

Interactive comment on “The Impact of Future Emission Policies on Tropospheric Ozone using a Parameterised Approach” by Steven Turnock et al.

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In general this is a well-written and very useful paper that addresses relevant policy issues.

As a possible user of the ozone precursor source-receptor relations, I would like to make some suggestions that would improve the readability of the paper and create the possibility for the scientific community to replicate the results.

Eq. 1: the same variable symbol (ΔO_3) is used at left and right-hand side of the equation, while they have different meanings. The same observation can be made for Eq. 2 where e.g. is written $f_{ij} = 2f_{ij} - g_{ij}$; suggest to use a different symbol at the left hand side.

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Eq. 1 expresses ΔO_3 as response to the sum of an emission change (for NO_x , CO and NMVOCs), and an abundance change in CH_4 . For the user, using emission changes for all precursors would make more sense. Isn't it possible, from the box model mentioned in section 3.2, and using a feedback factor, to relate a change in abundance to a change in emissions? Why not normalise the source-receptor responses by the emission strength? It would be useful to emphasise the time scale of the CH_4 responses and how to deal with this in such a parametrised approach.

It's not clear why paragraph 3.1 is named 'Scaling Factors'

Page 10, line 12: 'the same scaling factor', is not clear if 'same' refers to using the same as in HTAP1, or using the same (new) factor for CH_4 and NO_x . So, Eq. 3: is this now the scaling factor replacing the $0.95f + 0.05f^2$ from HTAP1 both for NO_x and CH_4 ?

Figures 7 and 8 (and similar in SI): does the ozone trend from CH_4 include the transient effect of the 12y perturbation response time? How can Eq. 3 be applied (for CH_4) to obtain this trend? The figures show the change in ozone relative to year 2010; does it include the time-lagged impact of CH_4 emissions before that date? I would appreciate having the box model for CH_4 better documented.

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