

Thank you for the revisions and your response to my comments. However, I note that the authors have not made substantial modifications to the manuscript, nor have they adequately addressed my concerns regarding the scientific robustness of the paper's conclusions. Measuring the depth of analysis by page number is inappropriate; a paper should delve into scientific exploration deeply, even if it is concise. The core conclusion proposed by the authors—that atmospheric chemical processing alters the solubility of aluminum in aerosols—while not necessarily incorrect, lacks convincing support from the current explanations. The authors fail to rigorously demonstrate that this is a dominant factor influencing aerosol aluminum solubility.

Regarding the abstract, I maintain that the current version is overly general. I provided specific suggestions for improvement in my previous comments, yet the authors have made almost no changes to the abstract. I believe that carefully crafting the language to distill the core scientific information would not significantly increase the word count and could even make it more concise. The current abstract still lacks essential scientific evidence and in-depth quantitative analysis, making it unsuitable for a qualified research paper. Furthermore, the authors have not proofread this critical section carefully, as evident from the misaligned lines (between lines 36 and 37) and the presence of extra spaces or characters. I urge the authors to treat the revision process with greater seriousness.

I understand that the solubility of aluminum in dust deposited into the ocean can vary across different maritime regions and times, potentially significantly. However, this study only observes aluminum solubility at two terrestrial sites. The connection to the inference about oceanic dust deposition is not direct. Even if we clarify the spatiotemporal characteristics of aerosol aluminum solubility, how does that allow us to better constrain oceanic dust deposition? If the solubility of aluminum in dust varies greatly, how can we effectively use dissolved aluminum concentrations in seawater to constrain oceanic dust deposition? The logic behind this is unclear to me.

Concerning the issue of local resuspended dust, as the authors mentioned, its aluminum solubility is typically lower than that of desert dust, which is a consensus in many studies. However, the higher solubility observed in Qingdao compared to Xi'an does not automatically imply that local resuspended dust has a minimal influence in Qingdao. A more plausible explanation could be that emissions of local resuspended dust are much greater in Xi'an, thereby lowering the overall solubility there. In contrast,

Qingdao might have less local resuspended dust, resulting in a relatively higher observed solubility. This is not even the most critical point. The more crucial issue is that if the interference from local resuspended dust is substantial, the paper's conclusions regarding the properties and transport of desert dust cannot be explained clearly and rationally.

In my previous comment, I pointed out that desert dust rarely occurs in Xi'an during winter because the major dust sources in northern China are typically snow-covered, with frozen or moist soil that prevents dust emission even under strong winds. Therefore, the dust observed in Xi'an during winter is likely predominantly local resuspended dust. In their response, the authors shifted the focus by stating that many studies show dust is a significant component of aerosols in Xi'an. However, this refers to the conditions in spring, not winter.

If the authors hypothesize that the dust samples originate from the Loess Plateau, which is close to Xi'an, they must provide substantial evidence to support this claim. It is important to distinguish concepts clearly: the Loess Plateau is generally not considered a dust **source** region but rather a depositional area for aeolian dust. The primary dust sources affecting China are located in southern Mongolia and China's own deserts (e.g., Taklamakan, Badain Jaran, Tengger, and Kubuqi deserts). These source regions are almost all over a thousand kilometers away from Xi'an, not "quite close" as suggested.

Finally, regarding the authors' explanation for the smaller difference in aluminum solubility between the two cities in spring—attributing it to faster transport due to higher wind speeds, thus less aging—it is important to note that major dust events are typically associated with strong winds during transport from west to east. Does this imply that the solubility of aluminum is less affected during these significant dust events, which are precisely the events of greatest interest for transport and deposition into the oceans? This point requires further clarification.