Table S1: Summary of chamber temperature (T), light intensity (PAR), transpiration rate (Tr), net assimilation rate (An) and emission fluxes (E) of individual plants when well-watered. The emissions were separated into the constitutive emissions (Ec) and the stress induced emissions (Es).

		T & PAR	Tr	An	E [nmolC m^{-2} s^{-1}]	
	Plant species	[°C/µmol m^{-2} s^{-1}]	[mmol m^{-2} s^{-1}]	[µmol m^{-2} s^{-1}]	Ec	Es
P1	Scots pine	18/800	2.0	10	4.8	21.7
P2	Scots pine	30/500	0.9	0.8	13.8	4.5
P3	Scots pine	25/400	1.5	2.8	12.0	0.0
S1	Norway spruce	25/700	0.6	1.4	1.6	76.4
S2	Norway spruce	23/700	0.39	1.45	1.3	2.1
S3	Norway spruce	28/700	0.24	0.34	1.4	0.0

Table S2: Emission fluxes (nmol m^{-2} s^{-1}) of individual compounds from six individual plants.

Compounds	P1	P2	P3	S1	S2	S3
isoprene	-	0.03	0.05	0.03	0.04	0.04
α-pinene	0.09	0.43	0.47	0.01	0.06	0.02
β-pinene	[a]	0.05	0.04	0.01	0.09	0.01
camphene	0.02	0.08	0.11	0.01	0.01	0.01
limonene	0.01	-	-	0.08	0.03	0.03
myrcene	0.07[a]	0.08	0.11	0.03	0.01	0
Δ^3-carene	0.07	0.64	0.21	-	0.01	0.01
β-phellandrene	-	-	0.07	-	0.03	-
1,8-cineole	0.23	0.08	0.16	-	-	0.04
(*E*)-β-ocimene	-	0.01	-	0.02	-	-
linalool	-	-	-	0.22	-	-
α-farnesene	0.6	0.07	-	2.14	0.08	-
(*E*)-β-farnesene	0.85	0.22	-	2.8	0.02	-

[a]For P1, the peaks of β-pinene and myrcene from the chromatogram were overlapping

Table S3: R_{iso_meas} and R_{13C_meas} of the major compounds emitted from S1 before (-1 h) and at the end (7 h) of the $^{13}CO_2$ exposure, together with the fraction of de novo biosynthesis (f_{synth}).

Compounds	C/S[a]	Type[b]	R_{iso_meas}		f_{synth}	R_{13C_meas}	
			-1h	7h		-1h	7h
α-Pinene	C	MT	0.10	0.15	0.06	0.01	0.04
β-Pinene	C	MT	0.10	0.12	0.02	0.01	0.02
Camphene	C	MT	0.10	0.12	0.02	0.01	0.03
Limonene	C	MT	0.10	0.18	0.09	0.01	0.08
Myrcene	C	MT	0.12	0.54	0.49	0.01	0.37
Sabinene	C	MT	0.11	0.52	0.47	0.01	0.38
(*E*)-β-ocimene	S	MT	0.09	0.81	0.79	0.01	0.62
Linalool	S	MT	0.11	0.85	0.83	0.01	0.64
α-Farnesene	S	SQT	0.16	0.92	0.91	0.01	0.66
(*E*)-β-Farnesene	S	SQT	0.15	0.93	0.92	0.01	0.68

[a]C = constitutive emissions; S = stress induced emissions.

Table S4: R_{iso_meas} and R_{13C_meas} of individual compounds emitted from S2 before (-1 h) and at the end (8 h) of the $^{13}CO_2$ exposure, together with the fraction of de novo biosynthesis (f_{synth}).

Compounds	C/S[a]	Type[b]	R_{iso_meas}		f_{synth}	R_{13C_meas}	
			-1h	7h		-1h	7h
α-Pinene	C	MT	0.10	0.14	0.05	0.01	0.05
camphene	C	MT	0.11	0.12	0.02	0.01	0.03
β-pinene	C	MT	0.10	0.11	0.01	0.01	0.01
Δ^3-carene	C	MT	0.10	0.15	0.06	0.01	0.04
limonene	C	MT	0.11	0.13	0.03	0.01	0.03
β-phellandrene	C	MT	0.10	0.12	0.02	0.01	0.02
α-Farnesene	S	SQT	0.15	0.89	0.87	0.01	0.61
(*E*)-β-Farnesene	S	SQT	0.15	0.85	0.82	0.01	0.56

[a]C = constitutive emissions; S = stress induced emissions.

Table S5: R_{iso_meas} and R_{13C_meas} of individual compounds emitted from P1 before (-1 h) and at the end (8 h) of the $^{13}CO_2$ exposure, together with the fraction of de novo biosynthesis (f_{synth}).

Compounds	C/S[a]	Type[b]	R_{iso_meas}		f_{synth}	R_{13C_meas}	
			-1h	8h		-1h	8h
α-pinene	C	MT	0.12	0.27	0.18	0.01	0.12
camphene	C	MT	0.13	0.22	0.13	0.02	0.06
sabinene	C	MT	0.11	0.85	0.83	0.01	0.68
β-pinene&myrcene	C	MT	0.13	0.50	0.45	0.01	0.32
Δ^3-carene	C	MT	0.11	0.14	0.04	0.01	0.03
limonene	C	MT	0.11	0.47	0.41	0.01	0.32
β-phellandrene	C	MT	0.13	0.29	0.21	0.01	0.15
1,8-cineole	C	MT	0.13	0.93	0.92	0.02	0.77
(*E*)-β-farnesene	S	SQT	0.20	0.97	0.97	0.02	0.66
α-farnesene	S	SQT	0.19	0.96	0.95	0.02	0.65

[a]C = constitutive emissions; S = stress induced emissions.

Table S6: R_{iso_meas} and R_{13C_meas} of individual compounds emitted from P2 before (-1 h) and at the end (8 h) of the $^{13}CO_2$ exposure, together with the fraction of de novo biosynthesis (f_{synth}).

Compounds	C/S[a]	Type[b]	R_{iso_meas}		f_{synth}	R_{13C_meas}	
			-1h	7h		-1h	7h
Δ^3-carene	C	MT	0.10	0.11	0.01	0.01	0.01
α-pinene	C	MT	0.10	0.12	0.02	0.01	0.02
camphene	C	MT	0.11	0.11	0.01	0.01	0.01
β-pinene	C	MT	0.10	0.12	0.02	0.01	0.02
myrcene	C	MT	0.12	0.26	0.18	0.02	0.12
1,8-cineole	C	MT	0.11	0.87	0.86	0.02	0.64
(*E*)-β-farnesene	S	SQT	0.15	0.62	0.55	0.01	0.15
α-farnesene	S	SQT	0.16	0.53	0.45	0.01	0.13

[a]C = constitutive emissions; S = stress induced emissions.

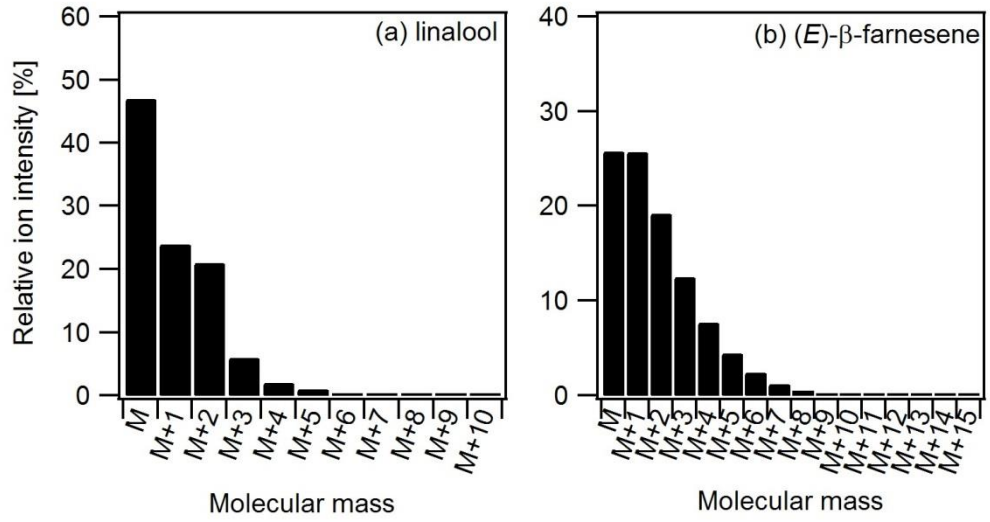

Fig. S1: Measured isotope abundance patterns of (a) linalool and (b) (*E*)-β-farnesene from S1 at the end of the 48-h ^{13}glucose exposure.

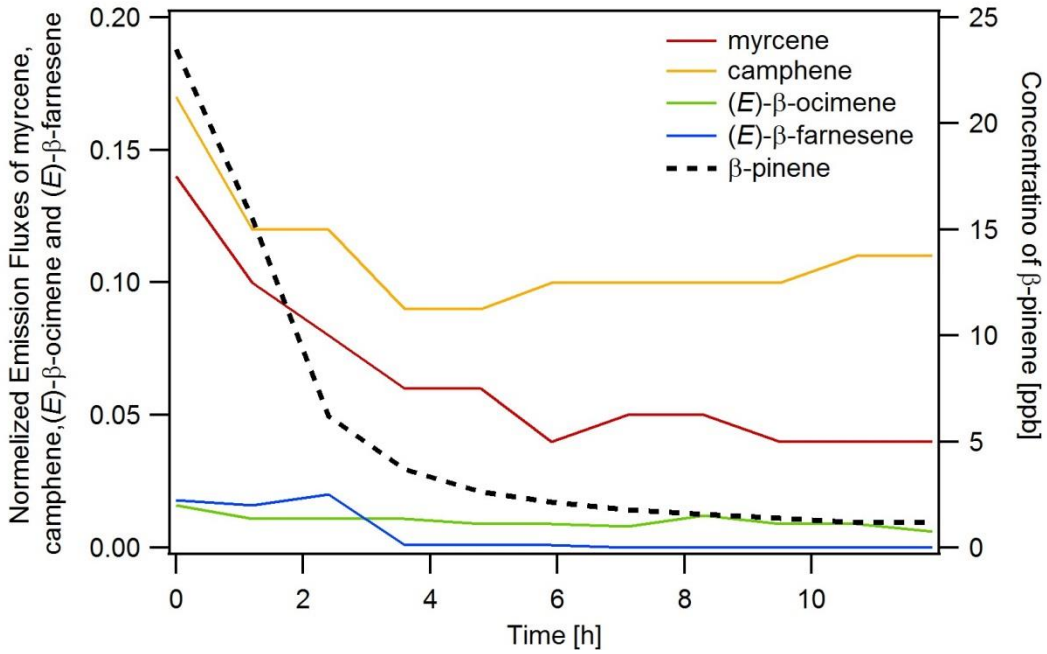

Fig. S2: Temporal changes of the concentration of β-pinene emission and the normalized release of myrcene, camphene, (*E*)-β-ocimene and (*E*)-β-farnesene from the cut branches of S1. The normalized emission rates of all compounds were stable after 3–4 hours after introducing the cut needles and bark into the chamber. The normalization was conducted by dividing the emission fluxes of individual compounds by the emission flux of the reference, β-pinene.