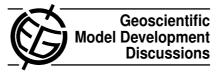
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Interactive Comment

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



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 Ta 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 forcers 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 sold line represents. Also briefly mention what the different colours represent.

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

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

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

Page 3201, Line 9: Reference?

the shortwave is considered".

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

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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