

## ***Interactive comment on “The 2009–2010 step in atmospheric CO<sub>2</sub> inter-hemispheric difference” by R. J. Francey and J. S. Frederiksen***

### **Anonymous Referee #1**

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The authors highlight the influence of inter-hemispheric exchange variations in variations of the inter-hemispheric difference in atmospheric CO<sub>2</sub>. Their paper is interesting and stimulating, but it is written in a very compact and elliptic way that may favor simplifications and not understanding for non-specialists of this particular domain. It could be suitable for publication after careful extension of the demonstration and possible mitigation of the main message. Some recommendations are provided hereafter. I am not repeating here the arguments brought forward by Prabir Patra and Benjamin Poulter about the possible roles of the end of the global financial crisis and of the timing of the 2010–2011 La Niña, which have been overlooked in the paper, but I support them.

- p. 15088, l. 16–17: I cannot find this statement in the Francey et al. (2013).

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- Figure 1: comparing a concentration difference to a concentration derivative is not trivial. Why not showing the derivative of the concentration difference?
- p. 15089, l. 6: the sentence suggests that the role of the equatorial land biosphere can be seen on the figure, but this statement seems to come from the literature: the sentence should be split.
- p. 15089, l. 7-8: the origin of this statement is not clear. Please explain it in the main text.
- p. 15089, l. 10-13: the first and the last words of the sentence together suggest that the MLO-CGO difference is close to zero.
- Section 2: for specialists only. Please expand. For instance the first line suggests that fossil fuel emissions are part of the terrestrial biosphere, “systematic nature” and “random nature” are too elliptic, and the meaning of the last paragraph is opaque to me.
- Section 3: the term “event” is defined at the start as “surface flux event”, but the noun is too vague for this abbreviation to work well for the reader.
- p. 15094, l. 16: “in” missing.

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