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Earth System Dynamics
Discussions

Interactive comment on "Uncertainty in temperature response of current consumption-based emissions estimates" *by* J. Karstensen et al.

Anonymous Referee #2

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This article addresses a very interesting and current topic, which is the estimation of consumption- vs production-based GHG emissions as well as related uncertainties. It is very well written. My scientific background is in the field of climate metrics and carbon accounting. I thus had a hard time understanding some parts of the method dealing with uncertainties associated to economic data. I know basically what GTAP and input/output models are, but I am not comfortable with all the details. The introduction and the first paragraphs of the method section (from the beginning to page 1019 line 14) present very clearly the scope of the paper and the work that has been done.

I do not understand where uncertainties for economic data are coming from. The authors are referring to McDougall 2001, but this reference is not listed, so I could

not take a look at it. I understand that uncertainties are estimated using previous studies since no uncertainties are available for the GTAP datasets (Equation 1). This equation is parameterized using only two points (min and max) and Equations 2 and 3. However, I do not understand how vmin, vmax, rmin and rmax are determined. I do not understand neither how Figure 2 was obtained. If uncertainties are determined using Equation 1, we should see only a trend line. Where are the points coming from? At page 1023 line 14 and following, the authors are talking about the calibration of the uncertainty relationship given by Equation 1. I still do not understand what they mean. "For the smallest sectors we set vmin equal to 1 USD and assume rmax = 100%, due to the lack of more precise regional uncertainty data." What is the basis of this assumption? My misunderstanding may be caused by my lack of scientific background in the subject (economic modeling), but I assume that other readers of this journal are in the same situation. The same approach is used to estimate uncertainties for emissions. Is Equation 1 also valid for this application?

Section 2.5: Everything looks as the state-of-the-art regarding climate metrics.

Page 1033 lines 5-20: I cannot understand this paragraph because I did not understand how uncertainties for economic data have been estimated. The authors seem to say that uncertainties are provided in the GTAP documentation. Why did they not use them? I do not understand this explanation.

The presentation of results is very clear.

Discussion: Would there be a way to look at the sensitivity of the results to the different limitations identified regarding uncertainties for economic data which seem to be much less reliable than the two other types of uncertainty (crude assumptions, only parametric uncertainties, etc.)? What would be the impact on the results if GWP was used instead of GTP? Since the parameters used to calculate GWP are also used for GTP, this sensitivity analysis would not require more data. I understand the arguments in favor of GTP compared to GWP. However, GWP is still used everywhere and to see

the difference using both indicators would be interesting.

Figures are not readable when printed in black and white. They are correct on the website with colors. However, if the authors wish that people could read the article when printed in black and white, it is currently not possible to understand most of the figures.

Page 1019 line22: I cannot find the McDougall 2001 reference in the reference list.

Page 1020 line 23 and page 1026 line 13: What is the basis for this assumption (relative uncertainties for developing countries are twice the relative uncertainties for developed countries)? Why would it not be three, four or five times?

Interactive comment on Earth Syst. Dynam. Discuss., 5, 1013, 2014.