## Abstract

Although urban rivers are considered to have a mitigating effect on the extreme heat stress, the influences of topographical characteristics still remain poorly understood, particularly under extremely hot weather conditions. Taking the mountainous city of Chongqing as an example, this research focuses on the river cooling effects on the surrounding urban environment during normal and extreme summer days based on 3 indices: River Cooling Intensity (RCI), River Cooling Distance (RCD) and Cumulative River Cooling Intensity (CRCI). Employing the Boosted Regression Tree (BRT) model, the impacts of environmental variables on river cooling effects have been explored. The findings underscore a pronounced intensification of river cooling effects on the extremely hot day, with the River Cooling Index (RCI) not only rising from an average of 5.5°C on the normal summer day to 6.4°C but also exhibiting a broader range of variability, as reflected by an increase in the standard deviation from 2.4°C to 3.1°C. Topographical characteristics exhibited strong impacts on river cooling effects, with the relative importance for RCI being 27.6% and 31.5% on the normal summer day and the extremely hot day, respectively. Moreover, average elevation and slope exhibited ascent and descent patterns in their influences on river cooling, while the impacts of patch density and river width were relatively fluctuating, showing descent and ascent patterns as a whole. These findings can provide a foundation for urban planners and managers to develop strategies aimed at improving the thermal environment of riverside areas.