

Atmos. Chem. Phys. Discuss., referee comment RC1
<https://doi.org/10.5194/acp-2022-355-RC1>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on acp-2022-355

Anonymous Referee #1

Referee comment on "Dust pollution in China affected by different spatial and temporal types of El Niño" by Yang Yang et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2022-355-RC1>, 2022

General comments

This study analyzed the impacts of different types of El Niño on dust activities over China using E3SMv1 model simulation. The authors showed that El Niño causes changes in boreal winter (DJF) dust concentrations over China by modulating wind speed and relative humidity near the dust sources (e.g., Gobi desert). The impacts on boreal spring (MAM) dust concentrations are statistically unclear. The influences of different types of El Niño are discussed. Overall, the paper is well organized, helpful and appropriate for publication in ACP. I may recommend publication of this manuscript after the following comments are addressed.

Specific comments

- The results might be sensitive to the model selected (i.e., E3SMv1). The authors pointed out that there are model biases in simulating dust emissions (Section 2.3). However, explanation on how these biases may affect the key results (e.g., as shown in Figure 2) is not clearly discussed. The discussion given in Section 4 might be too short. Further, is it possible to suggest that these biases are associated with the model biases in simulating humidity or near surface wind?
- I am wondering if the current model can provide the output of dust deposition and if the analysis of El Niño impacts on dust deposition is necessary.
- Line 185: It is unclear about the period of the sensitivity experiments. Why did the authors chose 13 years only? I supposed that the period of the sensitivity experiment for SD El Niño should be longer than LD El Niño, as there are more SD El Niño events (Lines 159-160).

Technical corrections

- Lines 23-24: This sentence needs to be rephrased.
- Line 26 and others: Do you mean 'boreal winter'?
- Line 26: 'an' □ 'a'
- Lines 79-80: This reference (<https://doi.org/10.5194/acp-22-5253-2022>) might be helpful to reinforce the statement of El Niño impacts on dust activities. For example, the El Niño–Southern Oscillation (ENSO) shows causal impacts on dust emission over the northwestern China and wetdust deposition over the eastern China. In addition, there is ENSO impacts on dust concentrations over the southern and western China.
- Line 183: If the results are based on the ensemble mean, it should be stated clearly.
- Line 592: 98% or 90%? It is more common to use 99% or 95% significance level, instead of 98%.