

Interactive comment on “Simulated coordinated impacts of the NAO and El Niño on aerosol concentrations over eastern China” by Juan Feng et al.

Anonymous Referee #1

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The manuscript investigated the impact of atmospheric circulation (NAO and ENSO) on the high aerosol concentration in Eastern China was investigated by using simulations of GOES-4, which can exclude the influence of emission. They found that the asymmetric impact of NAO and ENSO on the AC over central and eastern China, and further discussed the physical mechanism induced the circulation anomalies associated with NAO- and El Niño.

In general, I found the paper appropriate for ACP. However, it need to be major revised before accepted this paper for publication in ACP with addressing those comments listed below:

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Major Comments: 1. The manuscript focus on the winter high aerosol concentration and its interannual variation associated with NAO and El Nino, so I think, it is better to point out the seasonal information and time scale of variation in the title to avoid misleading, such as “Simulated coordinated impacts of the previous autumn NAO and winter El Nino on the interannual variation of winter aerosol concentrations over eastern China.”, Certainly, authors can give a better title than this.

2. the introduction mentions that “NAO exhibits significant cross-seasonal impacts on the East Asian climate, ... boreal spring NAO influenced the subsequent intensity of EASM”. However, the manuscript investigates the influence of autumn NAO on winter climate, so I think it is better to providing some references to explain why we should investigate the impact of autumn NAO on winter climate.

3. the time scale of NAO and ENSO are different, the impact of NAO is mainly in decadal time scale, ENSO is mainly in interannual time scale. The time scale should be clarifying clear when authors get the conclusion.

4. as the authors said, although the NOA index are close in 1997 and 2002 (-1.507 in 1997 and -1.510 in 2002), the precise location of anomalous SLP is different, so the difference of AC distribution in 1997 and 2002 (fig. 5a,b) may be caused by the difference of locations of anomalous SLP pattern associated with NOA, the author should give some explain before investigate the impact of NAO & El Nino and solo NAO on the AC.

Minor Comments: 1. Line 225 and Fig. 4, the significant level is 0.2 level, which is different with fig. 3 (0.1 level) and it is too lower in the statistical significance. Suggest to use consistent significant level (like 0.1 level).

2. Line 232, like author mentioned in Line406-408, author should point out that “the ENSO affects the distribution of AC in south China and northwest China.” Northwest China is not discussed but should be noted based on the figure.

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3. Line 248 and the legend in Fig. 5, “column AC anomalies “ in the maintext, however, the legend of Fig. 5 did not point out “anomalies”, which is right? Maybe the maintext is right.

4. Line 281: “negative SST “ -> “negative SST anomaly”

5. Line 300-301, “Under the influence of the anomalous downstream teleconnection, north China is influenced by convergence anomalies, with the center positioned over central China (Fig. 9).” The Fig. 9 can not fully support this sentence, maybe due to the missing lon information in the Fig. 9 or the country boundaries. I suggest to make the fig. 9 more clear.

6. “convergence “ in Line 308 and “anomalous divergence” in Line 313, which is contrary to the Fig. 10. Generally, the negative values of divergence indicate convergence, positive values indicate divergence. Therefore, Line 308 said “south China was influenced by an evident anomalous convergence at the lower troposphere..” however, I see the positive values (orange color) of divergence in Fig. 10a. please check it.

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