Supplement

To Section 2: EMeRGe research flights

Table S1 gives an overview of the flight labelling, take-off, and departure times as well as flight duration and the base (departure airport) of HALO during EMeRGe-Europe (EM-EU) and EMeRGe-Asia (EM-AS). EM-EU-01 and -02 are test flights and not listed. The transfer flights from Europe to Asia and back are not included in the Asian analysis. During the transfer flights EM-AS-02 and EM-AS-15, HALO had no permission to conduct any measurements.

Table S1: Overview of EMeRGe flights. UAE - United Arab Emirates.

Flight label	Flight date (dd.mm.yyyy)	Take off (UTC)	Departure (UTC)	Duration (hh:mm)	Base/transfer	Probing targets (outflows)
EM-EU-03	11.07.2017	10:00	16:30	06:30	Oberpfaffenhofen/Germany	Po Valley, Rome
EM-EU-04	13.07.2017	10:40	15:00	04:20	Oberpfaffenhofen/Germany	S Germany (Allgäu), Munich
EM-EU-05	17.07.2017	10:30	18:30	08:00	Oberpfaffenhofen/Germany	London, Paris
EM-EU-06	20.07.2017	09:00	17:30	08:30	Oberpfaffenhofen/Germany	Po Valley, Rome, Munich
EM-EU-07	24.07.2017	09:45	18:15	08:30	Oberpfaffenhofen/Germany	Marseille, Barcelona, W Europe, W Mediterranean
EM-EU-08	26.07.2017	07:45	15:20	07:35	Oberpfaffenhofen/Germany	London, Ruhr area, Paris
EM-EU-09	28.07.2017	10:00	18:30	08:30	Oberpfaffenhofen/Germany	Barcelona, Madrid, Marseille, SE France, Munich
EM-EU				51:55:00		
EM-AS-01	10.03.2018	07:40	15:30	07:50	Oberpfaffenhofen/Germany → Abu Dhabi/UAE	Rome (Italy), Athens (Greece)
EM-AS-02	11.03.2018				Abu Dhabi/UAE →U-Tapao/Thailand	no measurement permission
EM-AS-03	12.03.2018	04:50	11:20	06:30	U-Tapao/Thailand →Tainan/Taiwan	Bangkok (Thailand), China
EM-AS-04	17.03.2018	01:10	09:45	08:35	Tainan/Taiwan	China
EM-AS-05	19.03.2018	00:20	08:25	08:05	Tainan/Taiwan	Shanghai, Taipei
EM-AS-06	20.03.2018	19.03.2018 23:50	20.03.2018 06:35	06:45	Tainan/Taiwan	Manila
EM-AS-07	22.03.2018	03:50	09:30	05:40	Tainan/Taiwan	China, Taiwan
EM-AS-08	24.03.2018	01:00	09:50	08:50	Tainan/Taiwan	China, Taiwan
EM-AS-09	26.03.2018	00:25	09:25	09:00	Tainan/Taiwan	China, Taipei
EM-AS-10	28.03.2018	27.03.2018 23:50	28.03.2018 08:30	08:40	Tainan/Taiwan	Manila, Pearl River Delta, Taiwan
EM-AS-11	30.03.2018	00:05	09:25	09:20	Tainan/Taiwan	Yangtze River Delta, S Japan
EM-AS-12	03.04.2018	00:25	06:25	06:00	Tainan/Taiwan	Taiwan
EM-AS-13	04.04.2018	00:30	09:25	08:55	Tainan/Taiwan	S Japan, Taiwan
EM-AS-14	07.04.2018	01:00	08:40	07:40	Tainan/Taiwan → U-Tapao/Thailand	China, SE Asia, Bangkok
EM-AS-15	08.04.2018				U-Tapao/Thailand → Abu Dhabi/UAE	no measurement permission
EM-AS-16	09.04.2018	06:00	14:45	08:45	Abu Dhabi/UAE → Oberpfaffenhofen/Germany	W Asia, N Africa, Greece, Munich (Germany)
EM-AS				110:35:00		

To Section 3.1.2: Assessment of measurement noise

We assess VOC-specific measurement noises by smoothing the raw signal with a Savitzky-Golay filter (Savitzky and Golay, 1964) and estimate the noise as the standard deviation of the residuals (Fig. S1). We choose this filter technique because it is preferred for retrieving the original signal structure while removing noise (Acharya et al., 2016). Since the raw signal includes statistical noises caused by the measurement process itself as well as atmospheric fluctuations, the obtained noise represents both instrumental and atmospheric noises. For the definition of VOC concentration thresholds, we use the average of all VOC-specific noises during EMeRGe-Europe and -Asia, respectively.

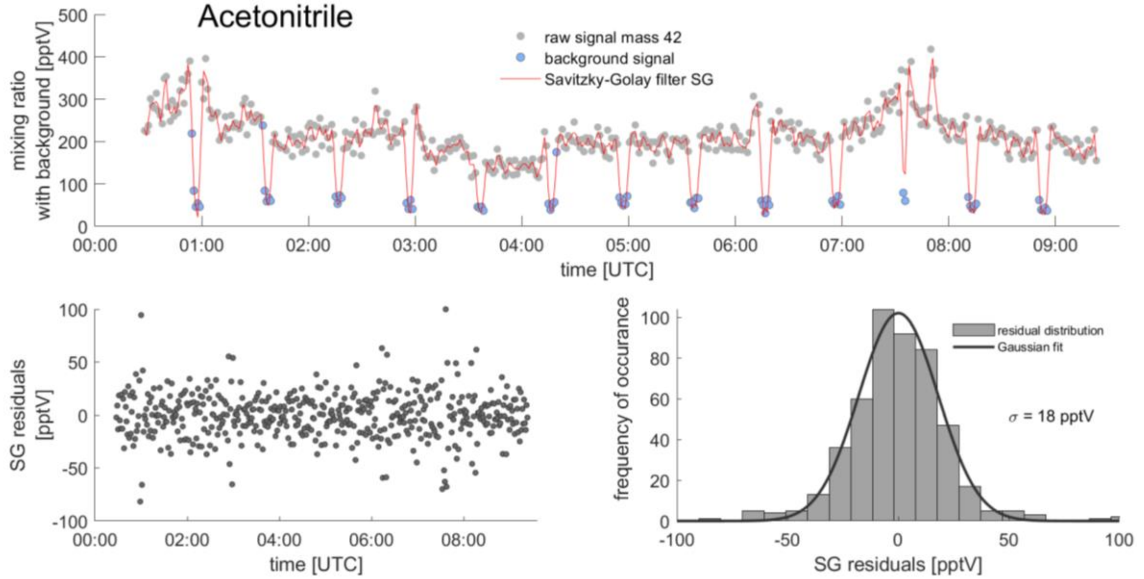

Figure S1: Noise assessment of acetonitrile using the Savitzky-Golay filter during EM-AS-13, 4th April 2018. The noise of 18 pptV is the standard deviation of the residuals distribution.

To Section 3.1.2: Atmospheric background determination of acetonitrile

As described in section 3.1.2 of the main document, we use long-term acetonitrile measurements in the tropopause from the IAGOS-CARIBIC data set (Fig. S2a) to assess the free tropospheric background.

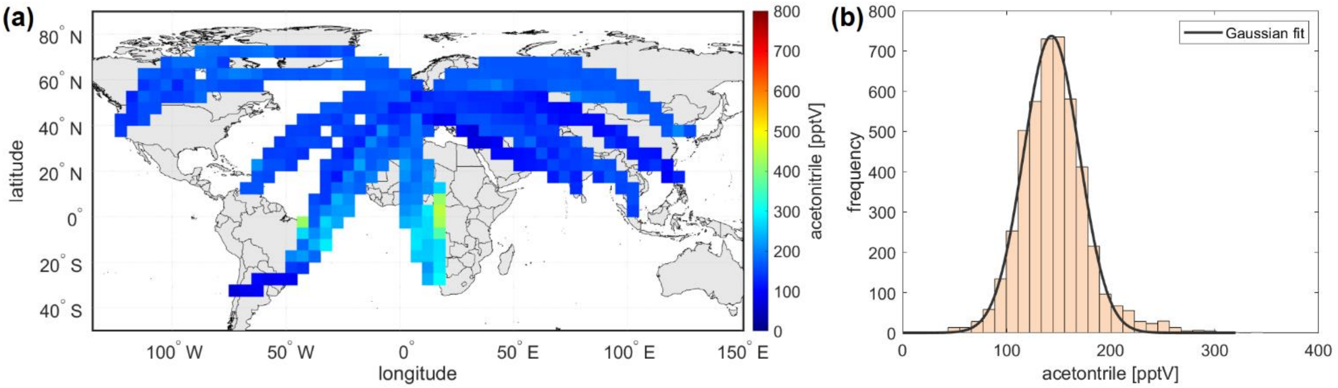

Figure S2: IAGOS-CARIBIC acetonitrile measurements for the months DJFM. (a) Spatial distribution of all flights (2005-2016) and (b) frequency distribution from 2012 to 2016 for potential vorticities smaller than 2 PVU (tropospheric air) and 35-65° N with a fitted Gaussian normal distribution.

We selected the northern hemispheric winter seasons (DJFM) of four years prior to the campaign (2012 – 2016). During DJFM, northern hemispheric, tropospheric acetonitrile concentrations are the smallest. They indicate, therefore, the lower background because the active (northern hemispheric) BB season is in summer. By fitting a Gaussian normal distribution onto the frequency distribution of the selected subset (Fig. S2b), we calculated a mean acetonitrile background concentration of 145 pptV for the northern hemispheric troposphere. As the value indicates the lower background, we use it for both EMeRGe in Europe and Asia.

To Section 3.1.2: Interpolation scheme for emission signatures

Due to the PTR-MS duty cycle, where the tracers benzene and acetonitrile are measured with a time difference of about 30 seconds by raw signal integration of about six seconds each, we interpolate the identification of emission signatures (based on the tracer enhancement) to cover the general measurement time resolution of one second.

For the interpolation, we use the following assumptions: If VMRs do exceed (not exceed) respective thresholds in two or more consecutive duty cycles, the time in-between is identified as emission signature (no signature) as well. If VMRs do exceed (not exceed) respective thresholds only in a single duty cycle, just the time of raw signal integration is marked as emission signature (no signature). If an exceedance is followed by a non-exceedance and vice versa, we consider the time in-between as not assessable (NA) because the exact time of threshold transition is unknown. During instrumental background detection, no ambient air measurements are available hence no indication of emissions signatures is possible, and we consider these times as NA as well. Same applies for isoprene.

This assumptions lead to higher availabilities of emission signatures when continuous VOC exceedances/non-exceedances are measured and hence to less availability when VOC concentrations vary around the thresholds. Hence, also the use of isoprene as additional tracer (together with acetonitrile and benzene) can lead to less availability compared to the use of only acetonitrile and benzene.

To Section 4.1: Fractions of emission signatures

Table S2: Fractions [%] of (a) enhancements observed in acetonitrile, benzene and isoprene, (b) emission signatures I (*aged BB*, *BB & BEN* and *AP* inferred from observed enhancements in acetonitrile and benzene; *only BIO* and *BG* inferred with additional isoprene) and (c) emission signatures II (inferred from observed enhancements in acetonitrile, benzene and isoprene). Top: during EMeRGe-Europe, bottom: EMeRGe-Asia. AP – anthropogenic signatures, BB – biomass burning signatures, BEN – benzene enhancements, BIO – fresh biogenic signatures, BG – background, NA – not assessable during instrumental background detection and threshold transitions (due to PTR-MS measurement resolution of one minute per tracer). EU-05 is not available due to instrument failure. The summary of EMeRGe-Asia excludes the non-Asian transfer flights AS-01 and AS-16. This figure is a supplement to Figure 4 of the main document.

	tracer enhancements (a)									emission signatures I (b)						emission signatures I (c)						
	acetonitrile			benzene			isoprene															
region	1	0	-	1	0	-	1	0	-	aged BB	BB & BEN	AP	only BIO	BG	NA	only BB	only BB & BIO	only BB & BEN	BB & BEN & BIO	only BEN	only BEN & BIO	NA

Italy, EU-03	0.6	76.8	22.6	15.6	58.3	26.2	7.7	57.0	35.3	0.1	0.5	14.0	1.8	47.5	36.0			0.1		4.7	4.9	40.9
S Germany, EU-04	2.4	73.8	23.8	0.6	71.9	27.5	8.2	48.5	43.3	1.3	0.4	0.1	7.7	43.7	46.8	1.3		0.4				46.9
London, Paris, EU-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Italy, Munich, EU-06	2.5	71.2	26.3	29.6	39.6	30.8	12.4	56.0	31.6	0.1	2.1	24.5	0.3	36.8	36.1	0.1		1.3	0.2	8.5	10.5	42.3
Spain, S France, EU-07	2.5	71.5	26.0	19.3	48.9	31.8	8.0	60.4	31.5	0.0	2.2	16.0	1.1	42.6	38.0				2.2	9.9	3.2	40.9
London, BNR, Paris, EU-08	1.0	74.2	24.8	20.8	42.7	36.4	4.5	62.8	32.7	1.0	0.0	20.5	0.1	38.3	40.2	1.0				10.3	3.0	47.4
Spain, S France, EU-09	5.5	66.0	28.5	35.1	32.3	32.6	4.0	69.2	26.8	0.1	5.1	24.4	0.0	29.9	40.5	0.1		3.7	0.6	18.4	2.8	44.5
EM-EU	2.5	71.9	25.6	22.2	46.5	31.3	7.4	60.0	32.6	0.4	2.0	18.2	1.3	39.1	39.1	0.3		1.0	0.6	9.6	4.4	43.6
Germany→U-Tapao, AS-01		58.5	41.5	7.9	44.8	47.3	2.9	51.5	45.7			7.9	1.9	37.6	52.6					7.0	0.7	52.8
U-Tapao→Tainan, AS-03	16.0	52.8	31.2	14.3	57.1	28.6	9.6	60.6	29.8	3.8	10.0	1.9	1.7	42.5	40.0	3.6		3.3	5.8	0.5	0.9	41.7
China, AS-04	9.4	55.5	35.1	62.8	6.4	30.8	5.5	57.1	37.4		9.1	40.9	0.3	4.3	45.4			4.4	2.5	32.5	1.7	54.3
Shanghai, Taipei, AS-05	52.3	17.5	30.1	61.6	12.1	26.3	5.7	67.7	26.6	2.0	46.9	8.0		6.9	36.2	1.7		41.4	3.1	6.1	0.9	39.9
Manila, AS-06	38.3	20.7	41.0	36.3	31.8	31.9	0.7	73.5	25.8	7.4	25.4	5.8		11.6	49.8	7.3		22.9	0.6	5.7		51.8
China, Taiwan, AS-07		75.9	24.1	66.6	3.1	30.3	11.0	51.7	37.3			65.4	1.0	0.9	32.7					46.5	7.2	44.4
China, Taiwan, AS-08	3.8	78.2	18.1	61.0	15.7	23.2	5.3	69.1	25.7		3.7	53.6		15.0	27.6			2.7	0.2	41.1	4.1	36.7
China, Taipei, AS-09	10.9	72.4	16.7	82.7	3.7	13.6	1.6	84.5	13.9		10.9	65.2		3.5	20.4			10.9		60.6	1.5	23.5
Manila, PEA, Taiwan AS-10	24.8	46.8	28.4	61.3	13.5	25.3	1.9	79.6	18.5	0.1	22.6	28.6		12.1	36.6	0.1		20.8	0.9	27.3	0.2	38.6
YAN, S Japan, AS-11	5.1	72.4	22.5	42.9	32.5	24.6	2.4	73.4	24.2	0.2	4.4	36.6		30.3	28.4	0.2		3.5	0.5	33.8	1.0	30.6
Taiwan, AS-12	8.8	64.0	27.3	39.1	23.5	37.5	1.5	78.8	19.8	5.1	0.8	35.7		11.0	47.4	5.1		0.8		31.3	1.2	50.6
S Japan, Taiwan, AS-13	9.5	56.3	34.2	32.1	25.7	42.2	0.5	73.2	26.3	1.5	4.4	26.2		17.4	50.6	1.5		4.4		25.4	0.4	51.0
Tainan→U-Tapao, AS-14	36.7	33.4	29.9	43.7	41.1	15.2	1.6	82.7	15.7	6.0	29.3	12.4		18.6	33.7	6.0		25.7	0.8	10.6	0.7	37.6
U-Tapao→Germany, AS-16		67.9	32.1	1.9	63.6	34.5	0.3	66.5	33.2			1.9	0.2	60.7	37.1					1.0		38.0
EM-AS (03-14)	17.8	54.2	27.9	51.3	21.6	27.1	3.7	71.5	24.8	1.9	14.1	32.3	0.2	14.5	36.9	1.9		11.9	1.2	27.6	1.6	41.1

To Section 4.2.1: Source regions with coordinates

Table S3: Source regions and MPCs (italic) with coordinates for EMeRGe-Europe and -Asia (supplement of Table 4).

EMeRGe-Europe				**EMeRGe-Asia**			
no.	abbr.	source region/*MPC*	coordinates	no.	abbr.	source region/*MPC*	coordinates
1	CAN	Canada	134.0W-55.0W, 47.0N-71.0N	1	EUA	Europe/Northern Africa	18.0W-34.0E, 5.0N-60.0N
2	USA	United States of America	134.0W-55.0W, 25.0N-47.0N	2	WAS	Western Asia	34.0E-68.0E, 5.0N-48.9N
3	NAT	North Atlantic Ocean	55.0W-10.5W, 25.0N-71.0N	3	WCH	Western China	68.0E-91.4E, 30.6N-48.9N
4	IRE	Ireland	5.4W-10.5W, 50.6N-55.4N	4	IND	India	68.0E-91.4E, 5.0N-30.6N
5	NGB	Northern Great Britain	5.4W-0.6E, 54.5N-60.0N	5	CCH	Central China	91.4E-108.0E, 26.5N-48.9N
6	SGB	Southern Great Britain	5.4W-2.2E, 50.0N-54.5N	6	SCH	Southern China	91.4E-119.8E, 21.6N-26.5N
7	BNR	Belgium, Netherlands and Ruhr area	2.2E-8.0E, 50.0N-54.5N	7	SEA	Southeast Asia	91.4E-111.2E, 5.0N-21.6N
8	NFR	Northern France	5.4W-8.0E, 46.8N-50.0N	8	MOR	Mongolia/Southern Russia	68.0E-122.6E, 48.9N-60.0N
9	SFR	Southern France	5.4W-8.0E, 42.8N-46.8N	9	ECH	Eastern China	108.0E-122.6E, 26.5N-48.9N
10	IBE	Iberian Peninsula	10.5W-3.4E, 37.1N-42.8N	10	TAW	Taiwan	119.8E-122.6E, 21.6N-26.5N
11	NGE	Northern Germany	8.0E-14.3E, 50.0N-54.5N	11	NPH	Northern Philippines	119.8E-122.6E, 14.0N-18.7N
12	SGE	Southern Germany	8.0E-14.3E, 46.8N-50.0N	12	NEC	Northeastern China	122.6E-135.0E, 40.4N-55.0N
13	NIT	Northern Italy	8.0E-14.3E, 42.8N-46.8N	13	KOR	Korea	122.6E-129.6E, 30.6N-40.4N
14	SIT	Southern Italy	11.6E-18.0E, 37.1N-42.8N	14	JAP	Japan	129.6E-150.0E, 30.6N-40.4N
15	NAF	Northern Africa	10.5W-23.9.0E, 25.0N-37.1N	15	ECS	East China Sea	122.6E-150.0E, 14.0N-30.6N
16	NEU	Northern Europe	0.6E-37.0E,54.5N-71.0N		UA	Unspecified areas	
17	EEU	Eastern Europe	14.3W-37.0W, 42.8N-54.5N	*M1*	*XBS*	*Δ Xian-Beijing-Shanghai (incl.in ECH)*	*109.8E-122.6E, 30.6N-40.4N*
	UA	Unspecified areas		*M2*	*BEI*	*Beijing (incl.in XBS)*	*115.6E-119.0E, 38.8N-40.4N*
M1	*LON*	*London (incl.in SGB)*	*2.0W-1.5W, 50.5N-52.0N*	*M3*	*YAN*	*Yangtze River Delta (incl.in XBS)*	*118.0E-122.6E, 30.6N-32.8N*
M2	*PAR*	*Paris (incl.in NFR)*	*1.0E-3.5E, 48.0N-50.0N*	*M4*	*PEA*	*Pearl River Delta (incl.in SEC)*	*112.0E-114.8E, 21.6N-24.0N*
M3	*MAD*	*Madrid (incl.in IBE)*	*6.1W-3.0W, 39.5N-41.9N*	*M5*	*TOK*	*Tokyo (incl.in SJA)*	*139.2E-140.6E, 35.2N-36.4N*
M4	*BAR*	*Barcelona (incl.in IBE)*	*0.8E-3.0E, 40.9N-41.9N*	*M6*	*OSA*	*Osaka (incl.in JAP)*	*135.0E-137.3E, 34.4N-35.6N*
M5	*POV*	*Po Valley/ Milano (incl.in NIT)*	*8.0E-13.0E, 44.0N-46.0N*	*M7*	*BAN*	*Bangkok (incl.in SEA)*	*100.0E-101.0E, 13.4N-14.3N*
M6	*ROM*	*Rome (incl.in SIT)*	*11.6E-13.7E, 41.2N-42.8N*	*M8*	*MAN*	*Manila (incl.in NPH)*	*120.5E-121.5E, 14.0N-15.0N*
M7	*MUN*	*Munich (incl.in SGE)*	*10.4E-12.0E, 47.9N-49.0N*	*M9*	*TAI*	*Taipei (incl.in TAW)*	*120.8E-122.0E, 24.8N-25.7N*

To Section 4.2.3: Linking and partitioning modelled source region emissions to observations (considering all uptakes)

Table S4: Trajectory-based emission contributions from different source regions (left from EMeRGe-Europe, right EMeRGe-Asia), listed according to temporal frequency and magnitude (contribution in %, flight time in min, uptake sum in kg). Mixtures (of significant uptakes) from different sources regions are indicated by hyphens, e.g. "IRE-SGB". MPCs are highlighted with bold letters. Contributions of less than 10 minutes flight time are omitted. The upper part indicates the overview (sums) of both campaigns. For full names of source regions see Table 4 in the main document.

EMeRGe-Europe

observations linked to	Contribution to total flight time [%]	linked flight time [min]	uptake sum [kg]
no up-take	35.4	1103	0
all uptakes	64.6 (**32.1**)	2017 (**1004**)	42.0 (**31.3**)
*non-mixed (**MPCs**)*	*19.3 (**3.6**)*	*603 (**114**)*	*3.3 (**0.5**)*
*mixture (**MPCs involved**)*	*45.3 (**28.4**)*	*1414 (**889**)*	*38.7 (**30.8**)*
EM-EU (7 flights)	100	3120	42.0

source region(s)/ **MPCs**	Contribution to total flight time [%]	linked flight time [min]	uptake sum [kg]
NAT	3.4	106.0	0.0
IBE	3.1	98.0	0.2
USA	2.5	78.0	0.8
CAN	2.4	75.0	0.1
IBE-**MAD**	2.0	63.0	0.4
MAD	1.9	59.0	0.3
CAN-USA	1.0	32.0	0.3
SFR	1.0	32.0	0.6
MUN	1.0	32.0	0.1
NAF	1.0	30.0	0.1
NEU	0.9	29.0	0.1
SFR-IBE-UA	0.9	28.0	0.2
BNR-NEU	0.9	27.0	1.6
IBE-NAF	0.7	21.0	0.2
NAT-SFR-UA	0.6	20.0	0.2
NAT-IRE-SGB-**LON**	0.6	19.0	0.7
NAT-SFR-IBE-UA	0.6	18.0	0.2
SFR-NIT-**POV**-UA	0.6	18.0	1.2
NFR-SGE-**PAR-MUN**	0.5	17.0	0.7
IBE-UA	0.5	17.0	0.1
USA-SFR-UA	0.5	16.0	0.3
UA	0.5	16.0	0.0
CAN-**MUN**	0.5	15.0	0.2
USA-NAT-IRE-SGB	0.5	15.0	0.3
NAT-SFR	0.5	15.0	0.1
SFR-IBE-**BAR**-UA	0.5	15.0	0.2
NFR	0.4	14.0	0.0
SFR-IBE	0.4	14.0	0.1
NAT-IRE-SGB	0.4	13.0	0.3
NAT-SGB-**LON**	0.4	13.0	0.4
NAT-SFR-IBE-**BAR**-UA	0.4	13.0	0.1
SGB-**LON**	0.4	12.0	0.1
NIT-EEU-**POV**	0.4	12.0	0.4
USA-SFR	0.4	11.0	0.2
IBE-NAF-UA	0.4	11.0	0.3
IBE-NAF-**MAD**	0.3	10.0	0.2
NEU-EEU	0.3	10.0	0.1
POV	0.3	10.0	0.1

EMeRGe-Asia

observations linked to	Contribution to total flight time [%]	linked flight time [min]	uptake sum [kg]
no up-take	39.9	2248	0
all uptakes	60.1 (**18.6**)	3392 (**1045**)	454.0 (**398.9**)
*non-mixed (**MPCs**)*	*16.2 (**0.5**)*	*915 (**27**)*	*23.2 (**2.4**)*
*mixture (**MPCs involved**)*	*43.9 (**18.1**)*	*2477 (**1017**)*	*430.8 (**396.5**)*
EM-AS (12 flights)	100	5640	454.0

source region(s)/ **MPCs**	Contribution to total flight time [%]	linked flight time [min]	uptake sum [kg]
TAW-ECS	2.6	145.0	5.8
SEA	2.3	131.0	6.2
WAS	2.2	126.0	1.0
TAW	1.8	99.0	6.1
CCH	1.7	98.0	1.4
ECS	1.7	95.0	0.0
EUA	1.6	88.0	0.8
TAW-JAP-ECS	1.5	87.0	2.5
SCH-TAW-ECS	1.4	80.0	2.5
SCH	1.1	62.0	3.0
WCH	1.0	59.0	0.1
TAW-ECS-**TAI**	1.0	58.0	5.7
UA	0.9	53.0	0.1
TAW-JAP-ECS-**TAI**	0.8	47.0	2.1
NPH-ECS	0.8	47.0	1.2
ECH	0.8	44.0	0.2
ECH-**XBS**	0.8	44.0	5.2
IND	0.7	42.0	1.6
SCH-SEA	0.7	42.0	3.2
CCH-ECH-**XBS**	0.7	40.0	5.0
SEA-UA	0.7	38.0	3.3
ECH-ECS-**XBS**	0.7	38.0	2.1
CCH-ECH	0.6	36.0	0.9
SCH-TAW	0.6	35.0	0.3
IND-SCH	0.6	32.0	5.6
IND-SEA	0.5	31.0	2.0
ECS-UA	0.5	31.0	0.0
JAP	0.5	30.0	0.0
EUA-UA	0.5	28.0	0.3
WCH-CCH	0.5	28.0	0.2
XBS	0.5	26.0	2.4
KOR-JAP-ECS	0.4	25.0	0.4
SEA-NPH-ECS-UA	0.4	21.0	2.0
KOR-ECS	0.4	21.0	0.0
EUA-TAW	0.4	20.0	1.0
CCH-SCH	0.4	20.0	2.7
SEA-ECS-UA	0.4	20.0	1.7
NPH-**MAN**	0.4	20.0	6.3
NEC-JAP-ECS	0.3	19.0	1.6
JAP-ECS	0.3	19.0	0.2
SEA-TAW-ECS-UA	0.3	18.0	1.9
TAW-**TAI**	0.3	18.0	0.4
ECS-XBS	0.3	18.0	2.3

				IND-SCH-SEA	0.3	17.0	2.0
				SCH-TAW-JAP-ECS	0.3	17.0	0.1
				SCH-ECS-UA	0.3	17.0	0.0
				TAW-NEC-KOR-ECS	0.3	17.0	2.2
				TAW-KOR-JAP-ECS	0.3	17.0	1.2
				TAW-KOR-JAP-ECS-**TAI**	0.3	17.0	1.0
				KOR-JAP	0.3	16.0	0.5
				EUA-WAS	0.3	15.0	0.3
				NPH-ECS-**MAN**	0.3	15.0	4.1
				TAW-NEC-KOR-JAP-ECS-**TAI**	0.3	14.0	4.4
				TAW-NEC-KOR-JAP-ECS	0.2	14.0	0.3
				NPH	0.2	14.0	0.3
				TAW-ECS-UA	0.2	12.0	1.8
				SCH-TAW-ECS-UA	0.2	12.0	1.7
				TAW-KOR-ECS-**TAI**	0.2	12.0	1.2
				EUA-TAW-**TAI**	0.2	11.0	0.5
				SEA-NPH-JAP-ECS-UA	0.2	11.0	1.7
				TAW-JAP-ECS-UA	0.2	10.0	0.2
				ECH-TAW-NEC-KOR-JAP-ECS-**YAN-XBS-TAI**	0.2	10.0	9.4
				WAS-CCH	0.2	10.0	0.1
				CCH-SCH-SEA	0.2	10.0	0.5
∑	33.6	1054	11.5	∑	41.8	2367	124.8

To obtain significant CO uptakes (as described in section 4.2.3 in the main document), we omit uptakes below 2.6 g CO (EMeRGe-Europe) and 20.6 g CO (EMeRGe-Asia), respectively. The sum of all small uptakes below the given thresholds add up to 5 % of the total CO uptake sum of the respective campaign part. However, we investigated also smaller and larger thresholds (0.25, 0.5, 2, 4 and 8 times) as well. The larger the threshold, the more source regions with large emission uptake sums dominate, and the smaller the overall contributing number of source regions. However, the dominating source regions do not change when applying these thresholds, only their contribution to the flight time. The selected filter is a compromise of neglecting small uptakes and obtaining a sufficient data basis to assess chemical fingerprints.

References

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