Line 31. Are you sure that "the summer drawdown for COS is 6 times stronger than for CO2"? The magnitude of the times seems too large to be believable.

The exact wording of the cited paper Montzka et al. (2007) is:

'However, while reduced mixing ratios of CO2 during the NH growing season represent a balance between vegetative uptake and total respiration (i.e. NEP), the percentage reduction on COS mixing ratio is 4-6 times (5.5+/- 1.6) larger during June- August (calculated relative to mixing ratios measured at 4-8 km asl) (Figure 6c).'

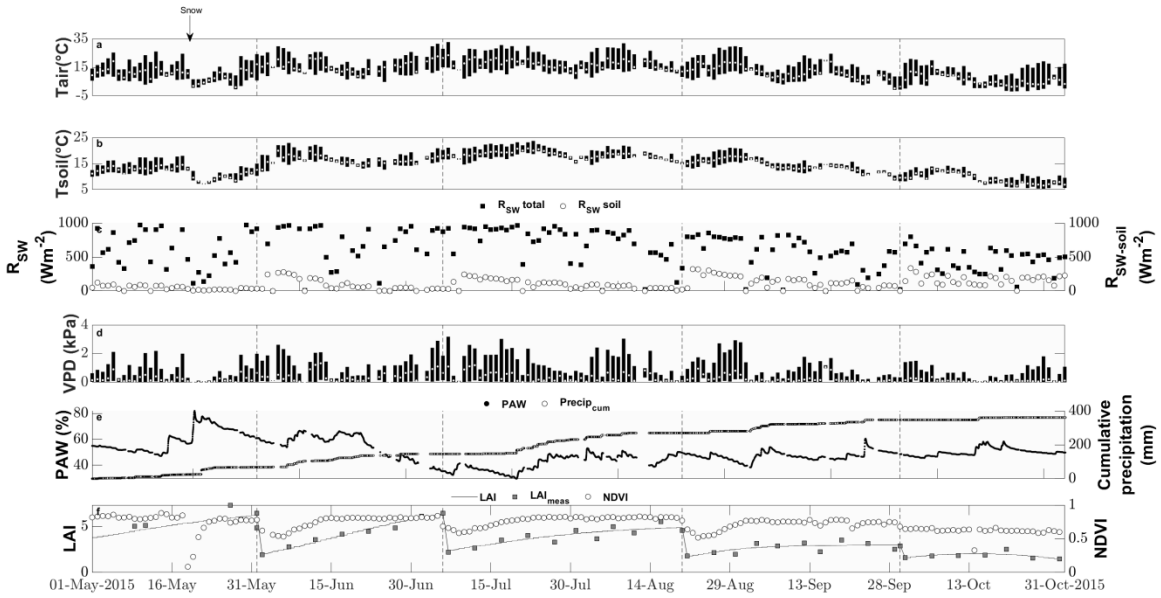
We will reword the sentence to more accurately correspond to the cited paper (Montzka 2007).

Line 130. "while air was sucked through the chamber to the QCL at a flow rate of 1.5 l min-1". The heights of air inlets for the chamber and ambient environment should be noted because remarkable vertical distribution of COS mixing ratio near the ground was observed in this study. If the height of air inlet for the chamber was within the canopy of the grass, the COS uptake flux would be largely overestimated, e.g., the COS mixing ratio could drop to 134ppt within the canopy in comparison with about 500ppt over the canopy.

The intake height was at 0.12 m above the ground and thus within the canopy. The COS concentration inside the chamber was thus similar to what the undisturbed soil would experience, which avoids fluxes being biased high when COS-enriched air from above the canopy would be used. We will include this information in the method section.
However, we also have to disagree with the comment on the overestimation of the uptake flux if the intake was within the canopy. If there already is a lower ambient mixing ratio, we would expect a decrease in uptake, as the gradient of the COS mixing ratio would be smaller. To take measurements closer to undisturbed conditions, the intake height should probably be within the canopy.

Line 228. What's the plant available water? Fig. 1 only presents the SWC (%) which is below 38% during almost all days, rather than 21 days.

The SWC in Fig.1 will be replaced with the plant available water, which falls below 50 % during 111 days.



Line 248. "During nighttime (RSW = 0, n = 43), the soils of the grassland acted as a net sink for COS 74.4 % of the time" is better replaced by "During nighttime (RSW = 0, n = 43), 74.4 % of the COS emission fluxes were negative, implying soils of the grassland acted as a net sink for COS".

The sentence will be changed as suggested.

Line 263. Why did you use both circles and open diamonds for depicting COS soil fluxes? What's the difference between them?

We will remove the depiction about the open diamonds, which are not present in the plots.

Lines 276-278. "Especially after the cuts we observed a strong decline in COS uptake and even times where the grassland turned into a net source for COS with midday means of up to 24.5 pmol m-2s-1 (Fig. 4 b) for up to 8 days after the cut, when the dried litter had already been removed (Fig. 2 a-c)". This sentence is suggested to be replaced by "Especially after the cuts we observed a strong decline in COS uptake ((Fig. 4 b)) and the grassland even turned into a net source for COS in middays (Fig. 2 a-c) with a highest emission flux of 24.5 pmol m-2s-1 in August after the cut.".

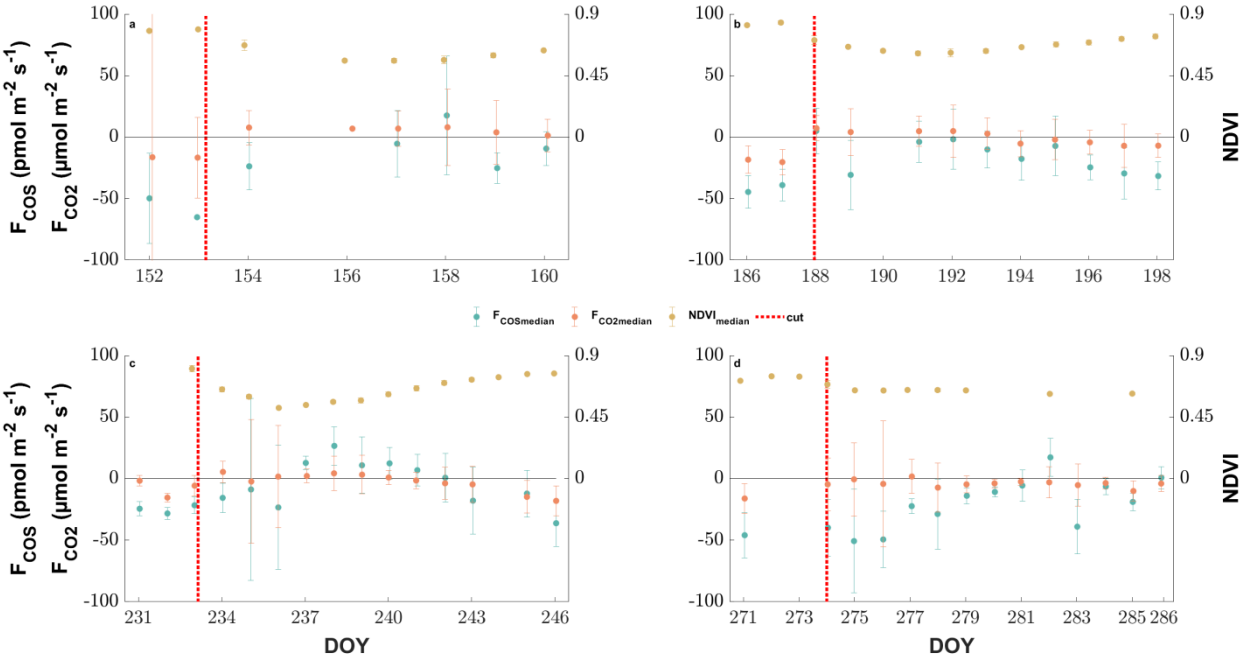
We will replace the sentence according to your suggestion. To keep the crucial information about the grassland turning into a net source for up to 8 days after the cut, we will add an additional sentence to the manuscript.

Lines 280-281. "The cut in October led to a reduction in COS uptake, which was lowest three days after the cut (Fig. 2d)". The description seems to be inconsistent with the Fig. 2d.

We agree that the lowest COS uptake did occur later than 3 days after the cut. However, this is also related to the overall decline in COS uptake by the grassland at the end of the season. We see no recovery

of the COS flux after the last cut. We will rephrase this in the manuscript and include more data points to Fig. 2 d):

The cut in October led to a reduction in COS uptake, which declined across several days and did not recover, as the end of the season was reached (Fig. 2 d & Fig. 4 b).



Lines 297-298. I don't understand the meaning of the sentence. Fig. 4a is the seasonal cycle of CO2, rather than COS.

We will change Fig 4a to 4c and add Fig 4a to subsequent sentence dealing with the seasonal response of respiration.

Lines 325-328. I wonder why the COS mixing ratio dropped so large during the nighttime when the COS uptake was much less than that during midday.

Compared to the constant influx of COS rich air during daytime, due to the increased boundary layer (see line 422), this influx stops during nighttime and COS gets depleted within the canopy, even when the COS uptake of the ecosystem is lower than during daytime. The strong input of COS rich air during daytime has also been reported by other studies (e.g. Rastogi 2018 – Ecosystem fluxes of carbonyl sulfide in an old-growth forest: temporal dynamics and responses to diffuse radiation and heat waves). We will add the reference to the manuscript.

Lines 375- 377. I don't understand the logic of this sentence. Because the chamber enclosed both soil and the residual grass after the cuts, the COS emission under sunlight irradiation might be due to the residual rather than the soil itself, e.g., the photochemical formation of COS from the possible liquid released from the cut grasses (JGR, 109, D13301, doi:10.1029/2003JD004206, 2004; JES, 5 1 (2 0 1 7) 1

4 6 – 1 5 6). If the COS emission was ascribed to soil, the authors are suggested to verify it by using a flow tube method under dark and irradiation conditions.

This sentence will be removed.

Line 413. Why did the lowest COS mixing ratio appear in winter when vegetation COS uptake is relatively low?

During winter, no strong emission fluxes are expected to originate from vegetation and soils. The mixing ratios rather depend on the transport of COS enriched air from oceans, which are also highest in summer (see Montzka 2007).

Lines 419-421: The above sentences didn't mention the difference in concentrations during day and nighttime.

We will add the sentence:

Even though the COS mixing ratio at the layer closest to the soil were higher during day than during nighttime, the absolute decrease in COS was lower during nighttime due to partial stomatal closure (see Kooijmans 2017 – Canopy uptake dominates nighttime carbonyl sulfide fluxes in a boreal forest). The absolute difference in concentrations during day and nighttime originate from changes in the height of the planetary boundary layer (PBL).

Lines 421-422. Considering the much stronger COS uptake by the grass in daytime than in nighttime, COS mixing ratio above the canopy should decrease in daytime, rather than nighttime despite of the variation of PBL

Several studies (e.g. Rastogi 2018 – Ecosystem fluxes of carbonyl sulfide in an old-growth forest: temporal dynamics and responses to diffuse radiation and heat waves) showed that the PBL is the main influence on sub-diurnal variability in COS mixing ratio. The incomplete stomatal closure as well as the soil sink cause the nighttime decrease in mixing ratio as there is no influx of COS rich air from the atmosphere. The stronger daytime drawdown can also be observed in the gradient analysis as the decrease in COS mixing ratio, from to the canopy height down to the soil was higher during daytime (125 ppt) compared to the nighttime decrease (102 ppt).

This information is already present in the manuscript; see line 325-328 and 419-423.