

## ***Interactive comment on “Characteristics of surface energy balance and atmospheric circulation during hot-and-polluted episodes and their synergistic relationships with urban heat islands over the Pearl River Delta region” by Ifeanyichukwu C. Nduka et al.***

### **Anonymous Referee #2**

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General comments: This study used observational data and numerical model simulations to identify eight HPEs during 2009–2011, and group the HPEs into three clusters (TC-HPE, ST-HPE, HY-HPE) based on their characteristics and mechanism. The relationship between HPEs and UHIs, air pollution during these episodes was also examined. This study has some interesting findings. My recommendation is to accept with major revision. Some concerns that need to be addressed: 1. Figure S2: I suggest authors to add the location of both all meteorology stations and PM stations into

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figure S2, which helps to understand the underlying surface information of the areas where stations located. 2. Table S4: Table S4 is important information for this study, I suggest to move this table from supplement to manuscript. 3. Fig. 1 and Fig. 2 are repeated, please check and revise. And authors should specify the results from observations or model simulations for each figure captions. 4. Line 161: “. . .cloud fraction (CF; yellow). . .”, the line color of CF is green instead of yellow. 5. Line 168: Please revise “HPC\_TC” to “TC-HPC”. 6. Lines 239-240 show “. . .(d-f) Vertical profile of potential temperature ( $\theta$ ) for TC-HPE<sub>rep</sub>, ST-HPE<sub>rep</sub>, and HY-HPE<sub>rep</sub> at mid-day for the PRD region. . .”, but lines 244-245 show “. . .Figure 2d depicts the difference between the potential temperature over urban and vegetated land covers in the PRD region at mid-day. . .”, Please clarify whether Fig. 2(d-f) are “potential temperature. . .” or “the difference between the potential temperature over urban and vegetated land covers. . .”. 7. Discussion: Do authors have any suggestions or thoughts about improving air quality (such as O<sub>3</sub>-PM<sub>x</sub> synergistic governance) in summer in the PRD region based on your research. If so, welcome to add them into discussion.

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