

Interactive comment on “Short-lived pollutants in the Arctic: their climate impact and possible mitigation strategies” by P. K. Quinn et al.

Anonymous Referee #1

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Quinn et al. present a summary of short-lived climatically important pollutants in the Arctic and their seasonally averaged forcing values. These forcing values are based on earlier published simulations made with several different models. However, as I understand, the seasonally averaged data presented in Table 1/Figure 2 of this manuscript have not been published before.

The manuscript addresses an important current topic (near-term opportunities to slow down the Arctic warming), is written clearly and uses scientifically sound methodology. However, it presents fairly little new unpublished data/calculations, and doesn't discuss the uncertainties related to the forcing/temperature response estimates or compare the estimates with results from other published model studies. I'm therefore not quite sure whether the authors have intended this work to be a summary of what is known of the

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short-lived Arctic pollutants (as the abstract suggests; however, the manuscript doesn't review the existing literature very thoroughly), or a report of new scientific results (despite the missing uncertainty estimates etc., or the fact that the abstract doesn't mention any of the calculated values).

I therefore recommend this work to be published in ACP only if the authors provide a much more detailed discussion of the following points:

- uncertainties related to their estimates due to the models used (e.g. Koch and Hansen (2005) underpredict the BC concentrations in the Arctic)
- a comparison of their forcing/response estimates with other estimates available in the literature
- how comparable are the forcing/response estimates for different pollutants as they are not from the same model
- based on the results in this manuscript and earlier studies as well as the technology available, which ones of the listed mitigation opportunities (which could be more specific especially for methane and ozone) have the greatest realistic potential to slow down the Arctic warming

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