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Interactive comment on "Assessing the spatial variability in peak season CO_2 exchange characteristics across the Arctic tundra using a light response curve parameterization" *by* H. N. Mbufong et al.

Anonymous Referee #2

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Mbufong et al. have successfully addressed all the major revisions needed in the previous submitted version of the manuscript. However, the author should also consider the following minor revisions before get the manuscript ready for publication. Lines 27-28: please specify when data have been collected. Line 45: replace "modern" with "actual". Line 46: add "collected " after data. Line 48: which question? Lines 49-50: why tundra ecosystem are unique ecosystem for climate change? PLease specify it. Lines 62-66: this sentence is too long and difficult to follow; please split it in two. Lines 67-70: this sentence is unclear; try to rephrase it and add some references to support it. Line

70: add "index" after "leaf area". Line 93: please define the acronym "LRC". Line 95: please define here the acronym "NDVI" (which is defined later in line 184). Line 96; remove "and"; Line 104: I would replace "range" with "type". Line 132: remove "the". Line 161: the sentence starts with "these parameters", but which ones? Line 166: please rephrase to avoid repetitions. Line 182: it is written "were also used", but to do what? Line 185: since the manuscript investigates many study sites, to what refers "the dominant wind direction"? Lines 206-208: what is written is quite obvious: is there any other (more) scientific reason? Lines 227-230: The author should also consider that photosynthetic CO2 depends on Ribulose 1,5 bisphosphate (Rubisco) enzymatic activity which has a variable optimum depending on plant species and growing conditions. Is there any reference of Rubisco activity specifically measured in tundra's vegetation? Moreover, the author should consider that the physiological process of "photorespiration", compete (in light conditions) with Rubisco activity and therefore decrease the efficiency of the CO2 photosynthetic assimilation (Laisk and Loreto, 1996). This can help the author to explain the variability found. Line 244-245: both Centritto et al (2011) and Ow et al. (2008a,b) run experiments at "leaf-" and not at "ecosystem" level (as it is written here). Line 250; with "ecosystems are diverse" does the author meant "ecosystem biodiversity"? Line 254: the author should make the point that whereas NEE is measured, Rd is just mathematically calucalted. Line 273: please rephrase "our study is circumpolar". Line 277: replace "during" with "through". Line 278: ...and not only! See my comment above about photorespiration. Lines 309-311: what are the "fen values"? Please rephrase it. Lines 338-339: again, please consider also the photorespiration process (see comments above). Lines 342-343: I suggest to remove this sentence as it is redundant. Line 344: I would replace "however, these differences" with simply "although".

- I would reverse Table A1 with Table A2. - Figure caption should not explain, but just describe the figures (i.e. Fi. B4, Fig. 6).

Interactive comment on Biogeosciences Discuss., 11, 6419, 2014.