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Organic carbon at a remote site of the western Mediterranean Basin: sources and chemistry during the ChArMEx SOP2 field experiment

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Supplementary material 1: Lists of compounds contained in the different VOC standards used for PTR-ToFMS calibration

Species OVOC cylinder (Praxair)	Mixing ratios (ppm)	Species HC cylinder (Praxair)	Mixing ratios (ppm)	Species Canister (Restek)	Mixing ratios (ppm)
Methanol	2.15	Acetonitrile	0.63	Méthanol	1,05
Acetaldehyde	1.43	Acrylonitrile	0.51	Acetonitrile	1,06
Acetone	4.50	Benzene	0.96	Acétaldéhyde	1,04
Methyl Ethyl Ketone	1.40	Toluene	0.91	Acroléine	0,91
2-Methylfuran	1.51	EthylBenzene	0.80	Acétone	0,99
Acrolein	1.48	1,2,4-TrimethylBenzene	0.52	Isoprène	0,94
Methacrolein	1.65	Styrene	0.71	Crotonaldehyde	0,92
Methyl Vinyl Ketone	1.54	Alpha-Pinene	1.07	2-Butanone	0,97
3-Methyl-2-buten-1-ol	0.60	Methyl Sulfur	1.14	Benzène	0,99
				Toluène	0,93
				o-Xylène	0,97
				Chlorobenzène	0,98
				a-Pinène	0,97
				1,2-Dichlorobenzène	1,04
				1, 2, 4-Trichlorobenzène	1,00

Supplementary material 2: Lists of compounds contained in the different VOC standards used for GC calibration

Species OVOC cylinder (Praxair)	Mixing ratios (ppm)	Species HC cylinder (NPL)	Mixing ratios (ppb)
Furane	2.96	ethane	1.85
2-méthyl furane	2.98	ethylene	1.83
Toluène	2.98	propane	1.82
Acétaldéhyde	3.04	propene	1.8
ETBE	2.93	isobutane	1.83
Tert-butylmethylether (MTBE)	3.31	acetylene	1.87
Tert-amylethylether (TAME)	3.34	butane	1.78
Méthacroleine	2.96	T2-butene	1.78
Acétonitrile	2.86	1-butene	1.75
Butanal	3	C2-butene	1.75
Acétone	2.95	isopentane	1.78
Pentanal	3.43	pentane	1.8
MVK	2.98	1,3-butadiène	1.8
Acétate d'éthyle	3	T2-pentene	1.72
2-Butanone	3	1-pentene	1.75
Ethanol	3.15	isoprène	1.78
Hexanal	3.36	2methylpentane	1.78
Isopropanol	3.08	hexane	1.78
2-pentanone	3.39	benzene	1.79
Heptanal	3.39	isooctane	1.79
4methyl2pentanone(MIBK)	3.39	heptane	1.76
Isobutanol	3.15	toluene	1.77
Tert-butanol	3.39	octane	1.77
Acétate de butyle	3	ethylbenzene	2.12
2hexanone	3.39	m+p-xylene	4.2
Butanol	3.09	o-xylene	2.19
Benzaldéhyde	2.96	135-trimethylbenzene	2.18
2heptanone	3.39	124-trimethylbenzene	2.27
3-Methyl2buten-1-ol	3.39	123-trimethylbenzene	2.12
		alpha-pinene	2.03
		beta-pinene	1.95
		limonene	2.01

Supplementary material 3: Intercomparison of aerosol measurements

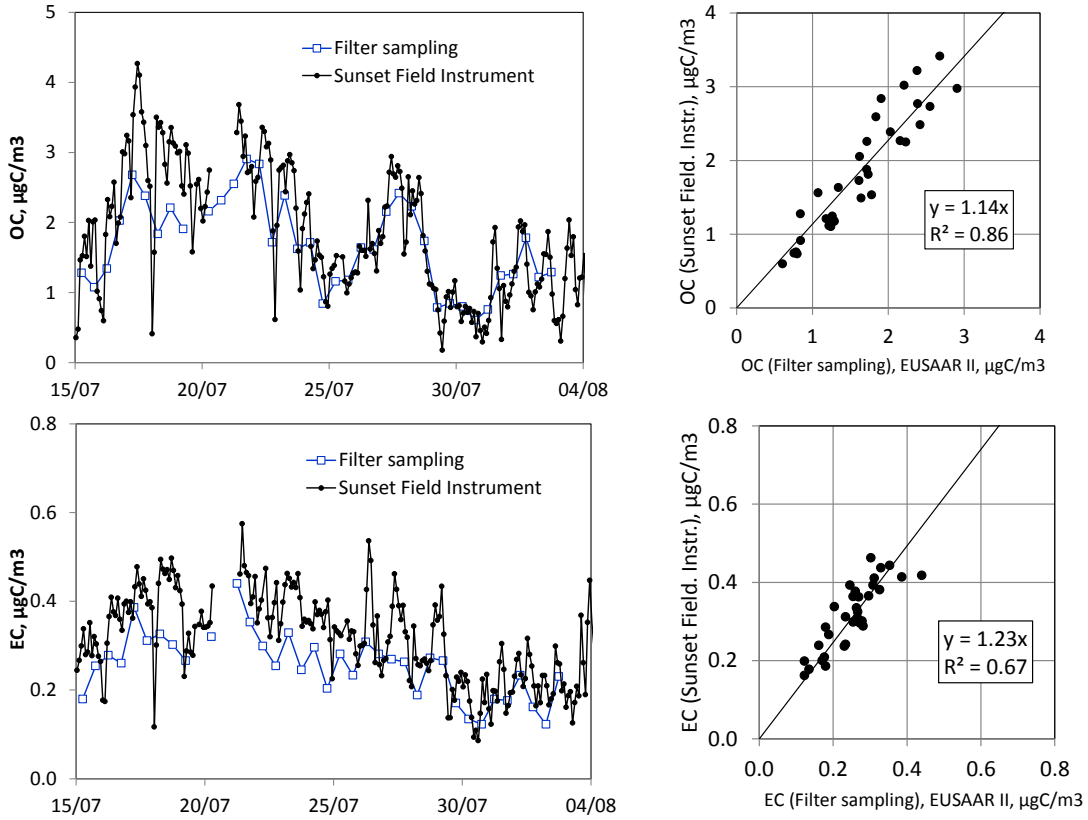

Figure S3a: Comparison of EC and OC from off-line and on-line measurements

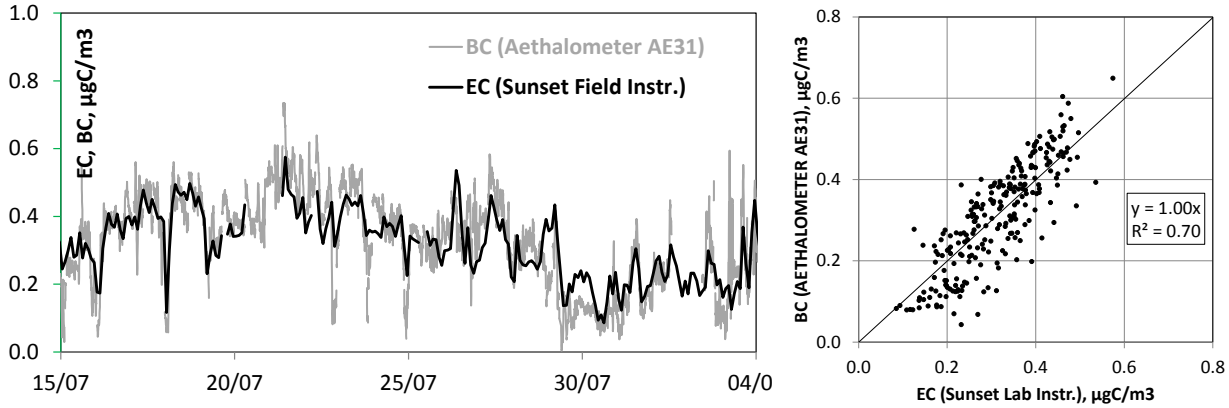

Figure S3b: Comparison between EC (online OCEC Sunset Field Instrument) and BC (Aethalometer AE31) measurements.

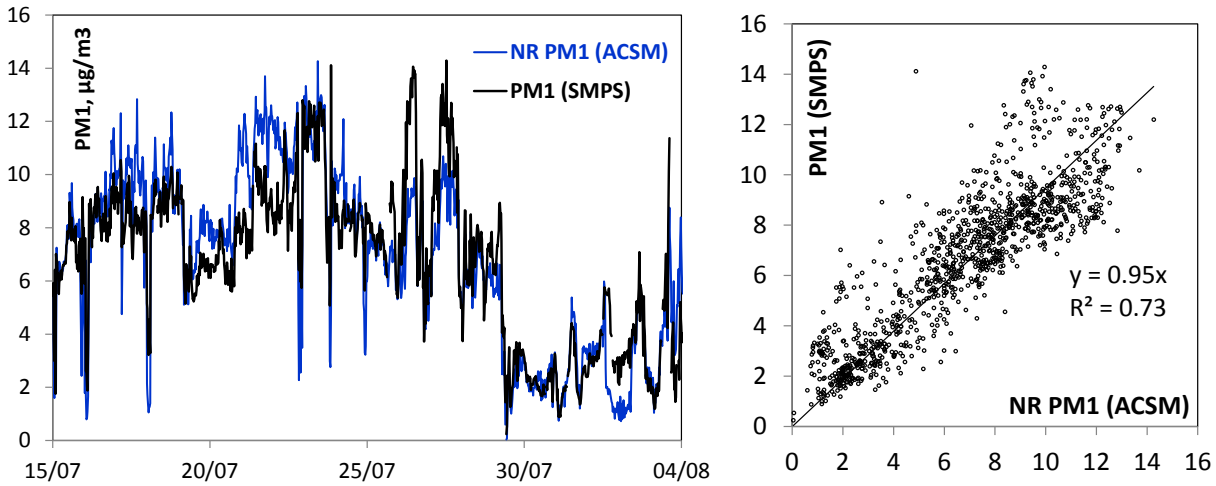

Figure S3c: Comparison of NR-PM1 from ACSM with PM1 data derived from SMPS measurements (using a constant density of 1.4).

Supplementary material 4: Comparison of alkane ratios obtained during the ChArMEx SOP2 field campaign in Cape Corsica to ratios obtained for receptor sites of different typologies.

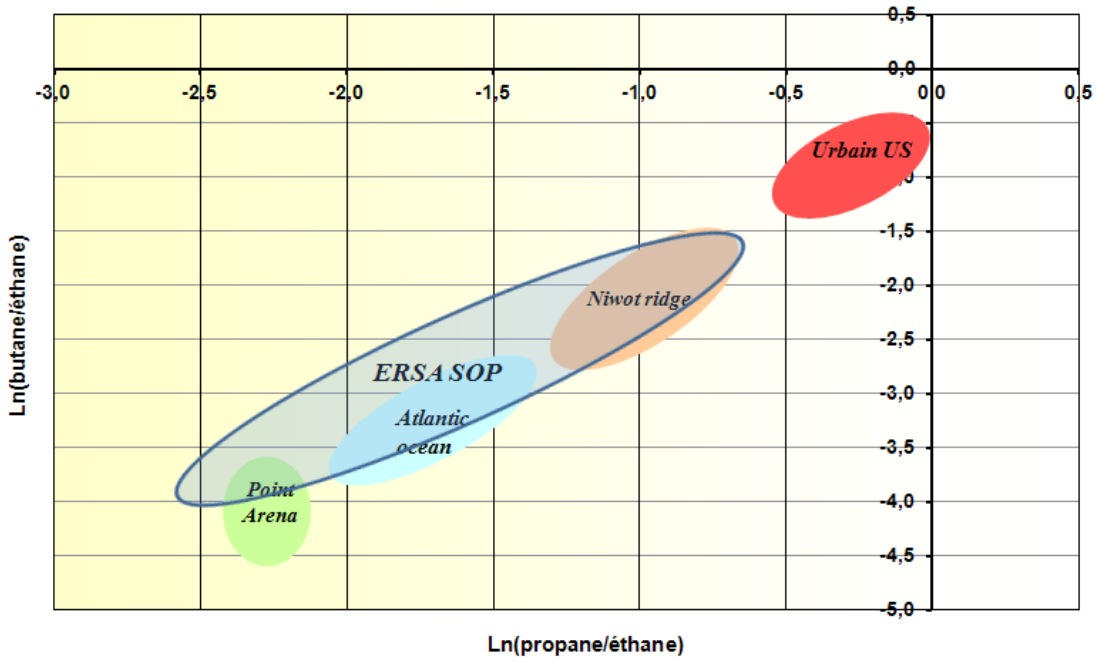

Figure S3: Evolution of Ln(butane/ethane) as a function of Ln(propane/ethane) represented as graphic areas for different receptor site typologies (Parrish et al., 1992) and for the ChArMEx SOP2 field campaign in Cape Corsica (blue ellipse). The sites have been chosen because they are characteristic of environments close to sources up to very remote areas (Urban, Niwot Ridge: remote continental site, Atlantic Ocean: remote oceanic site, Point Arena: highly remote site).

Supplementary material 5: dataset and statistics (mean and standard deviation) of species used for PMF analysis

	Mean (ppt)	standard deviation (ppt)		Mean (ppt)	standard deviation (ppt)
ethane	864	161	MVK+MACR	134	158
ethylene	165	45	propionic acid	282	98
propane	176	72	EVK	51	28
propene	28	14	butyric acid	71	35
isobutane	44	13	C8-aromatics	24	17
acetylene	92	49	C9-aromatics	12	7
butane	57	22	Monoterpenes	413	449
isopentane	29	20	Nopinone	45	48
pentane	12	10	Pinonaldehyde	13	13
2methyl2butene+1-pentene	11	7	prod terpenes 1	15	16
benzene	27	11	prod terpenes 2	10	7
toluene	59	11	prod terpenes 3	27	13
o-xylene	3	2	prod terpenes 4	10	7
undecane + camphor	13	12	MGLYOX	168	60
Methanol	3144	982	MEK	86	34
Acetonitrile	149	35	2methylfuran	134	18
Acetaldehyde	330	113	ethyl acetate	87	46
formic acid	1566	703	Hexanal	85	34
Acétone	2564	521	ethanol	196	69
acetic acid	1162	391	isopropanol	38	20
isoprene	198	222	butyl acetate	30	12

Supplementary material 6: Results of mapping of bootstrap factors to base run factors from the VOC PMF analysis

	Base Factor 1	Base Factor 2	Base Factor 3	Base Factor 4	Base Factor 5	Base Factor 6	Unmapped
boot Factor 1	100	0	0	0	0	0	0
boot Factor 2	0	86	0	3	0	0	11
boot Factor 3	0	0	100	0	0	0	0
boot Factor 4	0	4	0	89	1	0	6
boot Factor 5	0	0	0	0	88	0	12
boot Factor 6	0	0	0	0	0	100	0

Supplementary material 7: Repartition of measured VOCs

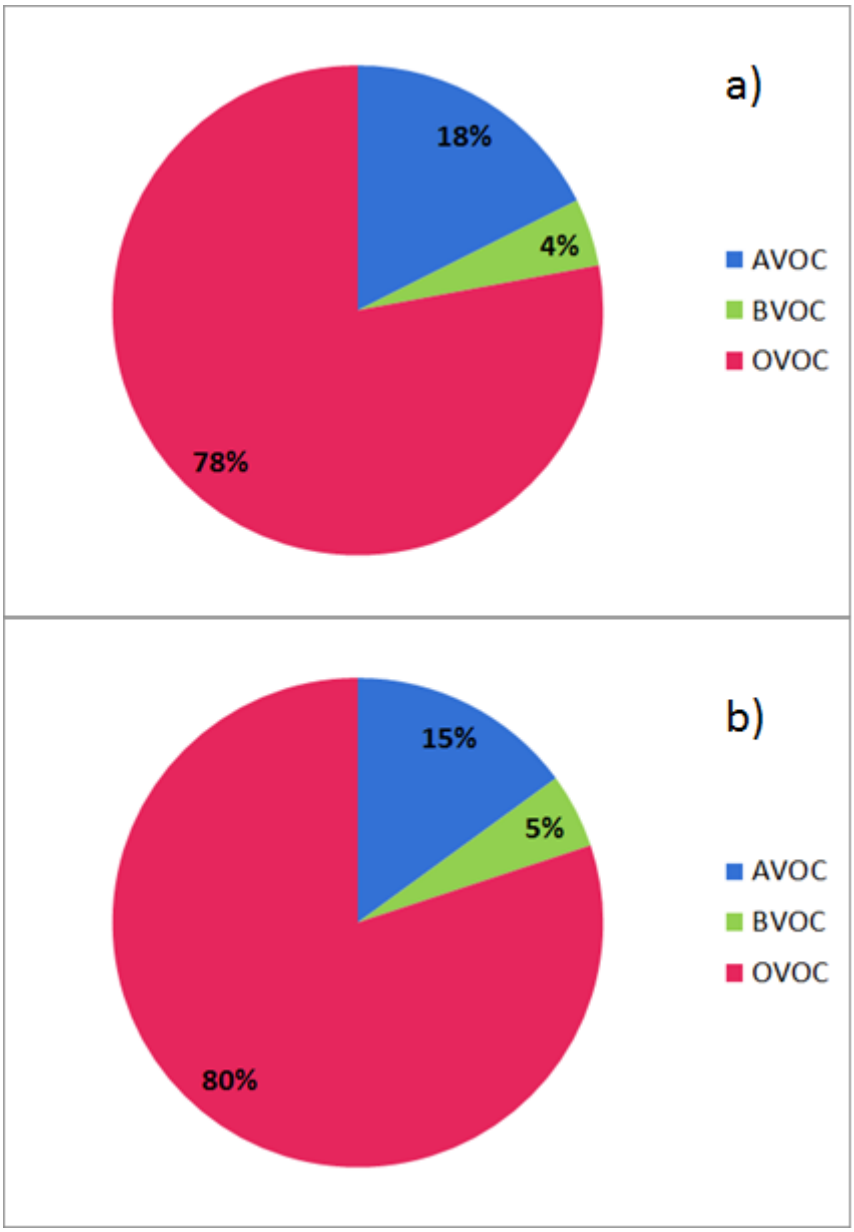

Figure S6: Distribution of the VOC families (AVOC: Anthropogenic non methane hydrocarbons, BVOC: Biogenic hydrocarbons, OVOC: Oxygenated VOCs including primary and secondary VOCs from anthropogenic and biogenic origins) at cape Corsica during the ChArMEx SOP2 field campaign, calculated from the full VOC database not including DNPH cartridges measurements (Top panel a) and from the database used for PMF analysis (Bottom panel b).

Supplementary material 8: Distribution of PMF factor contributions to the sum of species included in the database used for PMF analysis

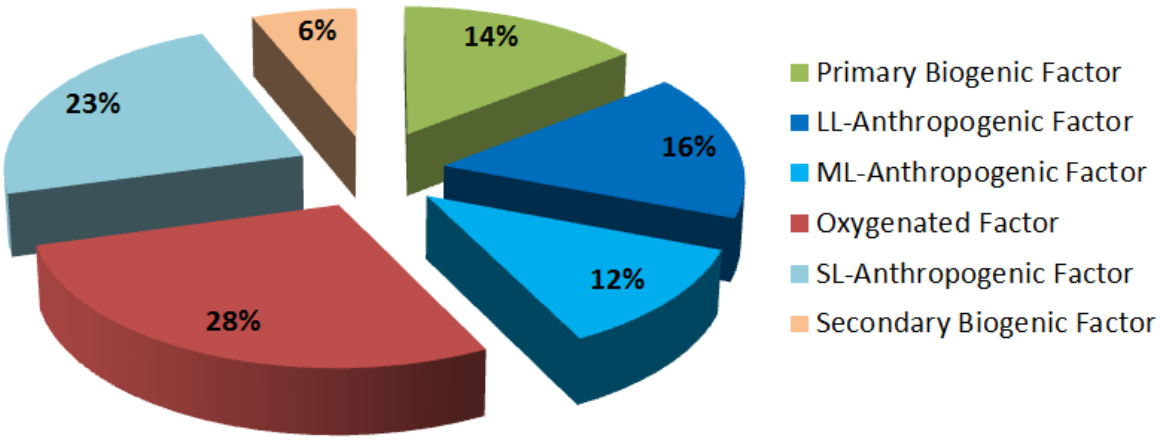

Figure S7: The relative contributions of the different PMF factors to the sum of species used as inputs.

Supplementary material 9: Scatter plots of various parameters with contribution of PMF factors

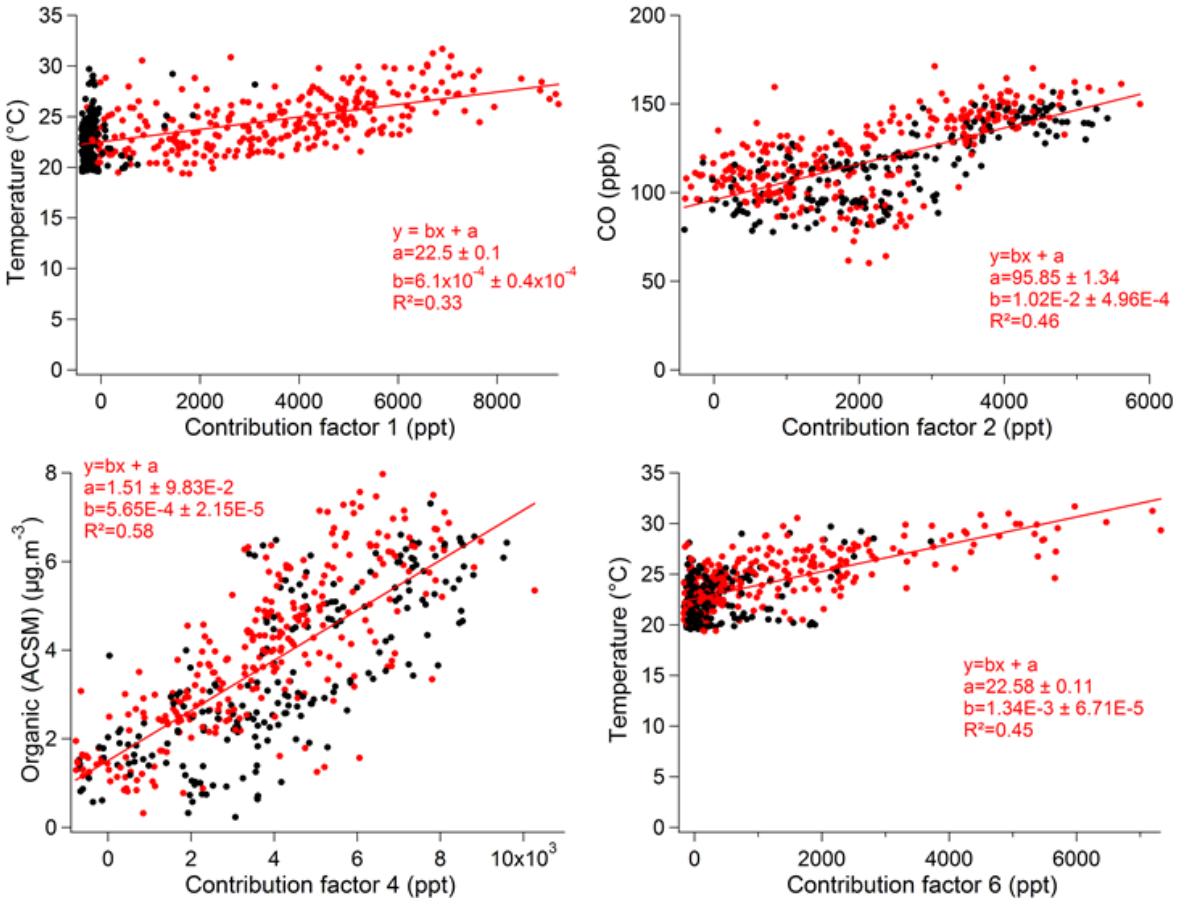

Figure S8: Scatter plots of temperature vs. contribution of factor 1 (top left), mixing ratios of CO vs. contribution of factor 2 (top right), organic fraction of aerosols vs. contribution of factor 4 (bottom left), and temperature vs. contribution of factor 6 (bottom right). Every scatter plots have been color-coded according to the period of the day (daytime: 07:00-20:00 local time in red; nighttime: 21:00-06:00 local time in black).

Supplementary material 10: Diurnal Profile of Factor contributions

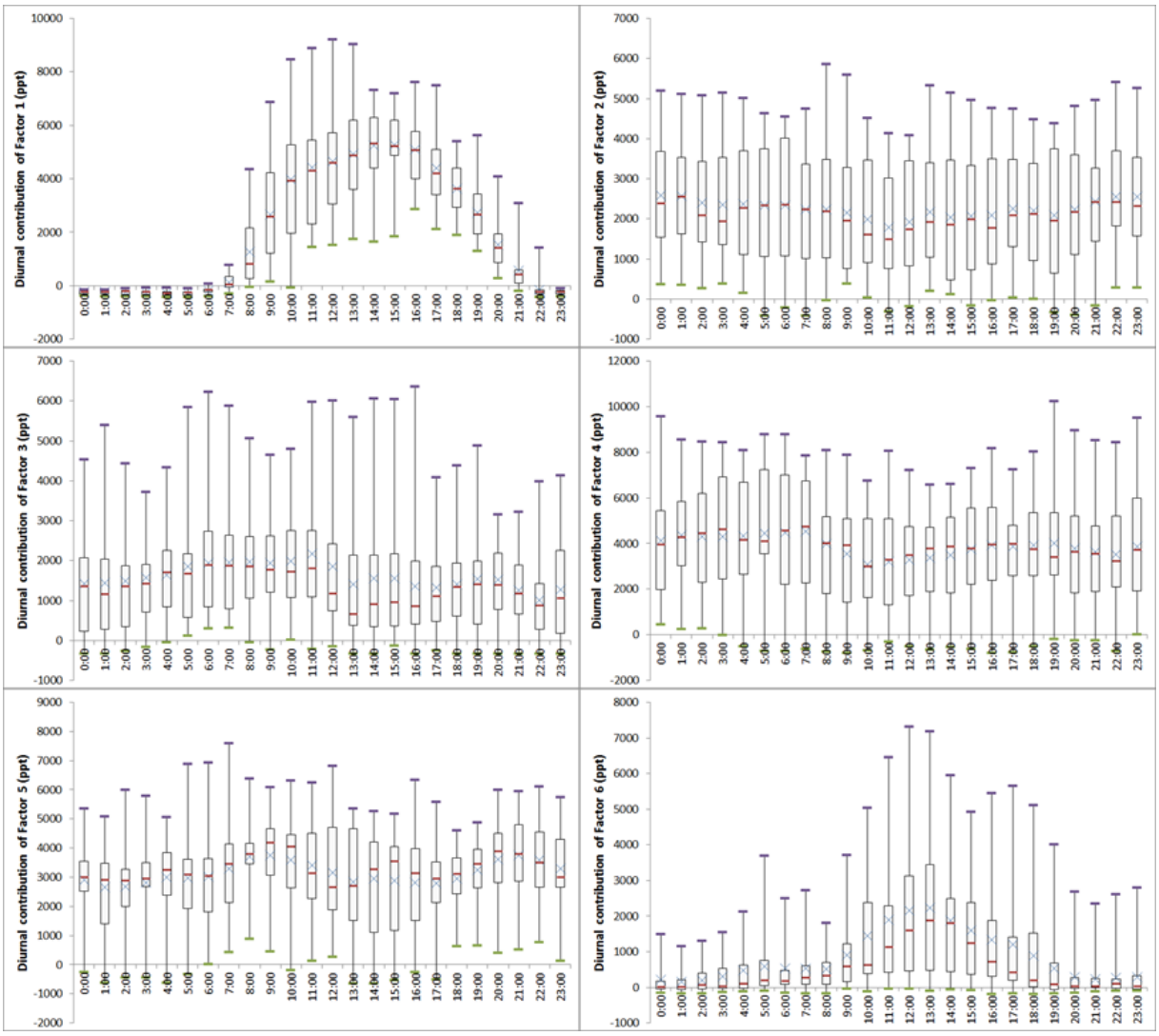

Figure S9: Diurnal profiles (Boxplots) of contributions of PMF factors during the ChArMEx SOP2 field campaign. Purple bars represent the maxima of the campaign, green bars the minima of the campaign, red bars the medians of the campaign, blue crosses the averages of the campaign, and the side of the boxes: the first (bottom) and the third (top) quartiles of the campaign.

Supplementary material 11: Diurnal profiles of OOA

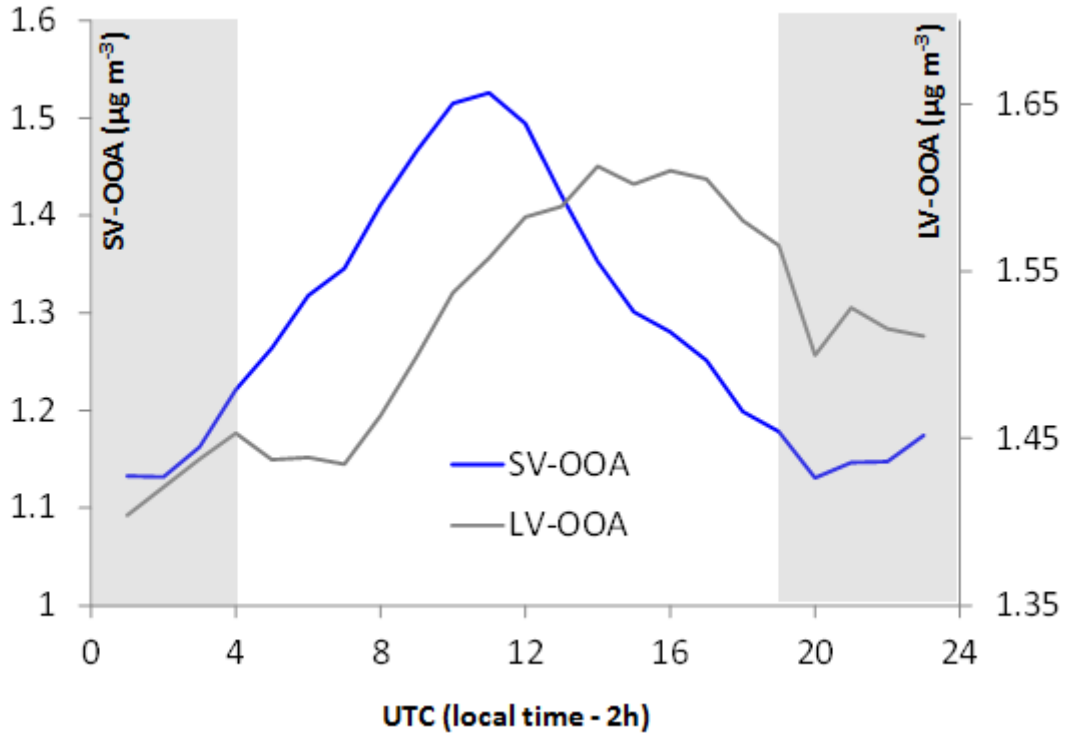

Figure S10: Diurnal variability of SV-OOA (blue line) and LV-OOA (grey line) at Cape Corsica. Grey zones correspond to nighttime.

References

Parrish, D. D., Hahn, C. J., Williams, E. J., Norton, R. B., and Fehsenfeld, F. C.: Indications of photochemical histories of pacific air masses from measurements of atmospheric trace species at Point Arena, California, J. Geophys. Res.-Atmos., 97, 15883– 15901, 1992.