## Cover Letter

Dear Editors,

We are pleased to submit our manuscript entitled "Exploring River Cooling Effects in a Mountainous City: A Study Across Normal and Extreme Summer Weather conditions" for your consideration.

In this study, we conducted a comparative analysis of the river cooling effects on the surrounding urban environment between the normal summer day and the extremely hot day, taking a mountainous city as an example.

Compared to previous researches, this study offers several novel contributions:

1. Complex topography can significantly impact urban climate in many cities. Including topographical factors could provide a more comprehensive understanding of the influences of blue spaces on thermal environment. However, previous studies on water cooling have focused on factors such as land cover and 3D building characteristics, with insufficient consideration of topography. In this study, we quantified the roles of topographical variables in affecting river cooling effects in a mountainous city and found that these roles exceeded the influences of other factors such as land cover and 3D building characteristics. These results enhance our understanding in this area.

1. Previous studies on the cooling effects of urban water bodies typically treated summer as a integral period, without distinguishing between normal and extreme summer conditions. As the cooling effects are more important during heatwaves than on normal summer days for understanding heat mitigation, our research have made this distinction. According to our findings, river cooling effects were significantly intensified during extreme heat compared to normal summer days. The relative importance of patch density increased, while the role of river width decreased during extreme heat. These results highlight the importance of differentiating between normal and extreme summer conditions.

Additionally, compared to other types of water bodies (e.g., lakes, ponds...), the effects of rivers in influencing the surrounding thermal environment were comparatively less understood. Unlike most studies that rely on traditional linear regression, our research employed machine learning technique, which allows for the consideration of non-linear effects of environmental variables on river cooling.

*Science of the Total Environment*is an international multi-disciplinary natural science journal for publication of novel, hypothesis-driven and high-impact research on the total environment, which interfaces the atmosphere, lithosphere, hydrosphere, biosphere, and anthroposphere. It frequently publishes papers on urban heat mitigation, including the cooling effects of water bodies and vegetation. In the last 2 years, more than 30 papers related to urban climate have been published in *Science of the Total Environment*. Our manuscript examined the cooling effects of rivers, and involved indicators related to river cooling effects, aligning well with the journal’s scope.

In summary, our paper falls within the scope of *Science of the Total Environment* and presents several innovative aspects. Therefore, we believe that this manuscript is well-suited for publication in your esteemed journal.

We confirm that this manuscript has not been submitted elsewhere, and all authors have no conflicts of interest to declare. We collectively agree with the contents of this manuscript and consent to its submission. We eagerly anticipate any suggestions and comments from you and the reviewers regarding our manuscript.

Thank you for considering our work.

Sincerely,

Rongfei Zhang