## Highlights

* The river cooling effects were more pronounced, both in average values and standard deviations, on the extremely hot day (6.4°C and 3.1°C) compared to the normal summer day (5.5°C and 2.4°C).
* Topographical characteristics had strong impacts on river cooling.
* 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.