

## ***Interactive comment on “Multi-model comparison of urban heat island modelling approaches” by Jan Karlický et al.***

### **Anonymous Referee #1**

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This is an interesting paper investigating the role of urban surface in regional climate in central Europe via using WRF and RegCM model simulation. The paper is generally well-written and the conclusions are adequately supported by the evidence presented. I have following comments before it is accepted to be published on ACP.

1. Page 4, Line 23 - 10km \* 10km horizontal resolution and 30/23 vertical levels is a relatively low for a study of urbanization impact. Previous numerical studies generally used a higher resolution of less than 3km in order to better illustrate the region of urbanized area (e. g. Lin et al., 2008; Holt et al., 2009; Wang et al. 2012). I suppose this number is restricted by the used computer power, but could you add a comment about it? How the resolution number can influence the results?

Holt T, Pullen J, Bishop C. Urban and ocean ensembles for improved meteorological

and dispersion modelling of the coastal zone. *Tellus Series A-dynamic Meteorology & Oceanography*, 2010, 61(2):232-249.

Wang J, Feng J, Yan Z, et al. Nested high-resolution modeling of the impact of urbanization on regional climate in three vast urban agglomerations in China. *Journal of Geophysical Research Atmospheres*, 2012, 117(D21):-.

Lin C Y, Chen F, Huang J C, et al. Urban heat island effect and its impact on boundary layer development and land-sea circulation over northern Taiwan. *Atmospheric Environment*, 2008, 42(22): 5635-5649.

2. Figure 2 - I suggest the author add a color bar (and the corresponding model) on the right side of the figure instead of the description in figure caption to make it easier to understand.

3. Figure 5 - Why the temperature is generally overestimated by WRF but underestimated by RegCM model? Can you give some possible explanations for it?

4. Figure 11- what does the Y-coordinate represent for Figure 11 and 12? Does it mean the frequency distribution of VI and SI? The Y-axis title needs to be added.

5. Since the paper discussed the urbanization effect on pollutant dispersion, some important publications need to be mentioned in the manuscript.

Liao, J., T. Wang, Z. Jiang, B. Zhuang, M. Xie, C. Yin, X. Wang, J. Zhu, Y. Fu, and Y. Zhang (2015), WRF/Chem modeling of the impacts of urban expansion on regional climate and air pollutants in Yangtze River Delta, China, *Atmospheric Environment*, 106, 204-214, doi:10.1016/j.atmosenv.2015.01.059.

Tao, W., J. Liu, G.A. Ban-Weiss, D.A. Hauglustaine, L. Zhang, Q. Zhang, Y. Cheng, Y. Yu, and S. Tao (2015), Effects of urban land expansion on the regional meteorology and air quality of eastern China, *Atmospheric Chemistry and Physics*, 15, 8597-8614.

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2018-3>,

2018.

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