This manuscript investigates the seasonal characteristics of eastward North African dust transport and examines three transport pathways toward East Asia using MERRA-2 and ERA5 reanalysis data, HYSPLIT trajectory simulations, and satellite and ground-based observations. The three case studies provide detailed synoptic analyses. However, some conclusions require stronger quantitative support, particularly regarding the representativeness of the three transport pathways and the attribution of near-surface PM anomalies in China to North African dust transport. I therefore recommend a major revision as follows:

1. Section 2.3 and 4. The authors use a PM10 threshold of 500 $\mu g\, m^{-3}$ to exclude the influence of local or nearby dust sources, citing Zhou et al. (2023a). However, Zhou et al. (2023a) used this threshold to classify dust weather conditions based on UAV observations over the Taklimakan Desert, rather than to distinguish dust originating from different sources. Therefore, this threshold alone cannot reliably exclude contributions from other East Asian dust sources.

Although the HYSPLIT simulations and lidar observations support the long-range transport of North African dust to East Asia, they do not demonstrate that these elevated dust plumes contributed to the observed surface PM anomalies. In Section 4, the authors further attribute the near-surface impacts mainly to the deposition of fine particles from elevated dust plumes around lines 520: "*This indicates that the near surface environmental impact of eastward transported North African dust over East Asia mainly results from the deposition of fine particles from the elevated dust plume. In three cases, the dust plumes did not show pronounced intrusion into the planetary boundary layer*". However, no deposition fluxes or direct evidence of this process are provided. The authors should provide stronger evidence linking North African dust transport to surface PM10 and PM2.5 anomalies, or revise their conclusions regarding its impacts on air quality in China.

2. Section 3.2. The manuscript identifies three representative transport pathways based on three case studies, but provides no long-term statistics to establish their relative occurrence frequencies during 2006-2023. In particular, the statement around Line 495 that "*In reality, most North African dust is transported toward the Indian Ocean or the Arabian Peninsula, and seldom crosses mountains and plateaus to affect southern China. Therefore, the southern transport pathway is relatively rare*" is not sufficiently supported by the three selected case studies. Please provide statistical evidence for these conclusions or revise them accordingly.

3. Section 3.1. The analysis of the spatial distribution and seasonal variability of North African dust relies primarily on MERRA-2 dust data, which have inherent uncertainties. The authors should compare the key results with other available datasets, such as CAMS DOD or other reliable satellite-derived dust products, to evaluate their consistency and assess the robustness of the conclusions.

4. Section 2.3 (around Line 190). The Methods section states that "*The monthly background concentrations averaged over the past three years were subtracted from the original PM10 and PM2.5 concentrations to obtain anomaly disturbances for impact assessment.*" However, the caption of Fig. 11 states that "*The anomaly background fields are defined as the averages of the monthly mean PM10 and PM2.5 concentrations for the event year and the preceding and following years*." These two

reference periods do not match. Please clarify which reference period was actually used in the calculations and correct the inconsistent descriptions.