Supplementary materials

2012-2013	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
O3 (µg.m^{-3})	49.6	59.5	68.4	77.6	76.2	76.6	75.3	71.6	66.8	51.1	45.1	47.8
O3 (ppbv)	24.9	29.8	34.3	38.9	38.2	38.4	37.7	35.9	33.5	25.6	22.6	24

Table S1: annual cycle of mean O_3 concentrations over the 2012-2023 period at OPE.

parameter	unit	slope	Lower estimate	Upper estimate	p	pstar
^{7}Be	µBq.m^{-3} per year	68,13	22,89	120,90	0,00	**
^{22}Na	µBq.m^{-3} per year	0,01	0,00	0,01	0,05	+
O_3 MeanAft	µg.m^{-3} per year	0,22	-0,10	0,59	0,24	
NO_x MeanAft	µg.m^{-3} per year	-0,59	-0,71	-0,48	0,00	***
CH_4 MeanAft	ppbv per year	9,24	8,41	9,96	0,00	***
CO MeanAft	ppbv per year	-0,79	-1,34	-0,25	0,00	**
BLH MeanAft	m per year	8,80	3,36	14,83	0,00	**
O_3 MeanNight	µg.m^{-3} per year	0,37	0,12	0,77	0,01	**
NO_x MeanNight	µg.m^{-3} per year	-0,66	-0,80	-0,56	0,00	***
CH_4 MeanNight	ppbv per year	9,09	8,13	9,99	0,00	***
CO MeanNight	ppbv per year	-0,93	-1,58	-0,27	0,00	**
BLH MeanNighth	m per year	1,70	-2,21	5,29	0,38	
O_3 q5	µg.m^{-3} per year	0,71	0,40	1,03	0,00	***
NO_x q5	µg.m^{-3} per year	-0,38	-0,46	-0,32	0,00	***
CH_4 q5	ppbv per year	9,66	9,03	10,24	0,00	***
CO q5	ppbv per year	-0,40	-0,82	0,08	0,11	
O_3 q95	µg.m^{-3} per year	-0,07	-0,42	0,33	0,64	
NO_x q95	µg.m^{-3} per year	-1,03	-1,26	-0,83	0,00	***
CH_4 q95	ppbv per year	8,26	6,98	9,47	0,00	***
CO q95	ppbv per year	-2,11	-3,21	-1,03	0,00	***
TM	°C per year	0,13	0,05	0,20	0,00	***
Solar radiation	W.m^{-2} per year	10,11	3,22	16,70	0,00	**
Rainfall	mm per year	-0,24	-0,71	0,25	0,37	
Sunspot number	nb per year	-5,26	-8,62	-1,41	0,02	*

Table S2: Linear trend slope estimates with their upper/lower interval and confidence levels using the TheilSen method for the different deseasonalized O3 indicators, meteorological parameters and other tracers over the 2012-2023 period at OPE. The pstar displayed the significance level according to the p value p<0.001 = ***, p< 0.01 = **, p < 0.05 = * and p <$0.1 = +.

	Tmean	RH	Spec Hum	SolarRad	Rain	Sunspot Nb	BLH Aft	BLH Night	Na22	Be7	Be7/Na22 ratio	O3 q95	O3 q5	O3 Aft	O3 Night	PM10 Aft	NOX Aft	NOX Night	CH4 Night	CH4 Aft	CO Night	CO Aft
Tmean	1	-0.4	0.63	0.35	0.03	0.07	0.19	-0.01	0.45	0.47	-0.14	0.51	0.44	0.54	0.53	0.09	-0.26	-0.24	-0.28	-0.36	-0.33	-0.37
RH	-0.4	1	0.35	-0.8	0.4	-0.06	-0.43	0.2	-0.64	-0.69	0.13	-0.58	-0.39	-0.63	-0.49	-0.38	-0.1	-0.19	-0.1	0.01	-0.18	-0.1
Spec Hum	0.63	0.35	1	-0.25	0.31	-0.02	-0.24	0.09	-0.02	-0.01	-0.06	0.06	0.11	0.05	0.12	-0.12	-0.3	-0.33	-0.3	-0.31	-0.36	-0.34
SolarRad	0.35	-0.8	-0.25	1	-0.45	0.09	0.3	-0.36	0.54	0.55	-0.09	0.51	0.27	0.56	0.31	0.39	0.15	0.25	0.18	0.06	0.23	0.16
Rain	0.03	0.4	0.31	-0.45	1	-0.07	0.04	0.49	-0.2	-0.23	0	-0.09	0.12	-0.08	0.11	-0.33	-0.29	-0.33	-0.37	-0.31	-0.32	-0.29
Sunspot Nb	0.07	-0.06	-0.02	0.09	-0.07	1	0.04	0	0.11	0.06	-0.05	0.06	0.07	0.08	0.07	0.04	-0.02	0	0.05	0.04	-0.04	-0.04
BLH Aft	0.19	-0.43	-0.24	0.3	0.04	0.04	1	0.44	0.19	0.2	-0.04	0.42	0.54	0.51	0.55	-0.14	-0.31	-0.26	-0.34	-0.37	-0.26	-0.26
BLH Night	-0.01	0.2	0.09	-0.36	0.49	0	0.44	1	-0.19	-0.19	0	-0.04	0.37	0.03	0.29	-0.4	-0.44	-0.48	-0.56	-0.5	-0.46	-0.42
Na22	0.45	-0.64	-0.02	0.54	-0.2	0.11	0.19	-0.19	1	0.9	-0.33	0.54	0.4	0.57	0.48	0.35	0.07	0.13	0.1	0.01	0.17	0.11
Be7	0.47	-0.69	-0.01	0.55	-0.23	0.06	0.2	-0.19	0.9	1	-0.22	0.57	0.41	0.59	0.5	0.37	0.07	0.12	0.08	0	0.16	0.1
Be7/Na22 ratio	-0.14	0.13	-0.06	-0.09	0	-0.05	-0.04	0	-0.33	-0.22	1	-0.1	-0.12	-0.1	-0.1	-0.05	0.02	-0.02	0.01	0.02	0.02	0.03
O3 q95	0.51	-0.58	0.06	0.51	-0.09	0.06	0.42	-0.04	0.54	0.57	-0.1	1	0.54	0.88	0.77	0.2	-0.14	-0.09	-0.04	-0.09	0.01	-0.02
O3 q5	0.44	-0.39	0.11	0.27	0.12	0.07	0.54	0.37	0.4	0.41	-0.12	0.54	1	0.7	0.77	-0.12	-0.47	-0.46	-0.43	-0.45	-0.36	-0.37
O3 Aft	0.54	-0.63	0.05	0.56	-0.08	0.08	0.51	0.03	0.57	0.59	-0.1	0.88	0.7	1	0.85	0.14	-0.27	-0.19	-0.14	-0.22	-0.09	-0.13
O3 Night	0.53	-0.49	0.12	0.31	0.11	0.07	0.55	0.29	0.48	0.5	-0.1	0.77	0.77	0.85	1	-0.04	-0.38	-0.4	-0.39	-0.38	-0.29	-0.28
PM10 Aft	0.09	-0.38	-0.12	0.39	-0.33	0.04	-0.14	-0.4	0.35	0.37	-0.05	0.2	-0.12	0.14	-0.04	1	0.46	0.49	0.44	0.41	0.47	0.46
NOX Aft	-0.26	-0.1	-0.3	0.15	-0.29	-0.02	-0.31	-0.44	0.07	0.07	0.02	-0.14	-0.47	-0.27	-0.38	0.46	1	0.9	0.6	0.6	0.61	0.59
NOX Night	-0.24	-0.19	-0.33	0.25	-0.33	0	-0.26	-0.48	0.13	0.12	-0.02	-0.09	-0.46	-0.19	-0.4	0.49	0.9	1	0.66	0.58	0.66	0.57
CH4 Night	-0.28	-0.1	-0.3	0.18	-0.37	0.05	-0.34	-0.56	0.1	0.08	0.01	-0.04	-0.43	-0.14	-0.39	0.44	0.6	0.66	1	0.89	0.74	0.71
CH4 Aft	-0.36	0.01	-0.31	0.06	-0.31	0.04	-0.37	-0.5	0.01	0	0.02	-0.09	-0.45	-0.22	-0.38	0.41	0.6	0.58	0.89	1	0.66	0.72
CO Night	-0.33	-0.18	-0.36	0.23	-0.32	-0.04	-0.26	-0.46	0.17	0.16	0.02	0.01	-0.36	-0.09	-0.29	0.47	0.61	0.66	0.74	0.66	1	0.93
CO Aft	-0.37	-0.1	-0.34	0.16	-0.29	-0.04	-0.26	-0.42	0.11	0.1	0.03	-0.02	-0.37	-0.13	-0.28	0.46	0.59	0.57	0.71	0.72	0.93	1

Table S3: Cross-Correlation matrix computed using weekly residuals of temperature, humidity, solar radiation, precipitation, BLH, 22Na, 7Be, 7Be/ 22Na ratio and several parameters derived from hourly O3, PM10, NOx, CH4 and CO over the period 2012-2023 at OPE

	Tmean	RH	Spec Hum	SolarRad	Rain	Sunspot Nb	BLH Aft	BLH Night	Na22	Be7	Be7/Na22 ratio	O3 q95	O3 q5	O3 Aft	O3 Night	PM10 Aft	NOX Aft	NOX Night	CH4 Night	CH4 Aft	CO Night	CO Aft
Tmean	1	-0.61	0.4	0.58	-0.24	0.02	0.2	-0.43	0.59	0.64	-0.22	0.63	0.43	0.63	0.6	0.39	0.13	0.18	0.15	0.11	0.22	0.2
RH	-0.61	1	0.44	-0.84	0.44	-0.09	-0.65	0.28	-0.64	-0.69	0.18	-0.66	-0.62	-0.72	-0.68	-0.36	-0.14	-0.3	-0.1	0	-0.22	-0.13
Spec Hum	0.4	0.44	1	-0.26	0.22	-0.07	-0.55	-0.2	-0.07	-0.05	-0.04	-0.03	-0.21	-0.1	-0.1	0.05	-0.03	-0.11	0.05	0.1	0.03	0.09
SolarRad	0.58	-0.84	-0.26	1	-0.5	0.13	0.51	-0.39	0.61	0.62	-0.2	0.59	0.53	0.67	0.52	0.38	0.11	0.31	0.18	0.03	0.26	0.18
Rain	-0.24	0.44	0.22	-0.5	1	0.01	-0.31	0.36	-0.25	-0.29	0.08	-0.27	-0.23	-0.33	-0.17	-0.23	-0.07	-0.2	-0.12	-0.01	-0.16	-0.11
Sunspot Nb	0.02	-0.09	-0.07	0.13	0.01	1	0.09	0.08	0.14	0.11	0	0.07	0.12	0.12	0.1	0.14	-0.05	0.01	0.08	0.03	0.11	0.11
BLH Aft	0.2	-0.65	-0.55	0.51	-0.31	0.09	1	0.05	0.34	0.35	-0.04	0.44	0.48	0.48	0.47	0.11	-0.06	0.1	-0.03	-0.13	0.01	-0.02
BLH Night	-0.43	0.28	-0.2	-0.39	0.36	0.08	0.05	1	-0.33	-0.37	0.17	-0.32	-0.01	-0.33	-0.14	-0.29	-0.26	-0.39	-0.34	-0.28	-0.37	-0.32
Na22	0.59	-0.64	-0.07	0.61	-0.25	0.14	0.34	-0.33	1	0.93	-0.45	0.63	0.61	0.7	0.67	0.37	0.16	0.26	0.22	0.14	0.4	0.33
Be7	0.64	-0.69	-0.05	0.62	-0.29	0.11	0.35	-0.37	0.93	1	-0.3	0.7	0.6	0.75	0.7	0.41	0.18	0.29	0.25	0.19	0.4	0.35
Be7/Na22 ratio	-0.22	0.18	-0.04	-0.2	0.08	0	-0.04	0.17	-0.45	-0.3	1	-0.13	-0.17	-0.13	-0.12	-0.11	-0.07	-0.07	-0.04	-0.04	-0.13	-0.11
O3 q95	0.63	-0.66	-0.03	0.59	-0.27	0.07	0.44	-0.32	0.63	0.7	-0.13	1	0.57	0.9	0.82	0.39	0.18	0.29	0.29	0.26	0.42	0.37
O3 q5	0.43	-0.62	-0.21	0.53	-0.23	0.12	0.48	-0.01	0.61	0.6	-0.17	0.57	1	0.67	0.7	0.24	0.02	0.09	0.13	0.08	0.21	0.21
O3 Aft	0.63	-0.72	-0.1	0.67	-0.33	0.12	0.48	-0.33	0.7	0.75	-0.13	0.9	0.67	1	0.86	0.39	0.14	0.3	0.33	0.25	0.45	0.4
O3 Night	0.6	-0.68	-0.1	0.52	-0.17	0.1	0.47	-0.14	0.67	0.7	-0.12	0.82	0.7	0.86	1	0.33	0.08	0.11	0.14	0.14	0.32	0.3
PM10 Aft	0.39	-0.36	0.05	0.38	-0.23	0.14	0.11	-0.29	0.37	0.41	-0.11	0.39	0.24	0.39	0.33	1	0.24	0.29	0.24	0.27	0.33	0.32
NOX Aft	0.13	-0.14	-0.03	0.11	-0.07	-0.05	-0.06	-0.26	0.16	0.18	-0.07	0.18	0.02	0.14	0.08	0.24	1	0.73	0.2	0.25	0.35	0.29
NOX Night	0.18	-0.3	-0.11	0.31	-0.2	0.01	0.1	-0.39	0.26	0.29	-0.07	0.29	0.09	0.3	0.11	0.29	0.73	1	0.33	0.27	0.47	0.33
CH4 Night	0.15	-0.1	0.05	0.18	-0.12	0.08	-0.03	-0.34	0.22	0.25	-0.04	0.29	0.13	0.33	0.14	0.24	0.2	0.33	1	0.81	0.56	0.54
CH4 Aft	0.11	0	0.1	0.03	-0.01	0.03	-0.13	-0.28	0.14	0.19	-0.04	0.26	0.08	0.25	0.14	0.27	0.25	0.27	0.81	1	0.52	0.58
CO Night	0.22	-0.22	0.03	0.26	-0.16	0.11	0.01	-0.37	0.4	0.4	-0.13	0.42	0.21	0.45	0.32	0.33	0.35	0.47	0.56	0.52	1	0.91
CO Aft	0.2	-0.13	0.09	0.18	-0.11	0.11	-0.02	-0.32	0.33	0.35	-0.11	0.37	0.21	0.4	0.3	0.32	0.29	0.33	0.54	0.58	0.91	1

Table S4: Same Cross-Correlation matrix as table S3 but computed only during the AMMJAS period.

	Tmean	RH	Spec Hum	SolarRad	Rain	Sunspot Nb	BLH Aft	BLH Night	Na22	Be7	Be7/Na22 ratio	O3 q95	O3 q5	O3 Aft	O3 Night	PM10 Aft	NOX Aft	NOX Night	CH4 Night	CH4 Aft	CO Night	CO Aft
Tmean	1	0	0.92	-0.21	0.34	0.17	0.23	0.31	0.21	0.19	-0.1	0.45	0.47	0.46	0.48	-0.37	-0.46	-0.45	-0.57	-0.63	-0.61	-0.65
RH	0	1	0.25	-0.73	0.25	-0.01	-0.06	0	-0.61	-0.7	0.13	-0.12	-0.12	-0.24	-0.1	-0.28	-0.08	-0.14	-0.04	0.05	-0.2	-0.1
Spec Hum	0.92	0.25	1	-0.39	0.45	0.12	0.22	0.33	0.03	-0.03	-0.08	0.44	0.45	0.4	0.47	-0.45	-0.51	-0.51	-0.59	-0.62	-0.62	-0.63
SolarRad	-0.21	-0.73	-0.39	1	-0.45	-0.02	-0.28	-0.39	0.4	0.48	-0.04	-0.03	-0.21	0	-0.2	0.46	0.33	0.37	0.3	0.2	0.42	0.32
Rain	0.34	0.25	0.45	-0.45	1	-0.07	0.49	0.62	-0.12	-0.14	-0.01	0.49	0.47	0.43	0.54	-0.43	-0.43	-0.44	-0.56	-0.53	-0.41	-0.38
Sunspot Nb	0.17	-0.01	0.12	-0.02	-0.07	1	-0.03	-0.02	0.09	0.01	-0.11	0	0.04	0.02	0.02	-0.03	-0.02	-0.02	0.01	0.03	-0.13	-0.13
BLH Aft	0.23	-0.06	0.22	-0.28	0.49	-0.03	1	0.85	-0.05	0	-0.05	0.52	0.67	0.65	0.71	-0.54	-0.55	-0.54	-0.63	-0.58	-0.47	-0.45
BLH Night	0.31	0	0.33	-0.39	0.62	-0.02	0.85	1	-0.05	-0.01	-0.06	0.55	0.69	0.61	0.74	-0.5	-0.51	-0.54	-0.68	-0.62	-0.5	-0.47
Na22	0.21	-0.61	0.03	0.4	-0.12	0.09	-0.05	-0.05	1	0.85	-0.39	0.14	0.14	0.16	0.12	0.21	0.02	0.06	-0.02	-0.09	0.08	0
Be7	0.19	-0.7	-0.03	0.48	-0.14	0.01	0	-0.01	0.85	1	-0.17	0.13	0.18	0.17	0.15	0.21	0.02	0.05	-0.06	-0.14	0.09	0
Be7/Na22 ratio	-0.1	0.13	-0.08	-0.04	-0.01	-0.11	-0.05	-0.06	-0.39	-0.17	1	-0.1	-0.11	-0.08	-0.1	-0.01	0.06	0.02	0.04	0.04	0.06	0.08
O3 q95	0.45	-0.12	0.44	-0.03	0.49	0	0.52	0.55	0.14	0.13	-0.1	1	0.66	0.83	0.79	-0.52	-0.61	-0.6	-0.63	-0.66	-0.49	-0.53
O3 q5	0.47	-0.12	0.45	-0.21	0.47	0.04	0.67	0.69	0.14	0.18	-0.11	0.66	1	0.82	0.87	-0.57	-0.7	-0.71	-0.78	-0.76	-0.63	-0.64
O3 Aft	0.46	-0.24	0.4	0	0.43	0.02	0.65	0.61	0.16	0.17	-0.08	0.83	0.82	1	0.9	-0.56	-0.69	-0.65	-0.74	-0.78	-0.59	-0.66
O3 Night	0.48	-0.1	0.47	-0.2	0.54	0.02	0.71	0.74	0.12	0.15	-0.1	0.79	0.87	0.9	1	-0.64	-0.7	-0.76	-0.86	-0.81	-0.68	-0.67
PM10 Aft	-0.37	-0.28	-0.45	0.46	-0.43	-0.03	-0.54	-0.5	0.21	0.21	-0.01	-0.52	-0.57	-0.56	-0.64	1	0.71	0.71	0.64	0.61	0.57	0.57
NOX Aft	-0.46	-0.08	-0.51	0.33	-0.43	-0.02	-0.55	-0.51	0.02	0.02	0.06	-0.61	-0.7	-0.69	-0.7	0.71	1	0.92	0.72	0.7	0.66	0.64
NOX Night	-0.45	-0.14	-0.51	0.37	-0.44	-0.02	-0.54	-0.54	0.06	0.05	0.02	-0.6	-0.71	-0.65	-0.76	0.71	0.92	1	0.77	0.68	0.69	0.61
CH4 Night	-0.57	-0.04	-0.59	0.3	-0.56	0.01	-0.63	-0.68	-0.02	-0.06	0.04	-0.63	-0.78	-0.74	-0.86	0.64	0.72	0.77	1	0.92	0.79	0.75
CH4 Aft	-0.63	0.05	-0.62	0.2	-0.53	0.03	-0.58	-0.62	-0.09	-0.14	0.04	-0.66	-0.76	-0.78	-0.81	0.61	0.7	0.68	0.92	1	0.68	0.76
CO Night	-0.61	-0.2	-0.62	0.42	-0.41	-0.13	-0.47	-0.5	0.08	0.09	0.06	-0.49	-0.63	-0.59	-0.68	0.57	0.66	0.69	0.79	0.68	1	0.93
CO Aft	-0.65	-0.1	-0.63	0.32	-0.38	-0.13	-0.45	-0.47	0	0	0.08	-0.53	-0.64	-0.66	-0.67	0.57	0.64	0.61	0.75	0.76	0.93	1

Table S5: Same Cross-Correlation matrix as table S3 but computed only during the NDJF period.

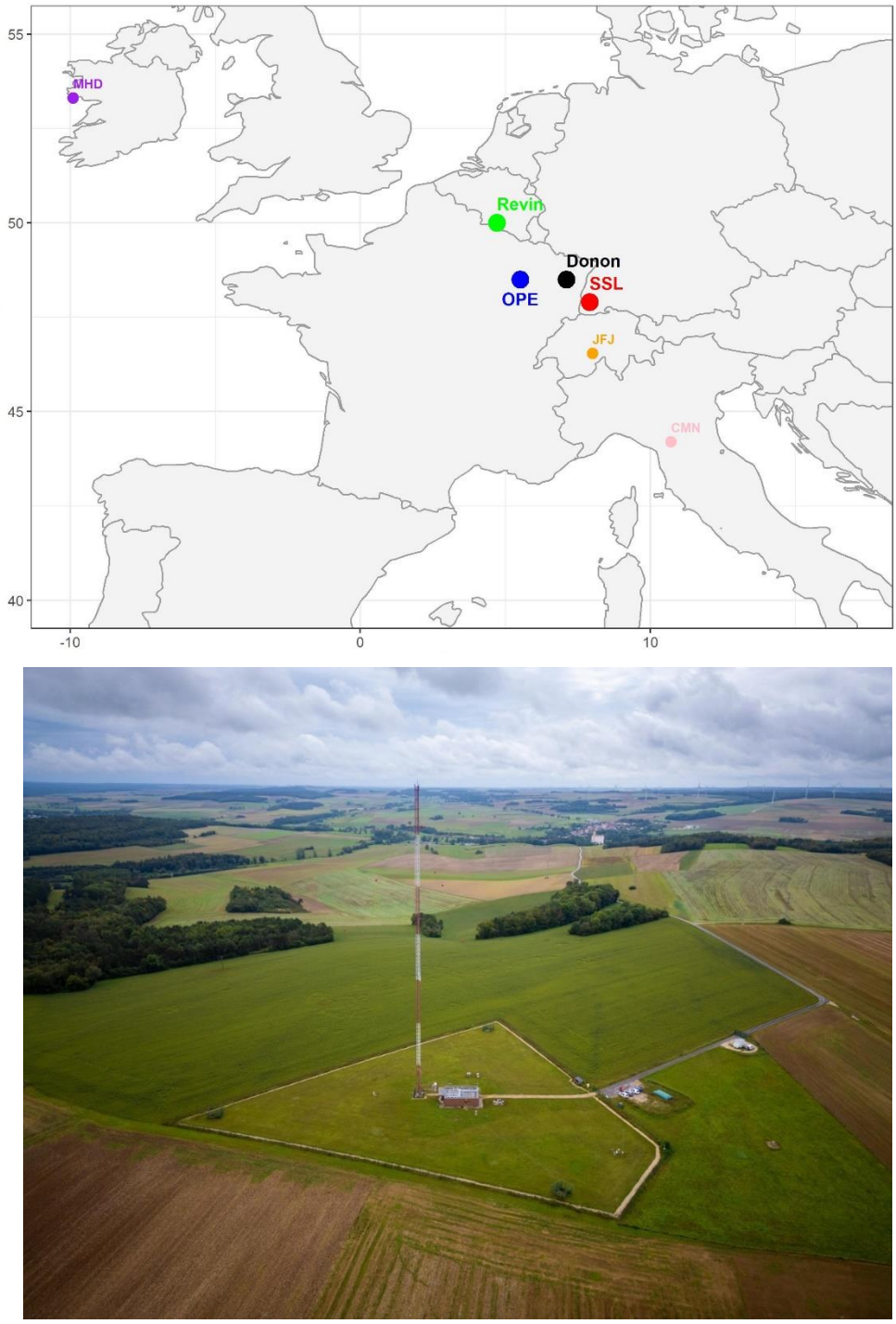


Figure S 1: Geographical location of the OPE atmospheric station (top panel) with REVIN, DONON and SCHAUINSLAND (SSL) stations (as well as MHD, JFJ and CMN for reference) and aerial photograph illustrating the landscape surrounding the station (bottom panel).

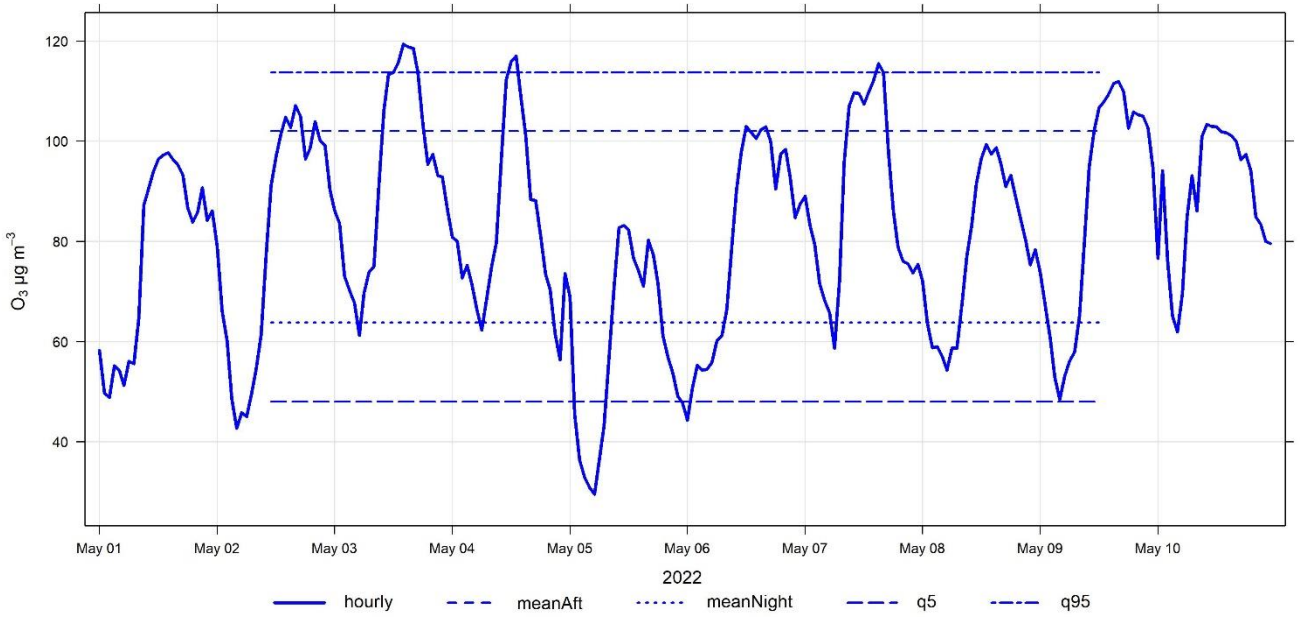
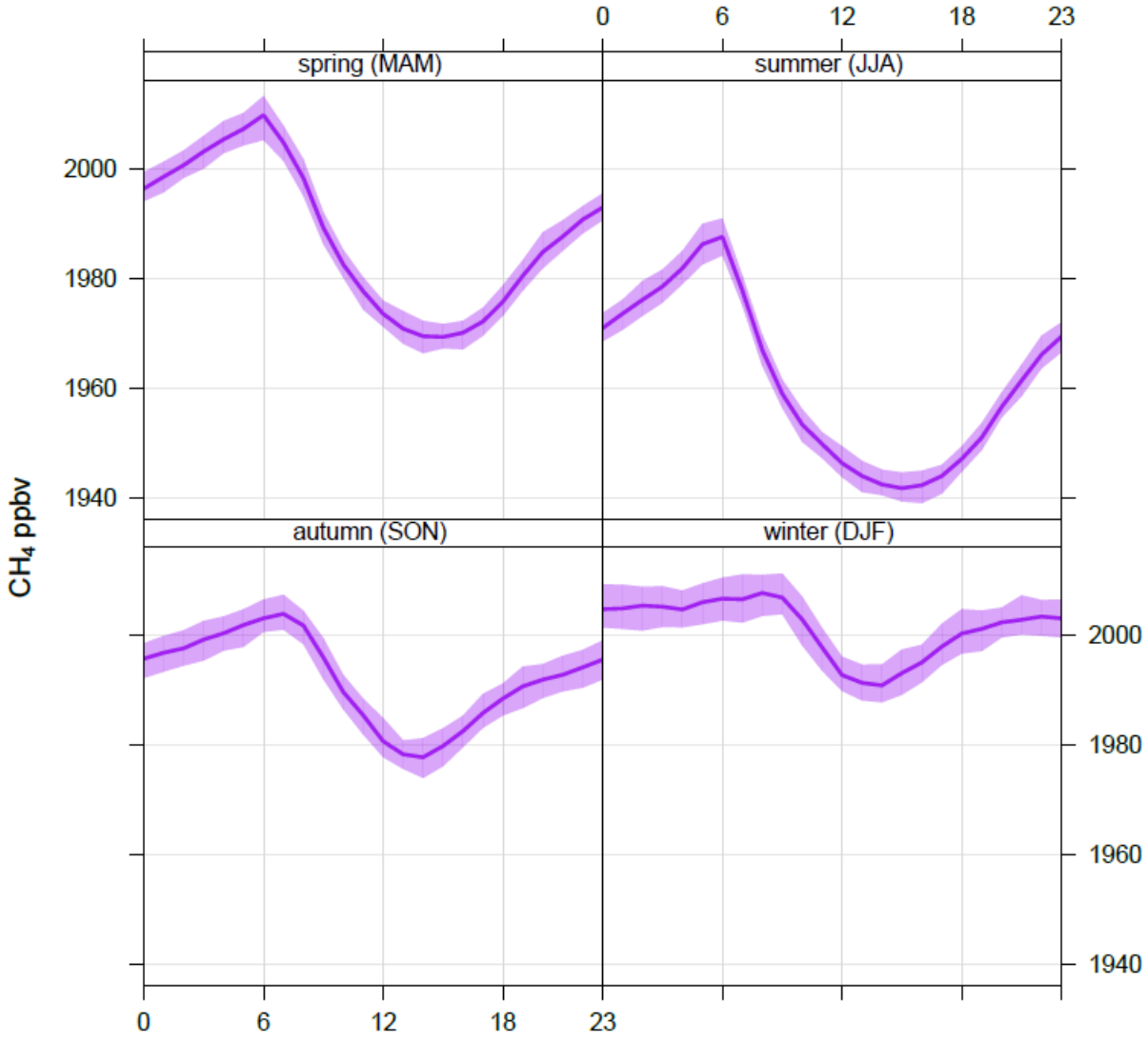


Figure S 2: Example of the definition of weekly O_3 data (O_3meanAft, O_3meanNight, O_3q5, O_3q95) from the original hourly O_3 data at OPE in May 2022 (nine days are shown around the week from May 2 to May 9, 2022). This week was selected based on a random sampling procedure). The solid line shows hourly data.



15

Figure S 3: mean diurnal cycles of CH_4 (purple) over the four seasons from spring (upper left) to winter (bottom right) computed over the period 2012-2023 at OPE.

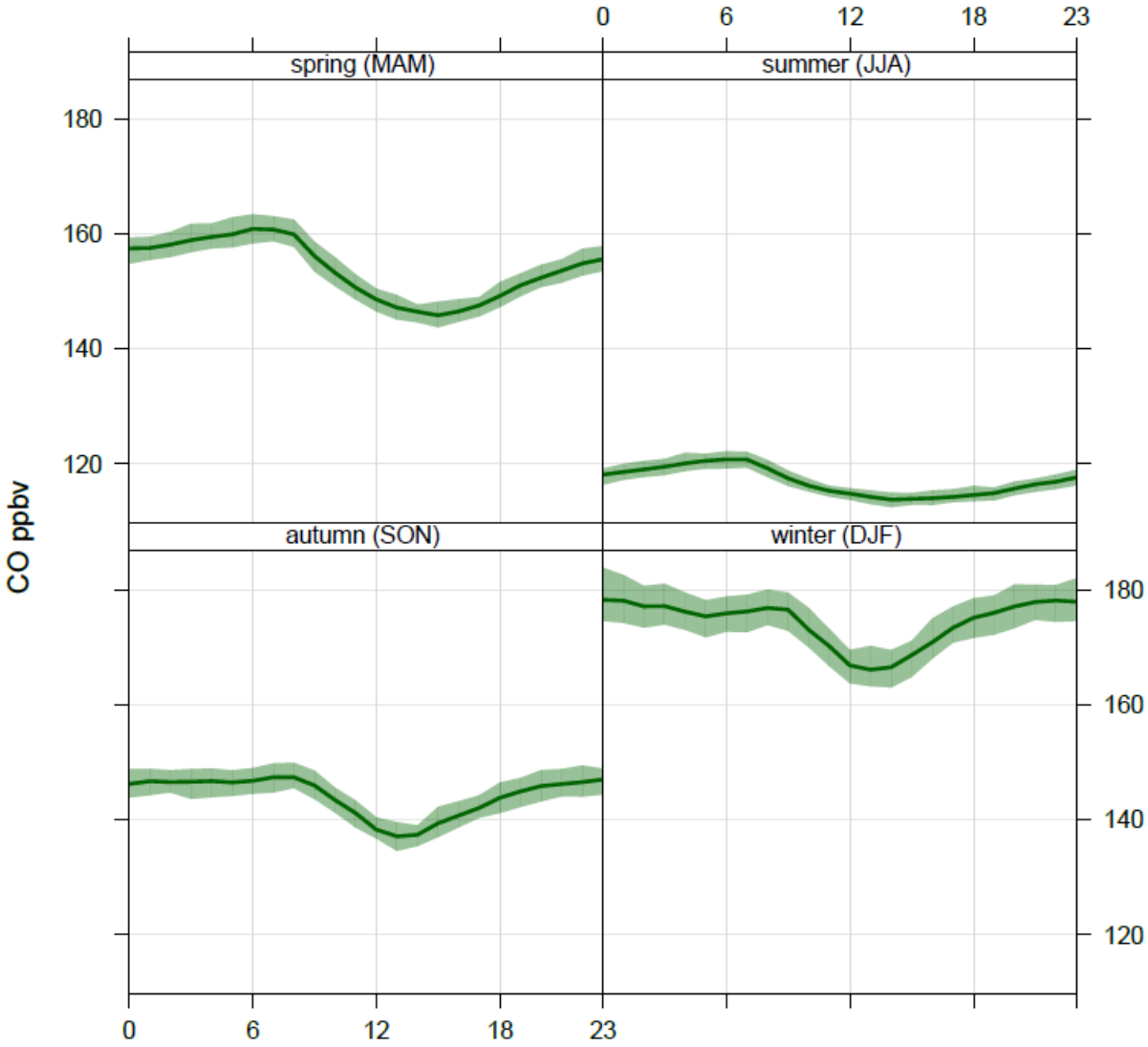


Figure S 4: mean diurnal cycles of CO (dark green) over the four seasons from spring (upper left) to winter (bottom right) computed over the period 2012-2023 at OPE.

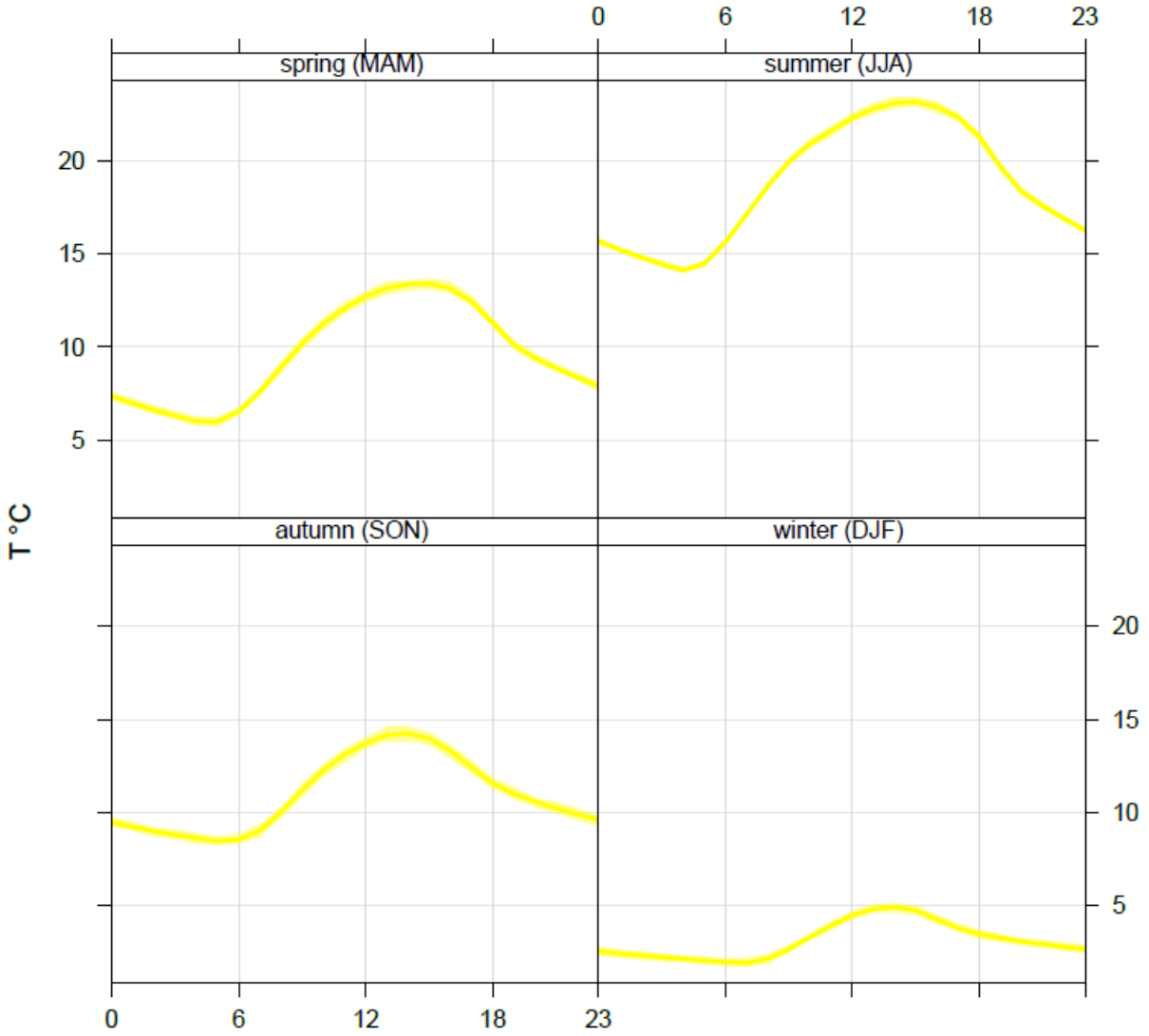


Figure S 5: mean diurnal cycles of Air Temperature (yellow) over the four seasons from spring (upper left) to winter (bottom right) computed over the period 2012-2023 at OPE.

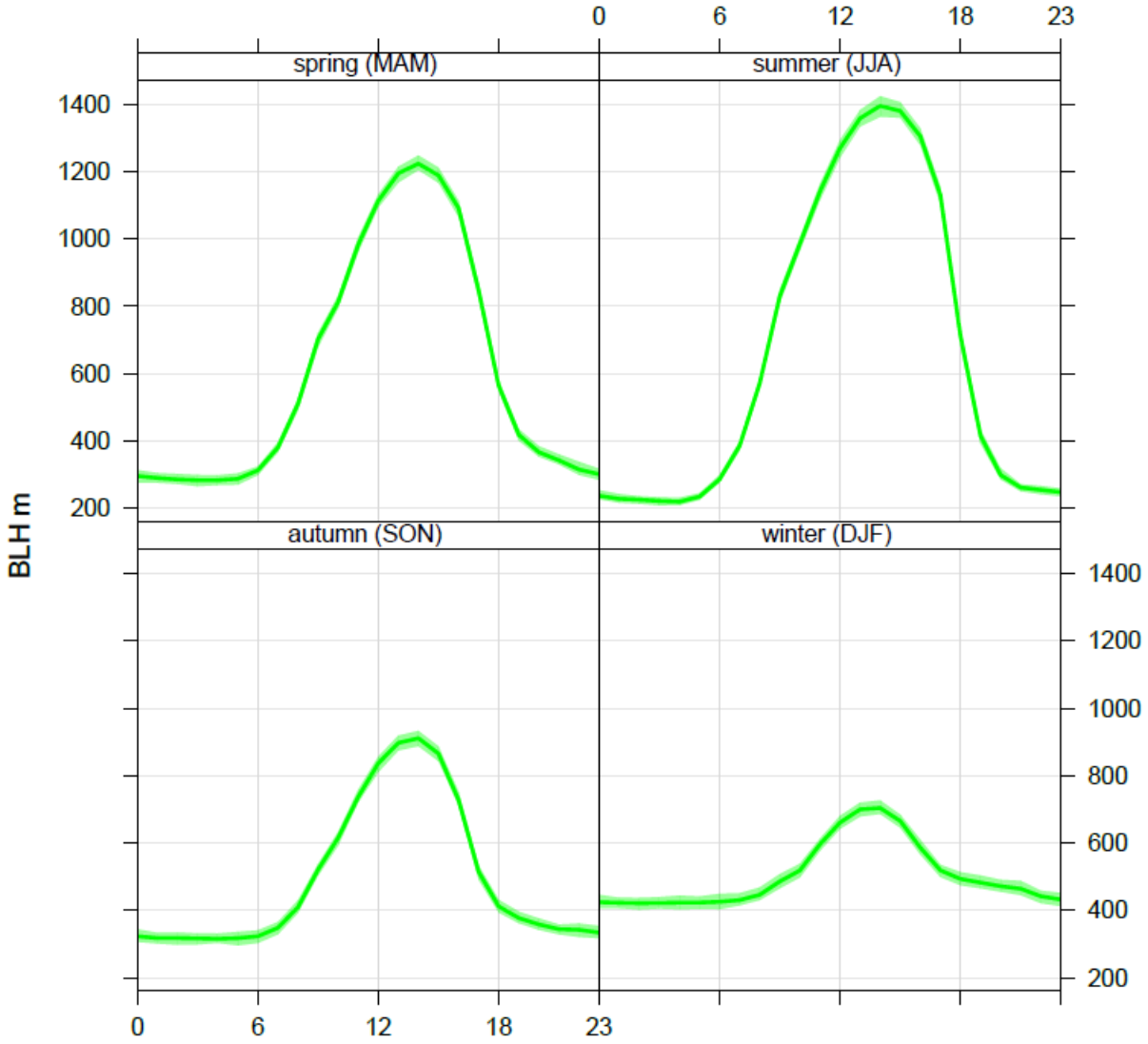


Figure S 6: mean diurnal cycles of BLH (green) over the four seasons from spring (upper left) to winter (bottom right) computed over the period 2012-2023 at OPE.

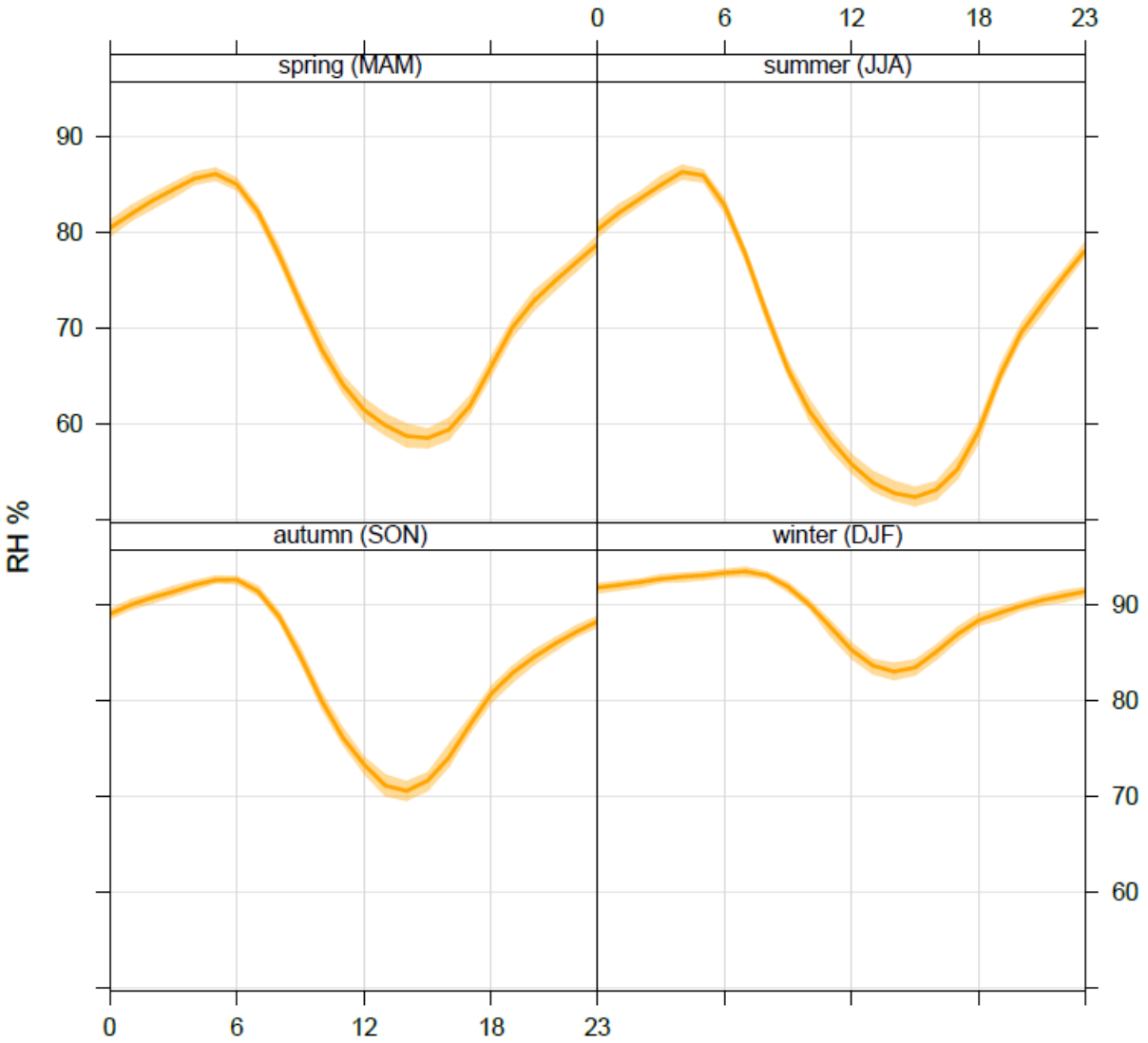


Figure S 7: mean diurnal cycles of Relative Humidity (orange) over the four seasons from spring (upper left) to winter (bottom right) computed over the period 2012-2023 at OPE.

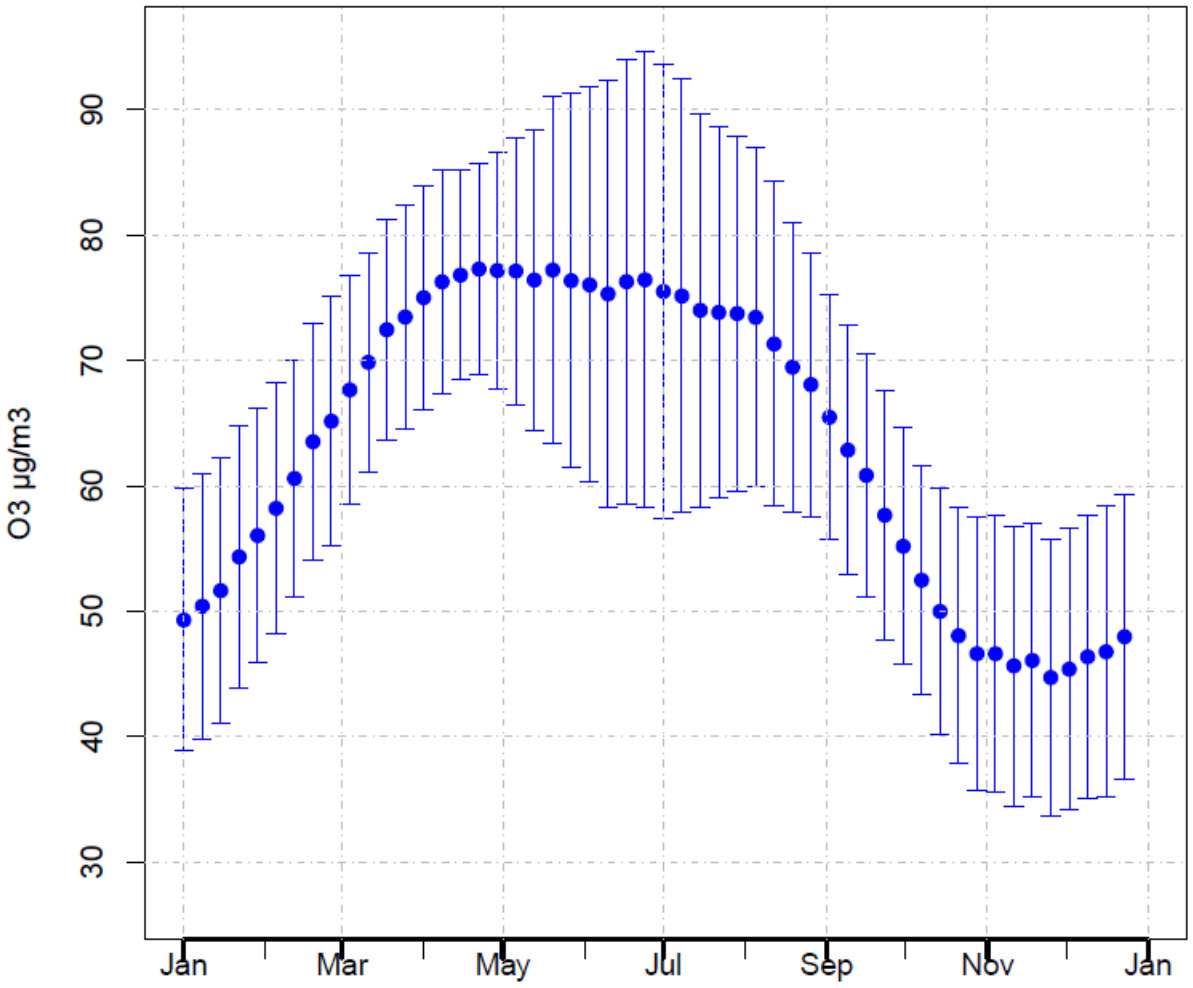


Figure S 8 Averaged seasonal cycles of O_3 and standard deviations at OPE for the period 2012-2023.

35

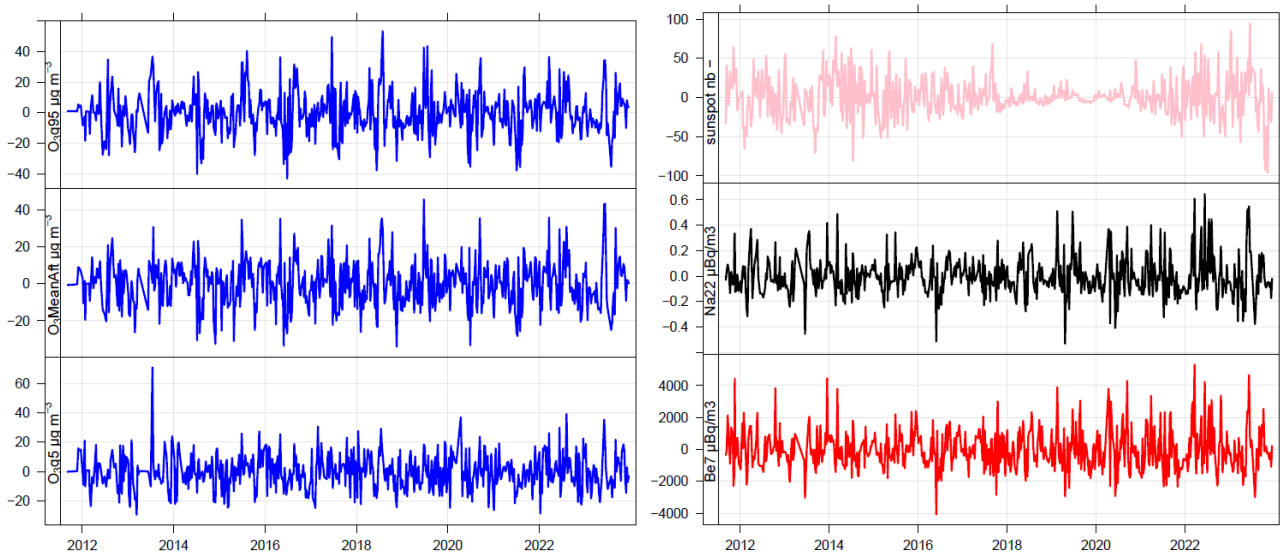


Figure S 9:Weekly anomalies (or residuals) of O_3 (blue) peak event (O3q95 upper left panel, µg m^{-3}) mean afternoon (12:00 to 16:59 UTC, middle left panel, µg m^{-3}), baseline (O3q5 bottom left panel, µg m^{-3}) and sunspot number index (pink, upper right panel), ^{22}Na activities (black, middle right panel, µBq m^{-3}) and ^{7}Be activities (red, bottom right panel, µBq m^{-3}) computed over the period 2012-2023 at OPE.

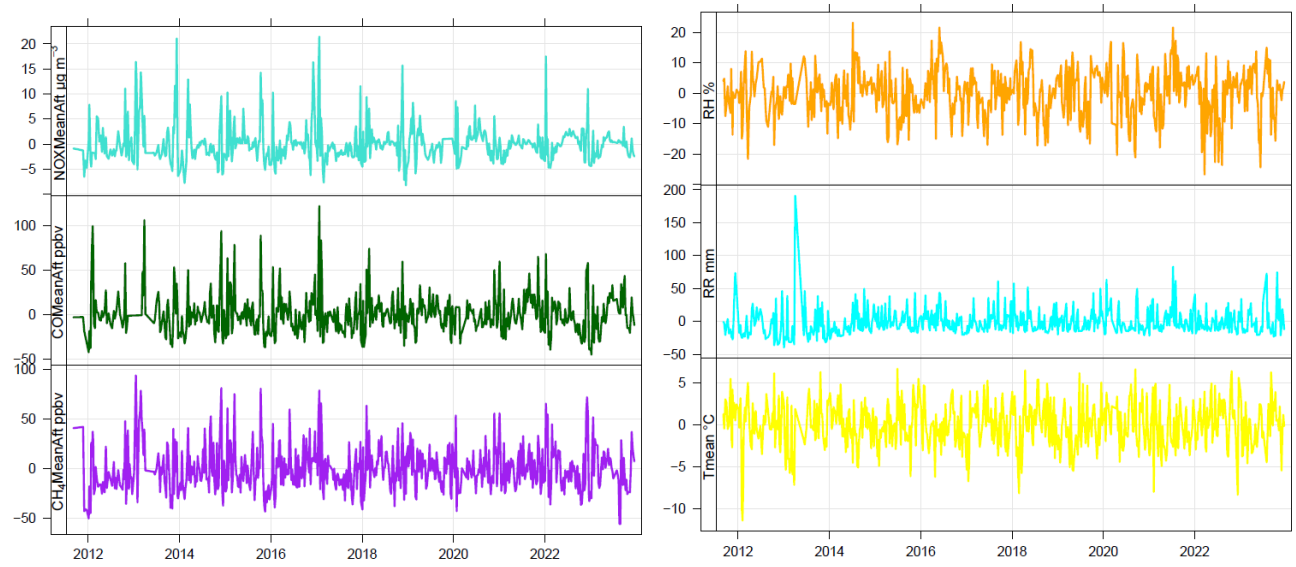


Figure S 10:Weekly anomalies (or residuals) of afternoon mean (12:00 to 16:59 UTC) NO_x (cyan upper left panel, µg m^{-3}) afternoon mean CO (green middle left panel, ppbv), afternoon mean CH_4 (purple bottom left panel, ppbv) and relative humidity (orange, upper right panel, %), precipitation (light blue, middle right panel, mm) and mean temperature (yellow, bottom right panel, °C) computed over the period 2012-2023 at OPE.

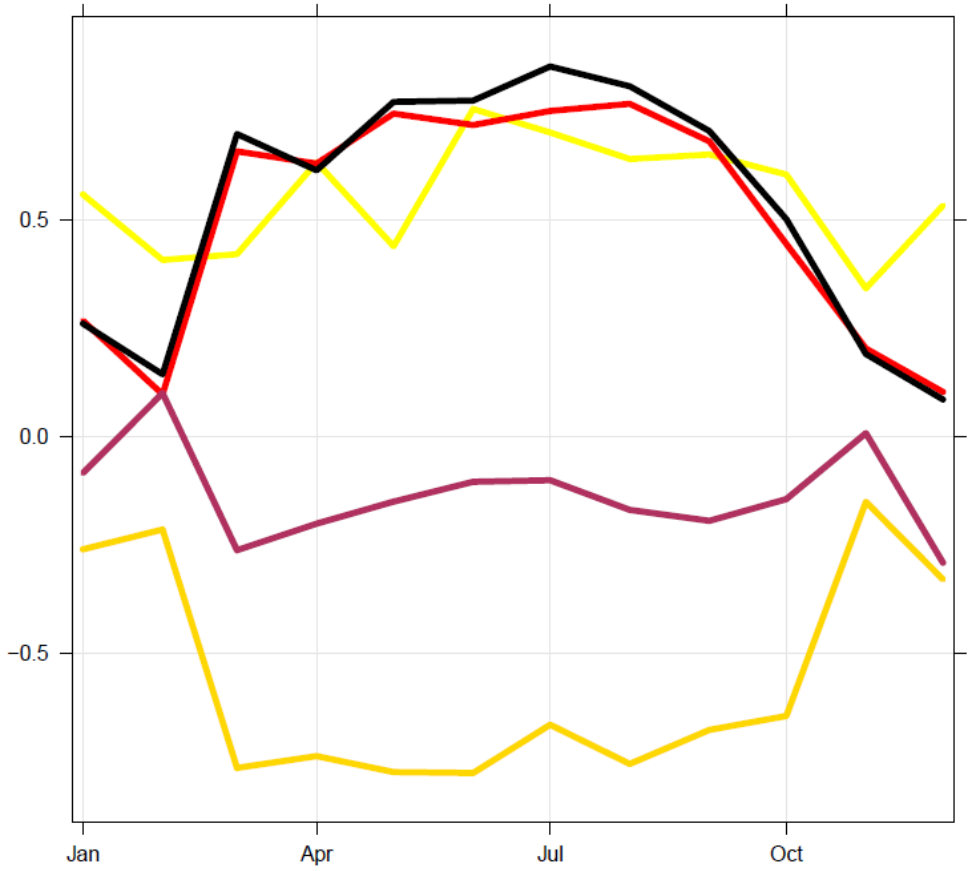


Figure S 11: Monthly evolution of the afternoon mean O_3 residuals correlation coefficients with mean Temperature (yellow) RH (gold), ^{7}Be (red), ^{22}Na (black), $^{7}Be/^{22}Na$ ratio (maroon) over the period 2012-2023 at OPE.

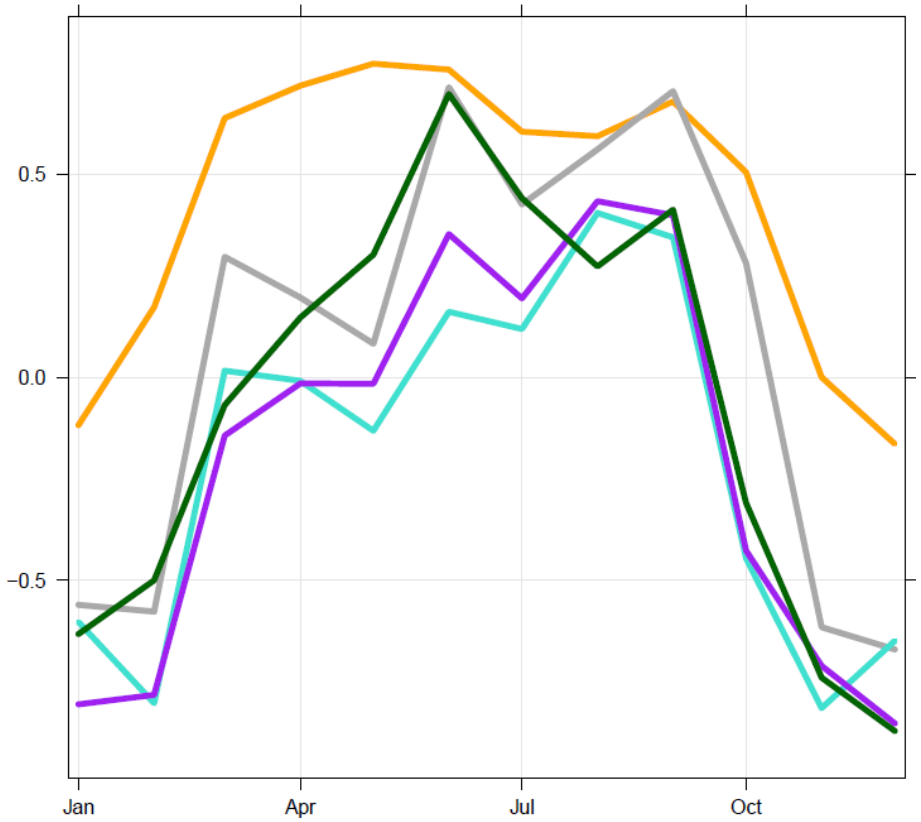


Figure S 12: Monthly evolution of the afternoon mean O_3 residuals correlation coefficients with mean Temperature (yellow) RH (gold), ^{7}Be (red), ^{22}Na (black), $^{7}Be/^{22}Na$ ratio (maroon) on the left panel and solar radiation (orange) PM10 (grey), NOx (cyan), CH_4 (purple) and CO (green) on the right panel over the period 2012-2023 at OPE.

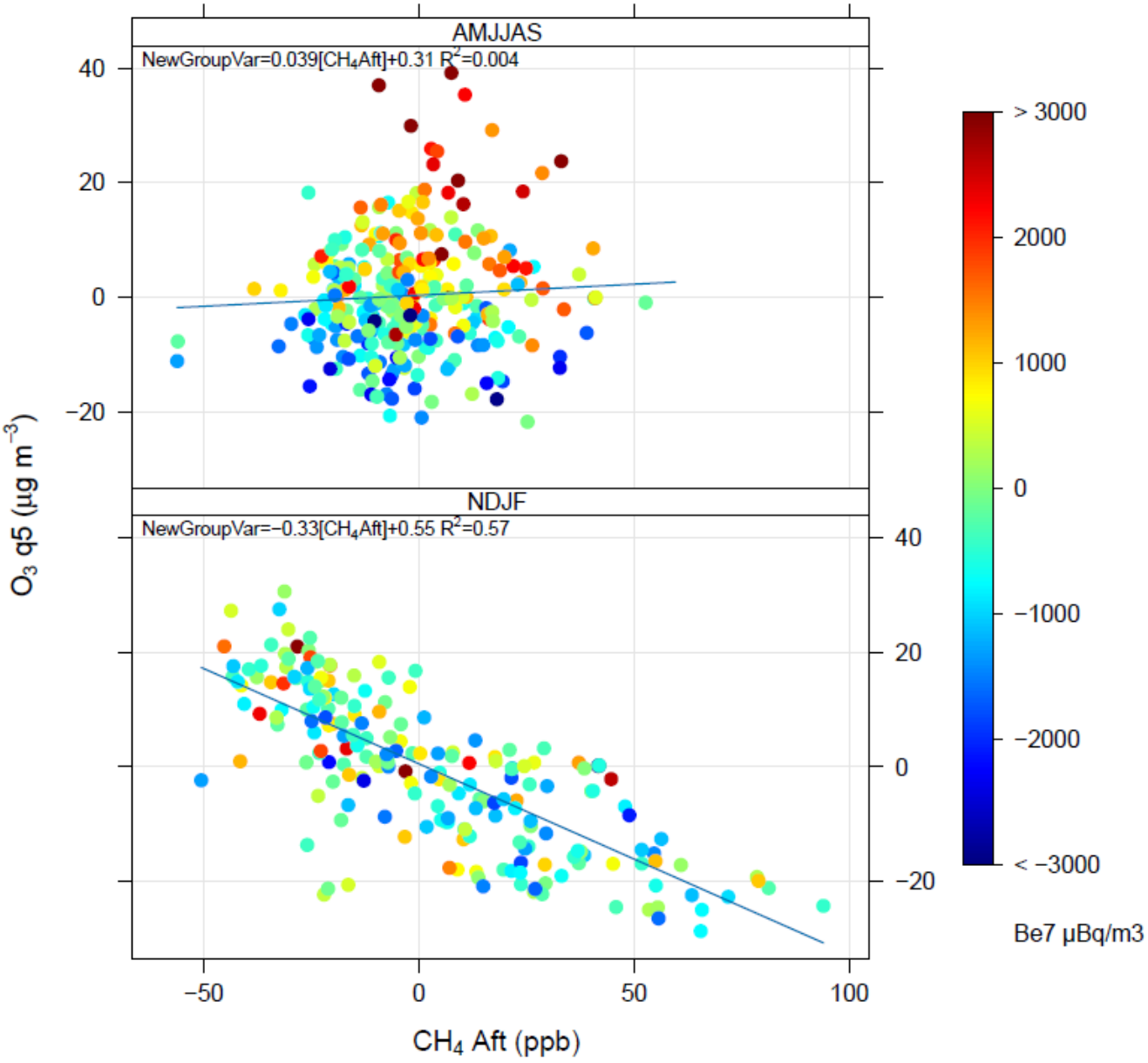


Figure S 13: Scatterplots of the weekly residuals of baseline O_3 vs mean afternoon CH_4 for the AMJJAS period (upper panel) mean and for the NDJF period (bottom panel). Colour coding is according to ^{7}Be weekly residuals. Data from 2012 to 2023 at OPE.

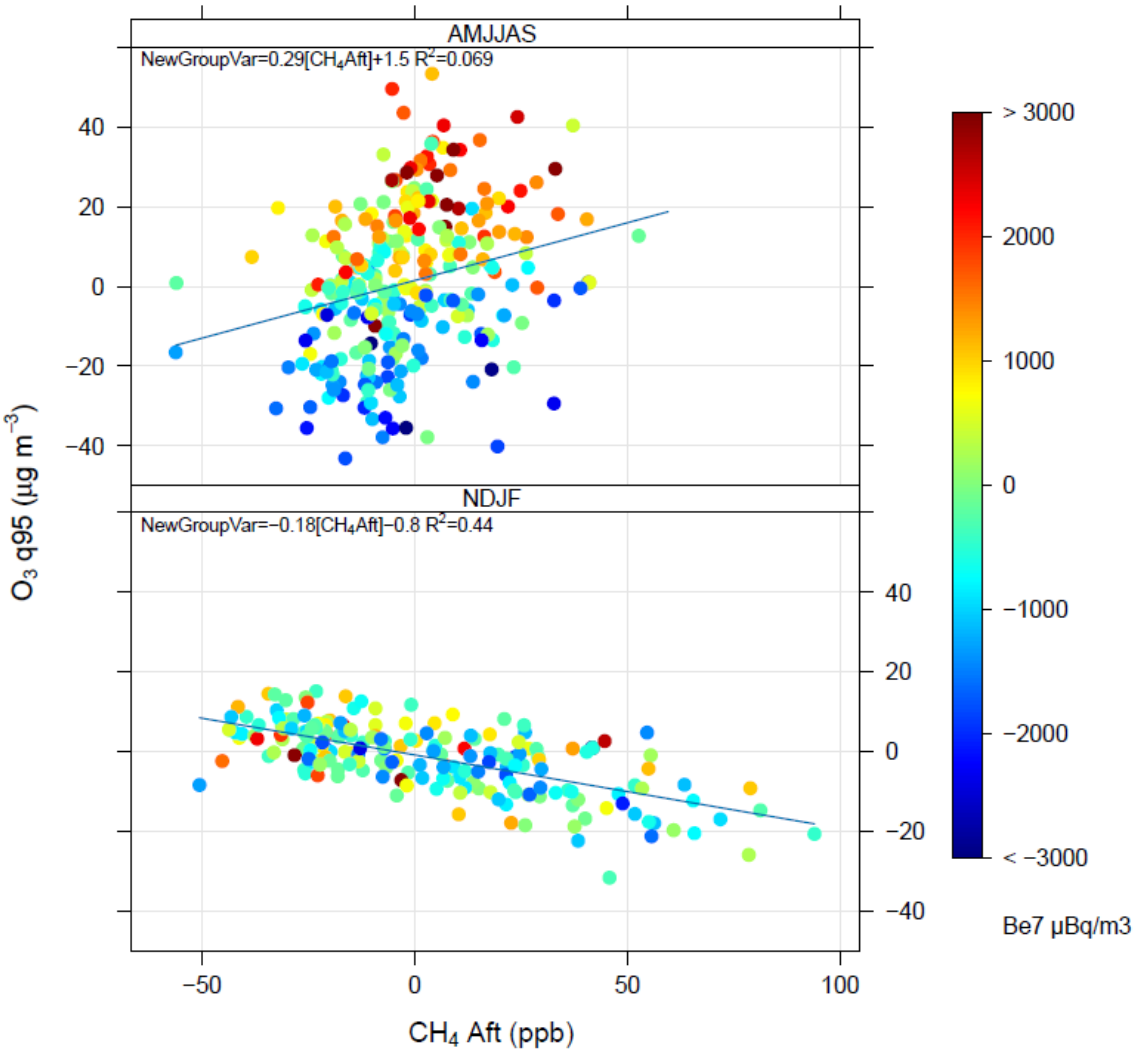


Figure S 14: Scatterplots of the weekly residuals of peak events O_3 vs mean afternoon CH_4 for the AMJJAS period (upper panel) mean and for the NDJF period (bottom panel). Colour coding is according to ^{7}Be weekly residuals. Data from 2012 to 2023 at OPE.

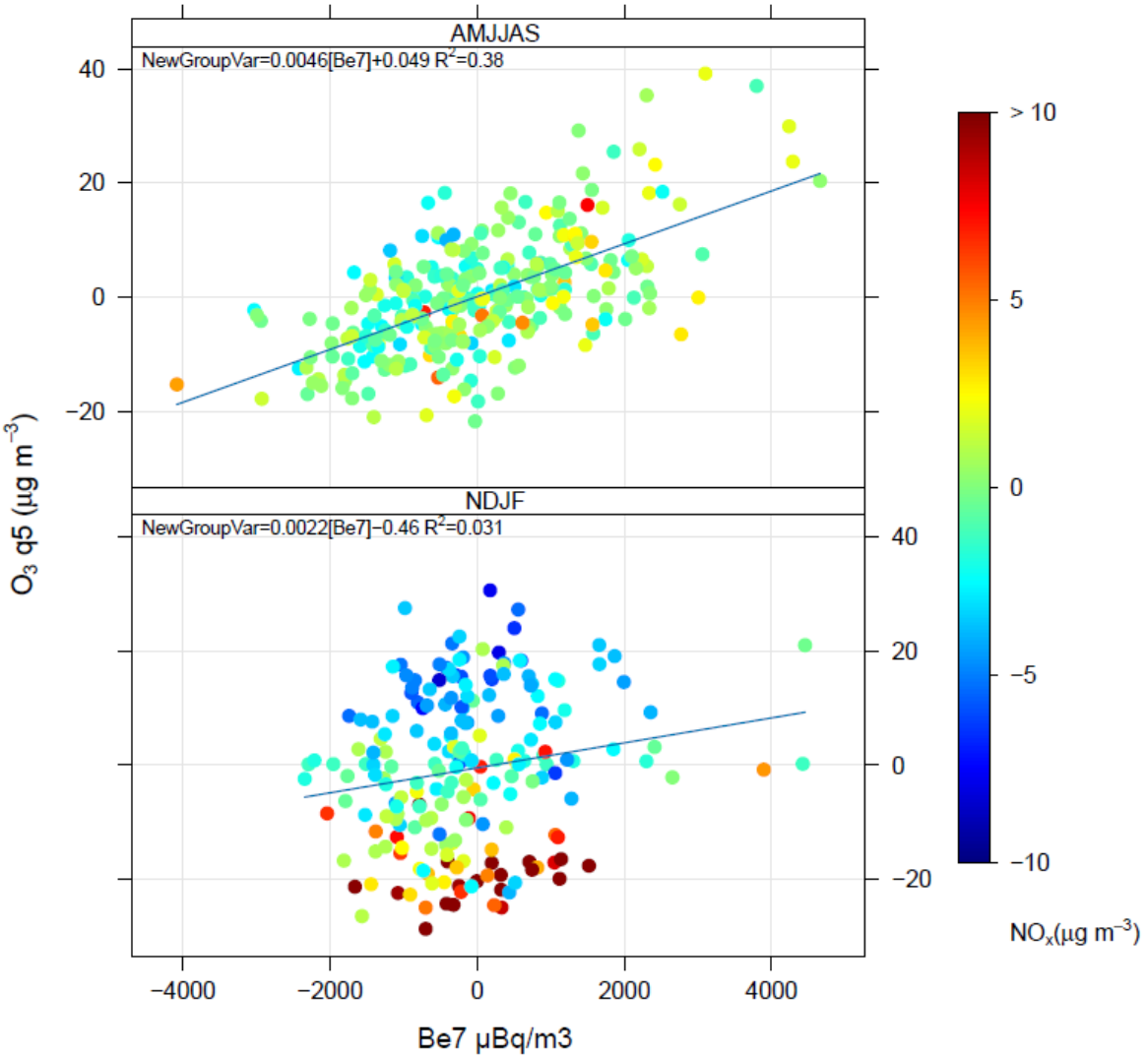


Figure S 15: Scatterplots of the weekly residuals of baseline O_3 vs ^7Be for the AMJJAS period (upper panel) mean and for the NDJF period (bottom panel). Colour coding is according to mean afternoon NO_x weekly residuals. Data from 2012 to 2023 at OPE.

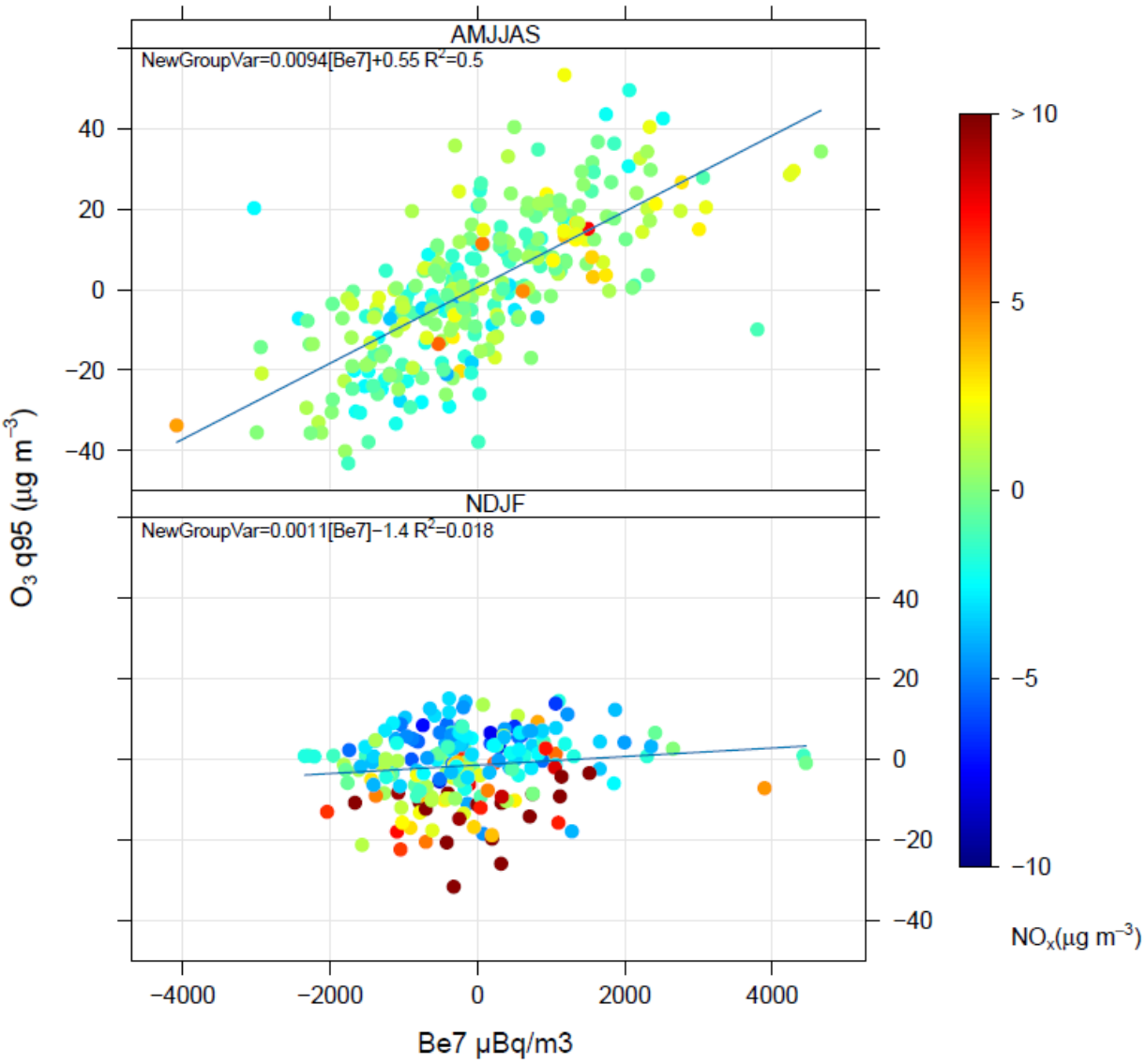


Figure S 16: Scatterplots of the weekly residuals of peak events O_3 vs ^7Be for the AMJJAS period (upper panel) mean and for the NDJF period (bottom panel). Colour coding is according to mean afternoon NO_x weekly residuals. Data from 2012 to 2023 at OPE.

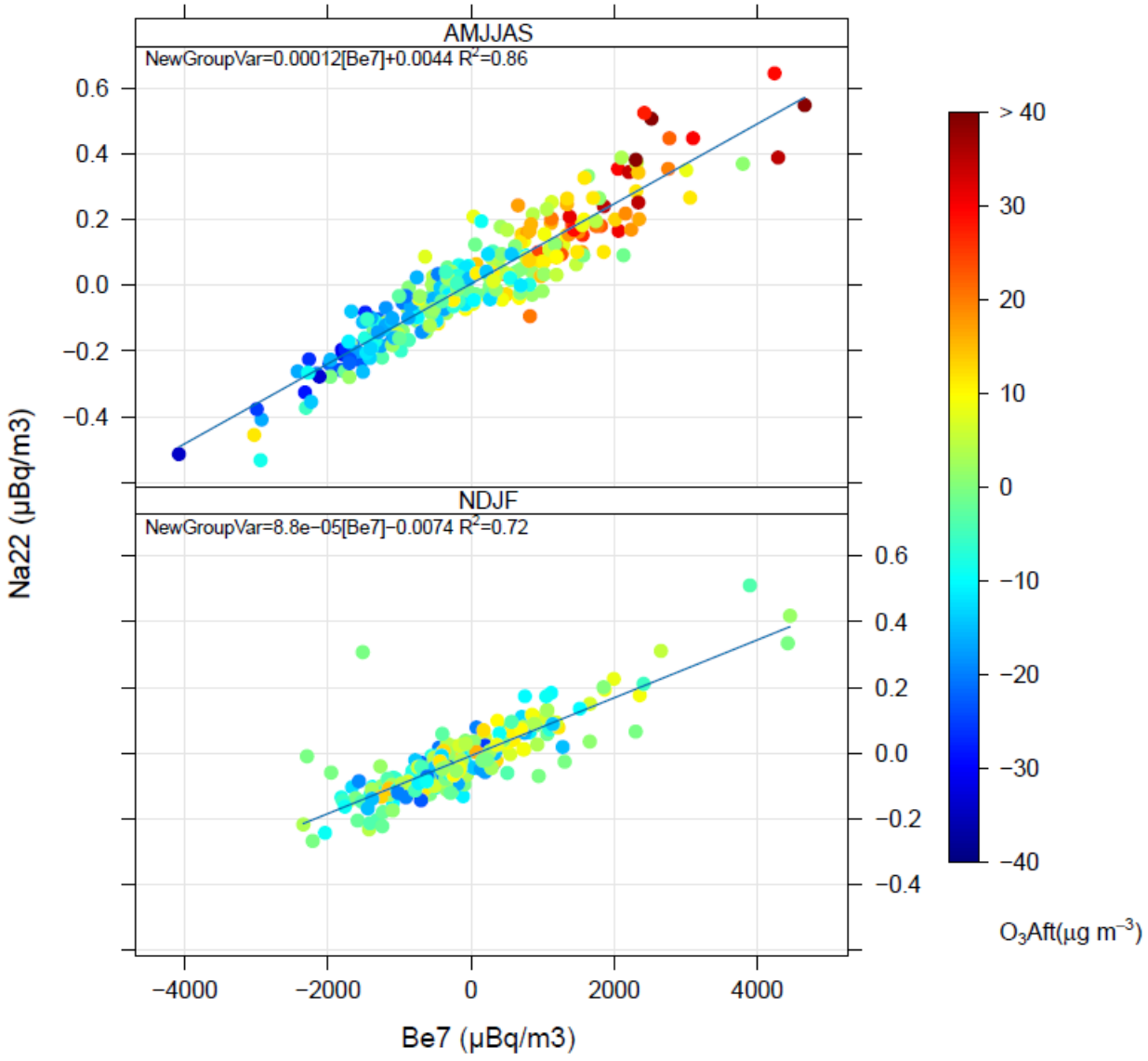


Figure S 17: Scatterplots of the weekly residuals of ^{22}Na vs ^{7}Be for the AMJJAS period (upper panel) mean and for the NDJF period (bottom panel). Colour coding is according to mean afternoon O_3 e weekly residuals. Data from 2012 to 2023 at OPE.

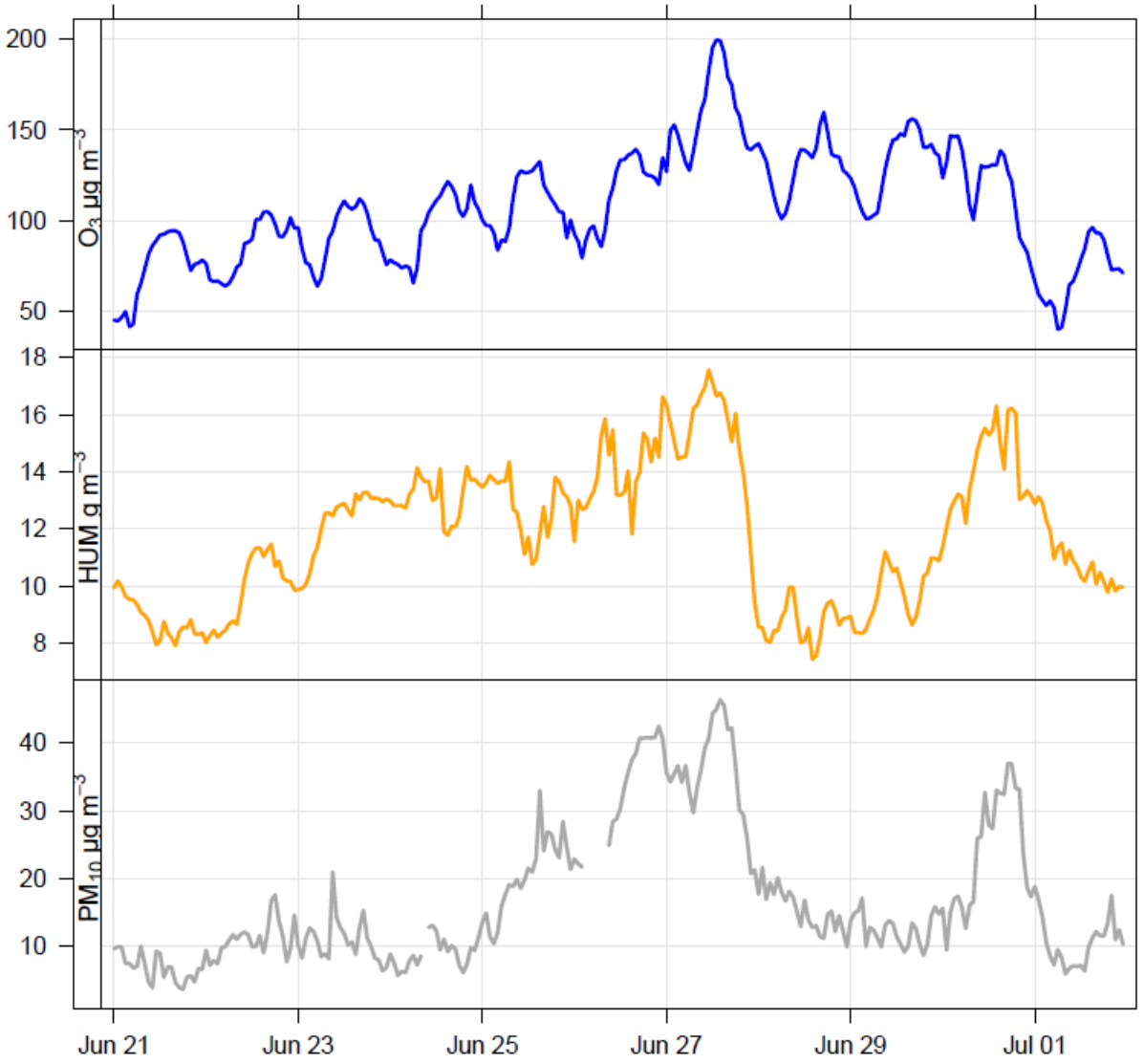


Figure S 18: Evolution of the hourly O_3 (blue, µg.m^{-3}), absolute humidity (orange, g.m^{-3}) and PM10 (grey, µg.m^{-3}) concentrations at OPE from June 21 to July 2. 2019.

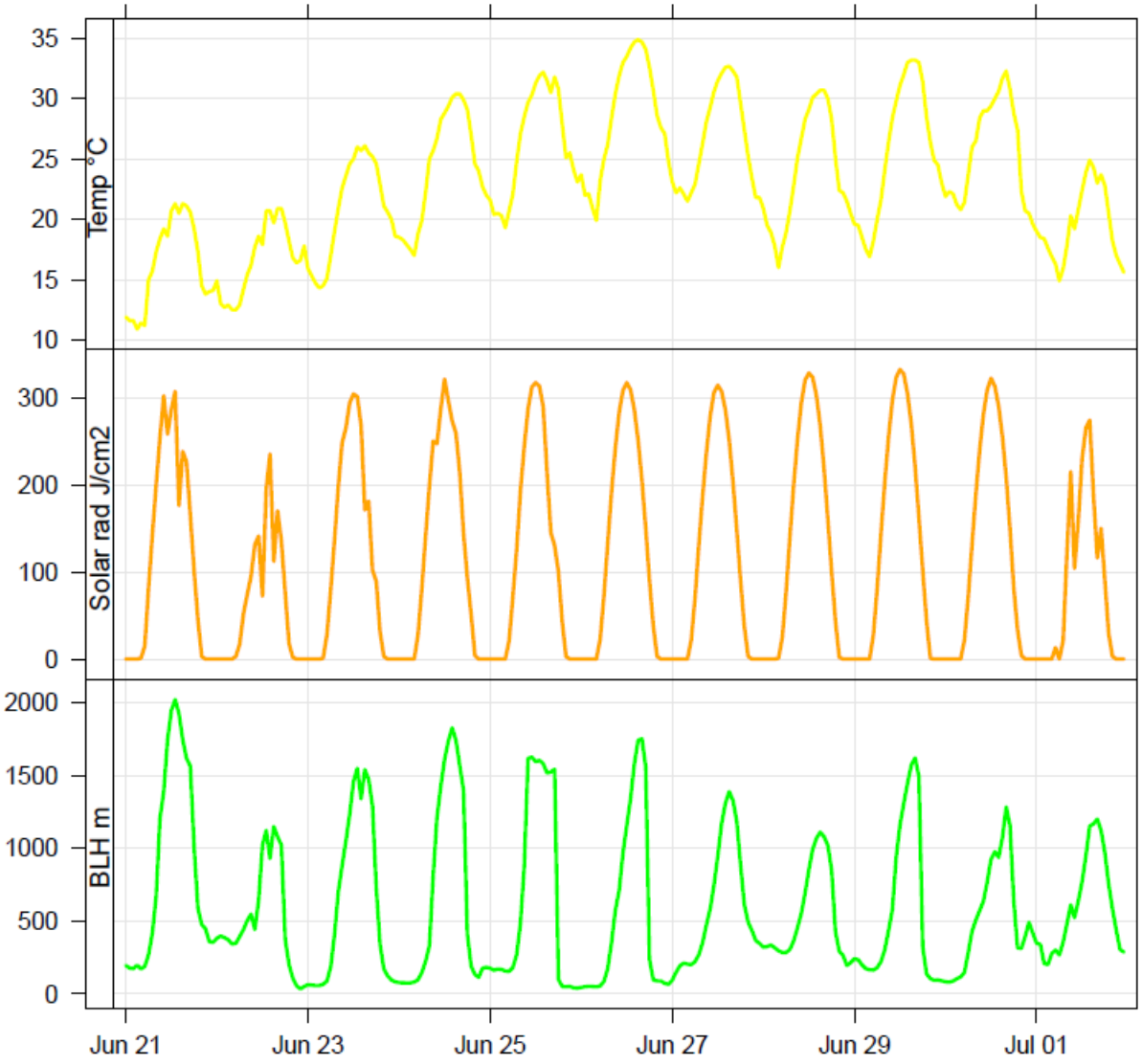


Figure S 19 : Evolution of the hourly temperature (yellow, °C) , solar radiation (orange, J.cm^{-2}) and BLH (green, m) at OPE from June 21 to July 2. 2019.

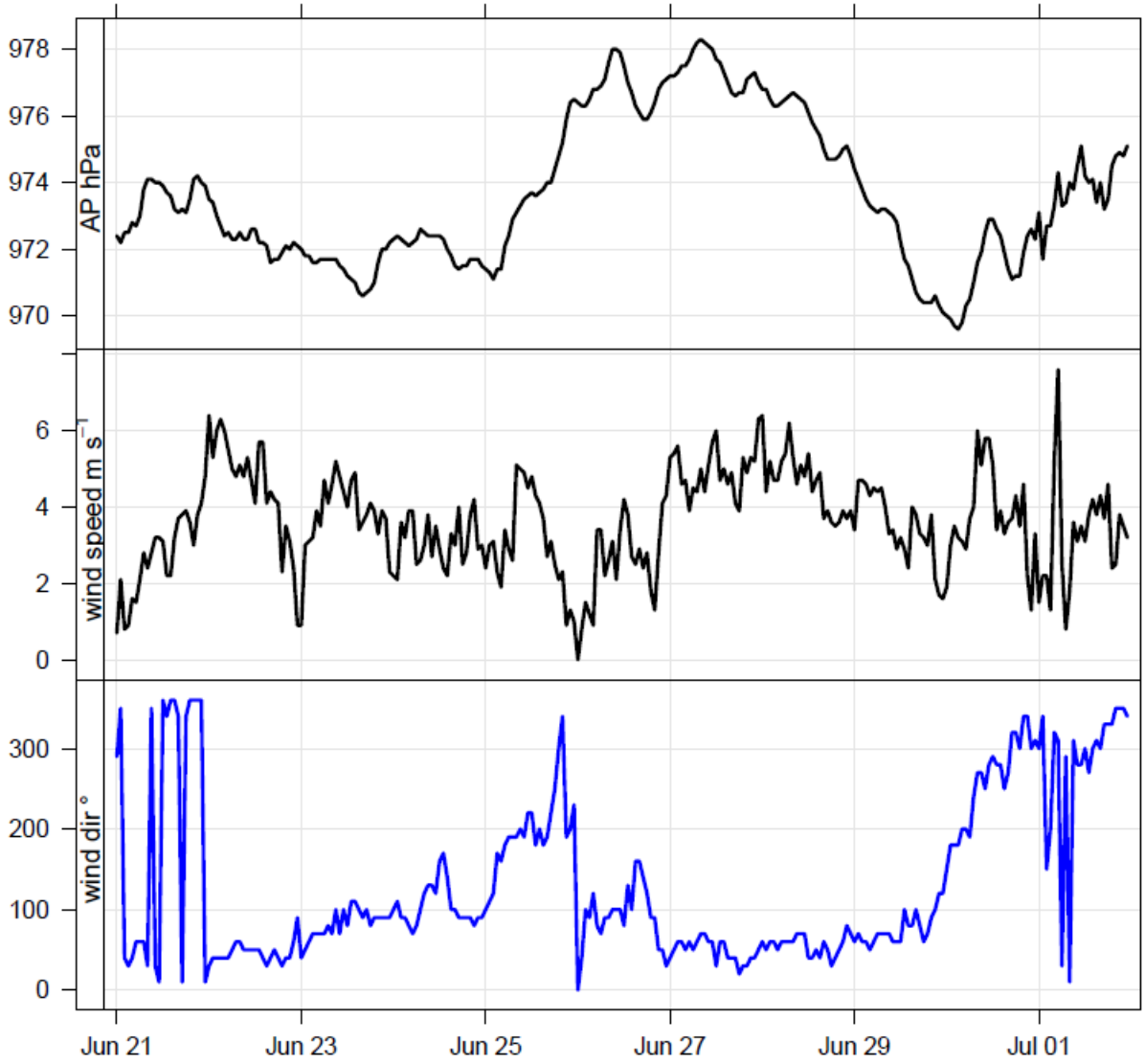
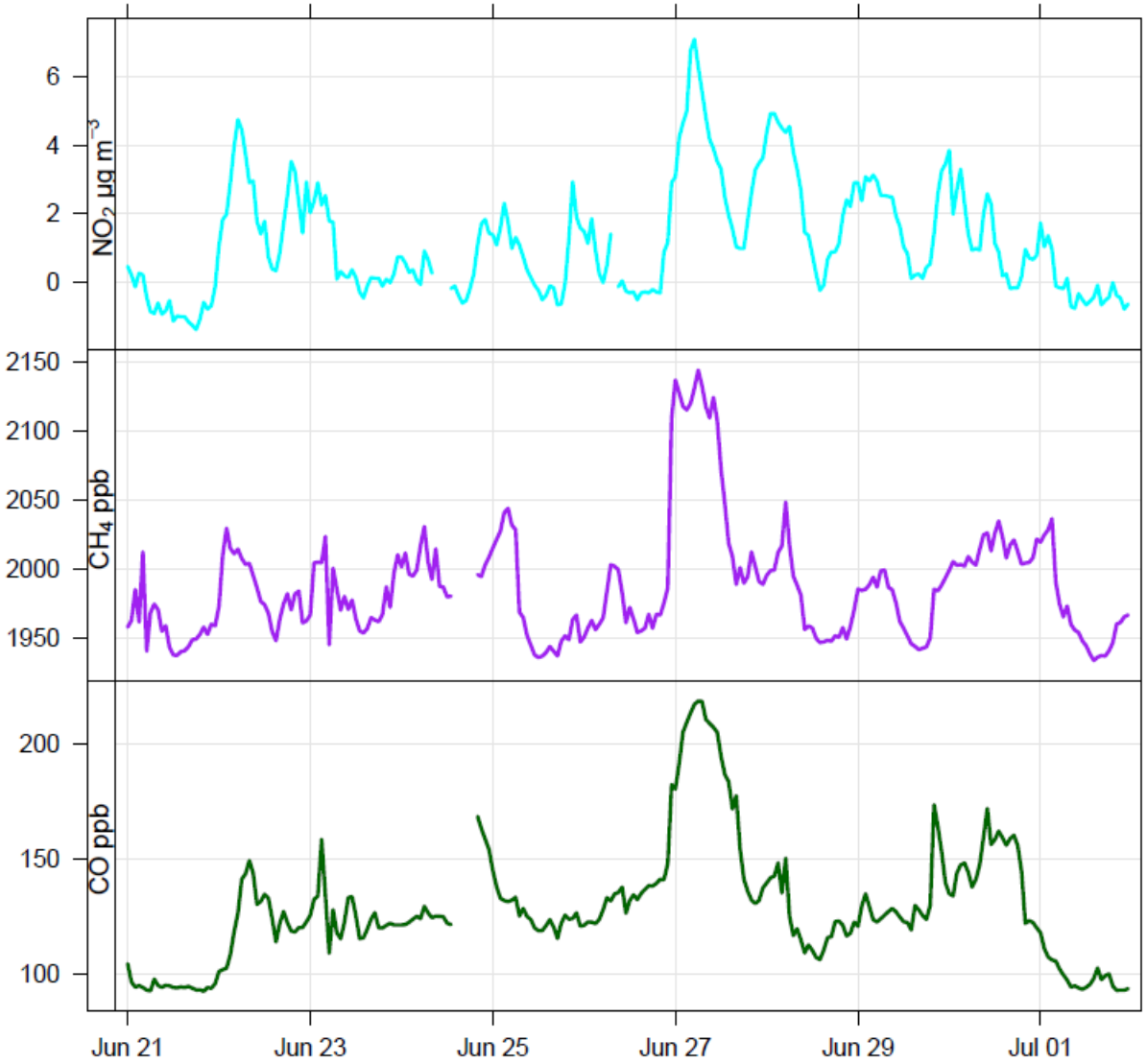


Figure S 20: Evolution of the hourly pressure (black, hPa), 10m wind speed (black, $m.s^{-1}$) and 10m wind direction (blue, °E) at OPE from June 21 to July 2, 2019.



90

Figure S 21: Evolution of the hourly NO_2 (cyan µg.m^{-3}), 10m CH_4 (purple ppbv) and 10m CO (green ppbv) at OPE from June 21 to July 2. 2019.