Supplementary material

Sensitivity of the Planetary Boundary Layer and Cloud Microphysics schemes to the drivers of dispersion and transportation of aerosols

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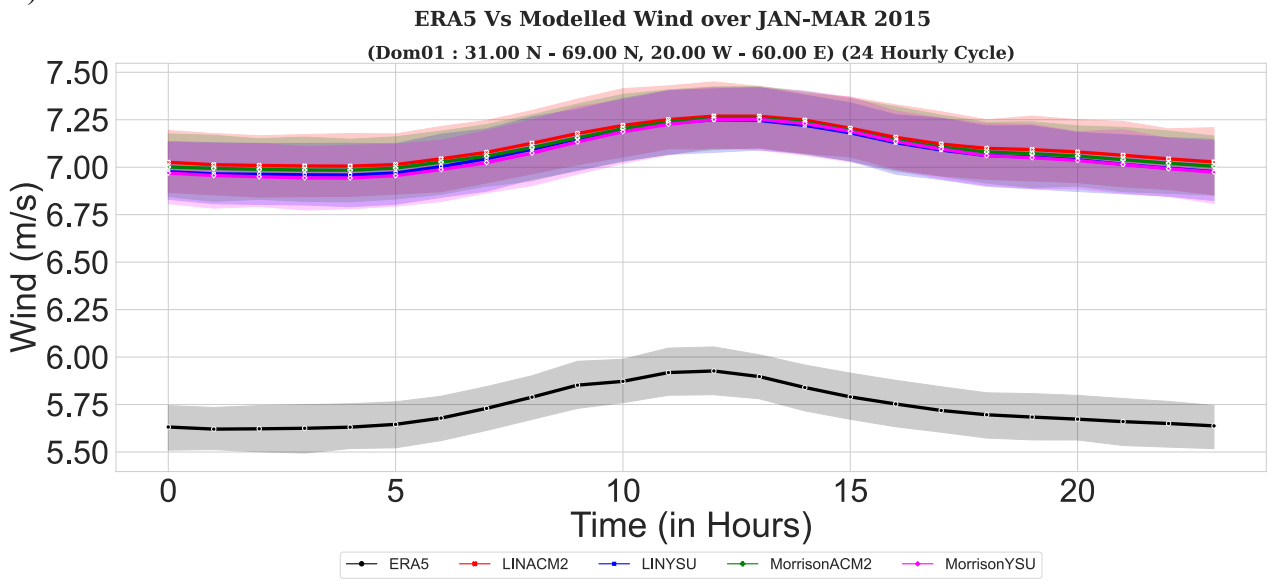
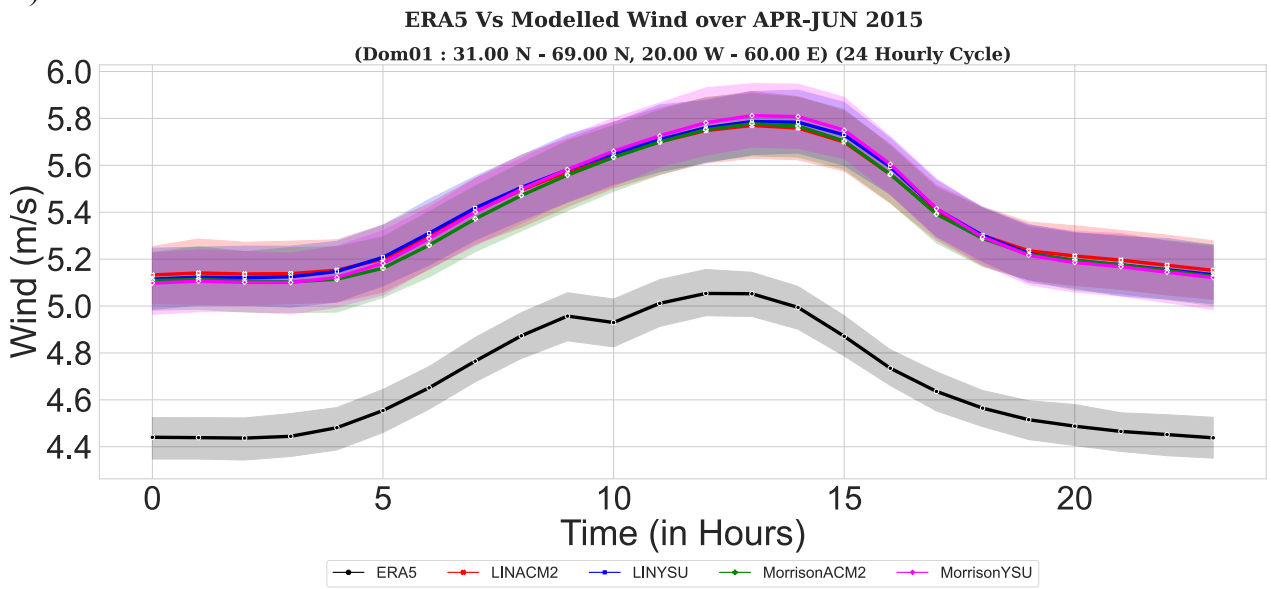
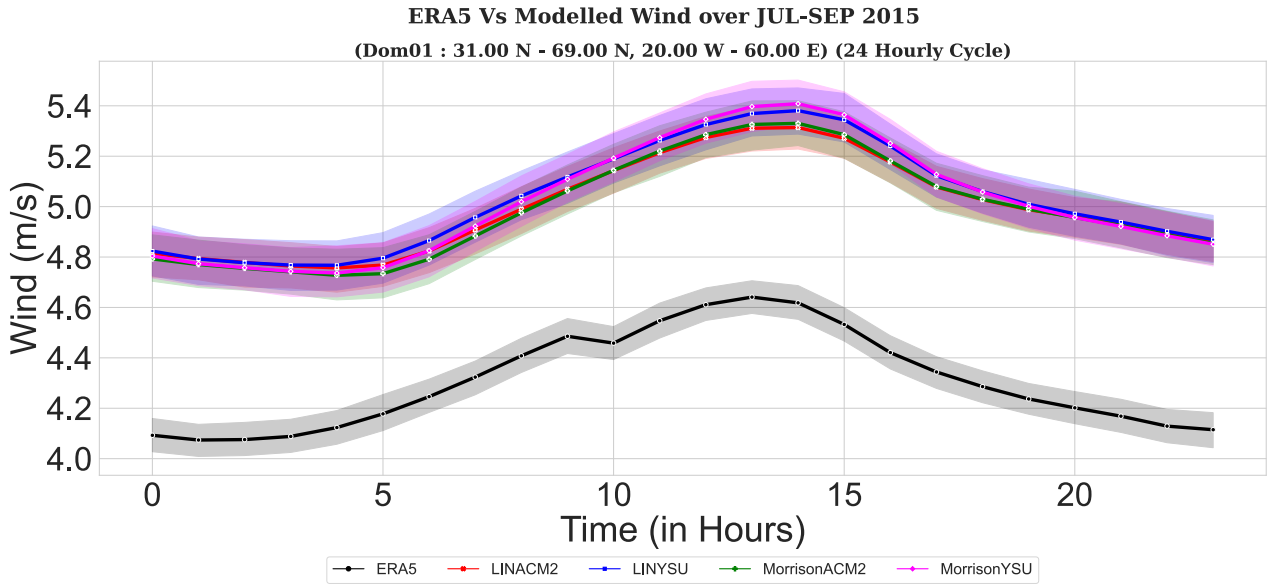
a) JAN – MAR



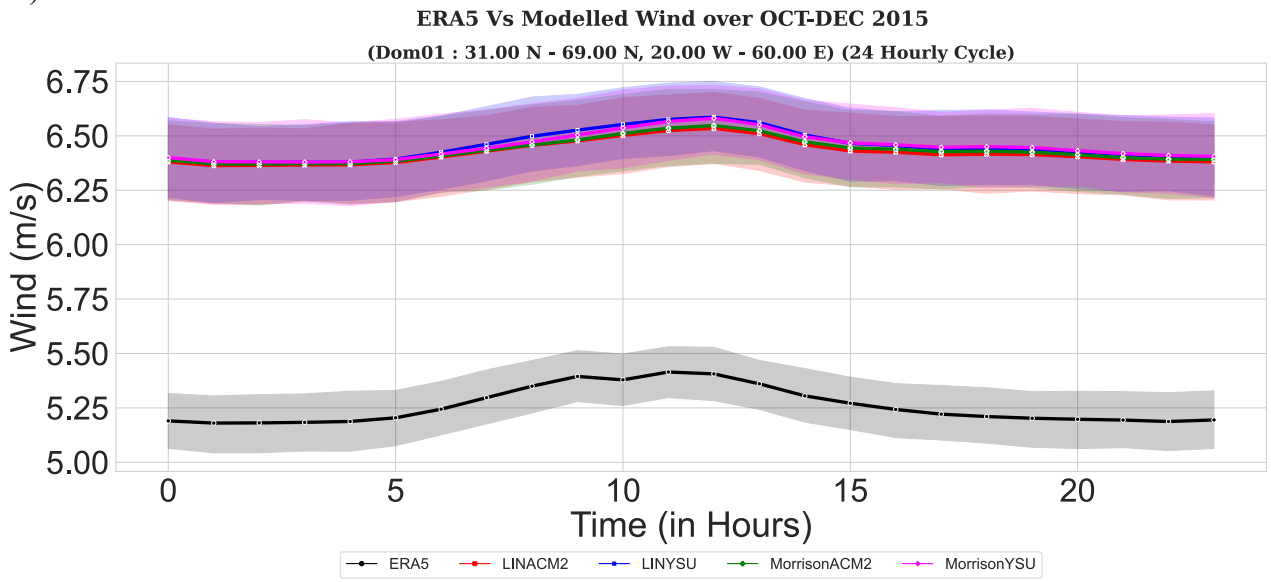
b) APR – JUN



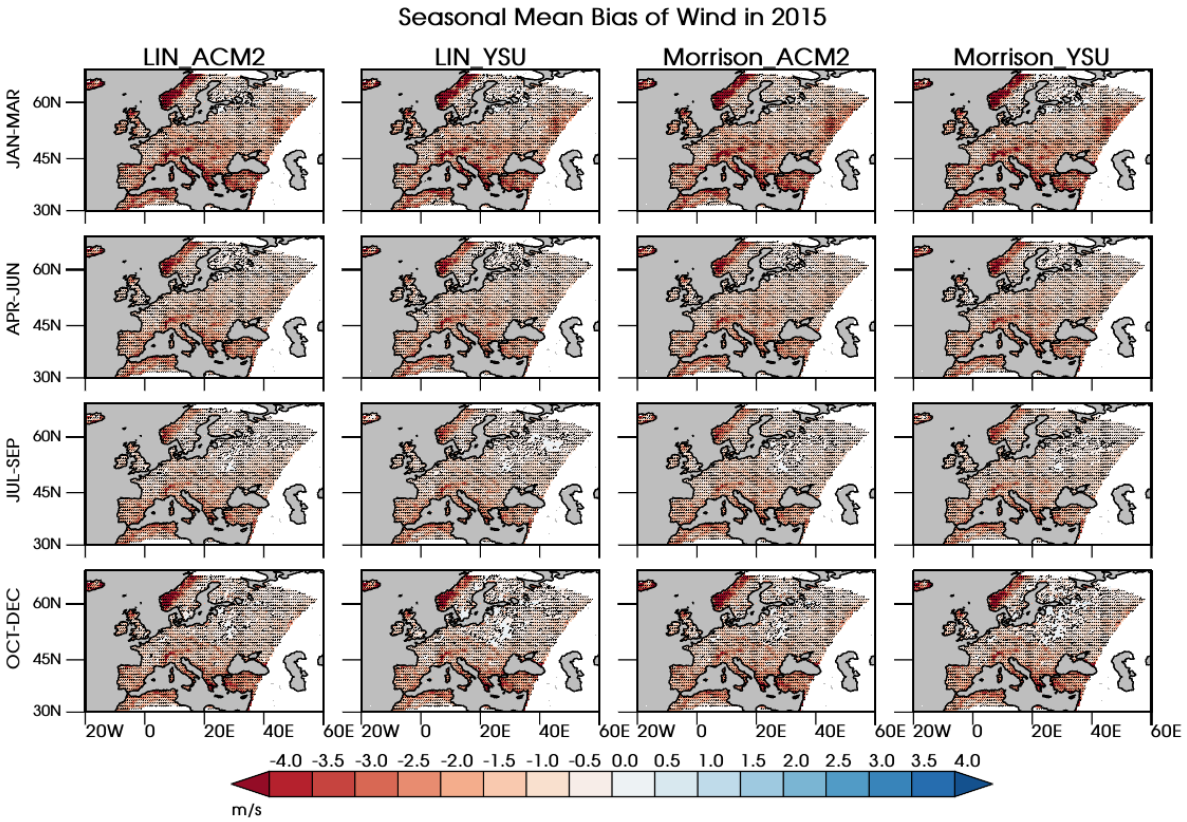
c) JUL – SEP



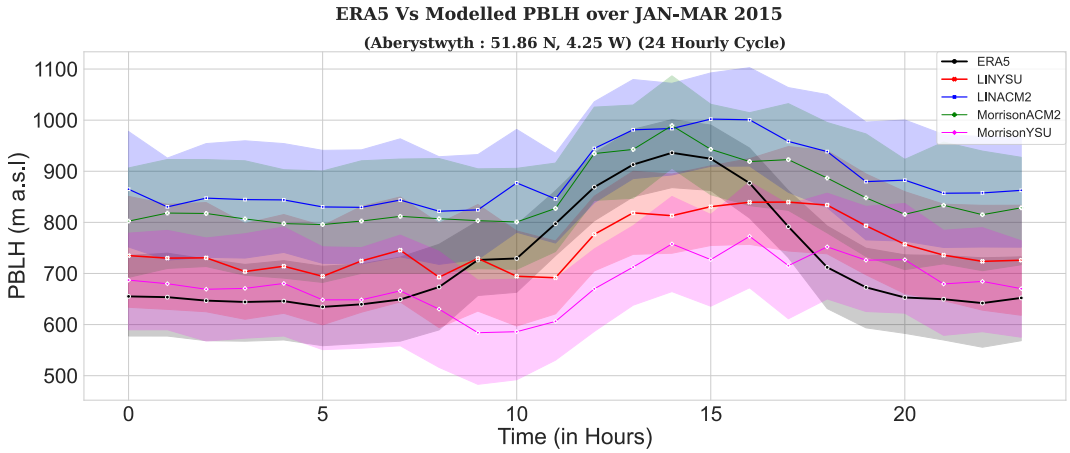
d) OCT – DEC

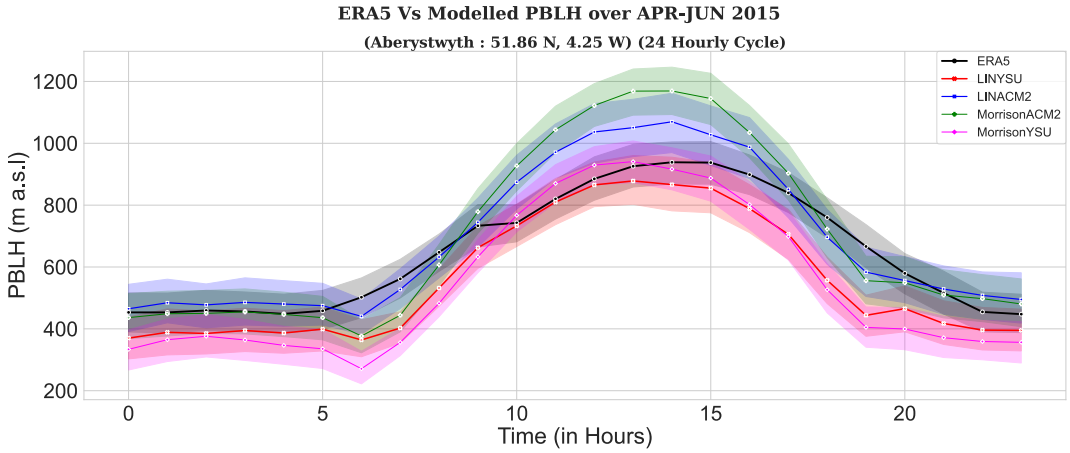


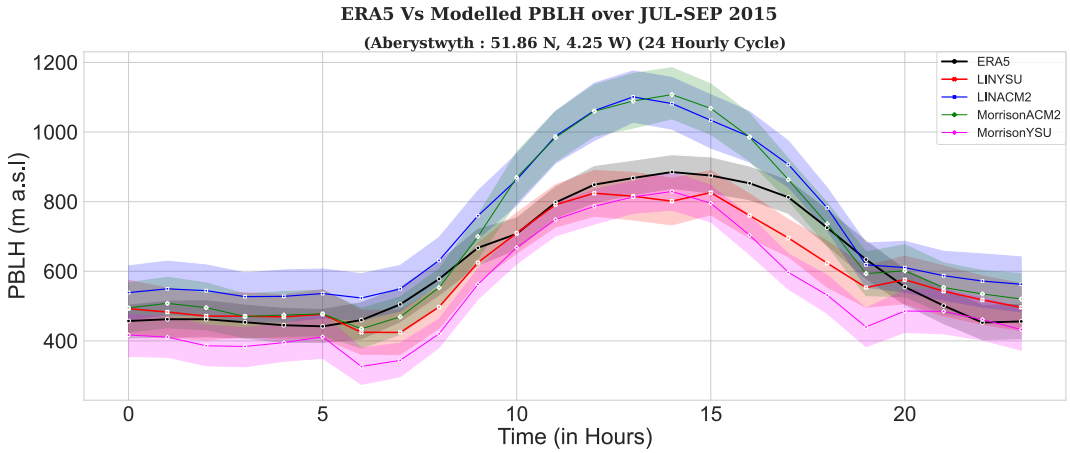
S. Fig. 1: Daily cycle (24 – Hourly) of wind speed calculated by taking the mean over time and space for the chosen domain. a – d represent the seasons Winter, Spring, Summer, Autumn respectively

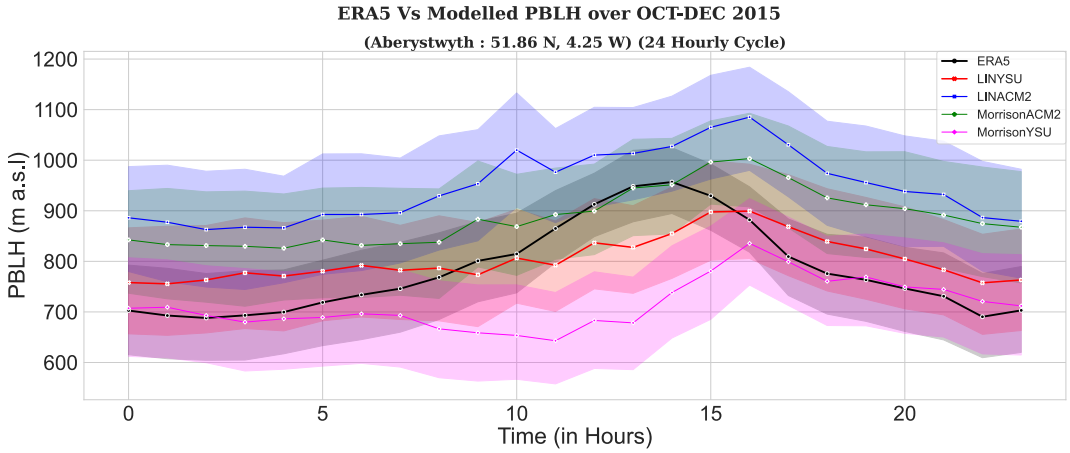


S. Fig. 2: Seasonal Mean Bias of Wind for the selected domain with reference to ERA5 dataset for different seasons (rows) across the physical scheme combinations (columns) chosen for simulation


ERA5 Vs Modelled PBLH over JAN-MAR 2015
(Aberystwyth : 51.86 N, 4.25 W) (24 Hourly Cycle)
PBLH (m a.s.l)
Time (in Hours)
ERA5
LINYSU
LINACM2
MorrisonACM2
MorrisonYSU


ERA5 Vs Modelled PBLH over APR-JUN 2015
(Aberystwyth : 51.86 N, 4.25 W) (24 Hourly Cycle)
PBLH (m a.s.l)
Time (in Hours)
ERA5
LINYSU
LINACM2
MorrisonACM2
MorrisonYSU


ERA5 Vs Modelled PBLH over JUL-SEP 2015
(Aberystwyth : 51.86 N, 4.25 W) (24 Hourly Cycle)
PBLH (m a.s.l)
Time (in Hours)
ERA5
LINYSU
LINACM2
MorrisonACM2
MorrisonYSU



S. Fig. 3: Daily cycle (24 – Hourly) of temperature calculated by taking the mean over time and space for Aberystwyth location inside the chosen domain. a – d represent the seasons Winter, Spring, Summer, Autumn respectively

S. Table 1: The Standard Deviation Error of Wind simulated for the year 2015 at various locations (chosen from the EARLINET website across the EURO-CORDEX domain).

Location	JAN - MAR				APR - JUN				JUL - SEP				OCT - DEC			
	LIN ACM2	LIN YSU	Morrison ACM2	Morrison YSU	LIN ACM2	LIN YSU	Morrison ACM2	Morrison YSU	LIN ACM2	LIN YSU	Morrison ACM2	Morrison YSU	LIN ACM2	LIN YSU	Morrison ACM2	Morrison YSU
Dom01	5.43	5.46	5.41	5.44	4.41	4.42	4.42	4.42	4.08	4.07	4.07	4.07	4.97	4.94	4.92	4.92
Birmingham	3.83	3.79	3.77	3.7	3.17	3.13	3.22	3.19	2.7	2.72	2.9	2.81	4.37	4.31	4.36	4.29
Oslo	1.73	1.66	1.78	1.65	1.73	1.73	1.74	1.65	1.61	1.63	1.74	1.71	1.63	1.58	1.65	1.45
Hatfield	3.89	3.84	3.84	3.78	3.28	3.22	3.26	3.19	2.72	2.75	2.85	2.83	4.29	4.15	4.33	4.11
Bayfordbury	3.87	3.83	3.82	3.77	3.23	3.18	3.22	3.15	2.72	2.74	2.85	2.83	4.24	4.12	4.28	4.07
Aberystwyth	4.93	5	5.01	4.94	3.81	3.8	3.8	3.88	3.72	3.76	3.84	3.82	5.93	5.97	5.91	5.91
Madrid	1.83	1.74	1.82	1.77	1.66	1.64	1.66	1.64	1.51	1.5	1.51	1.57	1.28	1.3	1.31	1.33
Palaiseau	3.13	3.15	3.07	3.07	2.61	2.6	2.73	2.62	2.19	2.43	2.53	2.4	3.16	3.12	3.21	3.16
Jungfraujoch	0.4	0.43	0.41	0.41	0.39	0.36	0.38	0.38	0.41	0.42	0.45	0.47	0.19	0.21	0.22	0.18
Ispra	0.56	0.63	0.59	0.6	0.48	0.48	0.51	0.48	0.44	0.44	0.52	0.46	0.41	0.42	0.42	0.41
Belgrade	1.94	1.91	1.95	1.87	1.76	1.75	1.81	1.8	1.29	1.29	1.19	1.4	1.68	1.55	1.62	1.68

S. Table 2: The Correlation of Planetary Boundary Layer Height (PBLH) simulated for the year 2015 at various locations (chosen from the EARLINET website across the EURO-CORDEX domain).

Location	Period1				Period2				Period3				Period4			
	LIN ACM2	LIN YSU	Morrison ACM2	Morrison YSU	LIN ACM2	LIN YSU	Morrison ACM2	Morrison YSU	LIN ACM2	LIN YSU	Morrison ACM2	Morrison YSU	LIN ACM2	LIN YSU	Morrison ACM2	Morrison YSU
Dom01	0.84	0.8	0.83	0.79	0.95	0.92	0.95	0.91	0.95	0.95	0.96	0.95	0.78	0.76	0.78	0.75
Birmingham	0.79	0.78	0.78	0.77	0.82	0.79	0.82	0.79	0.77	0.78	0.83	0.81	0.85	0.81	0.83	0.8
Oslo	0.56	0.55	0.57	0.48	0.74	0.73	0.74	0.72	0.69	0.65	0.7	0.69	0.64	0.68	0.65	0.65
Hatfield	0.74	0.71	0.71	0.71	0.81	0.78	0.81	0.79	0.72	0.74	0.8	0.79	0.8	0.75	0.81	0.75
Bayfordbury	0.74	0.71	0.72	0.71	0.8	0.77	0.81	0.79	0.72	0.74	0.79	0.79	0.8	0.75	0.81	0.75
Aberystwyth	0.76	0.74	0.73	0.7	0.74	0.66	0.71	0.63	0.69	0.67	0.72	0.66	0.83	0.83	0.81	0.79
Madrid	0.83	0.78	0.83	0.79	0.88	0.88	0.88	0.89	0.9	0.89	0.9	0.88	0.84	0.82	0.85	0.82
Palaiseau	0.76	0.73	0.73	0.69	0.8	0.8	0.81	0.81	0.75	0.79	0.83	0.81	0.75	0.72	0.78	0.72
Jungfraujoch	0.38	0.35	0.4	0.32	0.71	0.68	0.73	0.66	0.73	0.68	0.77	0.71	0.38	0.33	0.41	0.32
Ispra	0.5	0.48	0.48	0.43	0.75	0.73	0.76	0.69	0.81	0.81	0.81	0.81	0.58	0.53	0.58	0.52
Belgrade	0.67	0.66	0.69	0.64	0.79	0.79	0.8	0.79	0.83	0.83	0.85	0.84	0.69	0.64	0.69	0.69