(a)

(b)

(c)
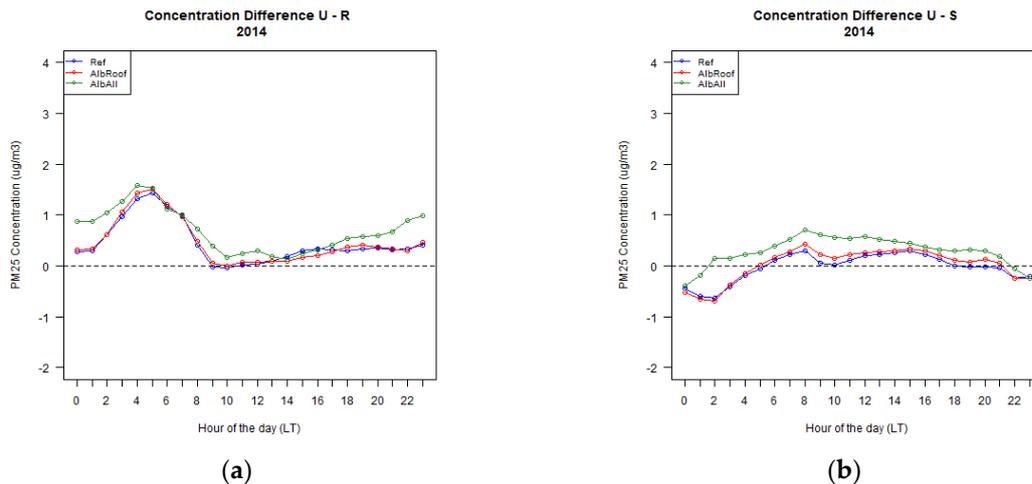
Figure S1. Vertical cross section of the mean turbulent kinetic energy (m² s⁻²) at latitude equal to 45.50 and at 12:00 LT for (**a**) the Reference; (**b**) the test case AlbRoof ; (**c**) the test case AlbAll .

(a)

(b)

Figure S2. Daily cycles of the PM25 concentration (μg/m³) averaged over the simulation period (14-23 July 2014) for the Reference case (blue line), the test case with highly-reflective roofs coverage (AlbRoof , red line) and the test case with highly-reflective coverage for roofs, walls and roads (AlbAll , green line): (**a**) Average PM25 concentration computed over the mixed forest land use (Rural) category in **Error! Reference source not found.**; (**b**) Average PM25 concentration computed over the croplands land use (Suburban) category in **Error! Reference source not found.**.
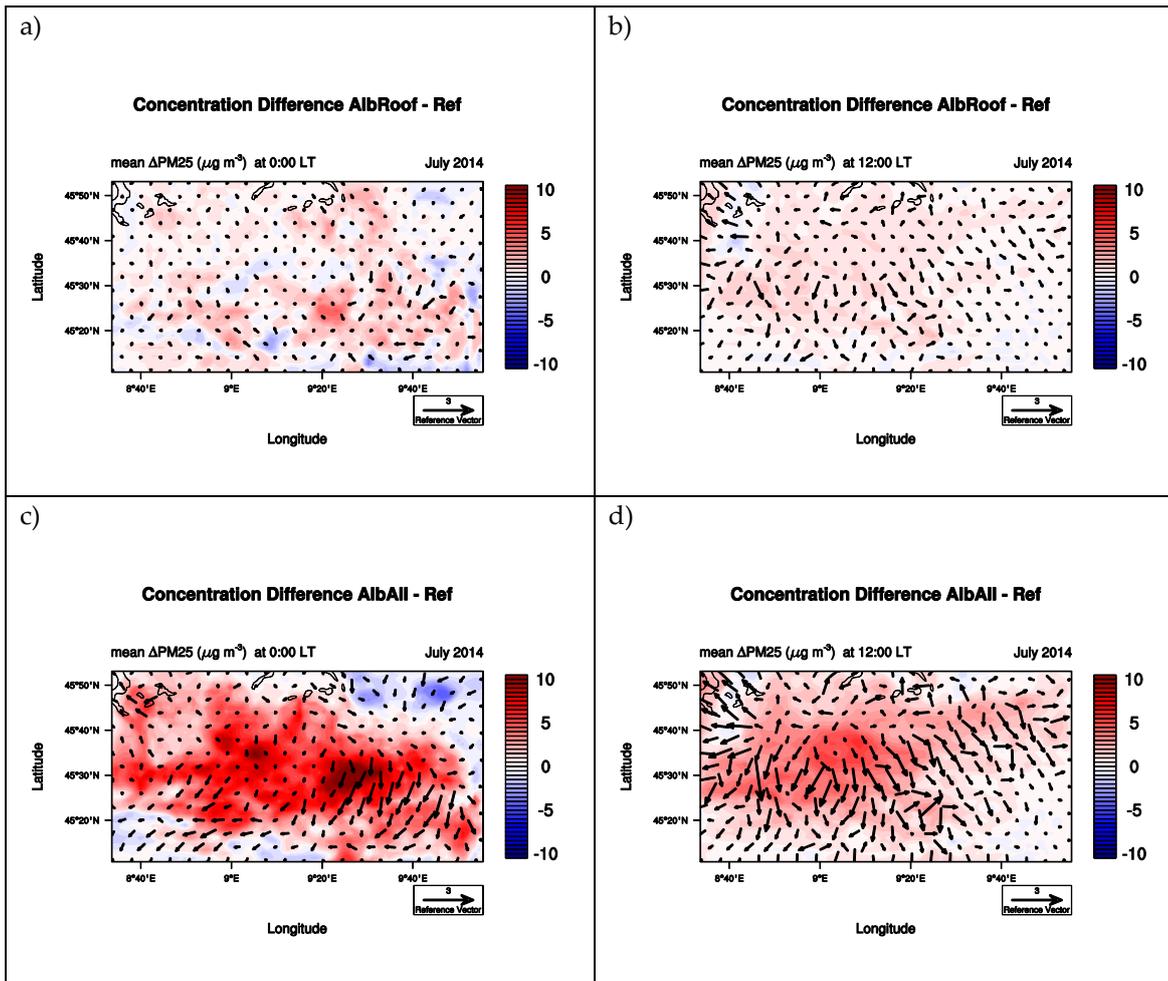
Figure S3. Difference of average PM25 concentration between tests using highly reflective materials and the reference case at 00:00 LT (left) and at 12:00 LT (right). From top to bottom: **(a-b)** difference between AlbRoof and Ref, **(c-d)** difference between AlbAll and Ref.

(**a**)   (**b**)
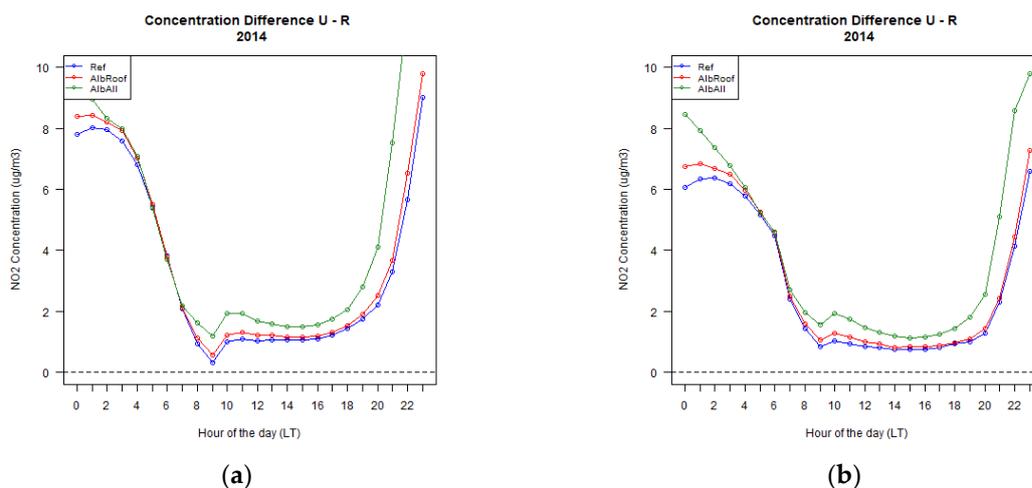
Figure S4. Same as Figure S2, but for NO₂ concentration: (**a**) Average NO₂ concentration computed over the mixed forest land use (Rural) category in **Error! Reference source not found.**; (**b**) Average NO₂ concentration computed over the croplands land use (Suburban) category in **Error! Reference source not found.**.

a)   b)
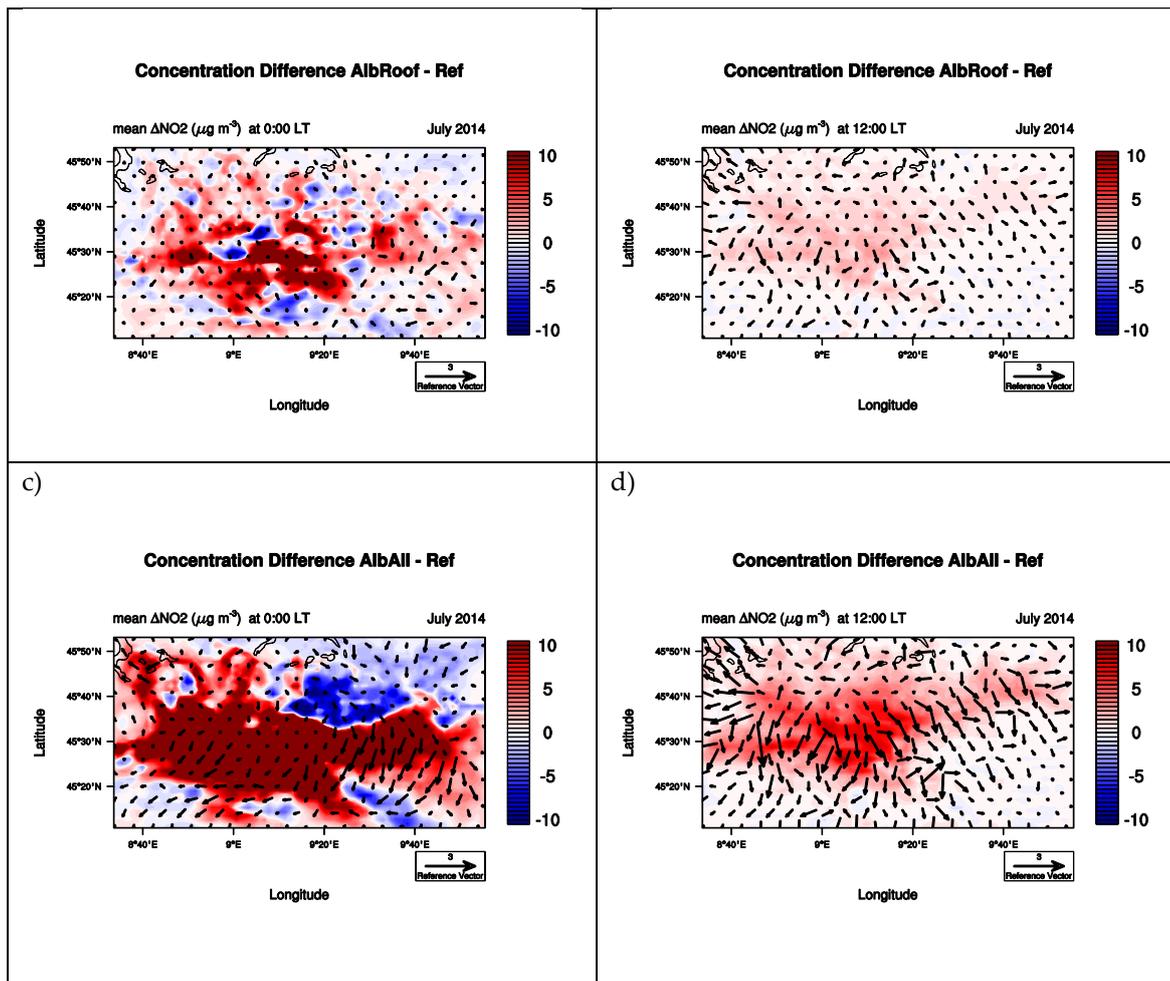
Figure S5. Same as Figure **S3**, but for NO$_2$**: (a-b)** difference between AlbRoof and Ref, **(c-d)** difference between AlbAll and Ref.

Table S1. Statistical summary of model to observation comparison for temperature at 2 m height and wind speed at 10 m height for test using different urban canopy models and referring to July 2010. Indices are defined below (Falasca and Curci, under review).

	Label[2]	Fractional Bias (FB)		Normalized Mean Square Error (NMSE)		Correlation Coefficient (R)		Fac2	
		U10m	T2m	U10m	T2m	U10m	T2m	U10	T2m
Milan[1]	**Ref**	-0.093	-0.0016	0.68	4.6 x10^{-5}	0.29	0.90	0.56	1.0
	UCM	0.20	-0.0043	0.70	0.00013	0.31	0.84	0.64	1.0
	UCMt	0.12	-0.0038	0.79	0.00010	0.27	0.83	0.56	1.0
	BEP	-0.33	0.00013	0.67	3.8 x10^{-5}	0.36	0.90	0.60	1.0
	BEPt	-0.46	-0.00094	0.86	3.8 x10^{-5}	0.36	0.90	0.53	1.0

[1] Values are averaged over stations included in the domain over Milan. [2] Labels refer to the urban canopy model used in the WRF run, with the letter "t" to specify if non-default values of thermal and morphological parameters have been used. The Ref case includes the SLAB scheme.

Table S2. Same as Table S1, but for ozone in July 2010 and PM10 in January 2010 (Falasca and Curci, under review).

	Label[2]	Fractional Bias (FB)		Normalized Mean Square Error (NMSE)		Correlation Coefficient (R)		Fraction of predictions within a factor of two of observations (FAC2)	
		O3	PM10	O3	PM10	O3	PM10	O3	PM10
Milan[1]	Ref	0.15	-0.75	0.041	1.0	0.79	0.47	0.99	0.45
	UCM	0.15	-0.73	0.039	1.0	0.78	0.42	0.99	0.44
	UCMt	0.19	-	0.053	-	0.78	-	0.99	-
	BEP	0.12	-0.85	0.030	1.4	0.79	0.45	0.99	0.33
	BEPt	0.14	-0.87	0.037	1.5	0.77	0.43	0.99	0.27

[1] Values are averaged over stations included in the domain over Milan. [2] Labels refer to the urban canopy model used in the WRF run, with the letter "t" to specify if non-default values of thermal and morphological parameters have been used. The Ref case includes the SLAB scheme.

Statistical parameters used to compare model to observations are defined as follows:

- Fractional bias (FB):

$$FB = \frac{\left(\overline{C_o} - \overline{C_p}\right)}{0.5\left(\overline{C_o} + \overline{C_p}\right)}$$

- Normalized mean square error (NMSE):

$$NMSE = \frac{\overline{\left(C_o - C_p\right)^2}}{\overline{C_o}\ \overline{C_p}}$$

- Correlation coefficient (R):

$$R = \frac{\overline{\left(C_o - \overline{C_o}\right)\left(C_p - \overline{C_p}\right)}}{\sigma_{C_p}\sigma_{C_o}}$$

- Fraction of modelled values within a faction of two of observations (FAC2):

$$0.5 \leq \frac{C_p}{C_o} \leq 2.0$$

where:

C_p represents modelled values;

C_o represents observed values;

overbar $\bar{C}$ represents average over dataset;

σ_C represents the standard deviation over the dataset.