Referee comment on "Impacts of tropical cyclone-heatwave compound events on surface ozone in eastern China: Comparison between the Yangtze River and Pearl River Deltas" by Cuini Qi, Pinya Wang, Yang Yang, Huimin Li, Hui Zhang, Lili Ren, Xipeng Jin, Chenchao Zhan, Jianping Tang, and Hong Liao, Atmospheric Chemistry and Physics

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General comments

This manuscript presents a study case of the effects that a combination of heatwave conditions and a tropical cyclone have on the presence of surface ozone over two river deltas in China. The observational dataset includes a good number of observation sites for temperature, as well as relevant typhoon data publicly available. As for the reanalysis dataset, the authors use ozone data from ChinaHighO3 dataset and ERA5 data for the meteorological conditions, both of which are widely used in the community. The methodology used to identify extreme events is appropriate as well as the presentation of the results, although the understanding of some figures could be improved by changing the colors used. The authors compared the results obtained with those already presented in the literature and include information about the meteorological situation in the episodes they study that justify their findings. However, the authors should revise the document as some sentences are difficult to read and the clarity of some figures could be improved (see some examples in the "technical corrections" section below).

As for the literature, the authors made a comprehensive revision of previous studies connected to the relationship between heatwaves and ozone, as well as between tropical cyclones and ozone. Articles dealing with the compound effect of both meteorological events on surface ozone are not numerous, but the authors cited the most relevant ones.

In that sense, the authors are trying to fill a gap in our knowledge and that is relevant for the scientific community, policy makers and for the public in general, especially for those living in areas prone to high levels of pollution and tropical cyclones with heatwave episodes, especially considering future projections under climate change scenarios.

The findings presented in this study are relevant and important for the community as mentioned before. Taking into this brief assessment, I recommend the manuscript to be published after minor corrections.

Specific comments

In the discussion of the spatial distribution of surface MDA8 ozone concentration in section 4, could the authors discuss why the ozone concentration decreases over Hainan islands and the north part of the SECC during TC-HDs events?

Despite the authors properly discuss the results and comparisons shown throughout the manuscript, sometimes the discussion of the different figures in the text does not follow the order of appearance of the different subplots shown within one figure. One example is Figure 5. In the text, the authors refer first to Fig.5d than to Fig.5d, and do the same with Fig.5f and Fig.5e. I would suggest to either fix the test to discuss them in order, or to modify the panel plots to adjust them to the order followed in the text. This would facilitate the reader to follow what the authors are presenting, and the manuscript would be clearer.

Finally, when analyzing the main physiochemical processes affecting ozone concentration over the selected two areas, it seems that those do not play a relevant role at around 700hPa over the YRD region. Could the authors try to give an explanation why the impact of these processes seems to be not so important at this pressure level overt his region?

Technical corrections

1. Lines 25-26: maybe the authors mean "more elevated"? Please, check.
2. Lines 96-101: I suggest split this long sentence into two to make it easier to read by the reader.
3. Line 187-188: here there are two verbs together. Please, delete one of them for clarity.
4. Figure 2: perhaps the authors could replace the black box for SECC in each panel by two smaller ones indicating the YRD and PRD regions. This way, it is clear since the beginning in which parts of the map the reader should focus on. Another option would be to keep the box for SECC and to add the boxes for the two selected regions. Nevertheless, the authors should revise the caption and adapt it to the latest modification for consistency (currently the authors mentioned a red box that now is black).
5. Figure 3, line 718: please, replace "minis" by "minus" and "difference" by "different".
6. Figure 4: to improve the understanding of this figure, I suggest marking the regions with a different color that does not interfere with the color bar showing ozone concentration.
7. Figure 5: while the selected regions can be seen relatively well in some plots, it is difficult to identify them in others, e.g., Figure 5d. A change of color (e.g., green) of the boxes for each area would improve the clarity of the plots.
8. Figure 6: same comment as for Figure 5.
9. Figure 7: same comment as for Figure 5.
10. Figure 8: the y-axis label is a bit cut. Please, change it.