

**EGUSPHERE-2024-1777**

**RC1 review**

The authors would like to acknowledge the time and effort spent by the reviewer RC1 on our manuscript. We provide replies to each reviewer comment.

RC1 – General comment:

This manuscript used meteorological surface station data and compact radiosondes to examine how the cooling effect of urban parks at night changes with park size and weather conditions in hot summer evenings. The findings are interesting. However, this study should address the following concerns before publication.

RC1 – Comment 1:

1、 Major concern: The findings of this study are very interesting and the evidence is very solid. However, it is recommended that the author should create a schematic diagram for each of the three different regimes, placing them in the conclusion section. This will not only help the author to refine the results but also help readers to understand the conclusions of this study more intuitively.

Author Reply to comment 1:

We fully agree with the reviewer that a schematic diagram would help to illustrate the main conclusions associated with the three turbulence regimes. We are working now on establishing such a schematic that will represent the nocturnal atmospheric stability in the UBL above built-up environments, urban parks and urban woods using a schematic representation of the potential temperature profile from the ground to the residual layer. The schematic will also show the typical wind profile and the thermodynamic processes that impact the nocturnal evolution of the temperature near the ground and at the top of the UBL. One schematic for each turbulence regime. We will post the proposed schematic as soon as it is ready.

RC1 – Comment 2:

2 、 Suggestion: If possible, in the future, it is recommended that the authors collect observational data from other cities to analyze whether cities with different terrains and climates also reach similar conclusions. This would be a very meaningful study.

Author Reply to comment 2:

Indeed, it will be interesting to study the occurrence of turbulence regimes in other cities with different geographical settings and climate conditions. Our next study is to refine our results with more parks to study the impacts of park dimensions, locations, taking into account when possible soil moisture, vegetation types ...

RC1 – Comments 3:

Author Reply to comment 3:

All suggested changes have been implemented in the manuscript.

- 3、 line 25: "near-by" should be "nearby"
- 4、 line 61: "Trees can provide efficient shading whereby reducing daytime air temperatures"  
should be "Trees can provide efficient shading, reducing daytime air temperatures"
- 5、 line 65: "The green infrastructures" should be "Green infrastructures"
- 6、 line 79: "e.g." should be "e.g."
- 7、 line 190: "Due to installation setup" should be "Due to the installation setup"
- 8、 line 239: "i.e." should be "i.e.,  
"
- 9、 line 332-333: "the advection" should be "advection"
- 10、 line 335: "July 19" should be "19 July"
- 11、 line 466 : "three turbulence regimes" should be "three types of turbulence regimes"
- 12、 line 610-611: "sensible heat fluxes" should be "sensible heat flux"
- 13、 line 768: "the temperature at all sites decreases to reach a minimal value the next morning  
at sunrise." Should be "the temperature at all sites decreases to a minimal value by the next morning at sunrise."
- 14、 line 811: "is" should be "are"
- 15、 line 848: "Hence in the" should be "Hence, in the"