

Reviewer 1 #

I found the authors address the various limitations of this study more clearly in the revised/resubmitted manuscript. One thing I still can not agree with is the “co-benefit” on climate forcing. By “co-benefit”, the authors refer the reduction in BC DRF in clear sky. First of all, the modeling set-up doesn’t seem to allow interaction between aerosols (CHIMERE) and meteorology (WRF). Second, the background meteorology does not represent the condition in year 2030. Third, the BC DRF is calculated for clear sky. So the reduction in BC DRF just due to the reduction in BC loading (no change in climate & no aerosol-weather interaction). I suggest to change “co-benefits” in the title to “effects” or “impacts”.

Response:

*Thank you very much for your valid insights and suggestion. We fully agree to change the word “co-benefit” to “impacts” in the revised title and also in the text. The title was revised to “[Assessment of emission scenarios for 2030 and **impacts** of black carbon emission reduction measures on air quality and **radiative** forcing in Southeast Asia”.*

*The word of co-benefit was revised throughout the manuscript:*

- *Line 10-13, page 1, “Our accompanying paper (Permadi et al., 2017a) focuses on the preparation of emission input data and evaluation of WRF/CHIMERE performance in 2007, this paper follows with detailing the *impacts assessment* of the future (2030) black carbon (BC) emission reduction measures for Southeast Asia (SEA) countries *on air quality, health and BC direct radiative forcing (DRF)*”.*
- *Line 21-23, page 1, “Under RED2030, the health *benefits* were analyzed in term of the avoided number of premature deaths associated with ambient PM<sub>2.5</sub> reduction *along with BC DRF reduction*”.*
- *Line 27-28, page 1, “Substantial *impacts* on human health and BC DRF reduction in SEA could be resulted from the emission measures incorporated in RED2030”.*
- *Line 28-30, page 1, “Future works should consider other *impacts* such as for the agricultural crop production as well as the cost benefit analysis of the measures implementation to provide relevant information for policy making”.*
- *Line 34-36, page 2, “The changes in the BC direct radiative forcing (DRF) and in the number of avoided premature deaths between BY2007 and RED2030 were compared to those between BY2007 and the business as usual scenario (BAU2030) to highlight potential *impacts*”.*
- *Line 36-38, page 2, “The results of this study would provide information to policy makers on the efficacy of different emission reduction measures and associated *benefits* for improving air quality, reducing health effects, and mitigating *BC DRF* in SEA”.*
- *Line 38, page 2 – line 3, page 3, “To our best knowledge, this is the first study addressing air quality and *BC DRF impacts* for the SEA region hence the results would contribute scientific evidences to promote the *co-control* approach that is currently not incorporated in the policy in any country in the region”.*

- *Line 8, page 5, “2.3 Assessment of impacts on air quality and BC direct radiative forcing”*
- *Line 9-10, page 5, “The potential impacts of the emission reduction scenarios on improvement of air quality (hence health benefits) and mitigation of climate forcing were assessed and quantified”.*
- *Line 14, page 9, “3.2 Impacts assessment of emission reduction measures in 2030”*
- *Line 15-16, page 9, “Our impacts assessment of emission reduction measures in 2030 covered the health impact in term of the avoided number of premature deaths associated with the reduced PM<sub>2.5</sub> pollution and the reduction in BC DRF”.*
- *Line 37, page 10, “These all would be translated into the uncertainty of the health and BC DRF effect results”.*
- *Line 18-19, page 12, “Our study thus demonstrated that the measures implemented to reduce BC (and PM) under RED2030 may bring in substantial benefits in avoiding the premature mortality and reduction in the BC DRF”.*
- *Line 22-24, page 12, “The impacts on crop production and materials should also be considered and the monetary values of the benefits should be presented to better inform policy makers and to promote mitigation measures for the SLCPs”.*
- *Line 27-29, page 12, “This study is a continuation of our previous paper (Permadi et al., 2017a, focusing on the model performance evaluation for the BY2007) and presents the development of two emission scenarios for SEA in 2030, (BAU2030 and RED2030) to assess the associated impacts on the premature mortality and BC DRF in the region”.*
- *Line 8-10, page 13, “WRF/CHIMERE/AODEM modelling system simulation results provided the PM ambient concentrations (i.e. PM<sub>2.5</sub>, PM<sub>10</sub>, and BC), AOD and BC DRF under different scenarios which showed substantial benefits of the emission reduction under RED2030 in improving regional air quality and BC DRF reduction”.*
- *Line 20-21, page 13, “Other pollutants (beside PM and BC) should be included in the assessment of health impacts”.*

I recommend this manuscript for publication only if the authors de-emphasize the co-benefit on climate forcing.

Response:

*Thank you for your recommendation and we agree to de-emphasize the co-benefit on climate forcing reflected in the revised MS.*