Referee 1:

This study characterizes the properties of long-range transport aerosols observed by analyzing in-situ measurements from the ACE-ENA field campaigns and ECMWFCAMS aerosol reanalysis data. Cloud-resolving WRF simulations are used to assess the possible influence of long-range transport aerosols on marine boundary-layer clouds. Results show that long-range transport biomass burning aerosols from U.S. continent and dust plumes from Sahara are observed during the field campaign. In situ measurements show that long-range transport aerosol layer is some distance away from the cloud top for one case and adjacent to the cloud top for another case. A series of WRF simulations suggest that the aerosol plume cannot affect underlying MBL cloud properties when the center of the plume is over 100 m higher than cloud top.

Noticeable effect of aerosol on cloud properties is found if the aerosol layer is right on top of the stratified MBL cloud deck. The manuscript is well written and the results and conclusions are clearly presented. I think the manuscript is suitable for publication in ACP after minor revision.

We appreciate the reviewer's valuable comments and constructive suggestions. We have carefully revised the manuscript according to these comments. Point-by-point responses are provided below. The reviewer's comments are in black, our responses are in blue, and the quotes from our manuscript are in italics.

1. Line 188: "July 18 and 12 presents the typical high- and low-plume cases. . ." The signal is clear from Figure 3 (in-situ measurements), but not clear in Figure 1. In fact, based on Figure 1 (reanalysis product), I think July 18 is likely to be low-plume case, while July 12 is high-plume case. Please comment on the difference and add some explanations/clarifications in the manuscript.

We have now clarified that sulfate occurrence below 1 km during 18-21 July in the reanalysis is unlikely caused by the long-range transport. The sulfate concentration experienced an increase in the MBL followed by a lag increase in the free troposphere. The elevated sulfate concentration within the boundary layer is due likely to some local sources such as oxidation of marine dimethyl sulfate (DMS) in the CAMS model. Also, the aircraft did not detect such a sulfate enhancement within the boundary layer on 18 July. Therefore, the July 18 is still considered as a high-plume case in this study.

2. Figure 6&7: Results are horizontally average in domain d04 or from one column where ENA site located? I guess it is averaged. Please clearly state it in the text and caption.

In the captions of Fig. 6&7, we have now added that "*The model results are averaged over 10×10 grid points centering at the ENA ground site location*".

3. Figure 9: Caption is not completed. b), d), f) are case with the aerosol plume removed?

We have completed the caption of Fig. 9 as "*WRF simulated CCN concentration, liquid water content (LWC), and cloud fraction for the low-altitude plume case, with observed aerosol profile (a,c,e) and idealized profile that removed aerosol transport in the free troposphere (b,d,f).*"