

Support Information

The role of vegetation on the urban atmosphere of three European cities. Part 1: Evaluation of vegetation impact on meteorological conditions

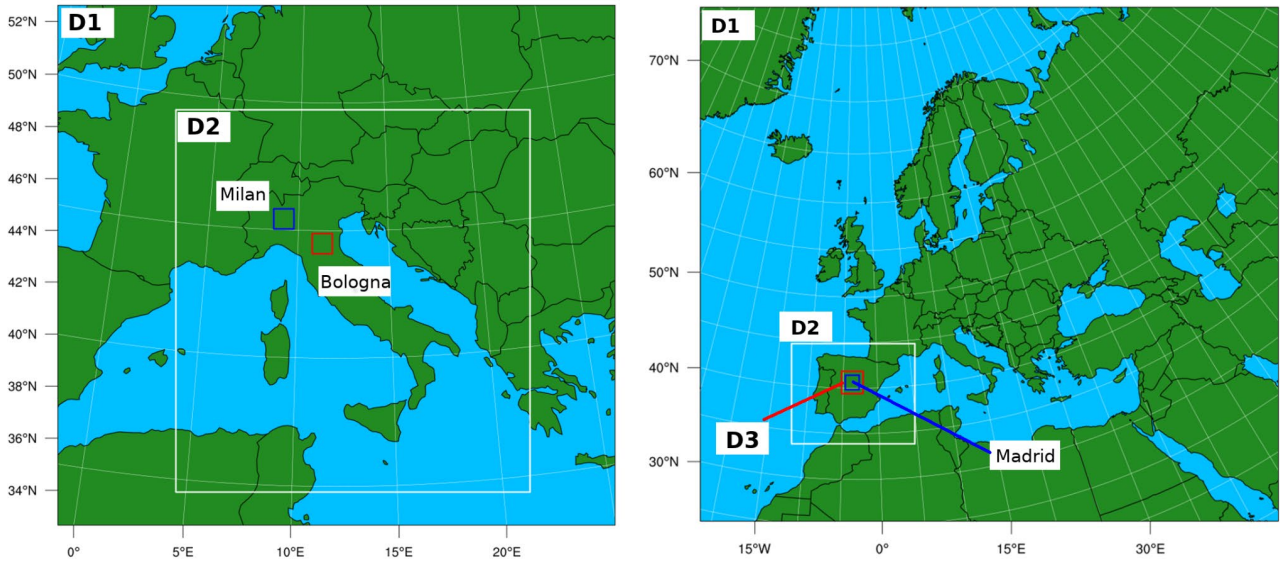


Figure S1. Domains used for simulations over Italy (Milano and Bologna, left) and Spain (Madrid, right).

Table S1. Domain specifications.

Italy	Geographic area	Grid Dimension (points)	Horizontal resolution(km)
		lon x lat	
D1	Europe	204 x 190	12 x 12
D2	Italy	388 x 418	4 x 4
Bologna	Bologna Municipality	89 x 89	1 x 1
Milan	Milan Municipality	89 x 89	1 x 1
Spain	Geographical area	Grid Dimension (points)	Horizontal resolution (km)
		lon x lat	
D1	Europe	248 x 220	27 x 27

D2	Iberian Peninsula	159 x 129	9 x 9
D3	Spain central area	84 x 87	3 x 3
Madrid	Greater Madrid area	159 x 168	1 x 1

Table S2. WRF statistical scores over Bologna, Milano and Madrid [34] computed for temperature (T), relative humidity (RH) and wind speed (WS) against local networks surface observations.

	Bologna			Milano			Madrid		
	T	RH	WS	T	RH	WS	T	RH	WS
BIAS	0.96°C	-5%	-0.62 m/s	0.85°C	-9.6%	0.1 m/s	2°C	-0.3%	-0.12 m/s
CORR	0.96	0.78	0.48	0.97	0.76	0.53	0.97	0.88	0.51
RMSE	2.5°C	14.7%	1.0 m/s	2.5°C	17.7%	1.0 m/s	3.2°C	10.8%	1.0 m/s
IOA	0.97	0.86	0.64	0.98	0.82	0.62	0.84	0.8	0.53
Mean model	15.4°C	65.8%	1.74 m/s	15.3 °C	63.7%	1.3 m/s	16.3°C	52.2%	1.1 m/s
Mean Obs	14.2 °C	72.0%	2.35 m/s	14.3 °C	73.3%	1.2 m/s	14.3°C	52.5%	1.2 m/s

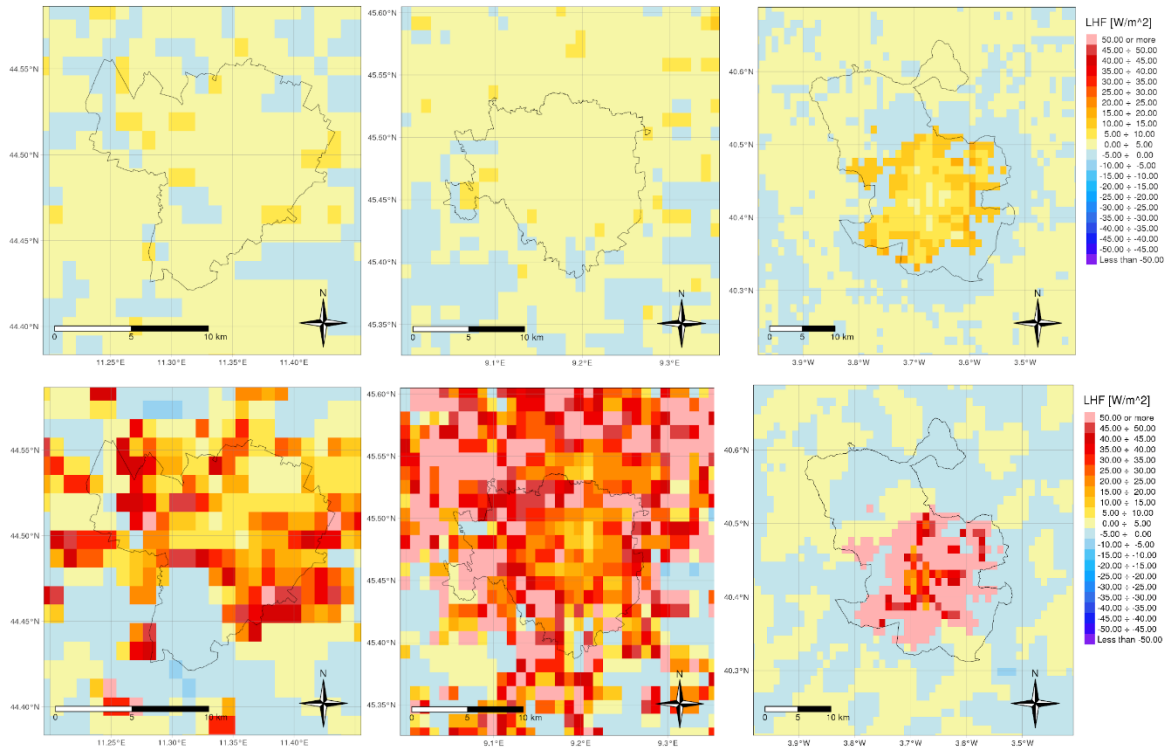


Figure S2. Average difference (VEG-NOVEG) for Latent Heat Flux (LHF, W/m^2), for January (top row) and July (bottom row), referred to Bologna (left column), Milano (middle column) and Madrid (right column).

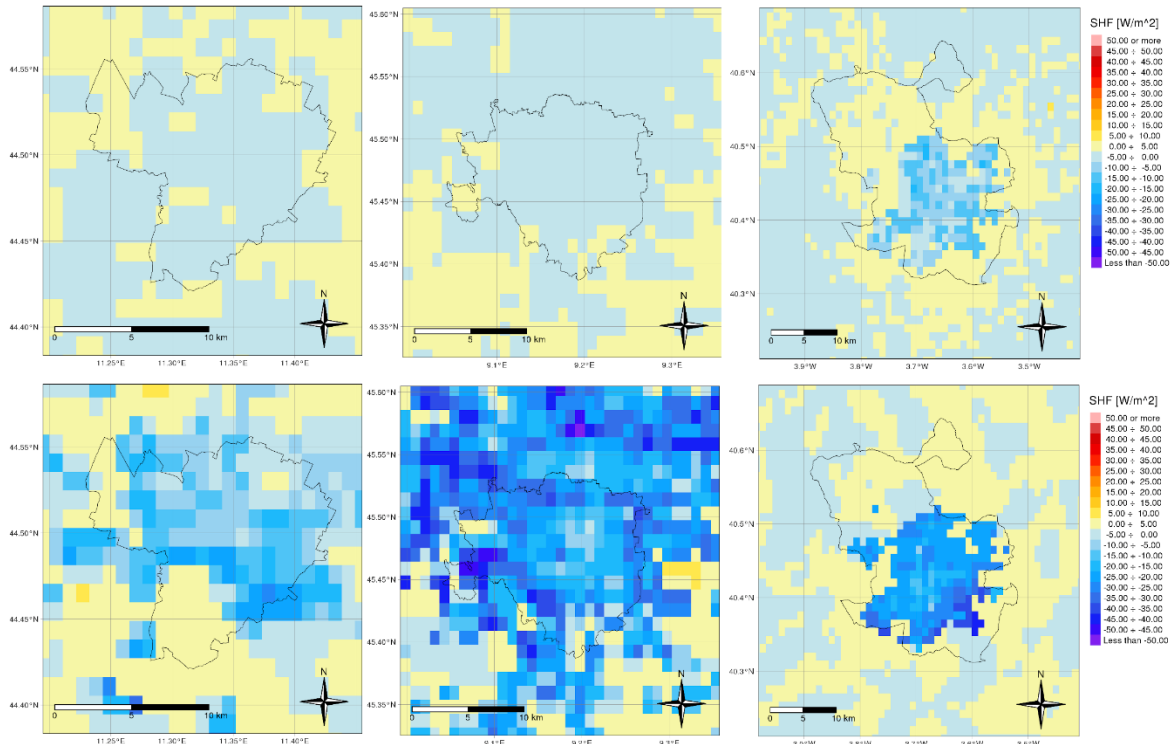


Figure S3. Same as in Figure S2 but referred to Sensible Heat Flux (SHF).

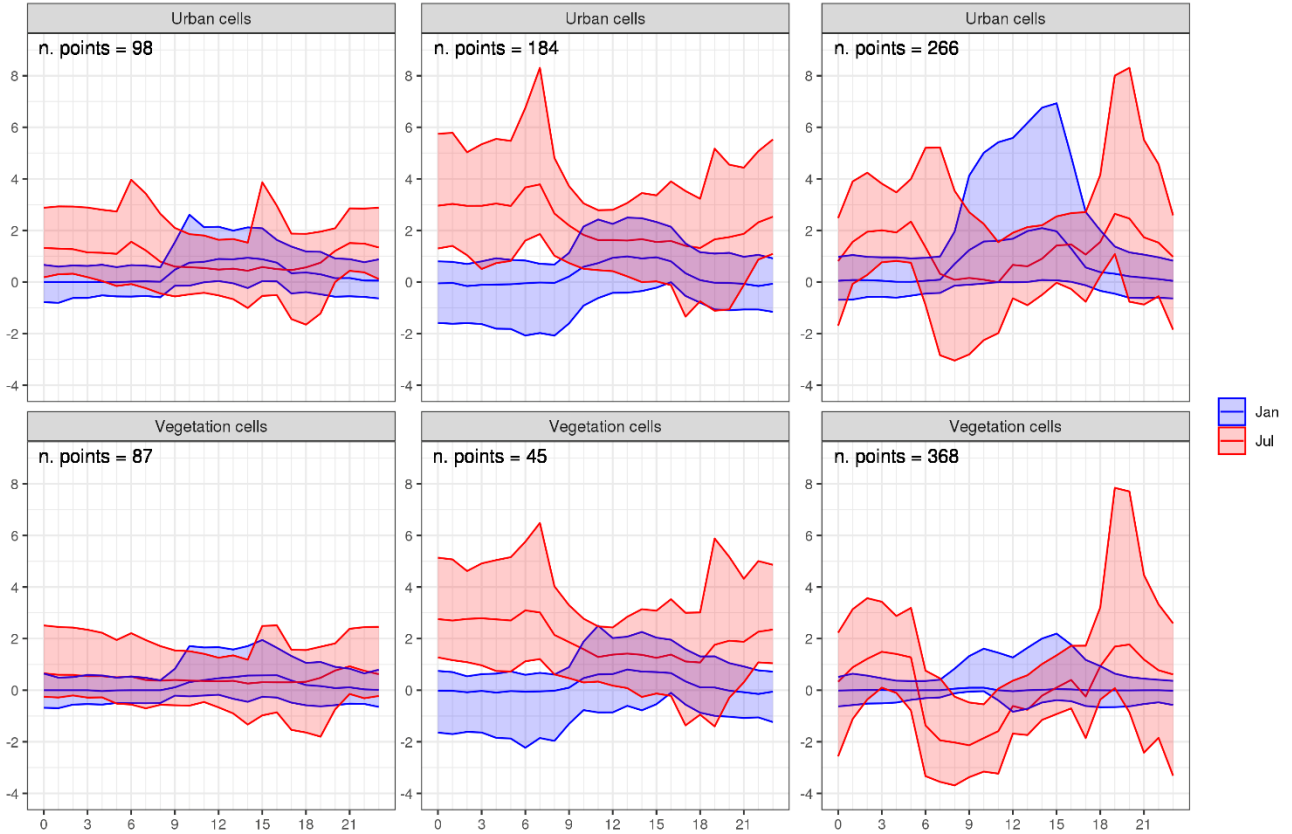


Figure S4. Daily cycle of the median, 10th and 90th percentiles RH difference (VEG-NOVEG) within Bologna, Milano and Madrid municipalities (left, middle and right column, respectively). Top row is referred to quantities calculated over

Urban cells where vegetation fraction was removed in NOVEG simulations, while bottom row shows quantities calculated over Vegetation cells where urban fraction is not prevalent and vegetation fraction was unchanged in both simulations. Colours refer to January (blue) and July (red), while shaded areas encompass the interval between 90th (upper bound) and 10th (lower bound) percentile. Units in %. The number of grid points associated with cell type is indicated in the panels.

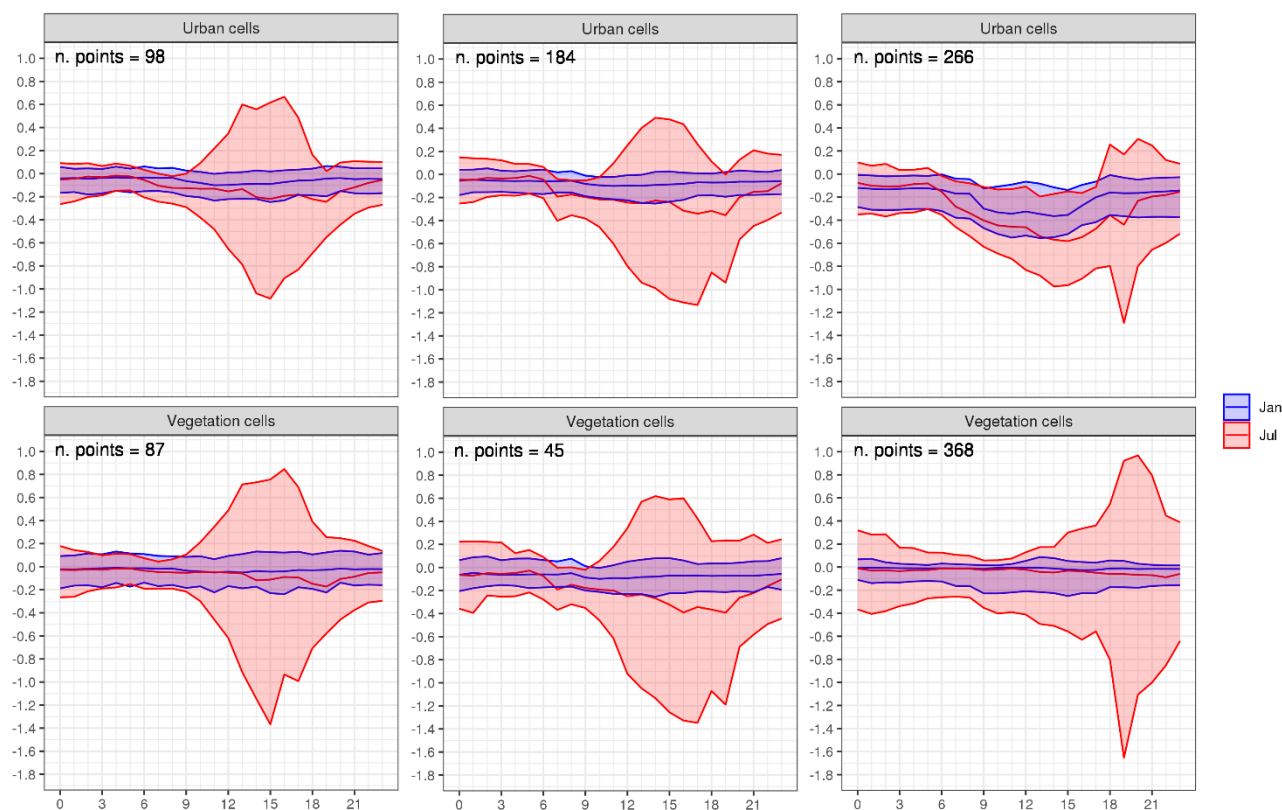


Figure S5. Daily cycle of the median, 10th and 90th percentiles WS difference (VEG-NOVEG) within Bologna, Milano and Madrid municipalities (left, middle and right column, respectively). Top row is referred to quantities calculated over Urban cells where vegetation fraction was removed in NOVEG simulations, while bottom row shows quantities calculated over Vegetation cells where urban fraction is not prevalent and vegetation fraction was unchanged in both simulations. Colours refer to January (blue) and July (red), while shaded areas encompass the interval between 90th (upper bound) and 10th (lower bound) percentile. Units in m/s. The number of grid points associated with cell type is indicated in the panels.

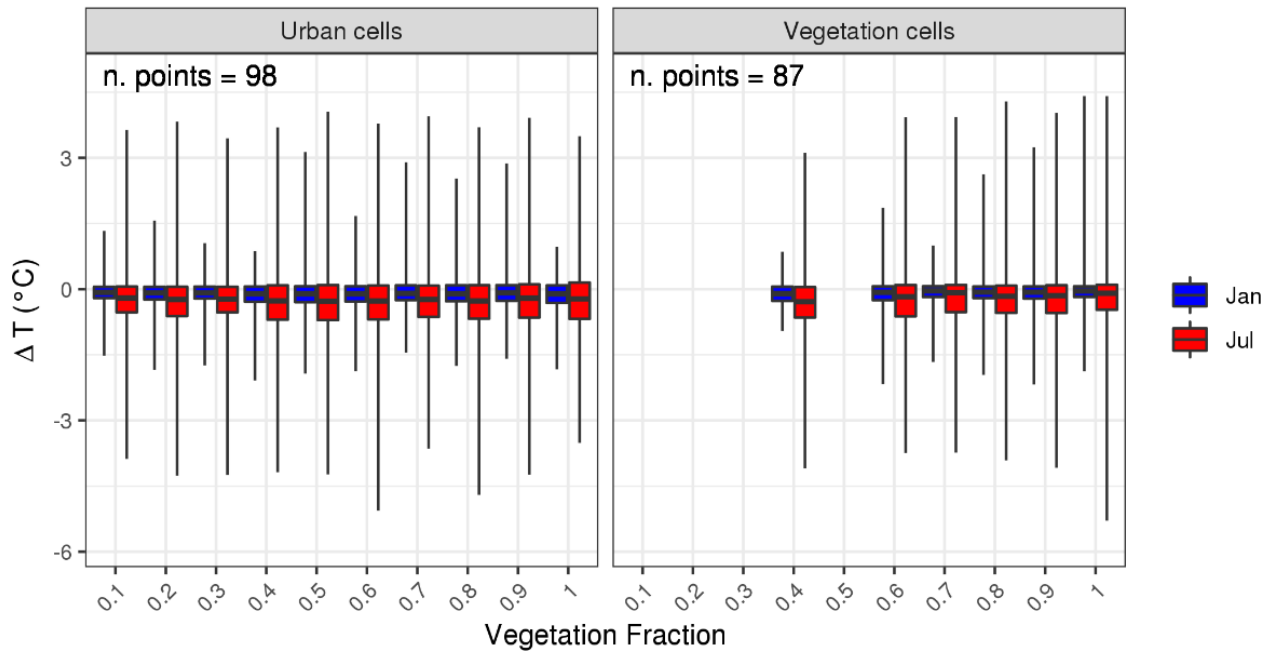


Figure S6. Boxplots of hourly T difference (VEG-NOVEG) as a function of vegetation fraction within the urban cells, divided into urban and vegetation cells, inside the municipality of Bologna. Whiskers span the interval 10th to 90th percentile. Blue (red) colour refers to January (July).

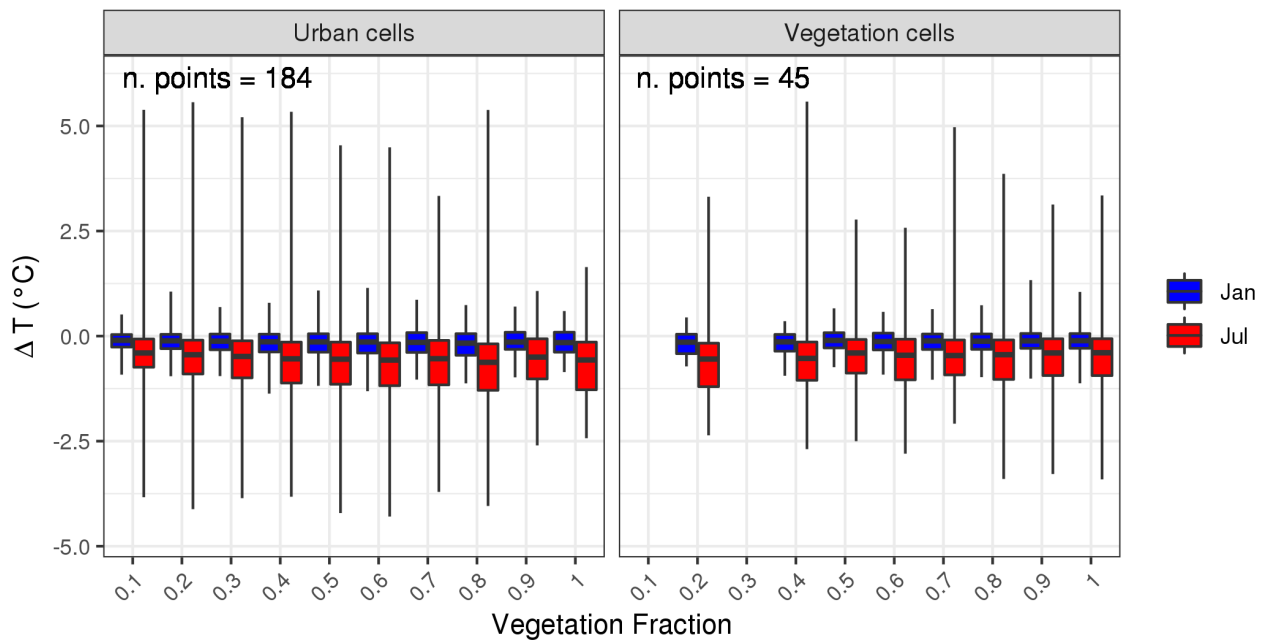


Figure S7. Same as in Figure S6 but referred to Milano.

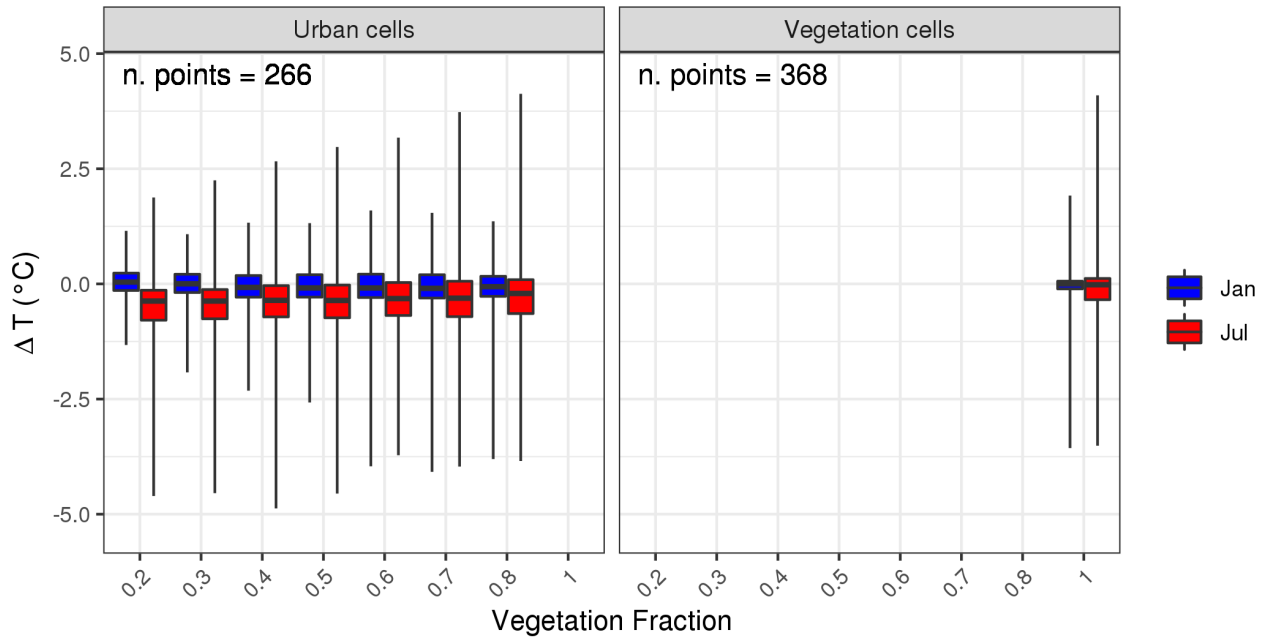


Figure S8. Same as in Figure S6 but referred to Madrid.

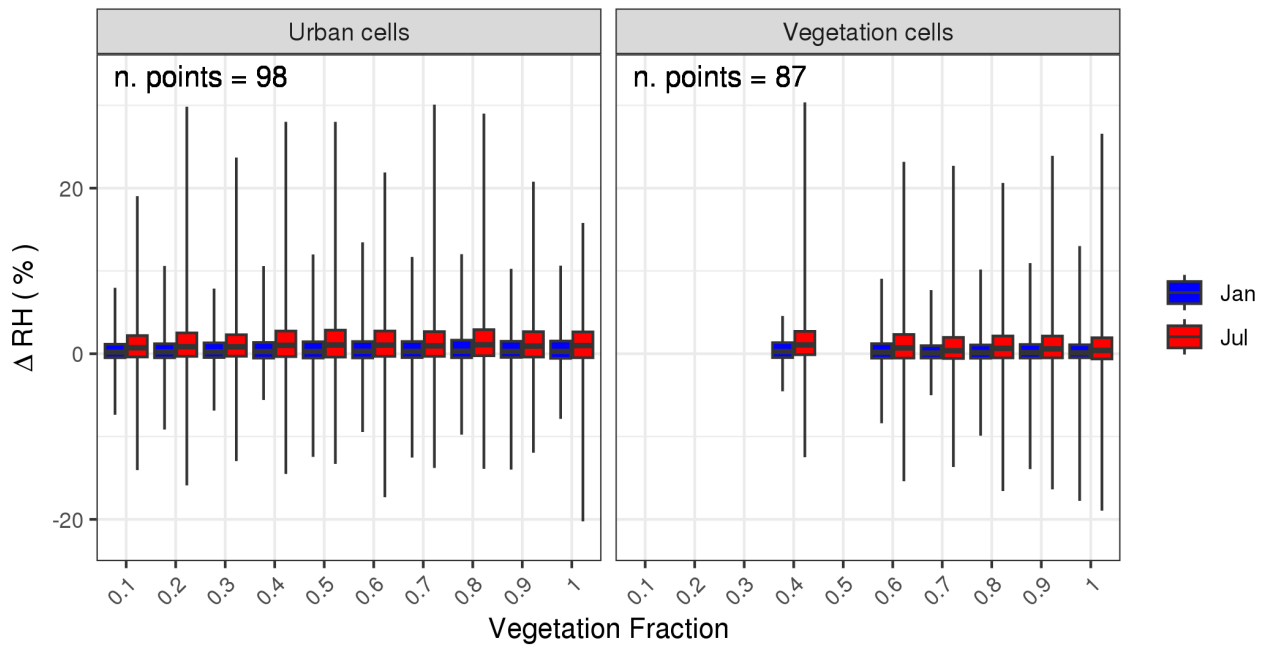


Figure S9. Boxplots of hourly RH difference (VEG-NOVEG) as a function of vegetation fraction within the urban cells, divided into urban and vegetation cells, inside the municipality of Bologna. Whiskers span the interval 10th to 90th percentile. Blue (red) colour refers to January (July). Units in %.

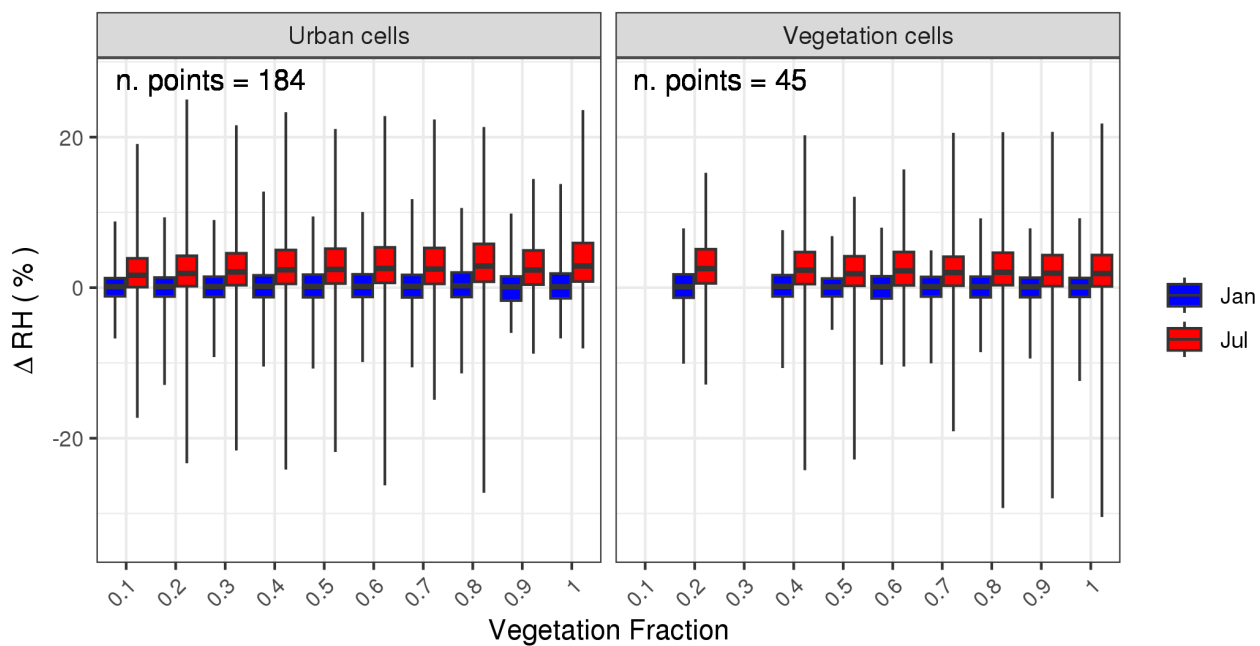


Figure S10. Same as in Figure S9 but referred to Milan.

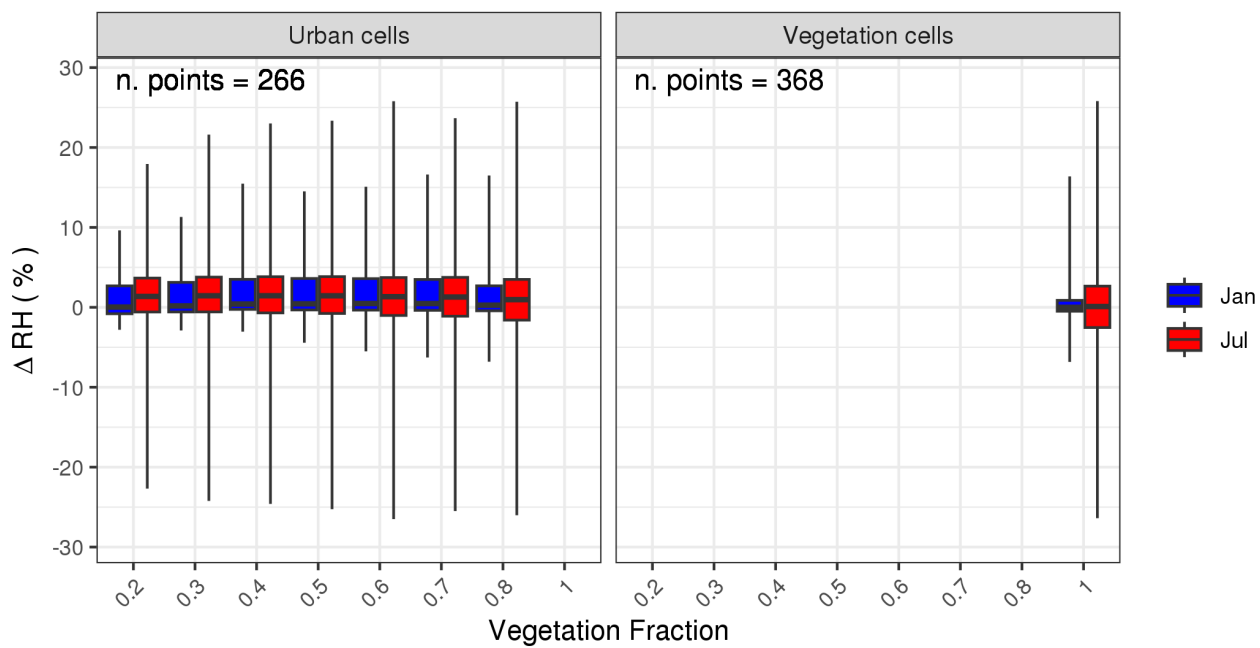


Figure S11. Same as in Figure S9 but referred to Madrid.

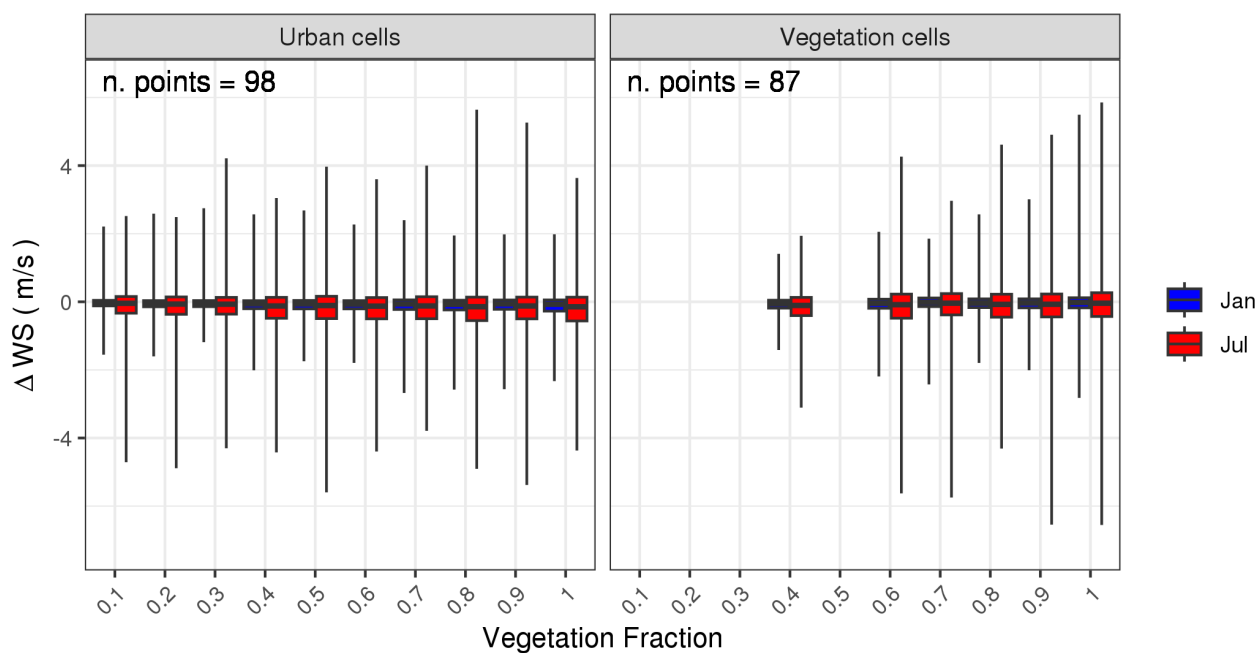


Figure S12. Boxplots of hourly wind speed (WS) difference (VEG-NOVEG) as a function of vegetation fraction within the urban cells, divided into urban and vegetation cells, inside the municipality of Bologna. Whiskers span the interval 10th to 90th percentile. Blue (red) colour refers to January (July).

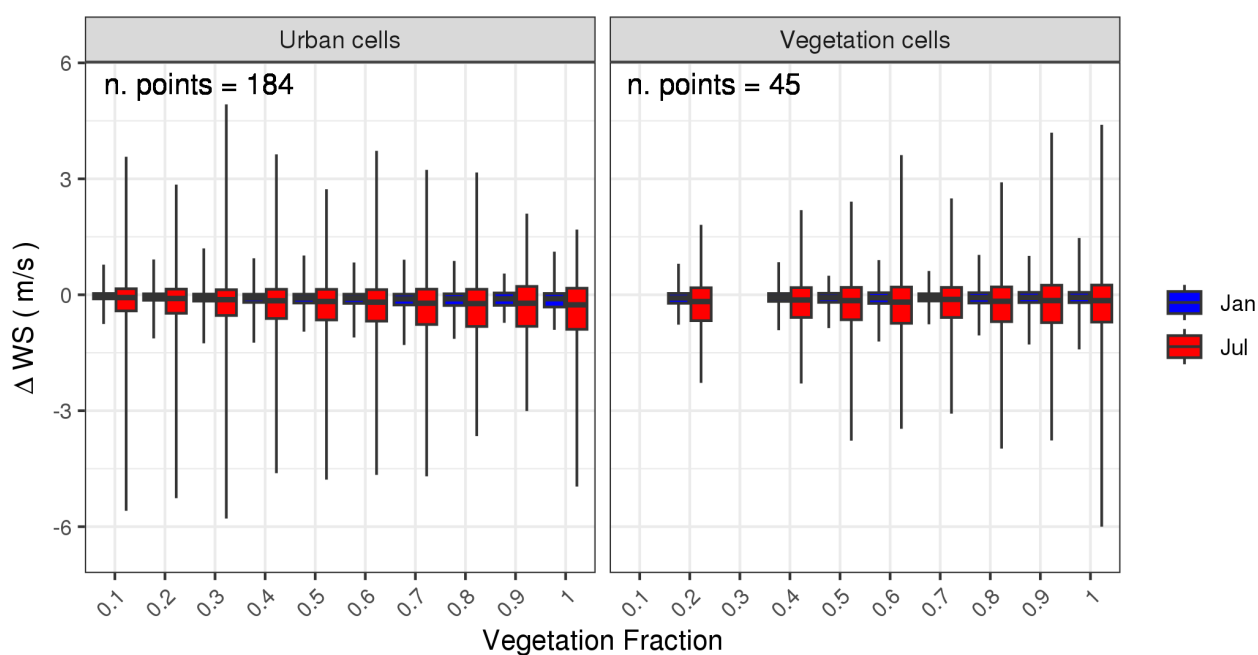


Figure S13. Same as in Figure S12 but referred to Milano.

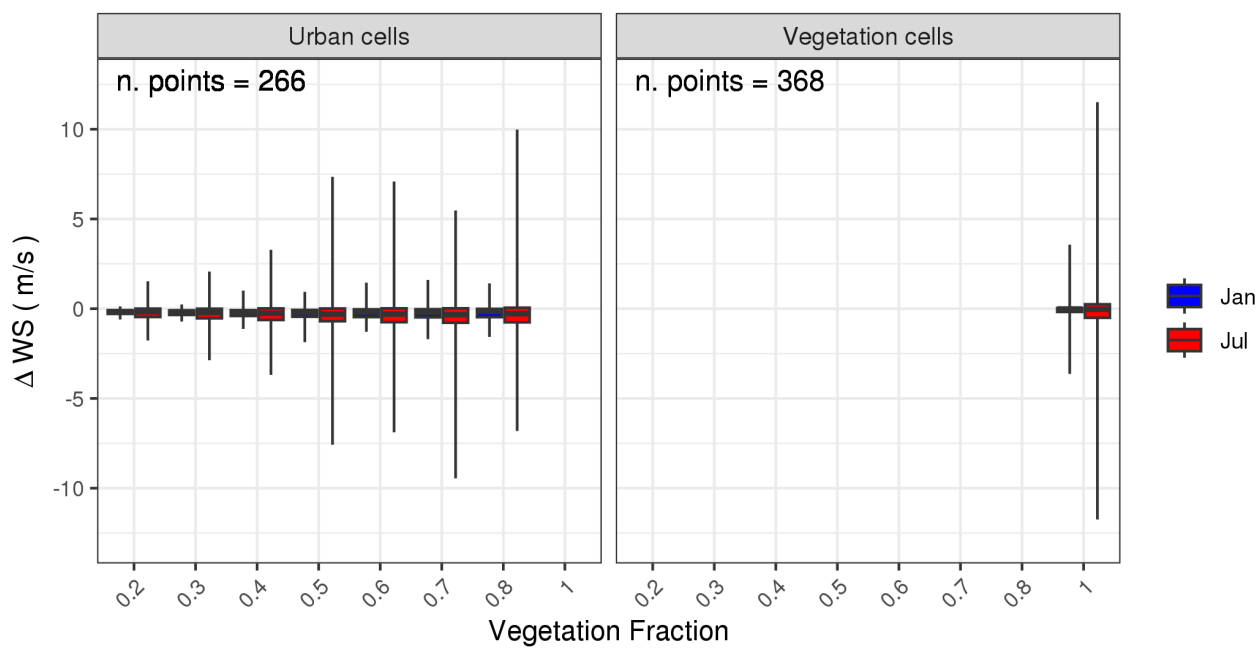


Figure S14. Same as in Figure S12 but referred to Madrid.