

## ***Interactive comment on “Changes of regional meteorology induced by anthropogenic heat and their impacts on air quality in South China” by Min Xie et al.***

**Anonymous Referee #1**

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General comments: This is a nice paper on using numerical modeling to address some important issues related to urban effects on the atmosphere. The paper is well written as a whole and easy to follow. The main idea is to analyze the relative importance of anthropogenic heat contribution to atmospheric patterns and its consequent effects on air pollution dispersion. Although the contribution seems to be small compared to other effects, it is clear that it is very important to correctly consider the AH sources during simulations, especially over very large urban areas. I consider the paper suitable for publication, after the verification of some small features, as listed in the specific comments below.

Specific Comments and technical corrections:

C1

Abstract: insert the acronym for boundary layer height before using it (see lines 23 and 26).

Page 2, lines 49-50 (and 201). Indicate which reference correspond to Zhang et al 2009. There are two different references with the same year.

Page 5, line 172-173, the authors mention that the model domain has a resolution of 27 km x 27 km. Actually, this refers to the grid spacing, as you mention on line 175. Resolution has another meaning and it is related to the feature that you are able to represent in the model.

The resolution of Fig 1 is too low. It would be better if the authors could improve it.

Page 6, lines 190-191. In the same way, the sentence “the resolution of 30-sec” should be changed by “30 arc seconds grid spacing”. Please, consider the same issue on lines 199 and 204.

Page 8, lines 263-264 (and 278) the authors cited the reference Chen et al 2012a. However, there is just one reference by Chen et al in 2012, as you can see in the reference list.

Page 8, line 266. Correct the figure number. The correct is 2f, instead of 4f. In the comparisons of Grd\_AH against Fix\_AH it would be useful for the readers to have a special view of the Fix\_AH contributions. The values are fixed, but they certainly are heterogeneous around the domain. A figure similar to Fig. 2 would be nice.

In page 16, section 3.3.3. The authors mention that the air near to the surface becomes dryer. It should be considered that the regions where RH is lower correspond mostly to the regions where Temperature is higher. Therefore, it does not necessarily mean that the air is actually drier. I believe that this whole paragraph should be better explained.

Page 19, line 503. The correct statement is “atmospheric conditions” instead of “meteorology conditions”.

C2

Page 25, line 652. The authors said that “. . . strong upward air flower. . .” Is that right?

References:

Indicate in the list which references corresponds to Chen et al 2014 a and b. The same for Liu et al 2013 a and b, Wang et al 2009 a and b.

Word Bank Group, 2015, cited on page 3, is not correctly cited in the reference list.

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