

Interactive comment on “Modeling tropospheric O₃ evolution during the 2016 Group of Twenty summit in Hangzhou, China” by Zhi-zhen Ni et al.

Anonymous Referee #2

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The manuscript attempts to investigate the factors controlling the urban ozone (O₃) pollution during a specific period using the WRF-Chem model. The topic is of interest, but generally the manuscript is not well written and further English polishing is imperative. There are several fatal factors hindering publication of the manuscript at present.

1) In the abstract, the authors clarified that they found a unique mechanism to modulate the high O₃ formation. 1) Prevailing northerly winds convey O₃ precursors (not “emission sources”) to the YRD region; 2) The vertical diffusion and the enhanced process of local chemical generation cause the growth of near-surface O₃ in Hangzhou. What is the role of the trans-boundary transport of O₃ precursors in the O₃ formation mechanism suggested by authors?

2) About the model validation. The authors need to provide the horizontal distributions

of O₃, NO₂, and PM_{2.5} with the observations at monitoring sites in the simulation domain. The China's MEE has released hourly observations of air pollutants since 2013, including PM_{2.5}, PM₁₀, O₃, NO₂ and SO₂, which can be used to validate the model performance.

3) About discussions. In the urban region, O₃ is formed as a result of photochemical reactions involving volatile organic compounds (VOCs) and nitrogen oxide (NO_x) in the presence of sunlight. However, in the discussion, the O₃ formation in the mechanism suggested by authors does not seem to be associated with VOCs. In addition, the authors clarified: "Oxidation reactions of VOCs, under the present of CO, provide alternative oxidants (i.e., HO₂ and RO₂) that efficiently convert NO to NO₂. This conversion enriches the reactants to O₃ photochemical generation while suppressing titration consumption, resulting in the accumulation of O₃". This is really confusing. Why does CO facilitate VOCs oxidation? Why does the O₃ formation suppress titration?

4) Fig. 4, what causes the O₃ simulation biases during nighttime? Fig. 7 is too busy and needs to be revised.

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Discussion paper

