To improve this, the existing governance challenges and the current lack of adaptive governance referred to above should be recognized and be addressed, both <b>through</b> transparent communication and by creating options for controversial discussions and participation.”</p>

2.11	<b>Reviewer comment</b>
	In summary, the paper is a valuable contribution to the field of behavioral studies on climate change adaptation and includes an excellent combination of methods for reaching a convincing triangulation. However, it needs some revisions with respect to organization, precision and integration into the existing body of literature.
	<b>Author response</b>
	Thank you for the overall positive reception of our manuscript. Given the comments made also by the other reviewers concerning the organization, precision and integration, we hope you agree with the changes suggested in our other responses to improve the manuscript.