



Interactive comment on “A new method to diagnose the contribution of anthropogenic activities to temperature: temperature tagging” by V. Grewe

Anonymous Referee #2

Received and published: 20 February 2013

The manuscript by Grewe discusses a tagging technique for understanding different contributions to temperature changes. It is based on a previous method that has been used for atmospheric chemistry studies, and here its potential for climate analysis is also demonstrated. I find the manuscript clear, well written, certainly interesting and appropriate for publication in GMD, following some minor revisions outlined below.

GENERAL COMMENTS:

1) I think that there is need for more description of how the method would fit to a larger scale complex model. The reader will need the parts of the manuscript before Sect. 4 to be better connected to Sect. 4 itself, in order to understand the potential

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applications of the technique on more specific problems. For example, it is not clear how an approach applied here to an equilibrium “big picture” context would be applied to a regional medium-range weather prediction context, such as the Russian heatwave case. I think the author should use this example (Russian heatwave) to explain further how such a problem would be approached practically using the tagging method.

2) Furthermore, it would be interesting to discuss in Sect. 4 how other radiative forcing agents such as aerosols, which do not only absorb radiation and have a mixture of properties, could be treated using the tagging technique in a complex model.

3) I would like to see some more referencing or at least support for the choice of certain values for parameters that have been used. Table 2 includes a variety of such values and it would be good to document where they come from.

MINOR COMMENTS:

(Some of the comments below refer to cases where some things may be clear after a careful read - or clear to a well informed reader on the topic - but could be made even clearer with some modifications so that following the manuscript will be more straightforward).

Page 3184, Line 26: Please change “temperature” to “temperature change”.

Page 3184, Line 27: Please change second “an” to “a”.

Page 3185, Line 7: Please change “This” to “Such”.

Page 3185, Line 13: Please change “gases and” to “gases or”.

Page 3185, Lines 23-25: Please modify sentence to avoid double use of word “question”.

Page 3186, Line 7: Please change “whether” to “weather”.

Page 3186, Line 12: Please avoid using “defined”/“definition” twice.

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Page 3187 Line 21: Table 2 appears before Table 1.

Page 3188 Line 2: 0 ppm cannot be “enhanced CO₂”, right?

Page 3188 Line 8: Please rephrase sentence to “. . .with a temperature T_a which absorbs. . .”.

Table 1: It is not clear at this stage what “var. (0.77)” means. Please explain.

Page 3189, Line 1: Please remove “the”.

Page 3189, Line 8-10: Please say explicitly in the text what the left-hand side of the equation represents.

Page 3190, Line 5-6: Please explain how and why a 30-year response was achieved.

Page 3190, Line 16-17: Please explain how these values were chosen (reference?).

Page 3192, Line 12: Please remove second “,”.

Page 3193, Line 15: Brackets are needed for the sum.

Page 3196, Line 3-4: Would it not be more reasonable to set the CO₂ concentrations to 360 ppmv for the spin up period as well?

Page 3196, Line 7-8: Please provide reference to support that this is a widely used definition.

Page 3197, Line 23-27: Is the much larger effect of non-CO₂ forcings consistent with our current understanding? Please comment and provide supportive references.

Fig. 5: Please change “a upward” to “an upward”.

Fig. 6: Please state in the caption what the solid line represents. Also briefly mention what the different colours represent.

Page 3198, Line 17: Please change “fluxe” to “flux”.

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Page 3198, Line 28-29: Please rephrase to "...if only an atmosphere which absorbs in the shortwave is considered".

Page 3200, Lines 2-4: Please explain this further.

Fig. 9: What is TnG in this plot? And why is TnC dropping? Please double-check colours used for labeling the different contributions.

Page 3201, Line 9: Reference?

Page 3203, Line 2: Please remove "to" before "100%".

Page 3203, Line 13: Please change "take" to "define".

Page 3203, Line 17: Please change "an" to "a".

Page 3203, Lines 21-22: Please rephrase to "...is an important addition to understanding..."

Page 3203, Line 22: Please change "toi" to "to".

Interactive comment on Geosci. Model Dev. Discuss., 5, 3183, 2012.

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