

Interactive comment on “A simple model of the anthropogenically forced CO₂ cycle” by W. Weber et al.

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First paragraph:

To our knowledge so far no attempt exists to simulate the whole of the CDIAC data by a carbon cycle model. Our rather simple model is based on the fundamental mass action law and reproduces successfully the CDIAC data. We would think that this qualifies as “new ground breaking innovative modeling”.

Major concerns:

Referee #2 observes correctly that the data used for determining the two parameters are not entirely independent of the data reproduced. However, only data after 1959 are used for the parameter determination, while the model describes perfectly the data

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before 1959. This result (usually called “hindcasting”) is an accepted test for models. For the period after 1959, the model does indeed corresponds to a fit, however, for the period prior it is a valid model. Let us mention in addition that the model parameters are also confirmed by Gloor (cited in the discussion paper) and Parry [1].

For the question of use of tracers, we mention that the quantities used result from measurements as well as modelling. Thus the remark “they are not measured values” is misleading. The CO₂ contents are direct measurements. The ocean data are (Le Quere 2015, cited in our discussion paper) “based on the mean sink obtained by observations in the 1990 decade and ocean models”. Thus they conform to the requirement of the referee since ocean models presumably used “observed tracers”. The biosphere data result directly from the sum rule. We would thus regard them as equally reliable as the measurements.

We mention that a major result of our work is that the very simple linear ansatz is found to precisely describe the measurements. Thus this simple ansatz would have also predictive power.

[1] M.L. Parry et al.: Effects of climate change on global food production under SRES emissions and socio-economic scenarios, *Global Environ. Chang.*, 14, 53-67, 2004.

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