Dear Editor,

We appreciate the prompt reviews and would like to thank the reviewers for insightful comments and suggestions on our manuscript entitled "Impact of northward tropical cyclones on ozone in Southeastern China" (MS No.: egusphere-2025-5765). We have carefully considered all comments and suggestions. Listed below are our point-by-point responses to all comments and suggestions of this reviewer (Reviewer's points in black, our responses in blue).

Anonymous Referee #1

This manuscript quantitatively evaluates the influence of the intensity and location of northward tropical cyclones (TCs) on ozone in Southeastern China, by using a vortex filtering method in combination with WRF-CMAQ simulations. The work falls well within the scope of ACP. The findings are novel and potentially impactful, providing important insights into the studies on TC-induced ozone pollution. In my view, there are some minor modifications needed to be committed before the publication.

Response:

We appreciate the encouraging comments and suggestions.

1. Line 40: Please define the geographical range of the SEC.

Response:

Thanks for pointing out our negligence. We have defined the geographical range of the SEC (105–123°E, 18–32°N) in the Data and Methods section of the revised manuscript (line 79).

2. Figure 2: Please add the latitude and longitude information.

Response:

Thanks again for pointing out our negligence. We have added the latitude and

longitude information in Figure 2 of the revised manuscript.

3. Section 3.1.1: Ozone concentration during westward TCs also frequently exceeds 50 ppb. However, the analysis mainly focuses on northward TCs, with little discussion of westward TCs. Could you provide further explanation?

Response:

Thank you for the thoughtful comment. We agree that ozone concentration over SEC also frequently exceed 50 ppb during westward TCs. In the original manuscript, the description of Fig. 3b already noted the occurrence of elevated ozone under westward TC influence. As further shown in Fig. 4a, the mean and median ozone concentration associated with westward TCs at all intensities are higher than those on non-TC days, with a slight additional increase at STY and SSTY. These results indicate that, when westward TCs approach SEC but have not yet made landfall, their peripheral circulation can create meteorological conditions more favorable for ozone production and accumulation over the region.

Nevertheless, ozone concentration associated with northward TCs are generally higher across all intensities, and their variations with TC intensity are also more pronounced. Particularly when TCs reach TY or higher intensity, ozone concentration during northward TCs are clearly higher than those associated with the other two track types. Our statistics further show that, among the three TC types, northward TCs account for the largest number of days with ozone concentrations exceeding 50 ppb and 60 ppb (Table S1). Therefore, although relatively high ozone can also occur during westward TCs, we consider the influence of northward TCs on autumn ozone pollution over SEC to be more prominent, and thus selected them as the main focus of the subsequent analysis.

Table S1. Percentage of days with ozone concentration exceeding 50 and 60 ppb during the three TC track types.

	westward TCs	landfalling TCs	northward TCs
> 50 ppb	91 / 222 = 41%	35 / 139 = 25%	121 / 211 = 57%
>60 ppb	29 / 222 = 13%	7 /139 = 5%	67 / 211 = 32%

4. Figure 3: It presents the time series of MDA8 ozone concentration and classifies TC tracks into three different types. However, the interannual variability in ozone for each TC type is not clearly shown or discussed. Additional analysis would be helpful.

Response:

Thank you for the helpful suggestion. We have added the interannual variability of ozone associated with different TC types to Fig. 3a, and have provided a detailed analysis of the corresponding results in the revised manuscript (page 7 to 8, line 183 to 193), so as to more clearly reveal the influence of each TC type on the interannual variability of ozone over SEC.

5. Lines 164 - 166: The description of "When these TCs make landfall between 18-18.8°N subsequently, the ozone concentration in SEC remains at a relatively high level." appears inconsistent with Figure 3b, which shows relatively high ozone during TC landfall over a broader latitude range (12~18°N). Please revise accordingly. In addition, the explanation "due to strong winds and precipitation" is not directly supported by the figure and should be either justified or removed.

Response:

Thank you for this helpful comment. We agree that the original description was not sufficiently consistent with Fig. 3b. We have therefore revised the relevant text in the manuscript accordingly (page 8, line 198). In addition, the explanation related to strong winds and precipitation has been removed from this part (page 8, line xxx to 200), as it is not directly supported by the figure.

6. Figure 4: Landfalling TCs are generally expected to reduce ozone through strong

winds and enhanced precipitation. Why does the mean ozone concentration during landfalling TC periods remain higher than on days without TCs (Figure 4b)?

Response:

Thank you for the thoughtful comment. We agree that landfalling TCs generally tend to reduce ozone through strong winds and enhanced precipitation, especially in areas close to the landfall location. However, Fig. 4 presents regional mean values for the entire SEC (105–123°E, 18–32°N) at each intensity. These averages include both the pre-landfall and post-landfall periods, and the spatial coverage is much broader than the local area most strongly affected by TC landfall. Therefore, the regional mean ozone associated with landfalling TCs reflects the combined response across different periods and different parts of SEC.

When a TC approaches but has not yet made landfall, its peripheral circulation can still create meteorological conditions favorable for ozone production and accumulation, allowing ozone concentration to remain relatively high (Fig. 3b). In addition, when landfall occurs to the south of SEC or in adjacent areas, the strongest wind and precipitation impacts do not necessarily extend uniformly across the whole SEC. Under such conditions, regions farther from the landfall center, such as northern SEC, may be less affected, and ozone can still remain at a relatively high level. Therefore, although landfalling TCs usually suppress local ozone after landfall, their regionally averaged ozone over SEC can still be higher than that on non-TC days.

7. Line 304: The caption for Figure 10 is unclear and potentially misleading. Please revise it for clarity.

Response:

Thank you for pointing this out. The caption for Fig. 10 has been revised to improve clarity and avoid potential ambiguity in line 362 of the revised manuscript.