

Interactive comment on “Accounting for the climate-carbon feedback in emission metrics” by Thomas Gasser et al.

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Gasser et al. report on findings that the effect of including climate-carbon feedbacks for both the target species and CO₂ produce GTP and GWP values that are much closer to their default values than was suggested in IPCC AR5 report. They also call for discussion in the community about the limits of the prevailing linear, impulse response function framework for describing complex feedbacks in the climate system.

I wanted to add some minor comments on the wording and equations:

Page 3 / L8: ‘dynamic’ – IRF describes a dynamic system, but not sure it is correct to say that it is dynamic; i.e. the impulse response functions are invariant with regards to initial time

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Page 3: “the change in atmospheric concentration of the species (Q_x)” - should be $Q_x(t) - Q_x(0)$, or else equation on next line could simply be $Q_x(t) = \dots$

Similar for the line about T_x

Page 4/L7: should be approximate (\approx) symbol rather than definition (\equiv)

Page 4: ‘mass’ would be more clear than ‘size’ in describing the emissions

The word ‘normalized’ and ‘relative’ are used inconsistently (it is not always used to say that GWP is relative while AGWP is absolute and that both are normalized (to a 1 kg pulse) metrics). This is apparent on page 4 / L9-11, but also applies page 2 / L18 and elsewhere

There is also a subtle change in notation that is not mentioned that some of the equations on page 5 and 6 give terms that were previously explicit functions of time but are now shown with implicit dependence through the variables T_x , Q_x , E_{0x} , RF_x and Θ

Page 5 / L26: $a(t)$ should be $a(t')$

Page 6, L18: This seems to be the relation between pulse and continuous emission given in Aamaas et al. 2013, ESD 4: 145-170, but I could not follow the logic here. Also unclear that the ‘definition’ (\equiv) symbol is applicable

Page 9 / L19: the use of the word ‘extended’ causes a little confusion since the meaning is not described until L27-L29

Constant intensity term (λ) “climate sensitivity” : overall there was not much discussion of this parameter, but believe should at least point out that it refers to an equilibrium climate sensitivity

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