

Atmos. Chem. Phys. Discuss., referee comment RC2
<https://doi.org/10.5194/acp-2022-355-RC2>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on acp-2022-355

Anonymous Referee #2

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-RC2>, 2022

Comments and suggestions

This study examines the impacts of different types of El Niño events on dust pollution in China based on an earth system model. According to the model simulation, the authors suggested that dust concentrations during the CP El Niño are much higher in northern China than during the EP El Niño. The short duration (SD) El Niño increases winter dust concentration over northern China, while there is a decrease in dust concentration during the long duration (LD) El Niño. In general, the topic of this study is interesting. However, current version of the manuscript at least needs a major revision. My comments are shown as follows.

This study examines the impacts of different types of El Niño events (EP, CP, SD, LD) on the dust concentration over China only based on one model simulation. Can the different impacts of the four types of El Niño event on the dust concentration over China can be obtained in the observations?

The obtained results of this study are only based on one model simulation. Many studies have demonstrated that impact of ENSO on extratropical atmospheric circulation and climate variation over East Asia are strongly model-dependent. It cannot confirm the robustness of the results obtained in this study only based on one model simulation.

Lines 183-184: 3 ensemble and the last 10 years are used to analysis. It should be mentioned that there exist a large internal variability over extratropics. Thus, 3 ensemble and 10 years mean cannot well remove the internal atmospheric variability.

From Fig. 4, it shows that there exist large differences in the atmospheric anomalies over East Asia related to the four types of El Nino. First, what are the mechanisms for the formations of the atmospheric anomalies induced by the different types of El Nino. Second, what are the factors for the differences of atmospheric anomalies generated by EP and CP El Nino (SD and LD El Nino)?

Lines 218-222: From Fig. 2c, the difference of dust concentrations over central-eastern China are weak and statistically insignificant. Hence, you cannot conclude that dust concentrations increase more significantly over central-eastern China. In addition, actually, from Fig. 2, differences in the dust concentrations between CP and EP are mostly insignificant in China. The related conclusions you mentioned are incorrect.

Lines 276-285: A comparison of Fig. 5 and Fig. 4 indicate that the simulated atmospheric circulation anomalies over East Asia show notably different with those in the observations. How can you say they are similar? In addition, the variables shown in Fig. 5 should be similar to those shown in Fig. 4. For example, SLP anomalies should be shown. In addition, the composites for the SD and LD El Nino events should also be shown in Fig. 5.

Minors:

Line 81: the under-->delete the

Lines 139-140: Nino3.4 SST index is defined as area-mean SST anomalies in the Nino3.4 region.

Definition of the EP and CP events: You should note that there also exist mixed El Nino event.

The years of CP, EP, SD and LD El Nino events should be shown in a Table.