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Sesquiterpenes dominate monoterpenes in northern wetland emissions

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Table S1. Chemical speciation of SQTs (%) from a sub-Arctic Wetland

	CAS	RT	RI
α-copaene	3856-25-5	34.9	1376
Longicyclene*	1137-12-8	35.2	1371
SQT6		35.6	
Isolongifolene*	1135-66-6	35.7	1390
α-gurjunene*	489-40-7	35.7	1406
β-farnesene*	18794-84-8	35.8	1448
Cadinene	5951-61-1	35.8	
β-caryophyllene*	87-44-5	36.0	1419
Isosativene	24959-83-9	36.1	1453
β-gurjunene	17334-55-3	36.2	1430
γ-selinene	515-17-3	36.3	1492
α-humulene*	6753-98-6	36.7	1451
α-farnesene	502-61-4	36.8	1496
SQT2		36.9	
α-muurolene	10208-80-7	37.2	1494
SQT8(sum of 3)		37.2	
β-cadinene	523-47-7	37.5	1522
Calamene	483-77-2	37.6	1510
SQT10		37.9	

*included into our calibration standard

Table S2. Limits of detection (LODs) for soil emission and ambient air samples and precision and expanded uncertainty (U) of the analytical method

Compound	CAS number	LOD ($ug\ m^{-2}\ h^{-1}$)	LOD (pptv)	Precision (RSD%)	U (%)
isoprene	78-79-5	0.055	5.1	3.0	16
<u>monoterpenes</u>					
α-Pinene	7785-70-8	0.006	1.1	2.6	17
camphene	79-92-5	0.002	1.0	1.6	18
β-pinene	19902-08-0	0.002	0.2	4.2	18
3Δ-carene	498-15-7	0.003	0.8	2	17
p-cymene	99-87-6	0.003	0.6	2	19
limonene	5989-54-8	0.010	1.0	1.5	17
1,8-cineol	470-82-6	0.005	0.9	2.6	18
terpinolene	586-62-9	0.011	1.2	2.5	17
linalool	78-70-6	0.015	1.6	2.4	18
bornylacetate	5655-61-8	0.008	0.6	2.4	20
<u>sesquiterpenes</u>					
longicyclene	1137-12-8	0.006	0.3	2.4	19
isolongifolene	1135-66-6	0.006	0.3	2.5	20
β-caryophyllene	87-44-5	0.018	0.8	2.2	17
β-farnesene	18794-84-8	0.033	0.9	5	25
α-humulene	6753-98-6	0.006	0.3	2.1	18

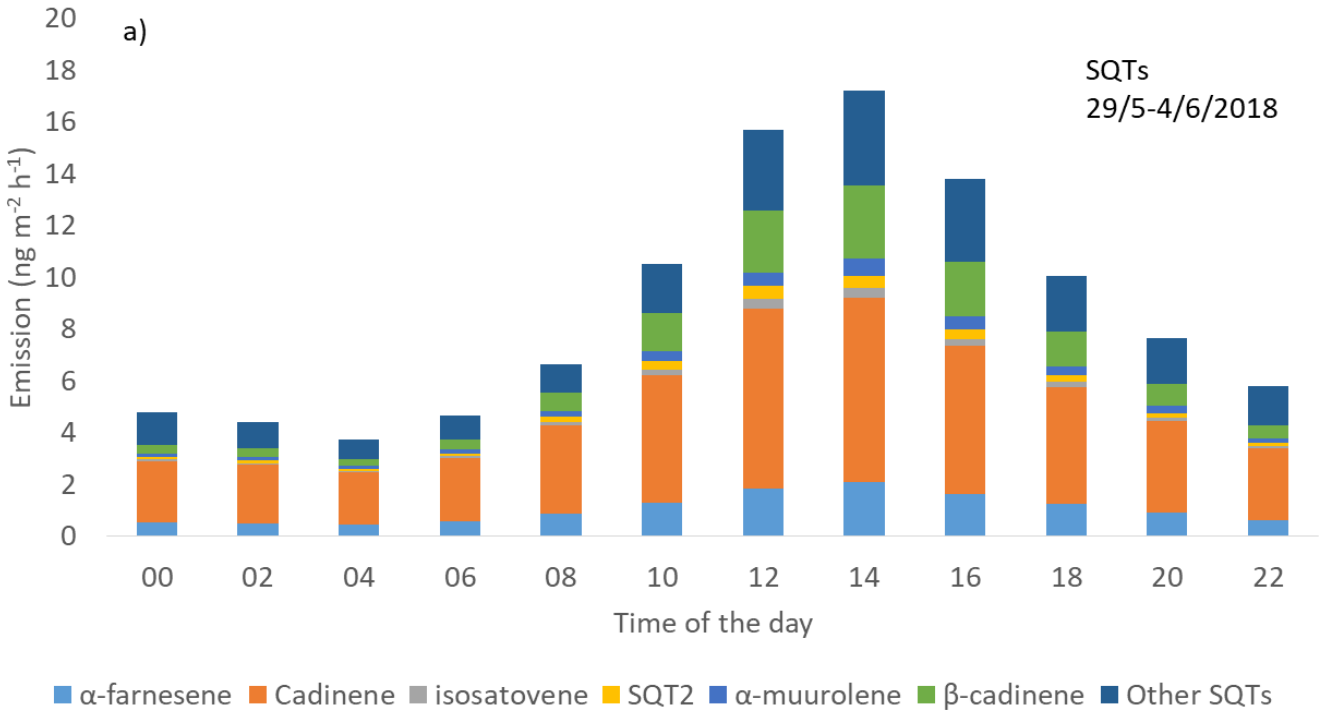
Table S3. Correlation of emission rates with temperature at the Lompolojänkkä wetland in 2018, temperature sensitivity (β), temperature correlations (R^2) and emission potential at 30°C (µg m^{-2} h^{-1}). The fitted curves were exponent functions $E=\alpha*e^{\beta T}$ where E is the emission rate, α is the intercept of temperature dependence curve and T is the temperature in the emission chamber.

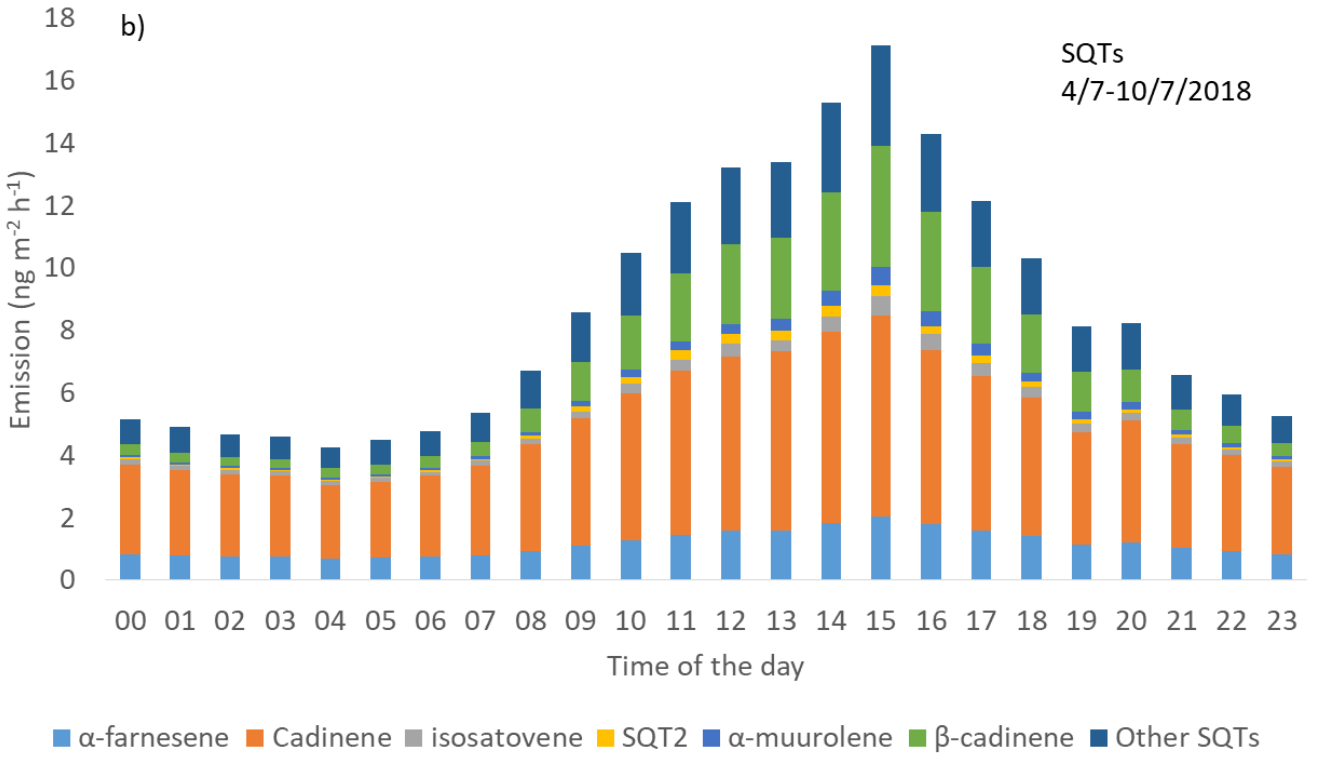
		β	R^2	E30 (µg m^{-2} h^{-1})
isoprene		0.18	0.75	68.6
1,8-cineol	MT	0.13	0.76	0.58
α-pinene	MT	0.06	0.44	1.36
β-pinene	MT	0.06	0.46	0.08
camphene	MT	0.05	0.35	0.06
3Δ-carene	MT	0.06	0.30	0.20
limonene	MT	0.11	0.72	0.26
linalool	MT	0.07	0.61	0.02
myrcene	MT	0.14	0.83	0.13
p-cymene	MT	0.12	0.64	0.06
MT sum		0.08	0.16	3.0
α-farnesene	SQT	0.05	0.43	1.64
α-humulene	SQT	0.06	0.37	0.04
cadinene	SQT	0.04	0.39	5.45
isolongifolene	SQT	0.08	0.52	0.04
isosatovene	SQT	0.07	0.59	0.40
calamene	SQT	0.07	0.67	0.04
β-gurjunene	SQT	0.06	0.55	0.70
SQT2	SQT	0.07	0.45	0.28
α-muurolene	SQT	0.07	0.49	0.38
β-cadinene	SQT	0.10	0.68	2.32
g-selinene	SQT	0.06	0.44	0.40
SQT sum		0.05	0.52	11.1

Table S4. Reaction rate coefficients for O_3 reactions of BVOCs. The experimentally determined reaction rate coefficients listed earlier by Hellén et al. (2018) were used. When the experimental reaction rate coefficients were not available, the values estimated by the AopWin™ module of the EPI™ software suite (https://www.epa.gov/tsca-screening-tools/ epi-suitetm-estimation-program-interface, EPA, USA) as implemented online by ChemSpider (http://www.chemspider.com, the Royal Society of Chemistry) were used. For the SQTs, which were not included into EPI sofrware suite, mean reaction rate coefficient (2.61E-15 cm^{-3} s^{-1}) of the known SQTs were used.

		$k_{O3}(cm^3\ s^{-1})$
isoprene		1.27E-17
α-pinene	MT	9.4E-17
camphene	MT	6.80E-19
β-pinene	MT	1.9E-17
carene	MT	4.80E-17
β-phellandrene	MT	4.77E-17
p-cymene	MT	5.00E-20
1,8-cineol	MT	1.50E-19
limonene	MT	2.11E-16
terpinolene	MT	1.60E-15
linalool	MT	3.15E-16
myrcene	MT	3.74E-17
longicyclene*	SQT	2.61E-15
α-copaene	SQT	1.60E-16
α-gurjunene*	SQT	2.61E-15
cadinene	SQT	8.60E-16
α-farnesene	SQT	1.04E-15
β-caryophyllene	SQT	1.2E-14
isosativene	SQT	1.14E-17
SQT2*	SQT	2.61E-15
α-muurolene	SQT	8.60E-16
β-cadinene	SQT	8.60E-16
g-selinene*	SQT	2.61E-15

*mean of other SQTs


a)
SQTs
29/5-4/6/2018
Emission (ng m-2 h-1)
0
2
4
6
8
10
12
14
16
18
20
00
02
04
06
08
10
12
14
16
18
20
22
Time of the day
α-farnesene
Cadinene
isosatovene
SQT2
α-muurolene
β-cadinene
Other SQTs


b)
SQTs
4/7-10/7/2018
Emission (ng m-2 h-1)
0
2
4
6
8
10
12
14
16
18
00
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
Time of the day
α-farnesene
Cadinene
isosatovene
SQT2
α-muurolene
β-cadinene
Other SQTs

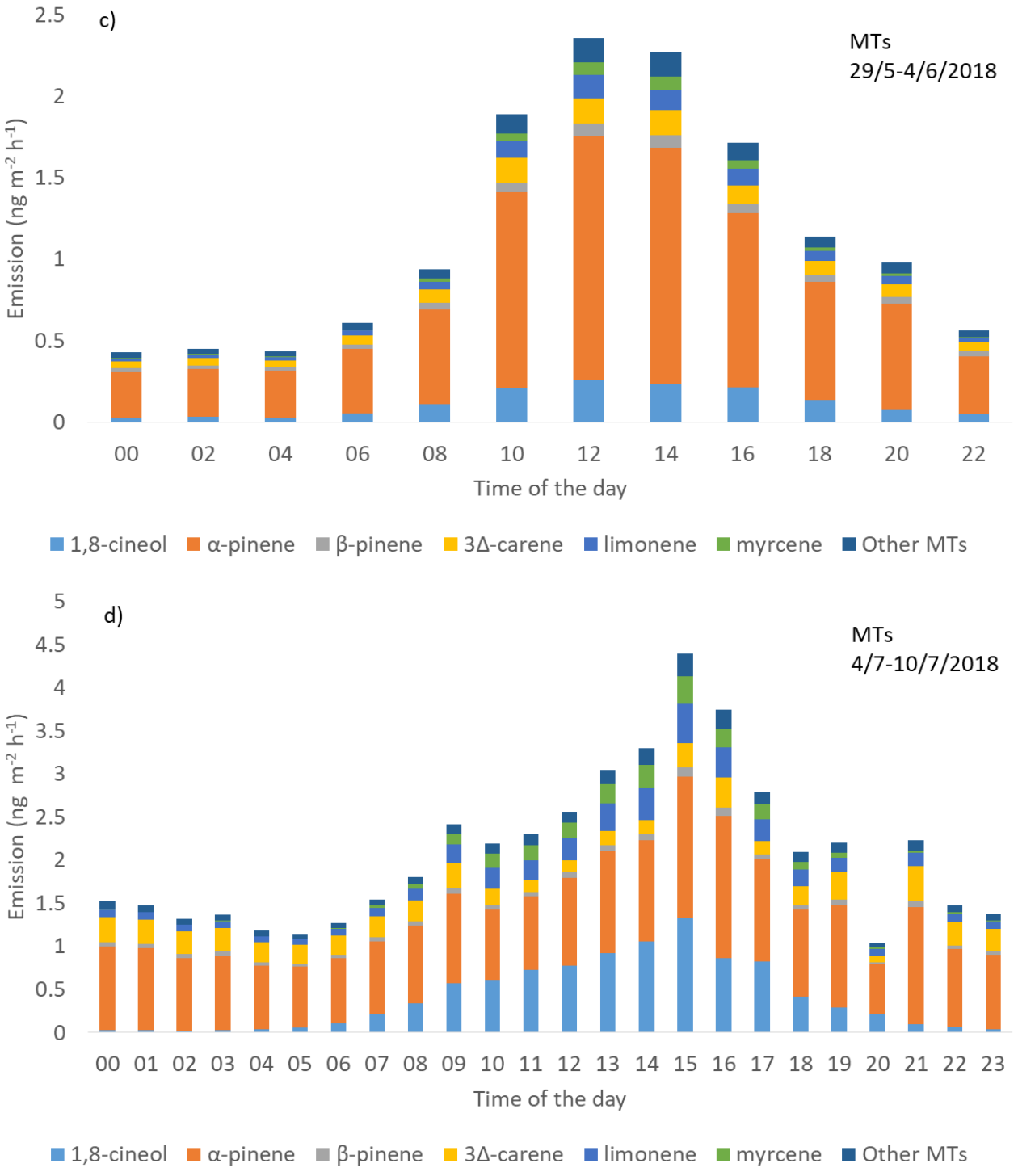


Figure S1: Diurnal variation of the emission rates of individual a) and b) STQs and c) and d) MTs during different measurement periods.