



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

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First of all, I would like to thank the reviewer for the comments. Detailed answers are given below. In bold I quote the reviewer's comments.

**(i) You state that the quantities in Eq. 35 are split equally, i.e., 50% percent for each quantity. Is this really necessary or could you also use something different if you would use for example a different variable? And what about if you have three components influencing a variable? Would it be split in thirds?**

Answer: Correct it will be split thirds!

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In a companion paper, two different ways to approach this problem are investigated: a combinatorical ansatz, as here, and a forcing term of the tagged quantities derived from a sensitivity calculation. Both ansatz lead to the identical solution, and both give for three (n) components a factor of  $1/3$  ( $1/n$ ). A reference will be made.

**(ii) In the method section you write that for a doubling of CO<sub>2</sub> you get a temperature change of 3.1K. In the section describing the doubling of CO<sub>2</sub> experiment you have a much lower value. Did I misunderstand something? Shouldn't they be the same?**

Answer:

Right and thanks! This is a typing error. The correct number is 1.2 K, which now corresponds to the flux and sensitivity value given in that paragraph.

**(iii) This is a highly hypothetical question. If you would implement this tagging method in a GCM would it be worthwhile to derive the partial response as a function of height or is it better to use everywhere the same function and let it be zero? The only setting that I can think of that this would be the case is the influence of wind stress on temperature in the ocean.**

Answer:

Depending on the objective, the partial forcing might be zero in many areas. The partial (tagged) response in the targeted quantities will normally be over all levels. An example might be regional forcings.

### **Minor changes**

The numbers in Fig. 3 are given on the left side.

Labels in Fig. 9 will be corrected ("nG" → "nC; and "nc" → "bC")

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