Interactive comment on "The regional temperature implications of strong air quality measures" submitted by Aamaas et al.

In this study, the authors investigate the potential temperature implications of stringent air quality policies, by applying matrices of regional temperature responses to new pathways for future anthropogenic emissions of aerosols, methane (CH_4) and other short-lived gases. This is an interesting and relevant topic since there are still a lot of uncertainties on how regional temperatures are affected by ambitious SLCF emission mitigation policies.

General comments

The Introduction is too short, I suggest the authors to add more information about SLCF description. For example, here you show results for BC, OC, SO_2, NOx, CO, VOC, and CH_4. Some description about their cooling/warming impact of them will help to a better understand of the results. Also, maybe a bit more description of the ECLIPSE project would be good, since this works is strongly connected to it.

Some figures are not well described in the text, for example, the authors directly mention Fig. 2 or 3 after describing a result obtained. The figures should be defined saying what it is representing there, and if needed, some explanation about how to interpret the graphic (if I got it right, the different symbols in fig 3 shows the influence of the different sectors of that region in a latitude band). This way it will be easier to follow the text. Please, do it whenever the figure has not been described in advanced. There is also a lack of mention some figures that I will point out in the technical comments.

A better organization of the results must be done. It would be better to organize them in subsections, like "Global/Regional temperature change" or/and "Results by regions", as an example. Furthermore, more quantitative results could be added. Complementing with a table would be helpful for a better overview of the results found in this study (and comparing the results found in Stohl et al., 2015).

Specific comments

Page 1, line 16, authors state that "*cutting CH4 and BC emissions contribute the most. This could offset warming equal to approximately 15 years of current global CO_2 emissions."* How do you get to this conclusion? I haven't seen it in the manuscript.

Page 2, line 24, when mentioning the work of Stohl et al., 2015, although the authors mention it throughout the text, it will be good to have more description of the what they found.

Page 2, line 29, here the description of the scenarios is done. I have several comments:

- The description of the SLCP_scen is not clear for me, so the difference is that the SLCP_scen only has 50 different mitigation measures on SLCFs compared to the

MTFR; a) how many has the MTRF scenario? And b) in what is it based to be called optimal?

- It would be helpful to have the scenarios description as a list or as a table with a short description.
- Check that you call the baseline scenario as "baseline" in the text. There are couple of times where you call it CLP, and sometimes is confusing to follow all the acronyms.

Page 3, line 7, IIASA has not been described.

Page 5, line 5, do you refer to the results shown in figure 5? If so, you could refer to it here.

Page 5, line 20, "The global temperature change is calculated as the area-weighted sum of the net regional changes given by equation 1." Can be added to the subsection 2.2, after describing the ARTP.

Page 5, line 28, "a warming of more tan 0.2ºC" how do you get this value?

Page 6, what about the warming temperature response found in fig. 3b and 4b? Authors only focus on cooling temperature response results.

Page 7, line 14, to what scenario does the value -0.33 ºC correspond?

Technical comments

Page 1, line 13, "using existing regional temperature change potential (ARTP)" did you mean, *using **absolute** existing regional temperature change potential?*

Page 1, line 25, add a comma after "pollution".

Page 3, line 16, move "in Table 3 in Stohl et al. (2015) " to the beginning of the sentence in line 15 to avoid "Stohl et al. (2015). Stohl et al. (2015) "

Page 4, line 14, "CLE" to "baseline".

Page 5, line 25, add Fig. 2A somewhere in this line.

Page 5, line 30, add Fig. 2B somewhere in this line.

Page 6, line 9, "CLE" to "baseline".

Page 6, line 14, in "mitigation scenarios" do the authors refer to MTRF?. If so:

Page 6, line 14, add Fig. 3b after "rest of the World".

Page 6, line 21, it should be Fig. 4a.

Page 6, line 25, add Fig. 3b after “to cooling.”.

Page 10, line 11, doi is missing.