

Comment on acp-2021-764

Anonymous Referee #2

Referee comment on "Atmospheric oxidation capacity and ozone pollution mechanism in a coastal city of southeastern China: analysis of a typical photochemical episode by an observation-based model" by Taotao Liu et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2021-764-RC1>, 2021

Liu et al. presented a typical ozone pollution event study of a coastal city of southeast China for the exploration of AOC, OH reactivity, radical chemistry and ozone pollution mechanism with OBM-MCM method. The predominant oxidant for AOC, dominant contributor for OH reactivity, important source of ROx radical were examined, as well as the ozone formation regime sensitivity. Finally, the VOCs emission reduction were proposed for limiting the radical recycling and O₃ formation. Overall, the paper is appropriate for publication at ACP subject to the following concerns.

Specific comments:

Even though this paper clarifies several important characteristics and mechanism of the ozone pollution for a selected case, the representativeness for a short period and the specific location seems not to be abroad of interests. I would like to suggest the authors can enhance the significance of the findings for the readership.

Regarding to the location, the authors considered the site shows a relatively low O₃ precursors and complex meteorological conditions. However, no evidence was found for the comparison of levels of O₃ precursors, and also the impacts of complex meteorological conditions were not well discussed. These may be improved via, e.g.: (1) comparative study on the non-low levels of O₃ precursors case for the ozone pollution; (2) the impacts of change of meteorological conditions (not only the synoptic situation) on the ozone pollution.

I could not find the observed HCHO data in the paper, which is very important for the observation constrained modelling, and further discussion on the radical sources and evaluation of the highest OFP species.

OBM modelling: Please specify the setting of dry deposition velocity.

Line 47, “&” may be not the suitable format for the text. Btw, here the authors want to indicate the “temporal and spatial distribution” of what? Ozone concentration? or precursors? Please clarify it.

Line 139-148, Please list the relevant reaction and reaction rates in the Eq. 1 to Eq. 3, at least in the Supplementary.

Line 234-239, High AOC were calculated for the ozone pollution episode in this study, which significantly higher than those at Hongkong, Shanghai, etc. However, as stated in the introduction, the AOC levels in the polluted regions are much higher than those at the background sites or remote regions. Does it mean that this site can be classified as a polluted one? And contradict to that non-low level of precursors? The authors should discuss carefully what are the main reasons causing the high AOC in this study.

Line 354-358, the classification of VOCs can be indicated in the Table 2.

Fig. 11, The Rtran was determined by the difference of Rmeas and Rchem. So my main concern is that how about the accuracy of Rtran? At least, I think it include the considerable uncertainties of Rchem. The inference about transport amount need be more cautious. Also no evidence provided can prove the northerly air flow is ozone polluted. Secondly, the authors explained why the two regular O₃ important phenomenon with positive Rtran happened. However, why did negative Rtran observed around noontime every day?

The English may need be improved, e.g.

Line 50, “control factors” to “controlling factors”.

Line 53, “destruction rates” to “loss rates”.

Line 57, “oxidative” to “oxidation”.

etc.