

Authors' response to suggestions from the editor

-please adapt the color/symbol coding in the figures of the main text and supplementary to ensure consistency across the same treatments (i.e. the color/symbol of each treatment should be the same in all figures)

-->We tried our best to keep the consistent use of the color/symbol.

-when results related to soil depth are shown (e.g. in Fig. 3, Fig. S4, Fig. S5) select different colors than those you used for the treatments (or alternatively just use a symbol-based legend) --

-->We used a symbol-based legend to show results related to soil depth and seasonality: Fig. 3, Fig. S3, Fig. S4, and Fig. S5.

-check that the text/legend/axes style you used is the same in all figures

-->We checked the text/legend/axes style and corrected keep the consistent use.

-please remove the grid lines in Fig. 4 and Fig S6, as these are not present in the other figures ---

-->done

-in the Legend of Fig 3., remove the wording 'Tr4'

-->Thank you. We removed them.

Authors' response to suggestions from the reviewer #1

Thank you to the authors for your revisions to the manuscript, which significantly improved the clarity of presentation, quality of discussion, and precision of the methods section. The main findings are presented more clearly and with better context, and I suggest only minor revisions to the presentation and discussion.

-->Thank you so much for your positive feedback on our revised manuscript.

Since the hypothesis of deeper methane oxidation is shown as a primary result, it would be appropriate to systematically report depth-integrated PMOR-area as calculated with the equation at line 120, perhaps as a third column to Table 2.

-->The depth-integrated PMOR-area is indeed a highlight of this study, and thus, we want to show the result in a separate figure (Figure 5) to effectively demonstrate the effect of fertilizer application.

There is still room for improvement in the discussion of the interesting finding of MORP increasing with depth. It is not clear from the discussion how this adds to the current knowledge of depth-resolved MORP, aside from brief discussion on lines 185-186 and 221-227. Discussion of what the actual Oxygen and CH<sub>4</sub> concentrations in the soil profile may be is crucial for interpreting the results of lab incubations. This is especially of note given that some treatments are observed producing methane during some sampling times.

-->Thank you for your suggestion. We added the following sentences including the information on methane concentration in the soil at the study site, which is given in our latest submission:

*“Methane oxidation in the soil is insensitive to a wide range of oxygen levels (2-20%) but suppressed at extremely low oxygen levels (<2 %) (Walkiewicz and Brzezińska, 2019; Walkiewicz et al., 2018; Bender and Conrad, 1994). Methane concentration in the soil of the study site is often lower than the atmospheric level and much less compared to that in the ex-situ incubation, even in the hotspots of methane accumulation during the wet season (3.76 ppm) (Epron et al., 2025). “ (L 22-228)*

Epron, D., Chotiphan, R., Wang, Z., Duangngam, O., Shibata, M., Paul, S. K., Mochidome, T., Sathornkich, J., Azuma, W. A., Murase, J., Nouvellon, Y., Kasemsap, P., and Sajjaphan, K.: Fertilization turns a rubber plantation from sink to methane source, *EGUsphere*, 2025, 1-35, 10.5194/egusphere-2025-

2, 2025.

Walkiewicz, A. and Brzezińska, M.: Interactive effects of nitrate and oxygen on methane oxidation in three different soils, *Soil Biol Biochem*, 133, 116-118, <https://doi.org/10.1016/j.soilbio.2019.03.001>, 2019.

Walkiewicz, A., Brzezińska, M., and Bieganski, A.: Methanotrophs are favored under hypoxia in ammonium-fertilized soils, *Biol Fert Soils*, 54, 861-870, [10.1007/s00374-018-1302-9](https://doi.org/10.1007/s00374-018-1302-9), 2018.

Additionally, the manuscript would still benefit from thorough proofreading to check grammar and language. Particularly, "para rubber" should be changed to "Pará rubber" throughout, and the latin name *H. Brasiliensis* should be mentioned at least once. Also, "in-situ" and "ex-situ" should be spelled consistently either with or without a hyphen.

-->Thank you for your suggestions. We change “para rubber” to “Pará rubber” throughout the manuscript. We also added the latin name of Para rubber in the section of the study site (L72). We used ”in-situ” as a compound adjective and “in situ” as an adverb according to a grammatical instruction. We check the consistency of the use throughout. We also made additional proofreading to check grammar and language.