

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2021-324

Anonymous Referee #2

Referee comment on "Decadal changes of connections among late-spring snow cover in West Siberia, summer Eurasia teleconnection and O₃-related meteorology in North China" by Zhicong Yin et al., Atmos. Chem. Phys. Discuss.,
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Yin et al. examined the possible impacts of snow cover over west Siberia on Eurasia teleconnection and ozone pollution meteorology in North China at the decadal timescale. They found that 1980-1998 changes in snow cover over west Siberia could modulate ozone pollution weathers over the North China through affecting the Eurasia teleconnection, but after that this connection tends to be insignificant. They also demonstrated that snow cover as well as sea ice could be the effective predictors for ozone pollution meteorology over the North China.

Overall, this is a timely study with interesting results. It fits well within the scope of ACP journal. I hope it can be published in the near future while the following concerns should be addressed.

Fig3a: There is no doubt that snow cover over west Siberia is linked with ozone pollution in North China. However, I am wondering if OWI and SC_{ws} are still significantly correlated over 1980-1998 if the authors remove the 1997/1998 El nino years, which could have driven these evident interannual anomalies at a large scale. Similar question also for correlation between NHFws and EU/OWI in Fig.6a.

L97: Is Yin et al. (2020a) the first one to devise the EU index? If not, the original reference should be added.

L111-112: I don't think winds at 10m can be used to represent the transport from Yangtze River Delta to North China. Moreover, lifetimes of O₃ precursors are generally within a few hours in summer. Any reference to support this argument?

L113: Rain shouldn't be effective to remove ozone. You also confirmed this in L127.

L130-132: How about emissions outside of China? Are they fixed at a certain year or changing over time?

L141&L217: The subtitles are not clear.

L169&Fig1c: Why is ozone strongly enhanced over the whole domain? There should be weak ozone formation over the high-latitude region with few emissions.

L211-212: Should be corrected.

L218: Please add "of" before "how to...".

Discussion: Further studies using climate-chemistry model to verify the role of snow cover should be highlighted.