Biogeosciences

Discussions

BGD

Interactive
comment

Interactive comment on "Isoprene emission potentials from European oak forests derived from canopy flux measurements: An assessment of uncertainties and inter-algorithm variability" *by* Ben Langford et al.

Anonymous Referee #3

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Overall, this is a nice paper that explores a technical aspect of isoprene emission modeling: relating whole-system, measured isoprene fluxes to the emissions capacity used in most isoprene emission frameworks. My biggest concern is that the authors recommend using the means of observations and of the calculated gamma to find the emission capacity (equation 6). On page 13, line 2, the authors' state that the superiority of this technique has been established in the previous results section. Since the least-squares approach has a well-established theoretical justification, the manuscript should do more to explore the advantages of Equation 6. This must be a pretty common

issue in modelling. For example, how do ecosystem models of net primary productivity deal with this issue? I think the authors could do more to justify this new approach.

Major comments

*Figures 2 and 3 pack in too much information. For example, I was interested in comparing the performance of the LSR & ODR approaches with MEGAN. In most cases in Figure 3, I could not distinguish these two cases because of overlapping plotting characters. What's the benefit of plotting all the different time average periods? Couldn't that be conveyed in a separate graph? Near lines 28-31 on page 12, you take away from Figure 3 that the G93 approach difference significantly from the MEGAN approach. This is well known, and could be conveyed more succinctly in a separate figure.

*The conclusion that "the emission potential is not constant throughout the day" should be refined. Within the modeling framework, the emission potential should be a constant throughout the day. The better way to frame this is that the calculated emission potential is not properly capturing the diurnal cycle. Also, considering just 08:00 to 18:00, there's not much variation in the EIP.

*On lines 9-12, page 8, you mention the issue of the intercept for the least-squares approach. For the least-squares calculations in this paper, did you use a zero intercept?

Minor comments

*The abstract is a bit long. While comprehensive, I counted 660 words. In particular, some of the recommendations at the end repeat material from the abstract (factor of four). A target of 600 words seems more reasonable. With an open-access journal, there is less pressure on fitting so much in the abstract.

Page 2, lines 33-34: The article by Arneth would be useful to consider and site at this point in the discussion (http://www.atmos-chem-phys.net/8/4605/2008/).

Page 2, lines 34-36: Very minor point: branch enclosure measurements typically can't

be performed at standard conditions. Instead, leaf temperature and light are measured, and often the Guenther algorithms are applied to derive a basal rate.

Page 3, lines 5-7: Again, a good place to refer to Arneth et al 2008.

Page 3, line 22: Inconsistencies isn't the right notion here. Yes, there are inconsistencies, but there are also different assumptions.

Page 4, line 1: Since the algorithms for previous light and temperature are coming to come into play, some mention of the meteorological conditions during the campaigns compared to average climatology is necessary. In particular, where any of the campaigns conducted during times of water stress?

Page 7, lines 21-32: This is a lot of text to describe something that wasn't used. Please consider if its necessary to include.

Page 8, line 25: Shouldn't this produce the same result as a linear regression with the intercept set to 0?

Page 11, lines 16-18: "discernable" is subjective. This might be a real effect, or it might be random noise. Also, connect this to the major comment above: this variation represents a failure in the underlying model. Lines 26-27 (page 11) are the proper way to frame this conclusion.

Page 11, lines 40-41: This is a major drawback to the ODR approach. Good, you reach this conclusion lines 3-5 on the following page.

Page 12, lines 36-41: Yes, but this is only true when considering the extreme ends of the day. Typically, the focus is 10:00 – 16:00, when the variability is much lower with MEGAN.

Technical comments

Page 1, line 34: hyphenate 'site specific'

Page 2, line 18: hyphenate 'ground level'

Page 3, line 39: note explicitly this is ug of isoprene, not carbon (ugC), which has also been used in the past.

Page 4, line 13: be consistent about lat/long significant figures. The two used elsewhere are probably sufficient.

Page 4, line 23: According to BG style, "32m platform".

Page 7, line 7: hyphenate "in canopy"

Page 10, lines 6-7: fix grammar

Page 10, line 13: reflect should be reflects

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