Comments on

Transported African Dust in the Lower Marine Atmospheric Boundary Layer is Internally Mixed with Sea Salt Contributing to Increased Hygroscopicity and a Lower Lidar Depolarization Ratio

This study investigated the evolution characteristics of physical and chemical properties of Saharan dust during its interaction with sea salt aerosols during long-range transport, and carefully analyzes the vertical distribution characteristics of the aging process of dust aerosols in the marine atmospheric environment, which is of great importance for understanding the radiative properties of dust aging. The results also highlight the importance of integrating vertically resolved lidar data with in-situ single-particle analysis and surface aerosol mass concentrations to improve the interpretation of lidar observations in dust-affected regions. The manuscript's presentation of linguistic logic is clear and rigorous, and its overall writing quality is good. Nevertheless, there are some minor issues in the manuscript that require further revision and clarification. Only when the following issues have been revised or clarified is it recommended for publication:

(1) The manuscript contains a large number of abbreviations, and it is recommended to include a list of abbreviations.

(2) Section 2.2 and Figure 1a: How is the dust mass concentration derived?

(3) Section 2.2: The method for calculating sea salt concentration is based on the assumption that all Na^+ originates from sea salt aerosols. However, dust aerosols contain a certain amount of sodium salts. Although the proportion of Na^+ in dust is small, when the dust concentration is high, the Na^+ contribution from dust may be difficult to ignore. Therefore, it is recommended to recalculate the sea salt concentration after deducting the Na^+ from dust aerosols.

(4) Line 247: The part after "0.03" lacks a period.

(5) It is recommended to add meteorological data on Figure 1, such as temperature, relative humidity (RH), wind speed/direction. In particular, RH can assist in understanding the role that meteorological conditions within dust plumes played in altering the physicochemical

properties of aged dust (dust + sea salt) with high hygroscopicity.

(6) The interaction between dust aerosols and sea salt over the ocean has long been studied. For instance, about 20 years ago, Zhang et al. investigated the interaction between dust aerosols originating from the Asian continent in East Asia and sea salt aerosols in the northwestern Pacific Ocean. It is recommended that the authors compare this study with previous research to highlight the innovations of this paper. (References: Zhang, D. Z., et al., Geophys. Res. Lett. 2001, 28 (18), 3613-3616; Zhang, D. Z., et al., Mixture state and size of Asian dust particles collected at southwestern Japan in spring 2000. J. Phys. Chem. A 2003, 108 (D24); Zhang, D. Z. and Iwasaka, Y., Size change of Asian dust particles caused by sea salt interaction: Measurements in southwestern Japan. Geophys. Res. Lett. 2004, 31 (15); Zhang, D. Z., et al., Coarse and accumulation mode particles associated with Asian dust in southwestern Japan. Atmos. Environ. 2006, 40 (7), 1205-1215.)

(7) Figure 5b shows that when dust concentration is relatively high, the fraction of sulfate particles is also high. Why? Are these sulfate particles derived from anthropogenic emissions or natural sources? Is there a possibility that these sulfate particles originate from dust aerosols? Recent studies have shown that fresh dust aerosols also contain sulfate (Li, W. et al., A Review of Water-Soluble Ions in Natural Dust Particles Over East Asia: Abundance, Spatial Distributions, and Implications. ACS ES&T Air 2025, 2 (8), 1379-1393).