

Interactive comment on “Drought effects on soil CO₂ efflux in a cacao agroforestry system in Sulawesi, Indonesia” by O. van Straaten et al.

Anonymous Referee #3

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General comments:

The paper “Drought effects on soil CO₂ efflux in cacao agroforestry system in Sulawesi, Indonesia” deals with the effects of drought in an agroforestry system. The authors excluded the rainfall building a roof, and then investigated the effect of the induced drought on the soil CO₂ efflux by comparison to some control plots. The peculiarity of the investigated agroforestry association (cacao and *Gliricidia*), given the large area involving Cacao cultivation in Indonesia, and the few studies conducted in both the area and the specific ecosystem make this article very interesting. In general the paper is well structured, and satisfying. The experimental design and the statistical analysis is good. In my opinion the paper is suitable for publication in Biogeosciences. Some minor points need to be addressed before the paper can be published in BGD.

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1) In the abstract no final conclusions are reported. Only the main results are presented but not real conclusions. A statement about the main findings would be really good.

Line 6 page 11542. Please delete replicated.

The introduction is well presented and very interesting. The Material and methods section is accurate and the methodology described in details. Only few minor soil characteristics presented in the tables need to be better addressed.

Line 24 page 11545: close bracket – Moser et al

line 16-21 page 11545 you report the soil classification and the texture referring to unpublished data from (Leitner and Michalzik). What about the soil features in Table 1 where are reported the texture, ECEC, pH, C and N with the relative errors. The table is really appreciated, could be worthy to refer to these data for soil characterization instead of the unpublished data non mentioned. Some of these parameters (e.g. bulk density) are not easily determined directly in the field and require a great accuracy. Spend few words about the methodology used would be important. Also because later in the text you refer some differences in soil respiration between roof and control plots to the different bulk density.

3) Line 5-15 page 1546, you mention that the roof was transparent. PVC panels placed on top of bamboo panels (0.5x4.5 m) that instead are not transparent. You state the roof was not influencing the temperature, humidity and incident radiation, but given the large numbers of bamboo panel used (1500) that can cover a large surface area probably you should support strongly your statement. You could explain were you placed the chambers to avoid misunderstandings.

4) Line 10-15 page 11548, when investigating the litter effect on soil respiration, you chose 2 chambers per control plots and in the surroundings of these two chambers per plot you installed other two chambers. From one of the new chambers you removed the litter and you placed it in the other. At the end you have: the main chamber, were

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I supposed you have the litter, and the new chambers installed, one with the litter and the other not. Can you explain how you deduce the effect of litter considering all the three chambers? Just making clear this part.

Line 11 page 11548. They are not six sites, but six chamber in three plots.

Line 11 page 11551. I suppose the three-time periods of the experiments are those clearly defined line 23-27 at page 11546

Results and Discussion are well reported and the data clearly elaborated.

Line 19-22 page 11557. You attributed the differences in soil respiration between roof and control plots to the differences in bulk density. From table 1 no great differences are observable to justify a difference in the flux. Taking into account the relative errors at each depth the bulk density between the control and roof plots are identical.

Line 2-7 page 11559. Please make clear this part. Try to rephrase.

Line 4-6 page 11561. Some reference to have a comparison with you high CO₂ concentration are needed.

5) I think some stronger conclusion should be reported in the conclusion section. At the moment only a repetition of the main results is reported.

Bibliography:

Is missing the reference Rdevelopment core team, 2008.

Table 3: not really useful. Probably a plot could be more interesting to see.

Interactive comment on Biogeosciences Discuss., 6, 11541, 2009.