Atmospheric
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Discussions

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Interactive
comment

Interactive comment on "Disentangling the rates of carbonyl sulphide (COS) production and consumption and their dependency with soil properties across biomes and land use types" *by* Aurore Kaisermann et al.

Anonymous Referee #1

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This is a nicely written paper with some important results for the carbonyl sulfide community.

Major comments: Pg 5, line 25: You describe using dry synthetic air flows for these experiments. Will the drying of the samples using these gas flows affect the results? Or was the air humidified and it's mentioned? Or was this accounted for by adding distilled water (as described in Pg 5 line20)? It's worth clarifying this.

Other general comments: I like the layout of the Discussion with the driving question

at the start but it might have even more impact with the answers to these questions instead. Might be nice to follow that through the Discussion rather than the current headers.

I feel like the abstract could do with a nice tie-up/bigger implications type sentence. Could you include something from the conclusions (maybe the N impact?)?

Minor comments:

Pg 1, line 25: Not essential. But could you edit the last sentence to be more specific? It seems really vague.

Pg 4, line 30: references missing.

Pg 5, line 8: Were the soil samples chilled for shipping? Or do you have any idea of the temperature history of the samples?

Pg 8, line 2: Do you mean the bias in the blank? The uncertainty on the blank value is 0.24 pmol.

Figure 1: I know it looks nice to have the fluxes in order but I'm trying to visualize what this is actually telling us. Would it be worthwhile grouping them by biosphere so they can be applied to other studies a little easier? So Boreal forest vs Peatland. Mediterranean Orchards vs grass vs forest and Temperate grass vs forest? Or something like that. And is grassland FR really boreal? Or do you mean alpine? Not in Table 1 so hard to tell. You could include the full site labels too. Could you also add some gridlines so it's easier to see what the labels are matching to?

Pg 10 line 25ish: Nice summary here.

Pg 11 line 4: I think this section could be tightened a little.

Figure 3: I must admit that I don't follow Fig 3. What do the dimensions (x vs y axis) represent? Is it really necessary?

Could you include Fig S4 in the main text? It's just missing the A and N labels for fertilizers. Is the CH Grassland not an agricultural land (Fig S5)? I's surprised you can find an unfertilized grassland in Europe!

Fig 4: Is there a reason for the order in Fig 4? Would it make more sense to keep the soil type (clay, silt, sand) together and microbial properties (Soil N, Soil C, Soil P, MBC and MBN) together? Then derived properties like PCOS (production), LCOS (loss) and k18. Some of the labels are not adequately explained. What do you mean by Redox, Q10k, etc. I know they are explained in the text but make sure the figures can be read independently.

Fig 5 and 6 could go in the supplement.

Table 1: Could you add the altitude of the sites? And maybe the annual mean soil temperature and moisture at each site if you have that data? Can you also include an explicit Fertilizer or not column?

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