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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Fine dust emissions from active sands at coastal Oceano Dunes, California" *by* Yue Huang et al.

Anonymous Referee #2

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General comment: This study highlights the significance of sand dunes as an important source of fine dust to the global dust cycle. An in situ field measurement is undertaken at a costal location (Oceano Dunes) in California to understand the various processes involved in production of aeolian dust from active sands. A suite of instruments were installed in a vertical tower to monitor meteorological and physical parameter to get insight of the physics associated with dust emission from sands. In addition, chemical and mineralogical composition of sand from experimental site were also measured using XRD and SEM-EDS. Based on their result, authors have inferred two major mechanism for fine dust emission, (1) aeolian abrasion of feldspar and (2) removal of clay-mineral coating during saltation, from sands at Oceano site. These inferences are well supported by the previous experiments and literature. The manuscript is well

written, easy to read and of great significance for dust research. Thus, I recommend for publication in ACP, However, below I have made few comments which authors may think to consider while revising.

Specific comments:

Section 4.2: The discussion on representativeness of Oceano dust emissions can be improved further. As authors have tried to propose " . . . sand dunes might be globally relevant source of dust." (Page 1 line no. 14-15) and the feldspar abrasion is the major mechanism for such emission. They can include the distribution of feldspar content in active sand dunes and can make an approx. estimation of fine dust emitted by these source. It is important in order to link its contribution to global dust cycle.

Section 4.3: The implication of this study to human health and park manangement is OK, but stretching it to hydrological cycle and climate is overstatement. This study has not quantified feldspar content being emitted and subsequently carried to higher altitudes. So, their role in ice nuclei formation and consequently on the hydrological cycle is highly speculative. The Oceano dust emission might have a local to regional impact. However, the process of dust emission from sand dunes may have global relevance.

Section 4.4: I think authors should have attempted to collect aeolian dust samples on substrate using high volume samplers simultaneously with the other measurements. The enrichment of feldspar in the collected dust samples compared to parent sand had provided robust evidence for the proposed hypothesis of emission of fine dust from feldspar abrasion. This can be included in the limitation section.

Table 2: How many sand samples were analysed to get mineralogical composition? Mention in the table caption.

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