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Comment

***Interactive comment on “A methodology for estimating seasonal cycles of atmospheric CO<sub>2</sub> resulting from terrestrial net ecosystem exchange (NEE) fluxes using the Transcom T3L2 pulse-response functions” by C. D. Nevison et al.***

**Anonymous Referee #1**

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The manuscript “A methodology for estimating seasonal cycles of atmospheric CO<sub>2</sub> from terrestrial net ecosystem exchange (NEE) fluxes using the Transcom T3L2 pulse-response functions” by C. D. Nevison et al. presents a methodology for calculating monthly atmospheric CO<sub>2</sub> concentrations from air-surface CO<sub>2</sub> exchange fluxes by so-called pulse response functions. The pulse-response functions are derived from 13 different atmospheric transport models for the Transcom 3 Level 2 set up corresponding to a total of 22 land and ocean source regions globally. Applying the pulse response functions to net terrestrial CO<sub>2</sub> fluxes simulated by the Community Land Model showed

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that the mismatch between modelled and observed atmospheric CO<sub>2</sub> concentrations is larger than the differences in the modelled CO<sub>2</sub> concentrations due to the transport uncertainties.

The authors claim that the pulse response functions are a new methodology for calculating the seasonal cycle of atmospheric CO<sub>2</sub> from modelled net terrestrial CO<sub>2</sub> fluxes. However, this pulse response functions (sometimes also called Jacobian matrices) methodology has first been introduced in 1996 by Kaminski et al. to also estimate the seasonal cycle of atmospheric CO<sub>2</sub> from model derived net terrestrial CO<sub>2</sub> fluxes.

In recent years, these pulse response functions have been frequently used in either atmospheric CO<sub>2</sub> and CH<sub>4</sub> inversions (e.g. Kaminski et al., 1999; Houwelling et al., 1999) or also in model validation studies (Sitch et al., 2003). In addition, the pulse response functions presented here are limited to 22 geographical regions globally whereas pulse response functions are easily available on a grid level for several transport models.

#### References:

Houweling, S., T. Kaminski, F. Dentener, J. Lelieveld and M. Heimann., Journal of Geophysical Research, 104, 26,137-26,160, 1999.

Kaminski, T., R. Giering and M. Heimann, Physics and Chemistry of the Earth, 21, 457-462, 1996.

Kaminski, T., M. Heimann and R. Giering, Journal of Geophysical Research, 104, 18,535-18,553, 1999.

Sitch, S., B. Smith, I. C. Prentice et al., Global Change Biology, 9, 161-185, 2003.

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