Comment on "*Scrutinizing the carbon cycle and CO_2 residence time in the atmosphere*" by H. Harde

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PII: S0921-8181(17)30136-4
DOI: doi:10.1016/j.gloplacha.2017.09.015
Reference: GLOBAL 2649

To appear in: *Global and Planetary Change*

Received date: 24 March 2017
Revised date: 22 September 2017
Accepted date: 22 September 2017

Please cite this article as: Köhler, Peter, Hauck, Judith, Völker, Christoph, Wolf-Gladrow, Dieter A., Butzin, Martin, Halpern, Joshua B., Rice, Ken, Zeebe, Richard E., Comment on "*Scrutinizing the carbon cycle and CO_2 residence time in the atmosphere*" by H. Harde, *Global and Planetary Change* (2017), doi:10.1016/j.gloplacha.2017.09.015

Comment on *"Scrutinizing the carbon cycle and CO_2 residence time in the atmosphere"* by H. Harde

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Abstract

Harde (2017) proposes an *alternative accounting scheme* for the modern carbon cycle and concludes that only 4.3% of today's atmospheric CO_2 is a result of anthropogenic emissions. As we will show, this *alternative scheme* is too simple, is based on invalid assumptions, and does not address many of the key processes involved in the global carbon cycle that are important on the timescale of interest. Harde (2017) therefore reaches an incorrect conclusion about the role of anthropogenic CO_2 emissions. Harde (2017) tries to explain changes in atmospheric CO_2 concentration with a single equation, while the most simple model of the carbon cycle must at minimum contain equations of at least two reservoirs (the atmosphere and the surface ocean), which are solved simultaneously. A single equation is fundamentally at odds with basic theory and observations. In the following we will (i) clarify the difference between CO_2 atmospheric residence time and adjustment time, (ii) present recently published information about anthropogenic carbon, (iii) present details about the processes that are missing in Harde (2017), (iv) briefly discuss shortcoming in Harde's generalization to paleo timescales, (v) and comment on deficiencies in some of the literature cited in Harde (2017).

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