

# Supplementary Material

This document is supplementary material to “Fiorillo, E.; Brilli, L.; Carotenuto, F.; Cremonini, L.; Gioli, B.; Giordano, T.; Nardino, M.; Diurnal outdoor thermal comfort mapping through Envi-met simulations, remotely sensed and in-situ measurements (2023)”.

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**Table S1.** Physiological Equivalent Temperature (PET) for different grades of thermal sensation and physiological stress on human beings during standard conditions (internal heat production: 80 W, heat transfer resistance of the clothing: 0.9 clo) for Western/Middle Europe (*after Matzarakis and Mayer, 1996*)

PET (°C)	Thermal perception	Grade of physiological stress
<4	Very cold	Extreme cold stress
4-8	Cold	Strong cold stress
8-13	Cool	Moderate cold stress
13-18	Slightly cool	Slight cold stress
18-23	Comfortable	No thermal stress
23-29	Slightly warm	Slight heat stress
29-35	Warm	Moderate heat stress
35-41	Hot	Strong heat stress
>41	Very hot	Extreme heat stress

**Table S2.** Selected ECOSTRESS LST scenes used in this study

Granule Id	DOY	LOCAL TIME	DATE
ECOSTRESS_L2_LSTE_16802_007_20210623T052417_0601_01.h5	174	07:24	2021-06-23
ECOSTRESS_L2_LSTE_16851_013_20210626T093213_0601_01.h5	177	11:32	2021-06-26
ECOSTRESS_L2_LSTE_16863_005_20210627T035230_0601_01.h5	178	05:52	2021-06-27
ECOSTRESS_L2_LSTE_17229_008_20210720T184012_0601_01.h5	201	20:39	2021-07-20
ECOSTRESS_L2_LSTE_17600_015_20210813T141723_0601_01.h5	225	16:17	2021-08-13
ECOSTRESS_L2_LSTE_17612_007_20210814T083704_0601_01.h5	226	10:37	2021-08-14
ECOSTRESS_L2_LSTE_17674_004_20210818T070519_0601_01.h5	230	09:05	2021-08-18
ECOSTRESS_L2_LSTE_17723_012_20210821T111202_0601_01.h5	233	13:12	2021-08-21

**Table S3.** Sentinel 2 scenes used in this study

Granule Id	DOY	DATE
S2B_MSIL2A_20210627T100559_N0300_R022_T32TPP_20210627T135856	178	2021-06-27
S2A_MSIL2A_20210722T101031_N0301_R022_T32TPP_20210722T120214	203	2021-07-22
S2A_MSIL2A_20210811T101031_N0301_R022_T32TPP_20210811T160521	223	2021-08-11
S2A_MSIL2A_20210821T101031_N0301_R022_T32TPP_20210821T120555	233	2021-08-21

**Table S4.** Meteorological characteristics of the selected days for hUHTI calculation (AVG = average; NA = not available)

DATE	DOY	AVG T <sub>air</sub> (°C)	AVG WIND SPEED (m/s)	AVG RELATIVE HUMIDITY (%)
23/06/21	174	19	0.6	NA
26/06/21	177	15.8	0.7	NA
27/06/21	178	17.9	0.7	NA
20/07/21	201	20	0.6	42
13/08/21	225	24.2	0.3	40
14/08/21	226	24.4	0.3	37
18/08/21	230	20.9	1.3	41
21/08/21	233	19.2	0.3	43

**Table S5.** Simple linear regression metrics of hUHTI and LST and PET Envi-met modelling outputs (\*= pvalue ≤ 0.05; \*\*= pvalue ≤ 0.01; \*\*\*= pvalue ≤ 0.001)

DAYTIME	LST			hUHTI		
	R <sup>2</sup>	Slope	Intercept	R <sup>2</sup>	Slope	Intercept
06:00	0.088	0.11	23.266	0.235	1.132	24.367
07:00	0.002	-0.079	35.333	0.988***	12.404	25.028
09:00	0.825**	2.029	-11.731	0.957***	18.531	33.304
11:00	0.842***	1.708	-19.184	0.909***	15.244	39.625
12:00	0.879***	1.216	2.469	0.884***	15.038	40.498
13:00	0.855**	1.091	3.374	0.839***	11.688	44.15
16:00	0.835**	1.402	-12.163	0.938***	14.224	41.622
21:00	0.499	0.203	23.698	0.627**	0.926	28.717

**Table S6.** Mean PET values at different daytimes according to land cover class

LAND COVER	07:00	09:00	11:00	12:00	13:00	16:00
Construction sites	34.55	47.85	51.29	51.6	53.31	53.06
Industrial and commercial areas	34.41	46.9	50.59	51.34	52.79	52.37
Road and rail infrastructure	34.12	46.58	50.18	50.71	52.45	52.02
Water areas	33.85	46.23	49.65	50.07	51.98	51.38
Swamps	33.77	46.21	50.14	51.85	52.61	51.59
Meadows	33.71	47.36	50.94	51.08	53.12	52.67
Residential areas with continuous fabric	33.6	45.02	48.89	49.73	51.44	50.86
Crops	33.49	47.25	50.64	50.84	52.92	52.35
Quarries and landfills	33.43	46.49	49.97	50.32	52.42	52.05
Recreational and sports areas	33.1	46.23	49.77	50.25	52.22	51.46
Residential areas with discontinuous and sparse fabric	32.93	44.88	48.87	49.63	51.52	50.77
Green urban areas	32.89	45.51	49.41	49.89	51.96	51.34
Areas with evolving woodland and shrub vegetation	32.6	45.24	49.02	49.43	51.58	50.94
Tree crops	31.47	44.3	48.41	48.28	51.11	50.47
Woodland	28.85	40.23	44.98	45.27	48.16	46.81