

Review of “Impacts of the East Asian summer monsoon on interannual variations of summertime surface-layer ozone concentrations over China” by Yang et al.

This study examines the impacts of the East Asian summer monsoon (EASM) on interannual variations of summertime surface-layer O₃ concentrations over China through a suite of sensitivity model simulations using the GEOS-Chem model. The impacts associated with EASM are also compared with the impacts from changes in anthropogenic emissions of ozone precursors. I feel this is an interesting topic which fits the scope of ACP well. The numerical experiments appear carefully designed. I would recommend publication of this paper after the authors address some relatively minor issues –

P3270, L25-27 (and multiple places in the text) on the discussion of the impacts of EASM compared to that from changes in anthropogenic emissions: “We also find that the changes in the EASM strength are as important as the changes in anthropogenic emissions over 1986–2006 in influencing JJA surface layer O₃ concentrations in China”

I think some clarification maybe needed to avoid/reduce the potential confusion for readers: The impacts on ozone associated with the interannual variations in EASM maybe particularly strong/important for certain regions and certain years, but that doesn’t mean the EASM has been affecting the ozone over China the same or similar way anthropogenic emissions have.

P3280, L17: On the discussion related to high surface ozone over western China – I think that literature studies often show higher surface ozone over the eastern China than that over the western China, but that does not seem to be the case for this study? Any particular factors driving this? Some discussion on this would be helpful.

Minor points -

P3270, L11: over the 21 yr → over the 21 yr period.

P3270, L17: nation mean → national mean

P3271, L2: incorrect statement; O₃ is the third most important “anthropogenic” greenhouse gas (as reported by IPCC), but we can’t say it’s the third most important contributor to greenhouse effect (H₂O should be the #1, but it’s not an “anthropogenic” GHG).

P3274, L2: are simulated driven by → are simulated using

P3278, L20-24: This section does not read well and easy to lead to some confusion; suggest to rewrite this section.

P3283, L26: “with the largest values of exceeding” → “with the largest values exceeding”

P3284, L11-12: “with a nation mean lower O3 concentration by” → “with the national mean O3 concentration lower by”

P3284, L18-19: Tg should be Tg/season here, right?