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Canopy uptake dominates nighttime carbonyl sulfide fluxes in a boreal forest

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Table S1.

^{222}Rn exhalation rates (F_{Rn}) in Hyytiälä as obtained from different references. For monthly rates published in Szegvary et al. (2009) and López-Coto et al. (2013) we only show the months that are relevant for this study.

Reference	F_{Rn} (mBq m^{-2} s^{-1})	Variability
Szegvary et al., 2007*	**15.3**	61.51 °N, 23.79 °E, 46 km distance from Hyytiälä, 24.7 % SWC
Szegvary et al., 2009o	7.4	June
	11.0	July
	11.5	August
	14.7	September
	16.0	October
	13.8	November
	12.4 ± 3.1	*Average*
Manohar et al., 2013o	**7.0**	
López-Coto et al., 2013o	7.8	June
	7.7	July
	7.6	August
	7.5	September
	7.5	October
	7.3	November
	7.6 ± 0.2	*Average*
Karstens et al., 2015o	**4.0**	Soil moisture map ERA-Interim
	11.4	Soil moisture map NOAH
Total average	**9.6 ± 4.1**	

* Measured

o Modelled

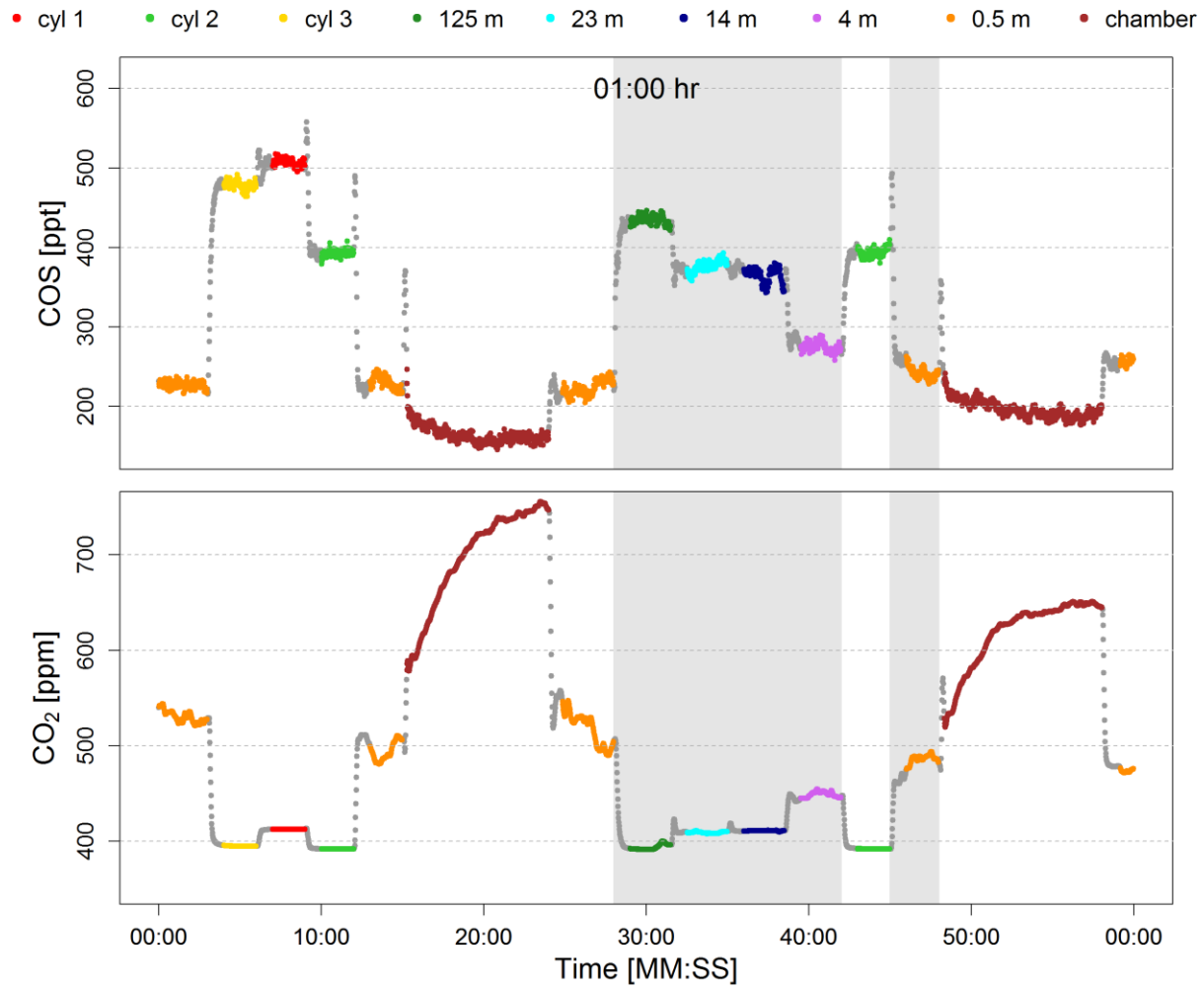

Figure S1: A typical 1 h cycle of COS and CO_2 concentrations during nighttime (01:00 hr) on July 20, 2015, showing the switching between cylinder gases, profile heights (shaded), and soil chambers. A gradient between the different profile heights can be distinguished.

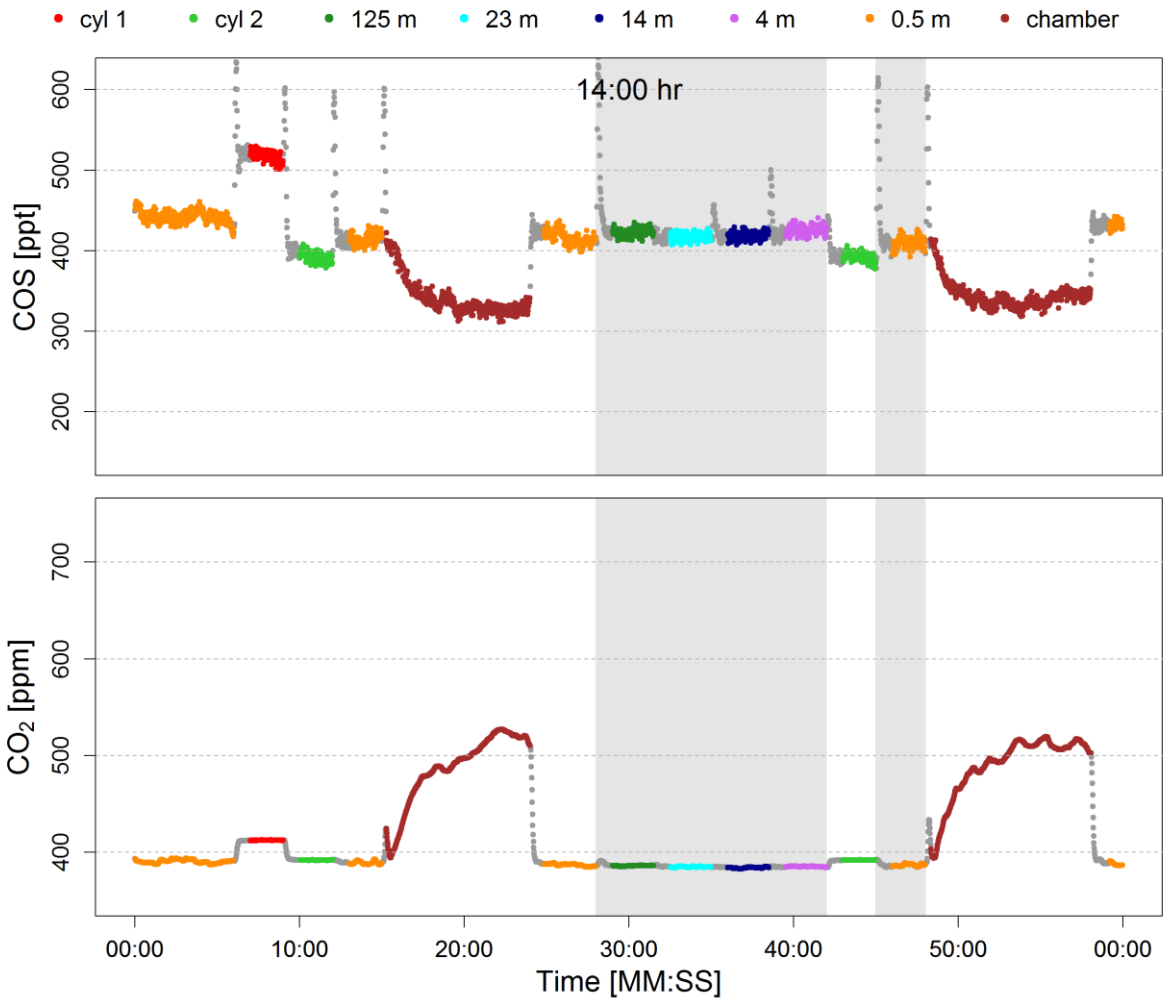

Figure S2: A typical 1 h cycle of COS and CO_2 concentrations during daytime (14:00 hr) on July 20, 2015, showing the switching between cylinder gases, profile heights (shaded), and soil chambers. A gradient is hardly detectable due to turbulent mixing of the air.

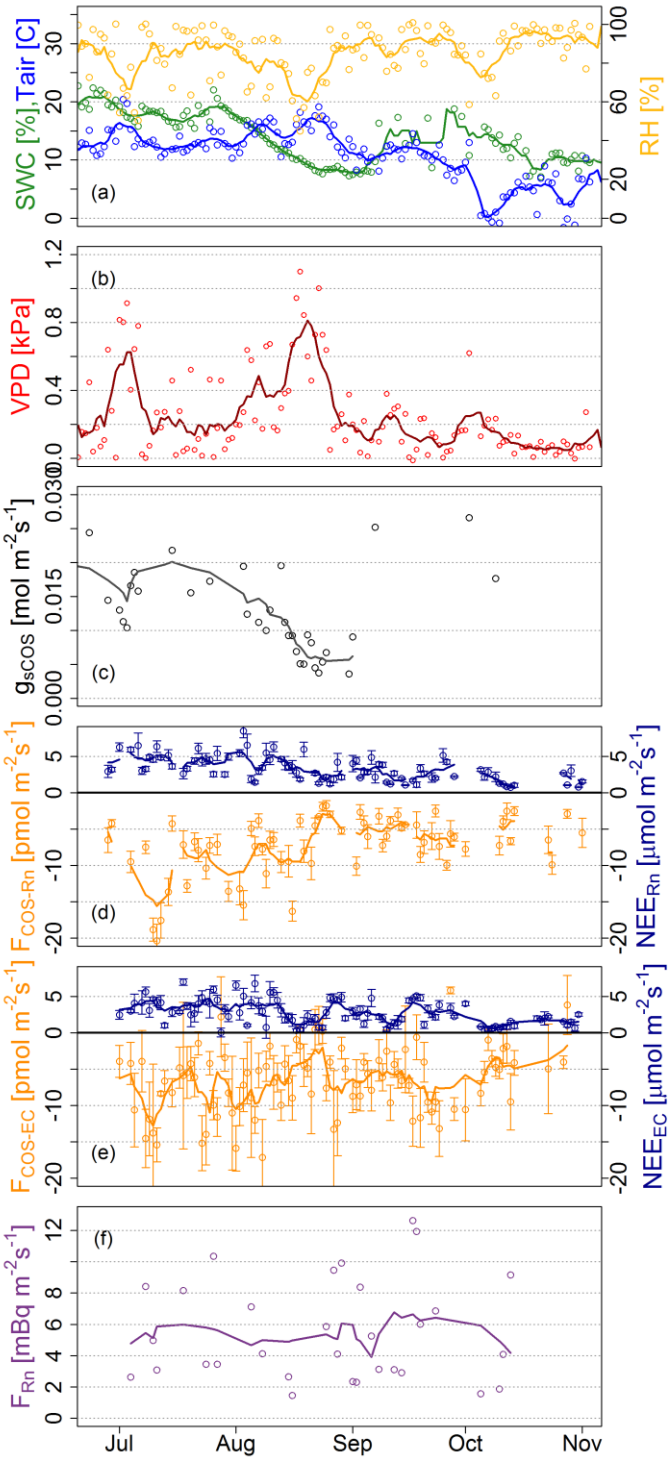

Figure S3: Overview of (a) meteorological conditions (SWC, T_{air} and RH), (b) VPD, (c) g_{sCOS}, (d) radon-based fluxes $F_{COS\text{-}Rn}$ and NEE_{Rn}, (e) EC-based fluxes $F_{COS\text{-}EC}$ and NEE_{EC} and (f) F_{Rn}. 5-day running averages are plotted in corresponding colors. For g_{sCOS}, the running average is only plotted up to September 1st as only very few data points are available after that period.

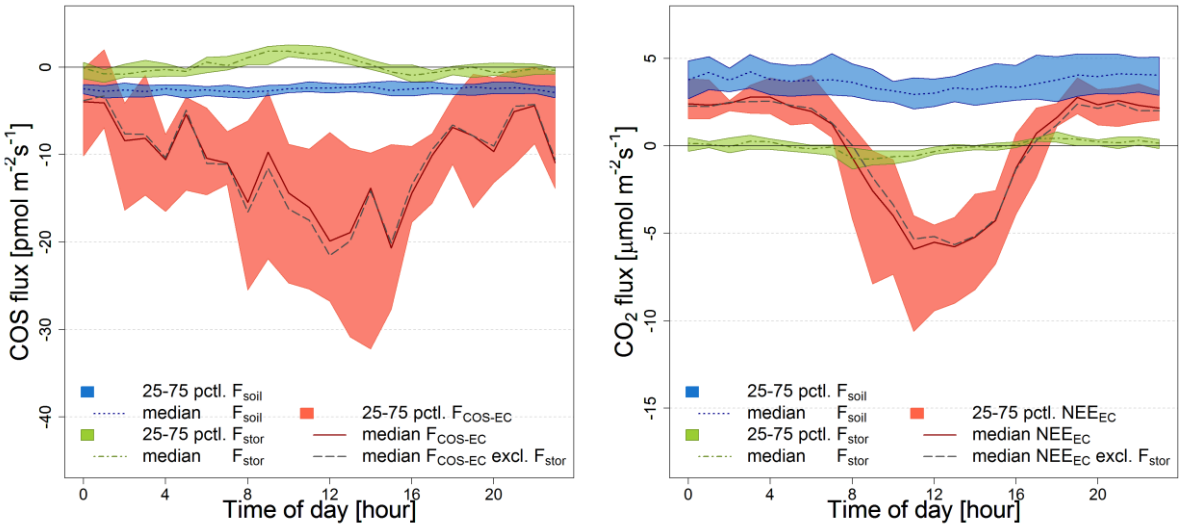

Figure S4: Storage fluxes F_{stor} (green), ecosystem fluxes NEE_{EC} and $F_{COS\text{-}EC}$ (red) and soil fluxes F_{soil} (blue) of COS (left) and CO_2 (right) in autumn (September – November) 2015. Thick lines indicate the median values of the data over the whole measurement period, and the shaded areas specify the 25^{th}-75^{th} percentiles. The median values of NEE_{EC} and $F_{COS\text{-}EC}$ without storage correction are shown in gray. The ecosystem fluxes are filtered for low u_* values with a threshold of 0.3 m s^{-1}.

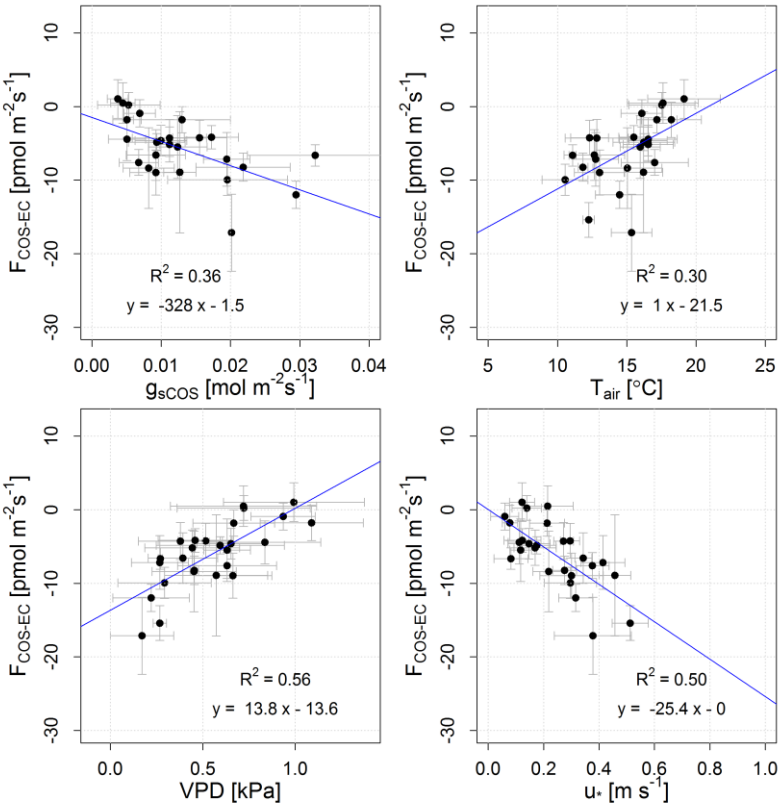

Figure S5: Correlations of $F_{COS\text{-}EC}$ with g_{sCOS}, T_{air}, VPD, and u_*. All data are averages over individual nights (with nighttime defined as sun elevation below -3°). In this plot $F_{COS\text{-}EC}$ is not filtered based on u_* as this would leave too few data points to make a correlation.

References

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