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Atmospheric Chemistry and Physics Discussions

Supplement of

AIRUSE-LIFE+: a harmonized PM speciation and source apportionment in 5 Southern European cities

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Supplementary material

Table S1: Summary of the number of samples collected for each city and analytical technique in colours.

			BCN-UB	FI-UB	MLN-UB	POR-TR	ATH-SUB
Daily samples	PM10	**Mass**	**122**	**226**	**379**	**123**	**197**
		Elements	122[I]	226[P]	241[P/X]	123[P/I]	197[P/I]
		Ions	122	226	337	123	197
		EC/OC	122	226	348	123	197
		CC	122	226	89	123	197
	PM2.5	**Mass**	**126**	**243**	**378**	**126**	**243**
		Elements	126[I]	243[P]	361[X]	126[P/I]	243[P/I]
		Ions	126	243	374	126	243
		EC/OC	126	243	370	126	243
		Levoglucosan	126	243	356	126	243

[P]: PIXE, [I]: ICP, [X]: XRF

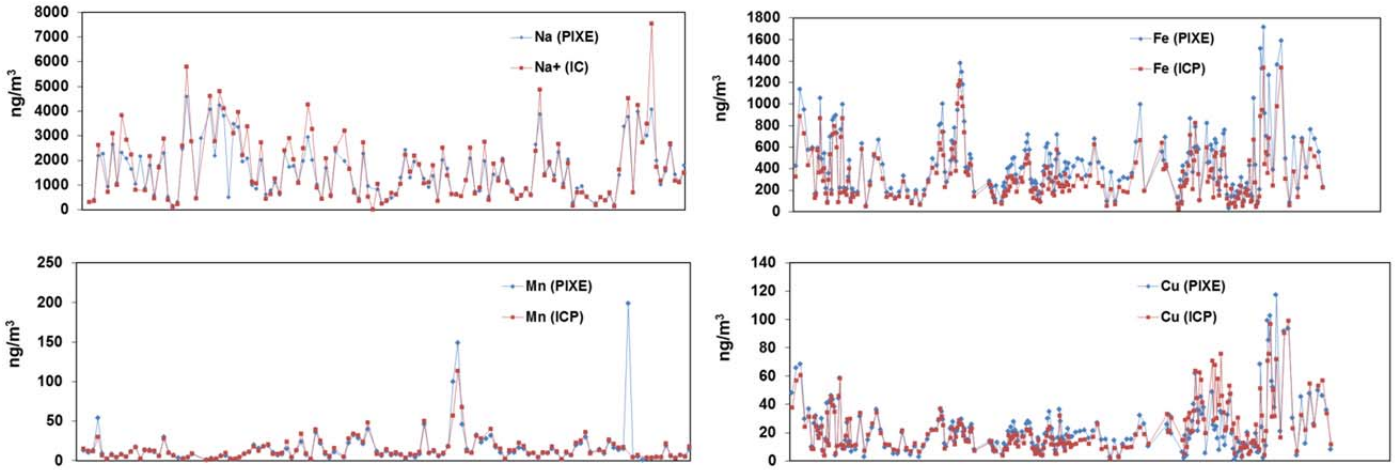


Figure S1. Comparison of results obtained with different analytical techniques in Porto (left panels) and Florence (right panels).

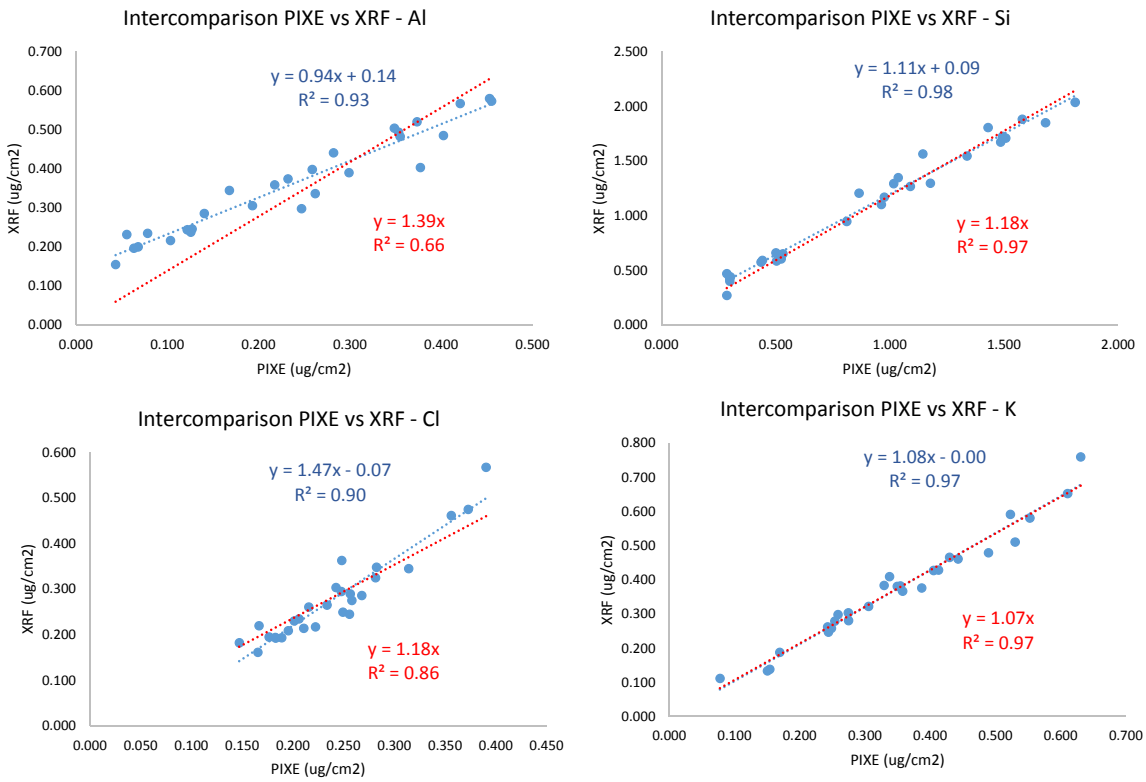


Figure S2. Comparison of results obtained with PIXE and XRF techniques in Milan for Al, Si, Cl and K. Red fits are constrained to the origin.

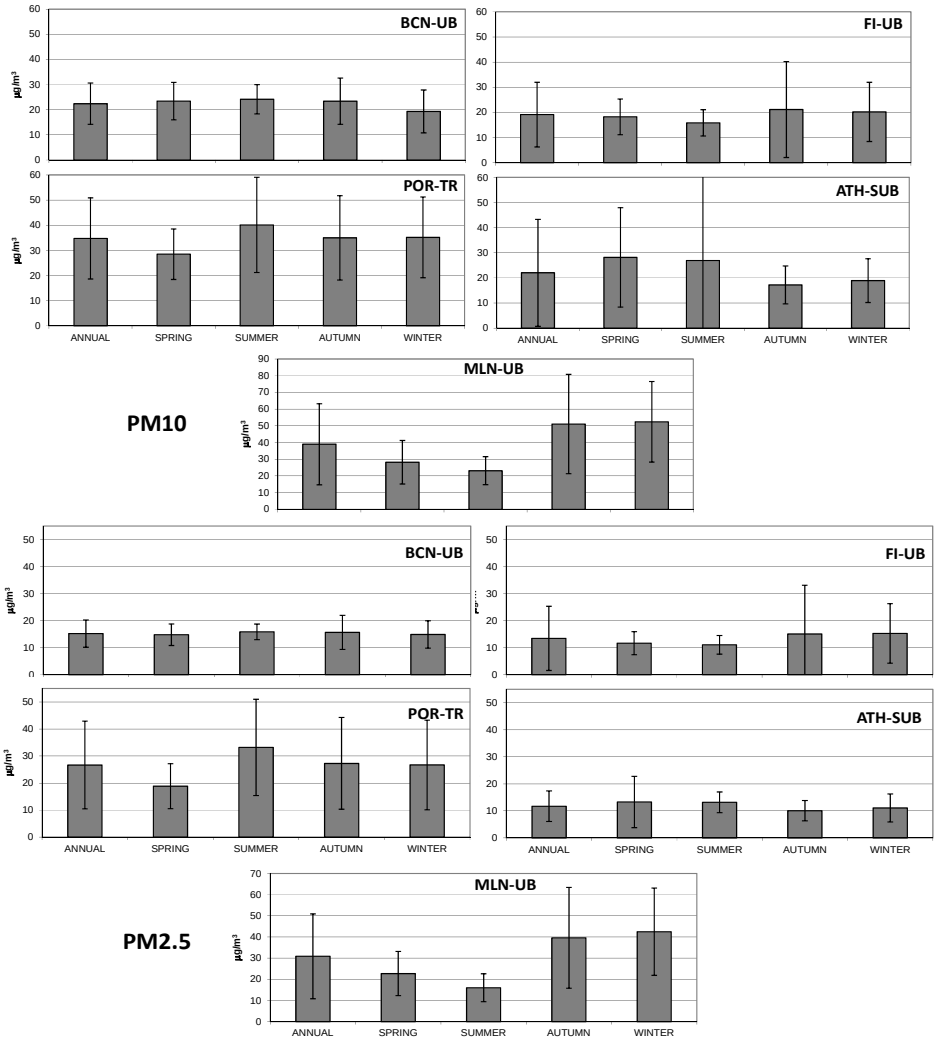


Figure S3. Seasonal variation of mean levels (± standard deviation) of PM10 and PM2.5 levels for the study period at the five AIRUSE cities.

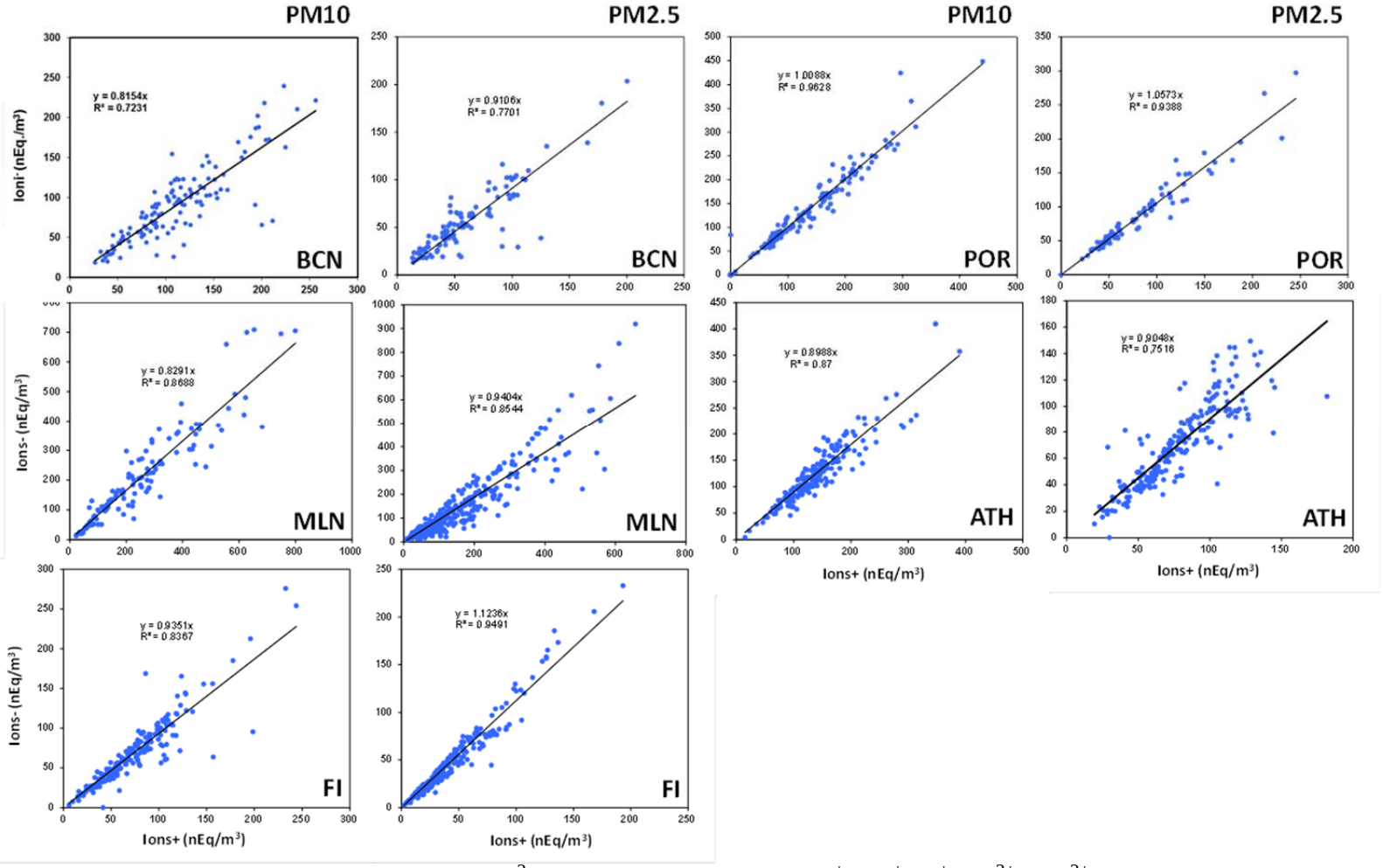
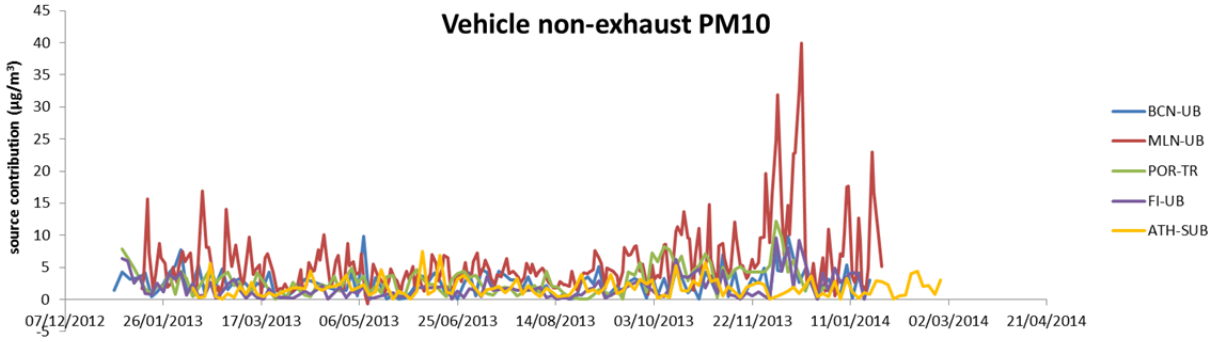
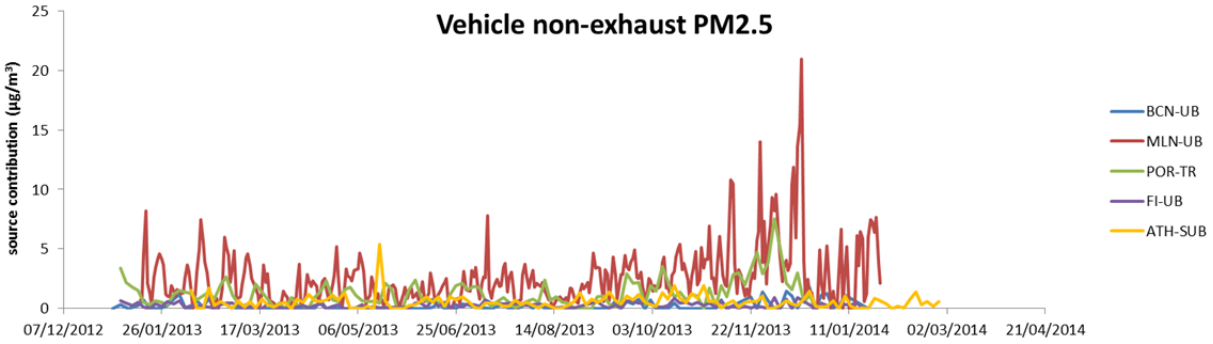
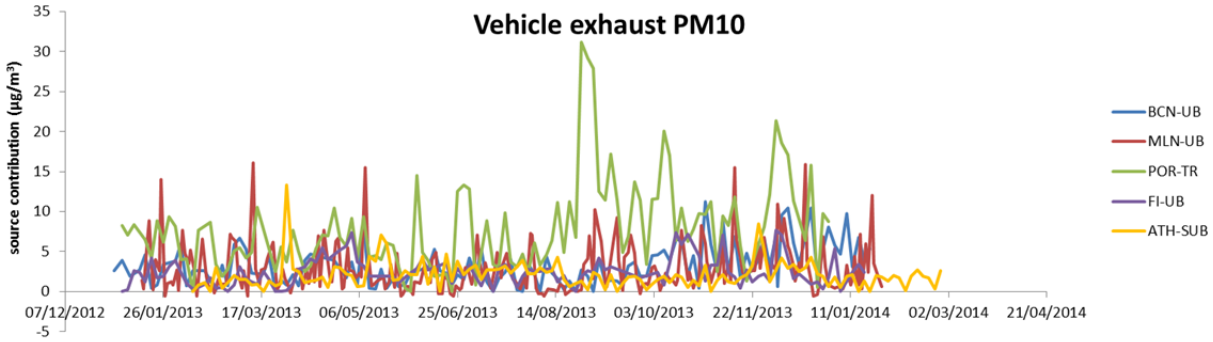
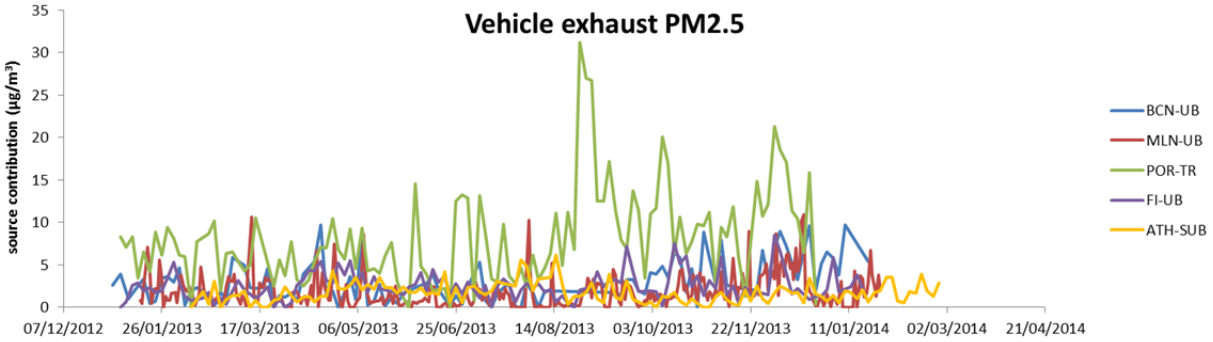


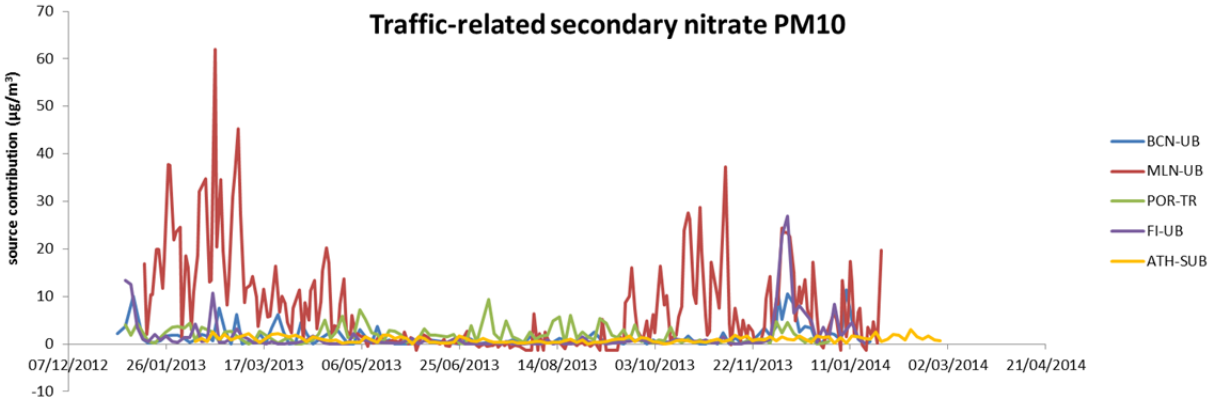
Figure S4. Ion balance of anionic (ions-: Cl^-, NO_3^- and SO_4^{2-}) and cationic (ions+: NH_4^+. Na^+, K^+, Ca^{2+}, Mg^{2+}) species in daily samples of PM10 and PM2.5 from the five AIRUSE cities.

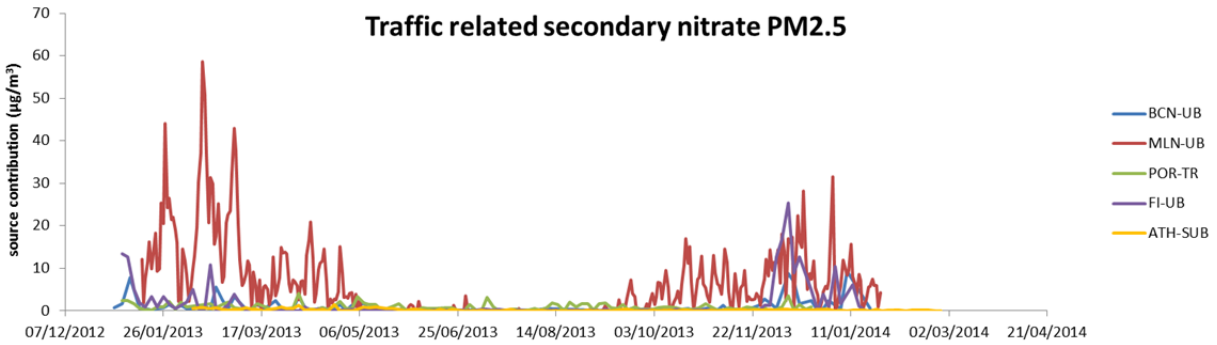

Vehicle non-exhaust PM10
source contribution (µg/m³)
45
40
35
30
25
20
15
10
5
0
-5
07/12/2012
26/01/2013
17/03/2013
06/05/2013
25/06/2013
14/08/2013
03/10/2013
22/11/2013
11/01/2014
02/03/2014
21/04/2014
BCN-UB
MLN-UB
POR-TR
FI-UB
ATH-SUB

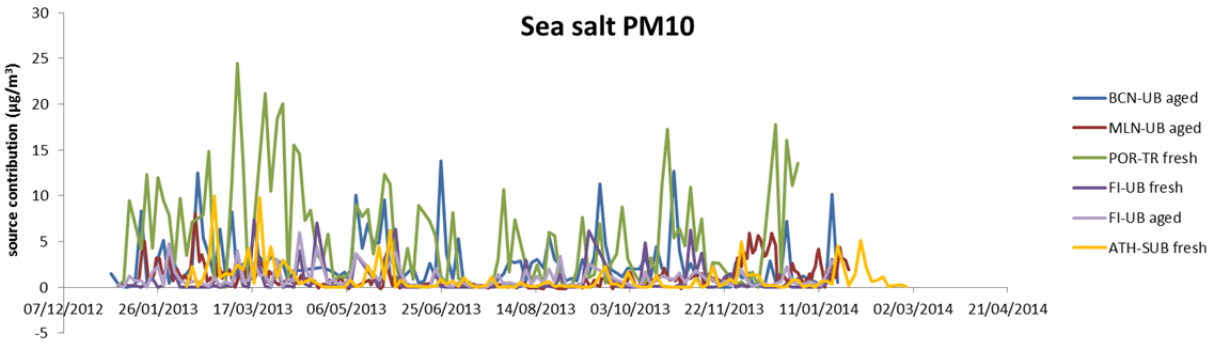

Vehicle non-exhaust PM2.5
source contribution (µg/m³)
25
20
15
10
5
0
07/12/2012
26/01/2013
17/03/2013
06/05/2013
25/06/2013
14/08/2013
03/10/2013
22/11/2013
11/01/2014
02/03/2014
21/04/2014
BCN-UB
MLN-UB
POR-TR
FI-UB
ATH-SUB

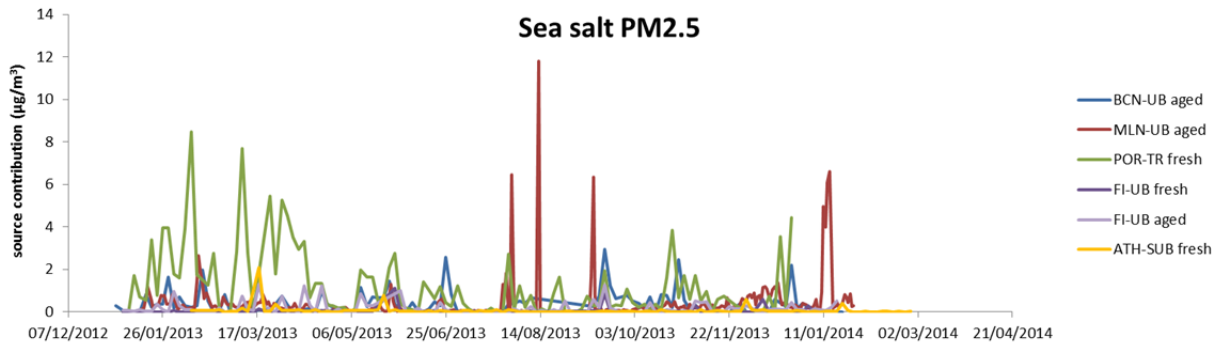

Vehicle exhaust PM10
source contribution (µg/m³)
35
30
25
20
15
10
5
0
-5
07/12/2012
26/01/2013
17/03/2013
06/05/2013
25/06/2013
14/08/2013
03/10/2013
22/11/2013
11/01/2014
02/03/2014
21/04/2014
BCN-UB
MLN-UB
POR-TR
FI-UB
ATH-SUB

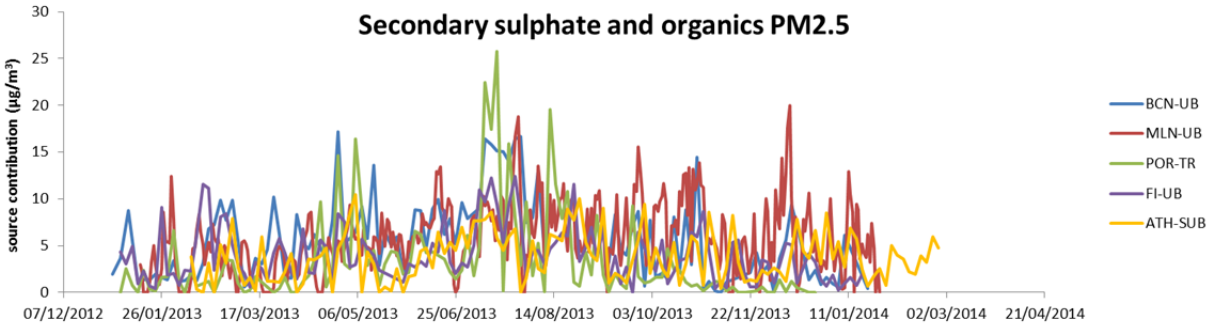

Vehicle exhaust PM2.5
source contribution (µg/m³)
35
30
25
20
15
10
5
0
07/12/2012
26/01/2013
17/03/2013
06/05/2013
25/06/2013
14/08/2013
03/10/2013
22/11/2013
11/01/2014
02/03/2014
21/04/2014
BCN-UB
MLN-UB
POR-TR
FI-UB
ATH-SUB


Traffic-related secondary nitrate PM10
source contribution (µg/m³)
70
60
50
40
30
20
10
0
-10
07/12/2012
26/01/2013
17/03/2013
06/05/2013
25/06/2013
14/08/2013
03/10/2013
22/11/2013
11/01/2014
02/03/2014
21/04/2014
BCN-UB
MLN-UB
POR-TR
FI-UB
ATH-SUB


Traffic related secondary nitrate PM2.5
source contribution (µg/m³)
70
60
50
40
30
20
10
0
07/12/2012
26/01/2013
17/03/2013
06/05/2013
25/06/2013
14/08/2013
03/10/2013
22/11/2013
11/01/2014
02/03/2014
21/04/2014
BCN-UB
MLN-UB
POR-TR
FI-UB
ATH-SUB


Sea salt PM10
source contribution (µg/m³)
30
25
20
15
10
5
0
-5
07/12/2012
26/01/2013
17/03/2013
06/05/2013
25/06/2013
14/08/2013
03/10/2013
22/11/2013
11/01/2014
02/03/2014
21/04/2014
BCN-UB aged
MLN-UB aged
POR-TR fresh
FI-UB fresh
FI-UB aged
ATH-SUB fresh


Sea salt PM2.5
source contribution (µg/m³)
14
12
10
8
6
4
2
0
07/12/2012
26/01/2013
17/03/2013
06/05/2013
25/06/2013
14/08/2013
03/10/2013
22/11/2013
11/01/2014
02/03/2014
21/04/2014
BCN-UB aged
MLN-UB aged
POR-TR fresh
FI-UB fresh
FI-UB aged
ATH-SUB fresh


Secondary sulphate and organics PM2.5
source contribution (µg/m³)
30
25
20
15
10
5
0
07/12/2012
26/01/2013
17/03/2013
06/05/2013
25/06/2013
14/08/2013
03/10/2013
22/11/2013
11/01/2014
02/03/2014
21/04/2014
BCN-UB
MLN-UB
POR-TR
FI-UB
ATH-SUB

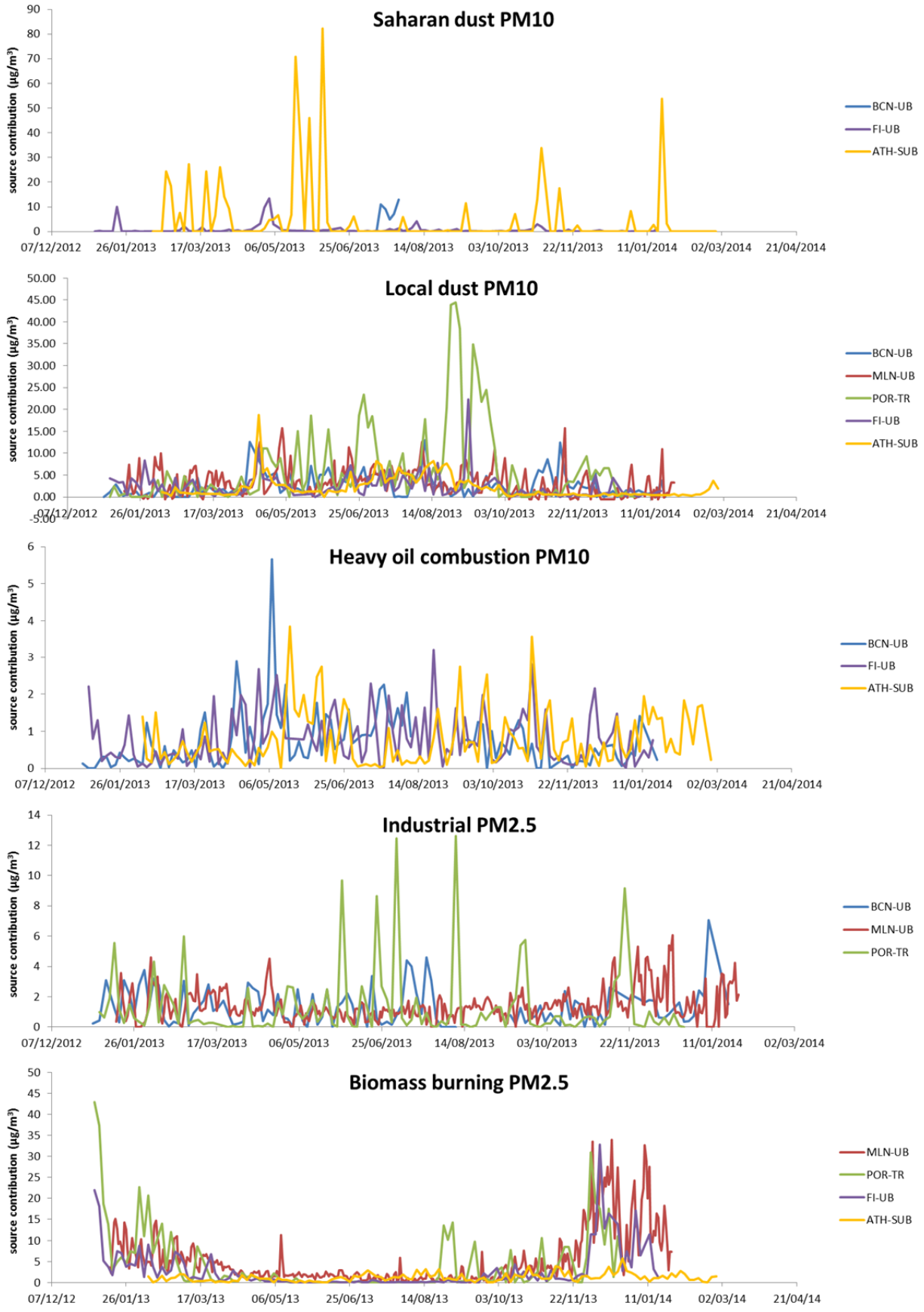


Figure S5. Daily source contributions to PM10 or PM2.5 levels for the study period at the five AIRUSE cities.