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## ***Interactive comment on “Relationships between photosynthesis and formaldehyde as a probe of isoprene emission” by Y. Zheng et al.***

### **Anonymous Referee #2**

Received and published: 10 June 2015

I agree with all the points of Referee #1 with some additional comments:

Reviewer 1's concerns about the "observed" GPP are well founded. What are the meteorological drivers being used to determine fluxnet-GPP? Are the results just a comparison of different meteorological drivers? I don't believe so, but this should be addressed. I also don't understand how global Fluxnet-GPP can be calculated from 1982 onwards when the only long-term flux sites were established in the 1990s.

As stated by Reviewer 1, there needs to be a systematic discussion of the uncertainties inherent in both the fluxnet-GPP and the HCHO variability. What are the model uncertainties? Are they of a similar order of magnitude to the fluxnet-GPP and HCHO<sub>v</sub>? Was the model calculated GPP ever compared to the fluxnet-GPP? If not, then there

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needs to be a short discussion on why.

CO<sub>2</sub> has risen appreciably since 1982, could the fluxnet-GPP/HCHO<sub>v</sub> relationship have changed in this time? Use of fluxnet-GPP comparable in time to the HCHO time series should address this problem. Do the MLRs change when using only co-sampled (or close in time) data? Is Section 3.2 using only 2005-2011 data for both HCHO<sub>v</sub> and fluxnet-GPP?

The discussion/conclusions are very short. I second Reviewer 1's suggestion of extending the discussion of soil moisture control on isoprene.

Minor comments In Sentence 1: "radiative forcing of global climate change" doesn't seem like a complete sentence

Pg 11766 line5. What are the other sources of HCHO? Can the destruction of HCHO be tied to precipitation by limiting O<sub>1</sub>D/OH?

Pg 11769 line 1: Is surface temperature the air temperature at some height close to the ground (if so, what height) or the soil surface temperature (or if lower, what depth). These are two very different variables.

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