Referee 2

This paper examines how the perception of heat stress in Berlin differs depending on urban forms and human vulnerability profiles. The motivation behind this work - to understand drivers and perceptions of heat stress in order to inform adaptation plans - is important, and the work being done by these authors has the potential to contribute to improving heat adaptation planning.

Dear referee,

Thank you for taking the time to read our article and for your positive and constructive review. We truly appreciate the specific issues you highlighted, along with your valuable suggestions. Attached, you will find our detailed responses and a plan for revising the manuscript in accordance with your individual comments.

The author team

#	Comments by referee	Response	Proposed changes in the manuscript (in blue)
1	Unfortunately, the use of rings to define perfectly circular zones radiating from the city center for analysis is arbitrary and likely masks geographic correlations that may be stronger than those found. The paper states that there are two city centers, yet the zones radiate from a single city center. Additionally, while cities tend to grow out from centers, they generally do not do so symmetrically due to geographic and historical influences. Defining zones within the city based on time of development, building types, population density, building density, development function (e.g. industrial, residential), and/or demographics would provide more logical geographic divisions to study.	The comment highlights an important challenge – how to characterize cities and linkages between the urban physical, socio-economic and climatic conditions. Since, the *urbisphere* project (see website https://urbisphere.eu/index.html) aims to explore linkages between cities and climatic conditions, we apply different typologies to characterize cities. More precisely, we use the typologies primarily used in urban planning, such as Urban Structure Types (USTs) and Planning Areas (PLRs) in Berlin and juxtaposed and linked the statistical analysis done for PLRs and USTs to the methods used for assessing and modelling urban climate conditions in a broader sense – like the developed and published ring structure (Fenner et al., 2024). The ring structure analysis zones for Berlin are defined as part of the *urbisphere* project campaign by a team from different disciplines (meteorology, remote-sensing and urban/spatial planning) as an attempt to provide a simplified comparative approach replicable in other cities (Fenner et al. 2024). The *urbisphere*-Berlin campaign analysis of form (building area fraction, vegetation area fraction, and building volume) and function data (population density, anthropogenic heat influxes) identified an inner-city ring (radius 6 km) and an outer city ring (radius 18 km) (Fenner et al., 2024, their Fig. 2). Consequently, we agree that the cities' growth is rarely symmetrical due to various geographic, historical, and social	We added the following description in line 133 to clarify this: *Our first premise is that there are broadly two city zones (inner and outer city), surrounded by a rural area. The proposed ring structure for Berlin is defined by an interdisciplinary team (meteorology, remote-sensing and urban/spatial planning) as an attempt to provide a simplified and comparative approach replicable in other cities (Fenner et al. 2024). Another important aim is to compare results and provide complementary methods and approaches between urban climate studies and urban planning studies. In this context also classifications and analysis schemes of different research communities are applied and linked.*

		factors. Therefore, two prominent local spatial units i.e., urban structure types (USTs) delineated by the Senatsverwaltung für Stadtentwicklung und Wohnen (2021) and PLRs (planning areas) defined by Amt für Statistik Berlin-Brandenburg and Senatsverwaltung für Stadtentwicklung und Wohnen Berlin (2021) are used in the analysis (i.e., section 3.1., Figure 3(a) and 3(b) and Figure 4–8). Moreover, correlation analysis of the perceived heat with the survey participants are based on PLRs (section 3.1.) and USTs (section 3.2. and section 3.3), reflecting the use of diverse characterization of the city.	
2	A second methodological problem is the manner in which respondents were recruited for the study. Age of respondents is an important factor, but the use of a QR-code and an online survey would likely lead to a lower response rate from older people who are generally less accustomed to technology.	We posted an invitation letter to 10,000 residential addresses located in the 39 Berlin PLRs selected. The letter stated that if the respondent had technological constraints, they could ask for a printed copy of the questionnaire by phone. We posted questionnaires in response to the calls received. The survey population sample and household data gathered captures and represents the elderly population quite well. Around 27.2% (N=155) of respondents are classed as "elderly" (65 and older). In 2022, the elderly (age 65 and above) had a share of 19% of the total population in Berlin and this group is expected to increase over the next decades (see: Demographie-Portal online: https://www.demografie-portal.de/DE/Fakten/bevoelkerung-altersstruktur-berlin.html). We further clarified it using a histogram of surveyed respondents and Berlin's population by age group. Please see **R1/ r34** for details.	
3	The final issue with the paper is the writing. Grammar and sentence structure are problematic in many places. The organization and development of ideas is also weak in some places. For example, the second and third sentences of the introduction talk about the problem of heat in urban areas, but it is not until the second paragraph that the paper establishes that heat in urban areas is a separate problem from heat in general. A thorough edit for clarity is needed.	Thanks for the comment. The paper will be edited thoroughly to improve the development of ideas and sentence structure (e.g., please see **R1/ r6, R1/ r8, R1/ r14** etc.). Language and grammar check is also carried out by native speakers.	We added the following statement in the revised manuscript to highlight proportionally larger increase within cities from lines to establish 29-30: *Cities are potentially subject to twice the levels of heat stress as compared to their rural surroundings under all RCP (Representative Concentration Pathways) scenarios by 2050 (Wouters et al., 2017).*

4	All that said, I think the data and the analyses are on the right track. With a better geographic analysis, this paper would have great potential for publication.	Once again thank you for your constructive review. We make sure to fully address your comments in the revised paper.	

References

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