

I have reviewed the manuscript and find that, despite its interesting scope, three substantial issues require the authors' serious attention and thorough revision. These concerns are central to the authors' interpretation of the trajectory-informed SHAP results and the resulting conclusions on regional transport contributions. They are fundamental to the validity of the main conclusions and should not be overlooked in the revision process.

1. Regarding the interpretation of the 1–3 hour trajectory ozone (T-1h Traj. O₃) factor, the authors attribute its importance to pollution transport, but the evidence supporting this conclusion is insufficient. Under stagnant synoptic conditions, the 1–3 hour short-term trajectory essentially reflects the short-distance movement of local air masses, and the ozone signal carried by such trajectories is strongly correlated with the current site ozone concentration through persistence (autocorrelation). In other words, T-1h Traj. O₃ most likely represents locally accumulated ozone rather than contributions from external transport. The authors are encouraged to conduct a correlation analysis between T-1h Traj. O₃ and site O₃ concentrations to verify this inference. It is also worth noting that incorporating ozone-related factors such as T-1h Traj. O₃ into an hourly ozone modeling framework inevitably diminishes the importance of independent meteorological factors due to autocorrelation, biasing the model interpretation toward the persistence memory of ozone rather than its formation mechanisms. Furthermore, the SHAP analysis shows that trajectory pollutants contribute the most among all factors, with their importance increasing sharply with pollution intensity (Fig. 7)—a pattern that is more consistent with the progressive accumulation of local pollutants on an hourly basis than with enhanced transport. However, the authors do not provide a breakdown of the SHAP contributions from individual components within the trajectory pollutants (e.g., trajectory ozone and precursors at different lag times), making it impossible to confirm whether T-1h Traj. O₃ is indeed the dominant component. The authors are advised to provide such a decomposition to identify the dominant factor and to reassess whether the attribution of trajectory pollutants to transport contributions is justified.

2. Regarding the ozone sensitivity analysis in Section 3.3, the authors associate the negative SHAP contribution of NO₂ with ozone formation sensitivity, but this interpretation may deviate from the intended meaning of the SHAP analysis. At the hourly scale, the inverse relationship between O₃

and NO₂ is a fundamental feature of the photochemical system (photochemical production during daytime versus titration at nighttime). When the model includes both NO₂ and T-1h Traj. NO₂ as input factors, the SHAP method, based on the covariate structure of the input features, distributes the titration effect of NO₂ and the precursor contribution to ozone formation across different variables—this is precisely why NO₂ exhibits a negative contribution while T-1h Traj. NO₂ shows a positive contribution. Therefore, the negative SHAP contribution of NO₂ reflects the NO titration effect rather than changes in ozone formation sensitivity. It is suggested that the authors re-examine the analytical logic in Section 3.3, clarify the fundamental distinction between SHAP contributions and ozone sensitivity diagnostics, and avoid directly linking the two.

3. Regarding the interpretation of Figure 8. Figure 8 essentially reflects differences in diurnal O₃ characteristics across sites, which is consistent with the findings in Figure 1, rather than representing the mechanisms of day-to-day temporal variations. The trajectory location/height in the figure primarily characterizes site elevation: higher elevation corresponds to stronger vertical mixing, which raises the minimum mean O₃ concentration at 07:00–08:00 and consequently reduces the diurnal O₃ range. Therefore, Figure 8 serves more as a diurnal-cycle complement to the spatial distribution patterns already shown in Figure 1, rather than an independent new finding. Furthermore, as noted in the first point, trajectory location/height over the 1–3 hour local pathway cannot represent physical meanings such as air mass transport structure; it largely reflects site elevation information. It is suggested that the authors reconsider the analytical positioning of Figure 8 and avoid overinterpreting its conclusions.