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Biogeosciences Discussions

Interactive comment on "Technical Note: Rapid image-based field methods improve the quantification of termite mound structures and greenhouse-gas fluxes" *by* Philipp A. Nauer et al.

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Author Response to Anonymous Referee #3

(1) comments from Referee

Nauer and coworkers present the efficiency of Photogrammetry (PG) method using Structure from Motion (SfM) by comparing with CT scan method. Complexity of termite mounds in ecosystems have made us difficult to understand the internal structure (both macro and micro pores), thus, biogeochemical reactions inside the termite mounds. This study provides simpler and more reliable ways to understand the internal/external

structures of termite mounds than conventional simple geometric shape methods. The results of this study can be utilized for more accurate estimation of termite population and GHG emission in various ecosystems. If the estimation of spatial distribution of termite mounds in each ecosystems will be combined, we can estimate ecosystem scale GHG emission more accurately. Therefore I can recommend the manuscript for publication as a technical note in Biogeosciences only after technical corrections. I suggest several points as outlined below.

- P3,L1 CH4 oxidation "by termite mounds" - P12,L15-P13,L3 This part should be moved to "Introduction".

(2) author's response and (3) author's changes in manuscript.

We sincerely thank the reviewer for her/his consideration and time invested in improving our manuscript. Please find our replies to the reviewers' specific suggestions below, with page and line numbers referring to the discussion manuscript.

Comment "P3,L1 CH4 oxidation "by termite mounds" We incorporated the suggested change as CH4 oxidation "in TMs", to be consistent with our terminology.

Comment "P12,L15-P13,L3 This part should be moved to "Introduction" We agree with the reviewer, and the suggested changes have been implemented. The sentences have been moved to P2,L31 onwards, including some minor modifications as follows, to improve text flow: "Photogrammetry (PG) via digital surface reconstruction is a relatively new low-cost approach to document and measure complex three-dimensional structures in nature. For example, PG has been embraced by the archaeological community for the documentation of cultural heritage sites (De Reu et al., 2013), used to measure the bulk density of soil clods (Stewart et al., 2012), measure shapes and dimensions of aquatic organisms (Lavy et al., 2015) and determine the diameter and biomass of buttressed and irregularly shaped tropical tree trunks (Bauwens et al., 2017). However, this approach has not been applied on TMs; therefore, there is currently no accurate, reliable, non-invasive method to determine the critical external

physical parameters of TMs such as VE, AE and AB."

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