

We thank Anonymous Referee #1 for the helpful suggestions and comments. Our point-by-point answers to the comments are presented below. Referee comments are in bold and our replies in body text.

1. Page 21993, lines 7-10: I think the authors need to re-word the sentence "We do not attempt to.....outside the scope of this paper", because they quite clearly do compare the two different metrics of RFP and mortality: Figure 6 shows "how many deaths a certain amount of RFP corresponds to" (lines 8-9) which is something this sentence says they do not do.

The meaning of the sentence was to say that we don't try to calculate how many deaths caused by climate change (heat waves, more widely spread infectious diseases etc. due to warmed world) could be avoided by slowing the warming by shipping emissions. The cited paper by Löndahl et al. (2010) made the first attempt to do this. We changed the sentence in the parenthesis to “ try to evaluate how many deaths caused by climate change could be avoided with a certain amount of RFP”.

2. Page 21999, line 9-11. Contrary to what is stated here, the most deaths are for the ships-2010_45 case, not ships-2010. I know that ships-2010_45 is a sensitivity study and not part of the main suite of simulations, but one can't just ignore its results and say that the biggest impact is from another simulation. A few words are required here for ships-2010_45, even if it's just to refer the reader to another section. An alternative would be to split up the results into different tables, with the "standard" simulations in Table 2 and the sensitivity studies (_45 and _corbett) in a separate table.

We now emphasize that the sensitivity simulations are excluded from this particular comparison by rewriting the sentence to:

”Of the studied main cases (i.e. excluding sensitivity simulations which are discussed in Section 3.4), current shipping emissions caused the most deaths (50, 200 deaths per year in ships-2010, Table 2)”

We also add subheaders “Main simulations” and “Sensitivity simulations” to Table 2 and replaced “additional” with “sensitivity” in the main text when introducing ships-2010_45 and geo-wide_45.

3. Page 22001 and after, and Table 2. All the RFP values should be quoted with some sort of uncertainty estimate: +/- one standard deviation would be the simplest thing to quote. This will allow the reader to get some feeling of the significance (or otherwise) of the difference between the various RFPs.

We have added the uncertainty range for RFP in Table 2, but omitted that in the text for readability. It is now calculated as the standard deviation of annual global mean RFP from the five simulated years.

4. Page 22002, line 1-9: How were the RFPs from coastal regions determined? If it was just by masking so that only these regions contributed to the calculation of global-mean RFP, then this assumes local emissions are directly linked to local effects. I don't think one can conclude from this analysis that "emission reductions near the coasts have relatively little effect on the global radiative balance" without doing specific simulations with coastal emissions only. Non-linearities in aerosol- cloud effects could give different estimates of the RFP due to coastal shipping if done as either "all-emissions vs. all-emissions except coasts" or else as "coasts-only vs. no-ships".

We agree that it is not very well supported to make detailed claims of the radiative effects of coastal emission controls. We have now removed analysis of coastal regions' RFP from the paper.

5. Page 22004, lines 11-15. From Table 2 & Fig.6 it seems that increasing primary sulfate fraction to 4.5%, while indeed having little impact on mortality, strengthens RFP by 25-30% in geo-wide_45 and ships-2010_45. Does this increase really count as staying "roughly the same" (line 14)? Without +/- values for the RFPs the reader can't tell whether a 25% increase is significant or not. The size of the changes should certainly be noted (especially as smaller changes are subsequently discussed in Section 3.4.3).

The RFP from ships-2010 to ships-2010_45 and from geo-wide to geo-wide_45 changes indeed notably as stated in the beginning of the paragraph. However, the sentence in lines 11-15 was meant to refer to the difference in RFP between geo-wide and ships-2010 being the same as difference in RFP between geo-wide_45 and ships-2010_45. In both cases the difference is -0.04 Wm^{-2} . We clarified this by re-writing the sentence to:

“Despite these differences caused by varying the SO_4 fraction, the difference in RFP between the simulations with standard emissions and the geoengineering runs (i.e. geo-wide minus ships-2010, and geo-wide_45 minus ships-2010_45) was the same (-0.04 Wm^{-2}) with both SO_4 fractions (Table 2).”

6. Page 22008, lines 8-9: The phrase "could be achieved with sea spray injections" suggests that this technique is proven, which is not the case. I suggest toning-down this statement.

We have changed the wording to “could possibly be achieved.”

Minor Comments/Technical Corrections

1. Page 21991, lines 7-8: move the opening parenthesis from before "Koch and Del Genio" in line 8 to before "the aerosol indirect..." in line 7.

Corrected.

2. Page 21996, line 4: Insert "primary" before "sulfate fraction".

Done.

3. Page 22000, line 26: Insert "fixed SST" (or similar) before "simulations".

We added “with fixed sea surface temperatures” to the end of the sentence.

4. Page 22001, line 29: Insert "change in" before "global mean RFP".

RFP (or ERF) refers implicitly to radiative difference compared to no-ships if not otherwise stated. Inserting “change in” would confuse the reader as the listed values are RFP of geo-wide and geo-narrow, but no difference in RFP is calculated at those lines. Thus, we left the text as it is.

5. Page 22007, line 15: I suggest replacing "should be" by "would need to be".

Changed as suggested.

6. Page 22024, line 21: "...was more or less retained..." - in fact RFP is strengthened in both geo-wide and geo-narrow compared with ships-2010, so why not say so?

We changed “was more or less retained” to “increased (by 10% and 36%)”.

7. Page 22016, Table 1: The caption should state that the emissions of SO₂, OC and BC are from shipping (just insert "from shipping" after "and black carbon (BC)").

Done. We also inserted “from shipping” to the next sentence to make it clear that we varied primary sulfate fraction of only shipping emissions.

8. Page 22024, Figure 6: A title is required for the x-axis, as is an indication of the units (thousands).

The label for the x-axis “Excess mortality (thousands per year)” was left out in the type-setting process. Thanks for pointing out that it's missing. We will put it back again.