

Supplementary Materials: Low-Cost Air Quality Stations' Capability to Integrate Reference Stations in Particulate Matter Dynamics Assessment

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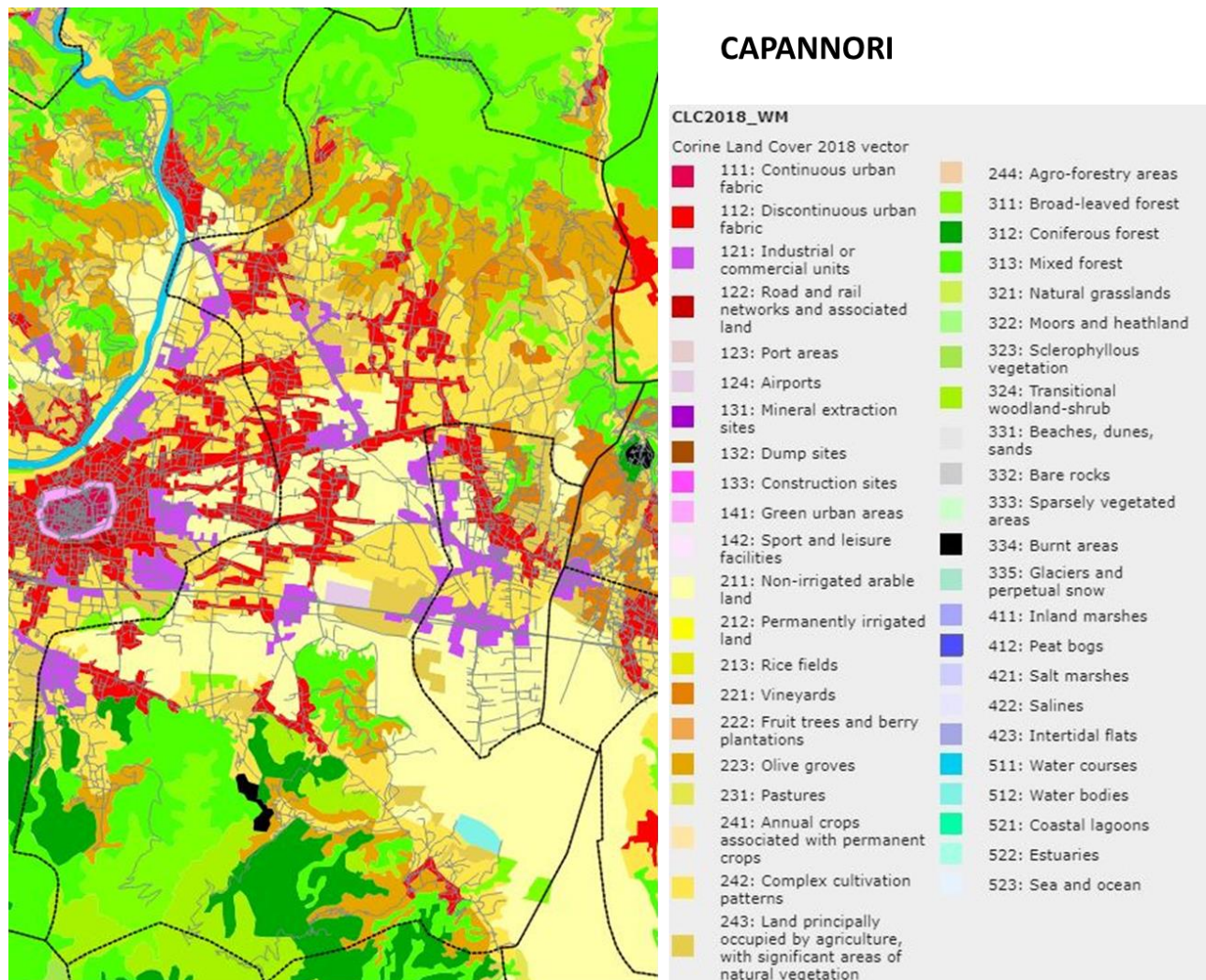


Figure S1. Land-use classification of the municipality of Capannori according to the 2018-updated Corine Land Cover classification performed at the highest third disaggregation level (EEA, 2020).

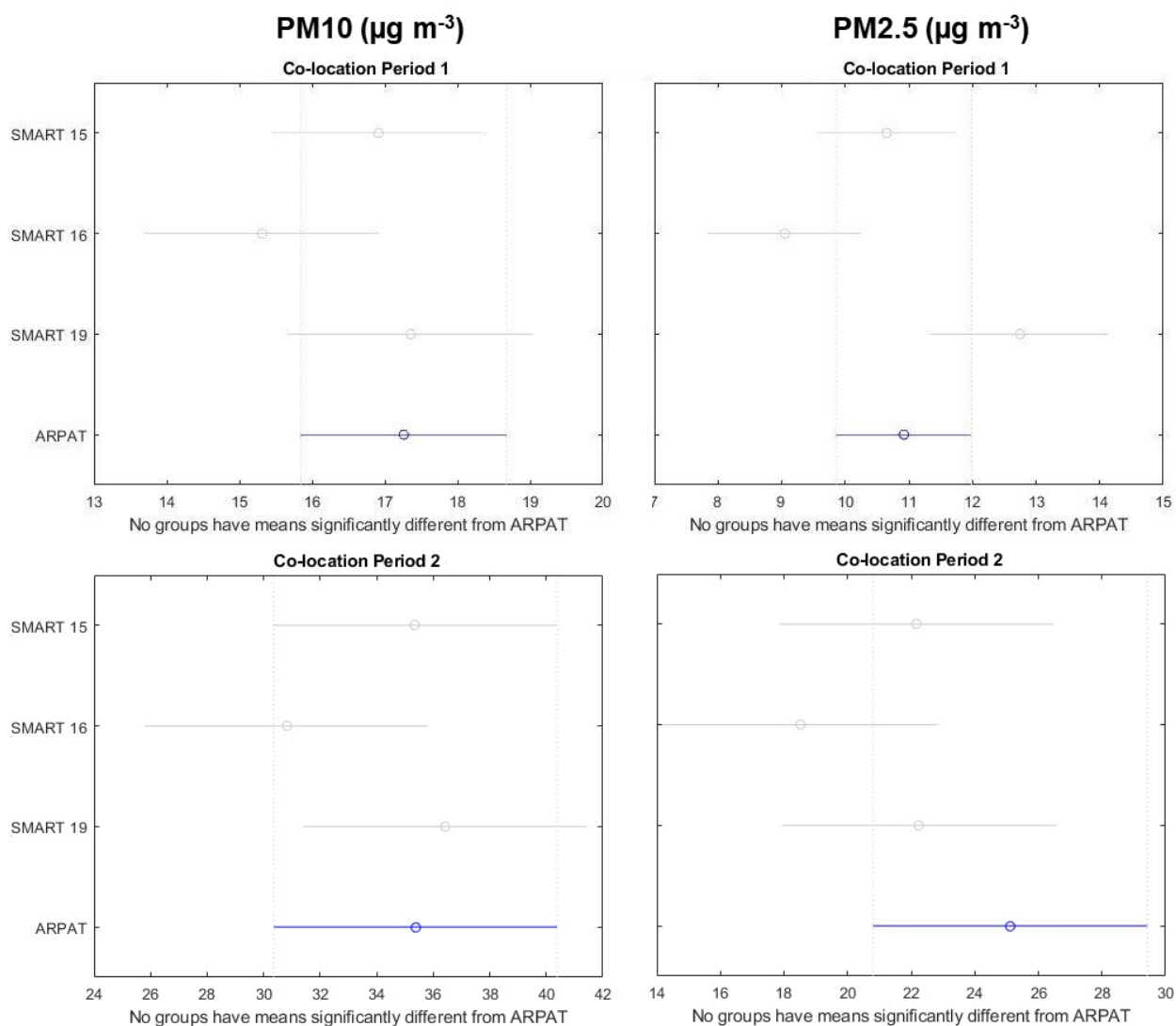


Figure S2. Anova analysis during field calibration and field validation processes. No groups showed mean values significantly different from the ARPAT reference station.

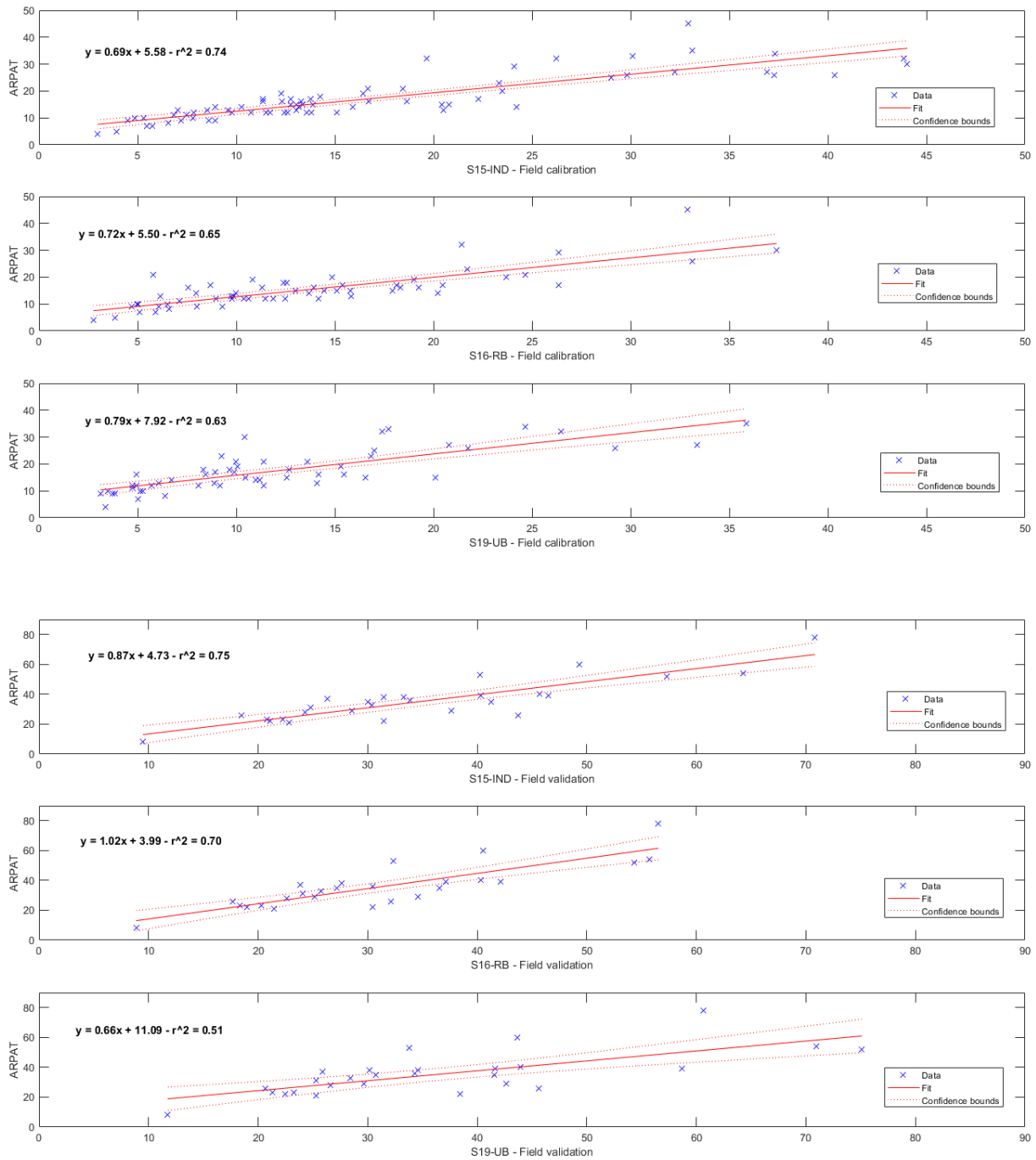


Figure S3. Scatterplot of the three AirQino stations (S15-IND, S16-RB, S19-UB) against ARPAT reference station for calibration and validation

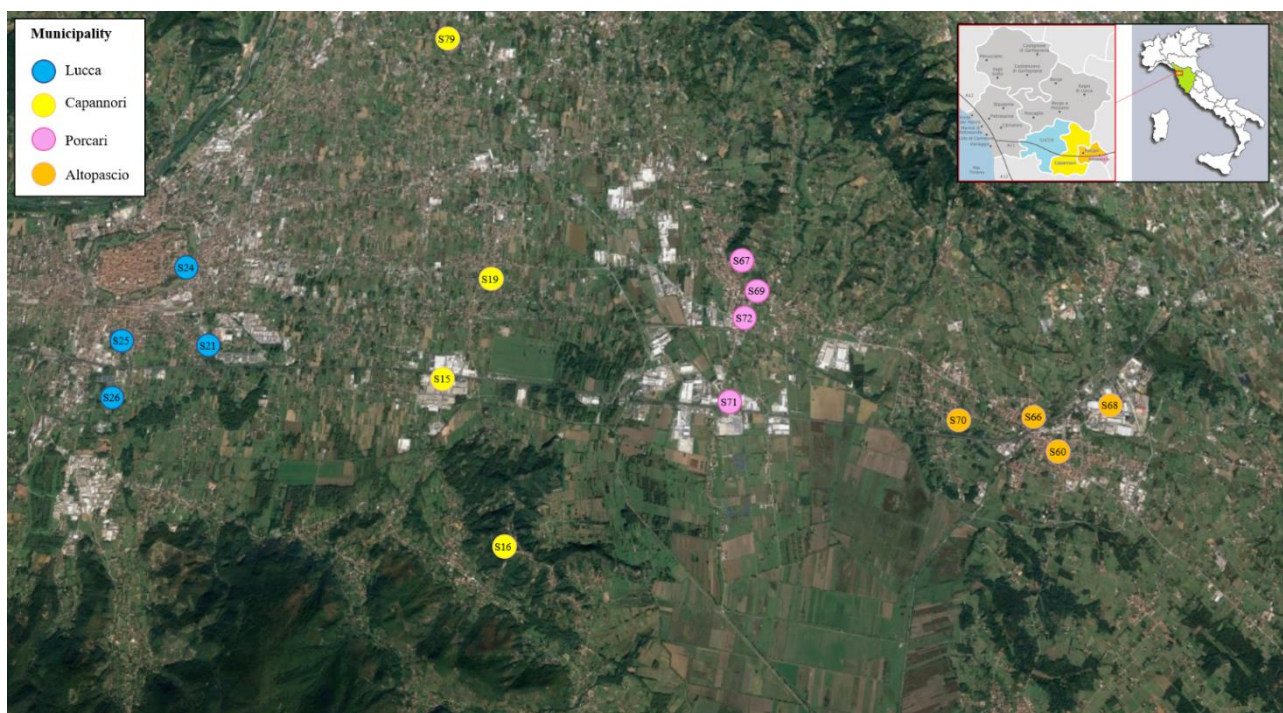


Figure S4. Location of the 16 AirQino air quality stations over the valley of Lucca as foreseen by the “VEG-LU-PM10” project. Stations are discriminated by colour depending on the municipality: Lucca (blue), Capannori (yellow), Porcari (pink), and Altupascio (orange).

Table S1. Characteristics of air quality stations deployed in the municipality of Capannori and data coverage during the PM_{2.5} and PM₁₀ concentrations monitoring campaign.

Station name	Latitude (deg N)	Longitude (deg E)	Altitude (m)	Type ^a	Start of activity ^b	End of activity ^b	Number of days	Data coverage (%)
S15-IND	43°49'2460"	10°33'4631"	12	Industrial	28/06/2018	15/04/2020	658	87.7
S16-RB	43°48'06.87"	10°34'3932"	85	Rural-Background	28/06/2018	15/04/2020	658	95.7
S19-UB	43°50'2340"	10°34'2241"	16	Urban-Background	18/01/2018	15/04/2020	819	92.4
ARPAT	43°50'2340"	10°34'2241"	16	Urban-Background	18/01/2018	15/04/2020	819	98.5

^a Stations are classified based on the 2008/50/EC EU Directive (EC, 2008)

^b For stations S15-IND and S16-RB, the activity periods do not include the sub-periods when both were co-located by the ARPAT reference station for field calibration and validation purposes (see Tab. 1).

Table S2 effects of meteorology on low-cost vs. reference sensor PM10 concentrations.

Field Calibration Period			
Station Name	Model ^a	R ²	RMSE ($\mu\text{g m}^{-3}$)
S15-IND	P	0.74	4.21
S15-IND	PTR	0.80	3.72
S15-IND	TR	0.02	8.23
S16-RB	P	0.65	4.10
S16-RB	PTR	0.79	3.25
S16-RB	TR	0.02	6.91
S19-UB	P	0.63	4.64
S19-UB	PTR	0.69	4.38
S19-UB	TR	0.25	6.50
Field Validation Period			
S15-IND	P	0.75	7.27
S15-IND	PTR	0.87	5.43
S15-IND	TR	0.51	10.51
S16-RB	P	0.70	8.02
S16-RB	PTR	0.85	5.92
S16-RB	TR	0.51	10.44
S19-UB	P	0.51	10.31
S19-UB	PTR	0.76	7.56
S19-UB	TR	0.51	10.48

^a Letters indicated the different kind of linear regression model: P is for PM10 only (i.e.: Station PM10 vs. ARPAT PM10); PTR is for PM10, Temperature and Relative Humidity (i.e.: Station PM10, Temperature and Relative Humidity vs. ARPAT PM10) and TR for Temperature and Relative Humidity only (i.e.: Station Temperature and Relative Humidity vs. ARPAT PM10).

Table S3 correlation coefficients for linear regression between PM10 percentage errors vs. Temperature (T) and Relative Humidity (RH).

Station Name	r ² for PM10 % error vs. T	r ² for PM10 % errors vs. RH
S15-IND	0.01	0.01
S16-RB	0.06	0.20
S19-UB	0.07	0.23