## Cover Letter

Dear Editors,

We are pleased to submit our manuscript entitled "River Cooling Effects with Consideration of Topography: 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 water 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.

*Sustainable Cities and Society* focuses on designing, understanding, and promoting environmentally sustainable and socially resilient cities. It frequently publishes papers on urban heat mitigation, including the cooling effects of water bodies and vegetation. Our manuscript examined the cooling effects of rivers, a specific type of water cooling, aligning well with the journal’s scope.

In summary, our paper falls within the scope of Sustainable Cities and Society 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