## 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).
* Distance and cumulative effects were more effective than intensity of river cooling in reflecting the influences of environmental variables.
* Topographical characteristics had strong impacts on river cooling, with the relative importance for RCI being 27.6% on the normal summer day and 31.5% on the extremely hot day.
* 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.