Supplementary Material (ESI) for Journal of Environmental Monitoring

Saharan dust contribution to PM_{10}, $PM_{2.5}$ and PM_1 in urban and suburban areas of Rome: a comparison between single-particle SEM-EDS analysis and whole-sample PIXE analysis.

Luca Matassoni,*[ab] Giovanni Pratesi,[ac] Damiano Centioli,[d] Fabio Cadoni,[d] Franco Lucarelli,[e] Silvia Nava,[f] and Piergiorgio Malesani [acg]

[a] *Dipartimento di Scienze della Terra, Università di Firenze, Via La Pira 4, 50121 Firenze, Italy.*
[b] *Prato Ricerche, Via Galcianese 20/H, 59100 Prato, Italy. E-mail: l.matassoni@pratoricerche.it; Fax: +39 0574 447725; Tel: +39 0574 447722;*
[c] *CESPRO, Università di Firenze, Viale Morgagni 48, 50134 Firenze, Italy.*
[d] *ISPRA, Istituto Superiore per la Protezione e la Ricerca Ambientale, Via di Castel Romano 100, 00128 Rome, Italy.*
[e] *Dipartimento di Fisica e Scienze dello Spazio, Università degli Studi di Firenze, Via Sansone 1, 50019 Sesto Fiorentino, Italy.*
[f] *INFN, Istituto Nazionale di Fisica Nucleare, Sezione di Firenze, Via G. Sansone 1, 50019 Sesto Fiorentino, Italy*
[g] *CABeC, Università di Firenze, Via La Pira 4, 50121 Firenze, Italy.*

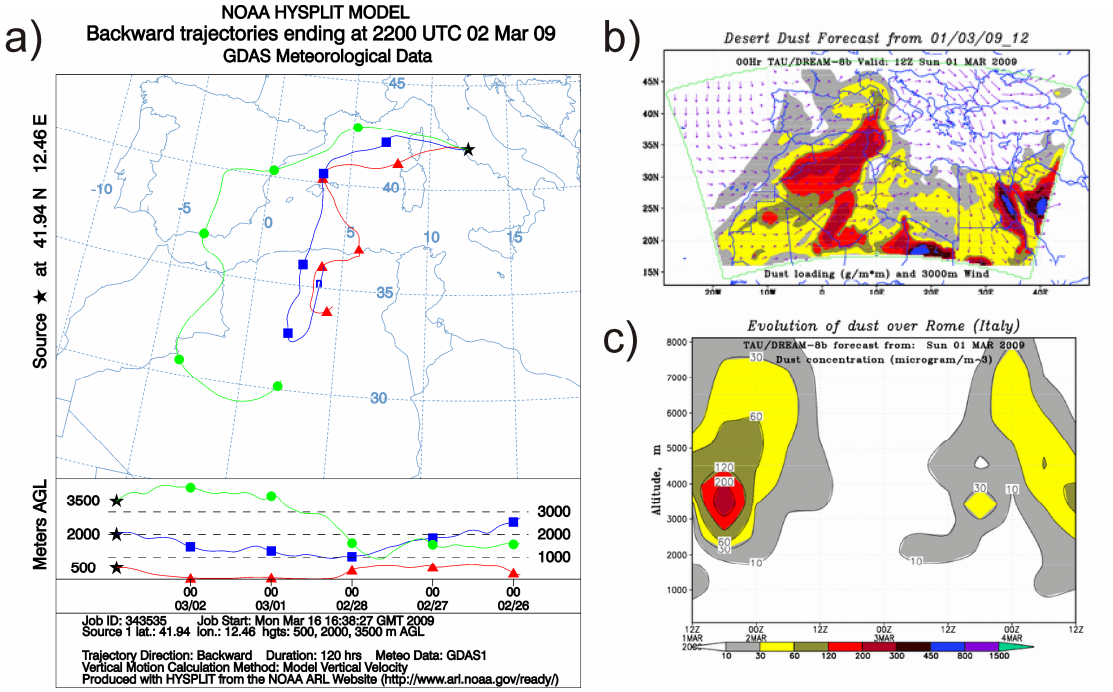

Fig. S1 In-dust days identifications, episode of March 1st-4th: back-trajectories by HYSPLIT model (a) and images of the forecasting model TAU / DREAM (right): map of dust loading (b), vertical section of dust concentration evolution over Rome (c).

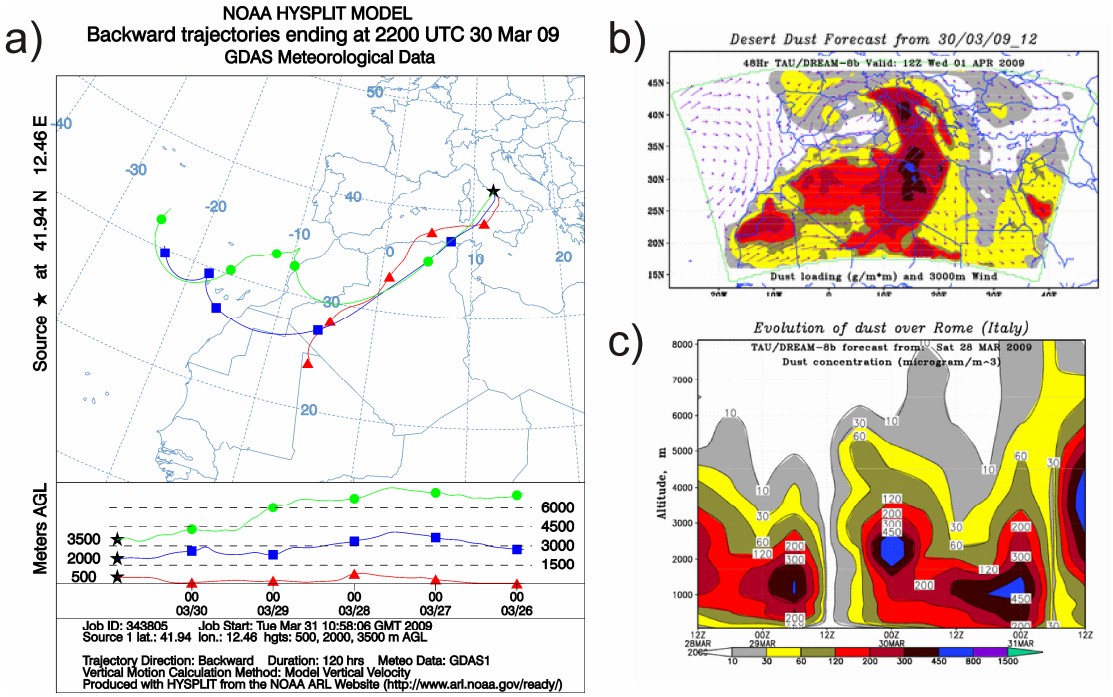

Fig. S2 In-dust days identifications, episode of March 28th-April 1st: back-trajectories by HYSPLIT model (a) and images of the forecasting model TAU / DREAM (right): map of dust loading (a), vertical section of dust concentration evolution over Rome (b).

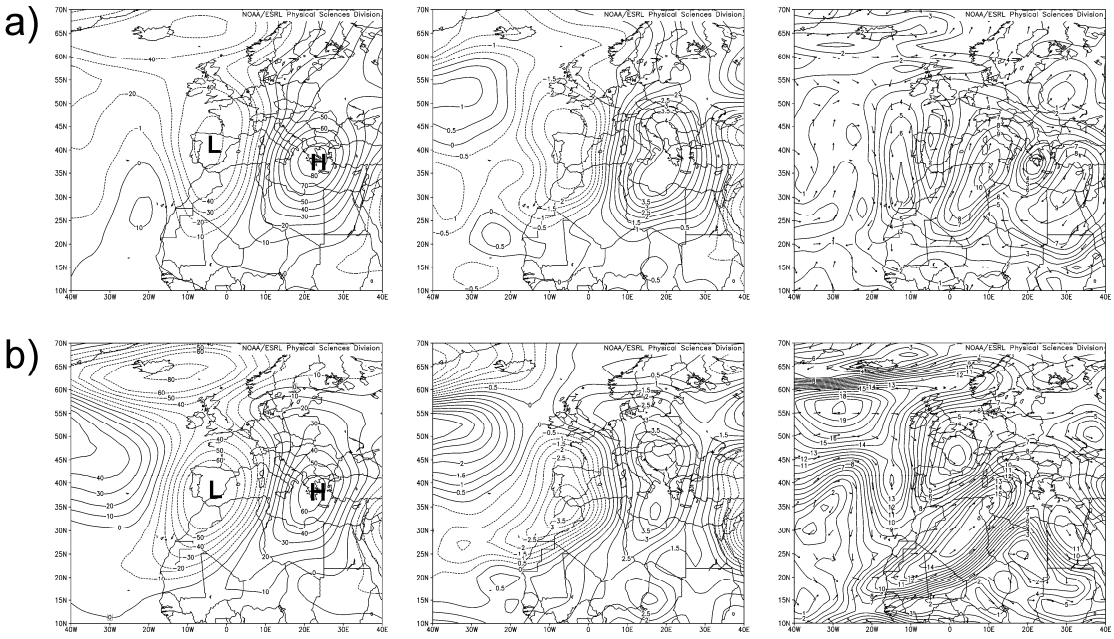

Fig. S3 In-dust days synoptic anomalies at 700 hPa level, based on all days of considered sample (a) and on the same days of 1968-1996 period (b): left, geopotential height (m); middle, air temperature (°C); right, wind vectors (m s^{-1}).

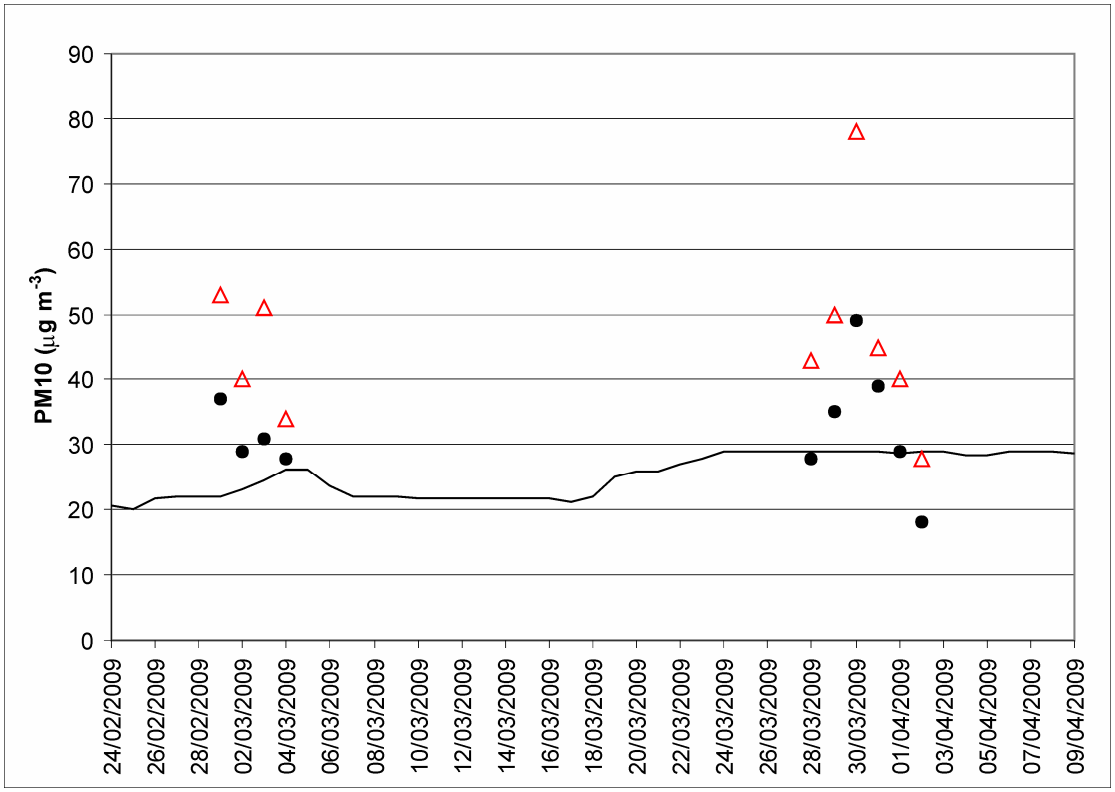

Fig. S4 Daily mean of the PM_{10} concentration values during in-dust days at suburban CR station (dots) and at urban CF station (triangles) compared to the montly moving 30th percentile of non-dust days calculated at CR (solid line). The Saharan contribute was evaluated at CR station as gap from dot to solid line at the same day; then this contribution was compared to the triangle value to evaluate his influence to the urban area.

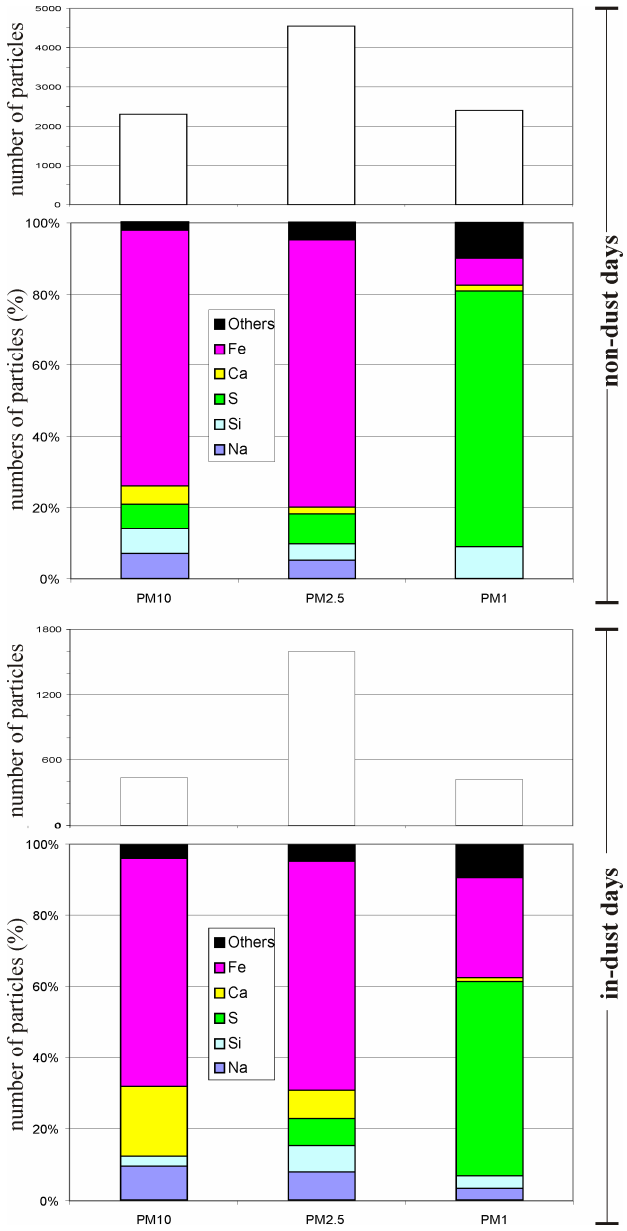

Fig. S5 Mono-elemental particles number and their composition for each PM fractions, non-dust days (above) and in-dust days (below).

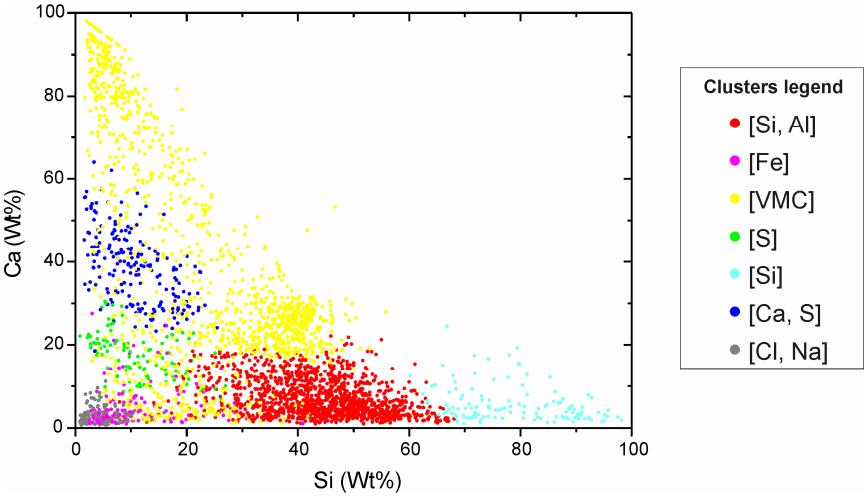

Fig. S6 Si-Ca binary graphic for the PM_{10} at CF station, non-dust days.

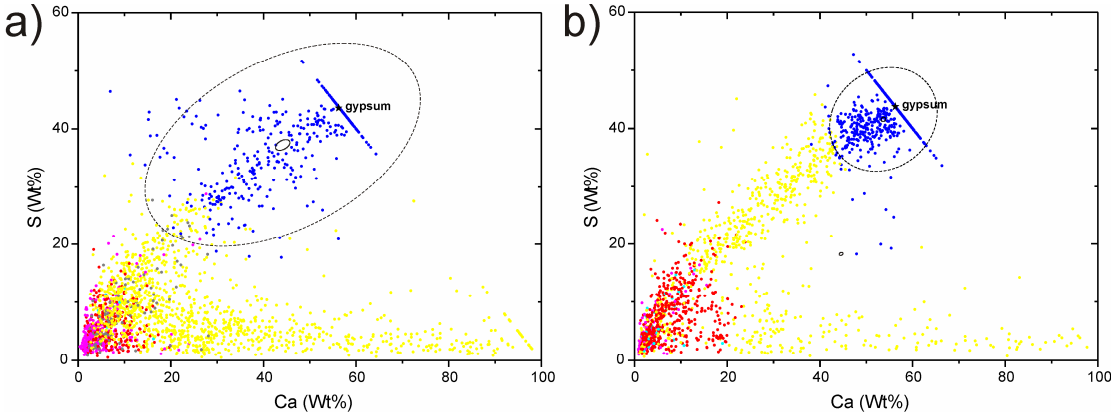

Fig. S7 Ca-S binary graphics for the PM_{10} at CF station, non-dust days (a) and in-dust days (b). Graphics showed compositions of gypsum and confidence ellipses of 95% (prediction and mean) for [Ca, S] cluster. See color legend in Fig. 2 or Fig. S6.

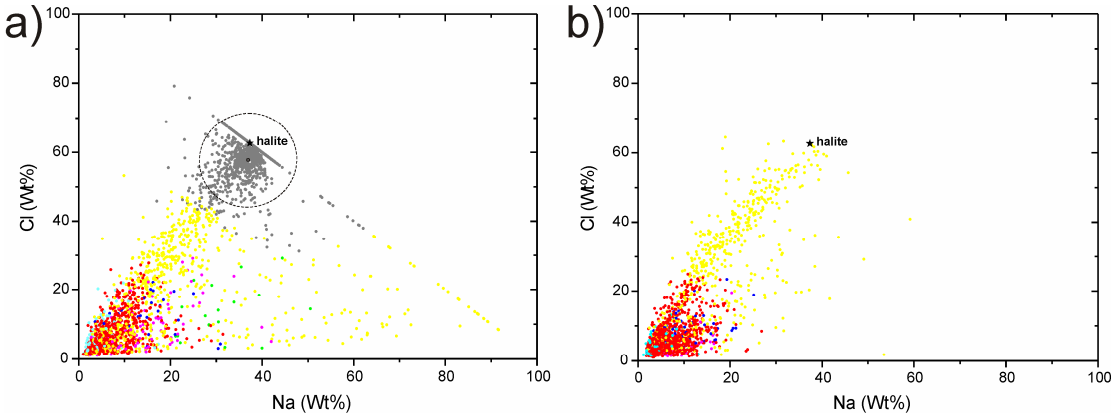

Fig. S8 Na-Cl binary graphics for the PM_{10} at CR station, non-dust days (a) and in-dust days (b). Graphics showed compositions of halite and confidence ellipses of 95% (prediction and mean) for [Cl, Na] cluster. See color legend in Fig. 2 or Fig. S6.

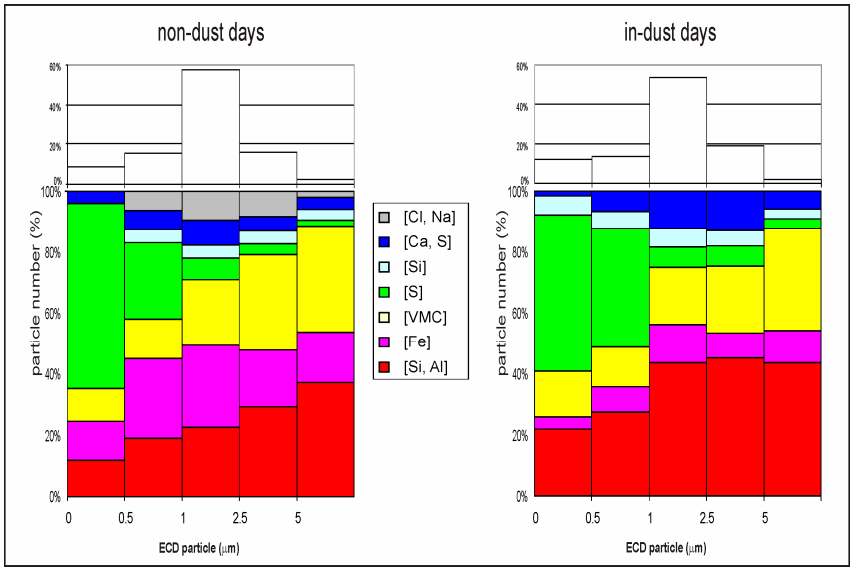

Fig. S9 Particles distribution in different size classes based on their Equivalent Circular Diameter (ECD), total (above) and by cluster membership (below), non-dust days (left) and in-dust days (right).

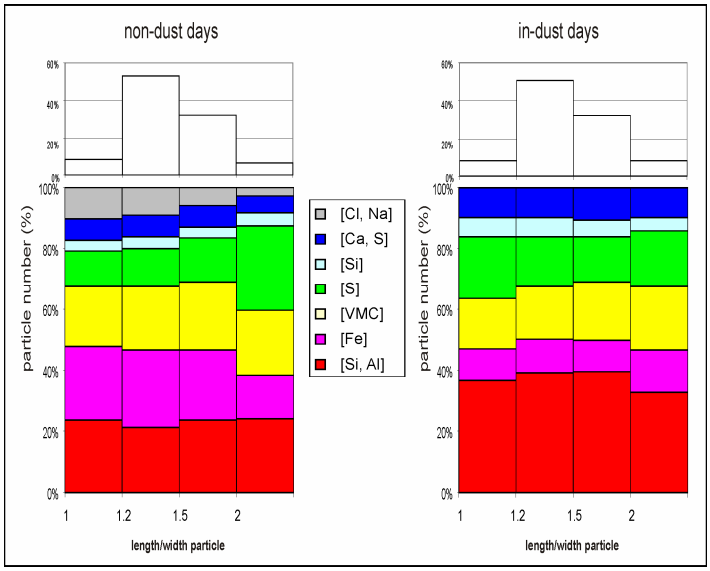

Fig. S10 Particles distribution in different aspect classes based on their aspect ratio (length to width ratio), total (above) and by cluster membership (below), non-dust days (left) and in-dust days (right).

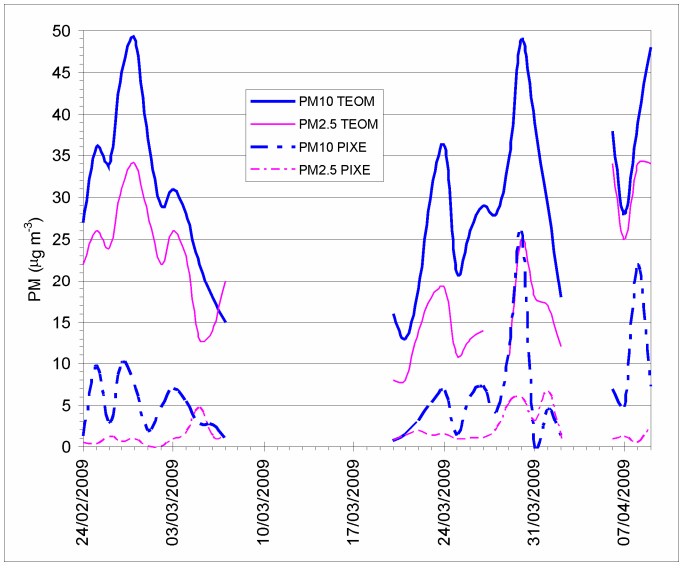

Fig. S11 PM Concentration values measured at CR station by TEOM (solid lines) and calculated as sum of elements by PIXE analysis (dashed lines).

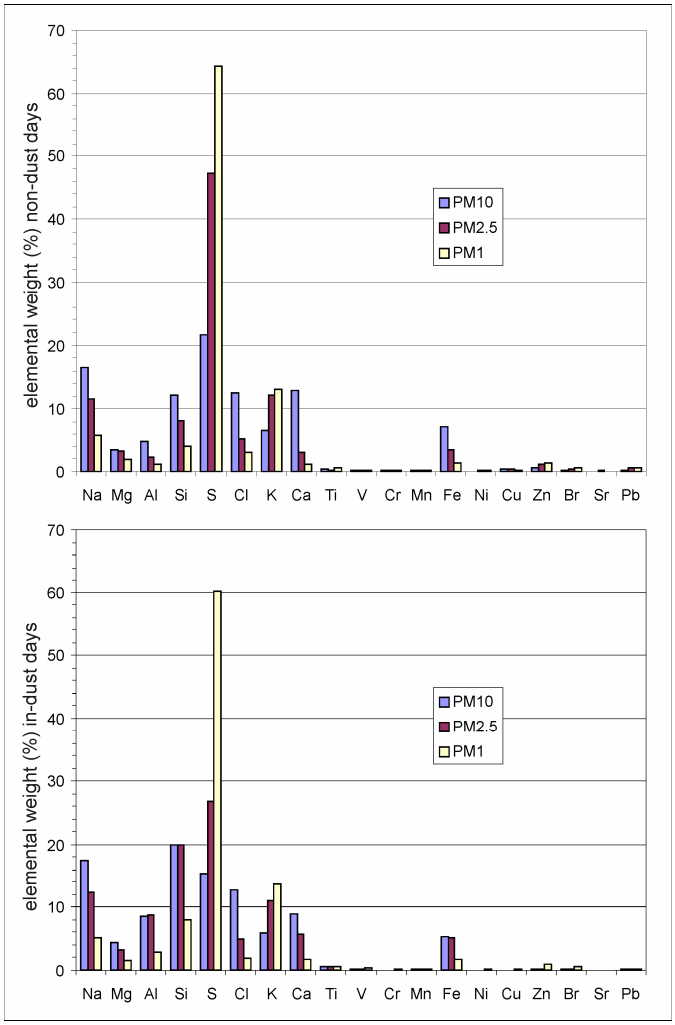

Fig. S12 Weight percent average of elements by PIXE analysis in the different PM fractions, non-dust days (above) and in-dust days (below).

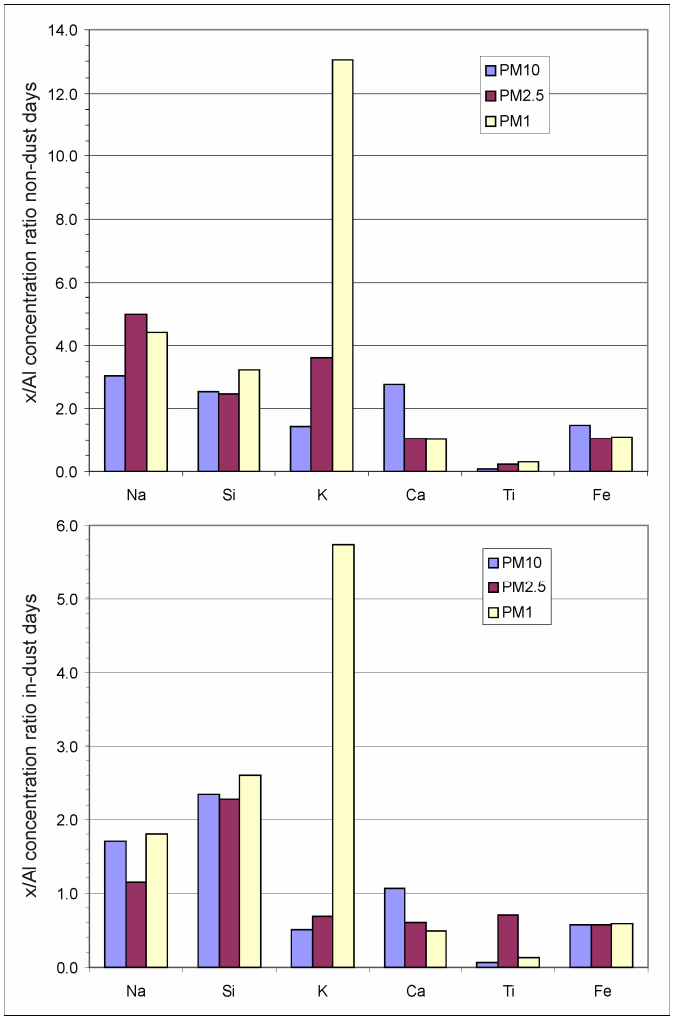

Fig. S13 Concentration values mean ratio (crustal element to Al ratio) for the different PM fractions, non-dust days (above) and in-dust days (below).

Table S1. Daily concentration values of PM at the Corso Francia (CF) and at Castel Romano (CR) stations, with rain occurrances, sure (xx) and light or uncertain (x). In-dust days highlighted by bold.

Date		CF		CR		Rainfall
		PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	
Tue	24/02/2009	30	17	27	22	xx
Wed	25/02/2009	27	14	36	26	x
Thu	26/02/2009	43	25	34	24	
Fri	27/02/2009	71	47	45	31	
Sat	28/02/2009	62	43	49	34	
Sun	**01/03/2009**	**53**	**37**	**37**	**28**	
Sun	**02/03/2009**	**40**	**20**	**29**	**22**	**xx**
Tue	**03/03/2009**	**51**	**29**	**31**	**26**	
Wed	**04/03/2009**	**34**	**13**	**28**	**23**	**xx**
Thu	05/03/2009	24	6	22	13	xx
Fri	06/03/2009	20	8	18	14	
Sat	07/03/2009	20	16	15	20	x
Fri	20/03/2009	17	8	16	8	x
Sat	21/03/2009	18	13	13	8	
Sun	22/03/2009	29	22	19	14	
Sun	23/03/2009	43	-	31	18	
Tue	24/03/2009	45	20	36	19	
Wed	25/03/2009	24	14	21	11	
Thu	26/03/2009	35	15	26	13	
Fri	27/03/2009	46	22	29	14	
Sat	**28/03/2009**	**43**	**20**	**28**	**-**	
Sun	**29/03/2009**	**50**	**12**	**35**	**11**	**x**
Sun	**30/03/2009**	**78**	**23**	**49**	**25**	**xx**
Tue	**31/03/2009**	**45**	**19**	**39**	**18**	**xx**
Wed	**01/04/2009**	**40**	**18**	**29**	**17**	**xx**
Thu	02/04/2009	28	19	18	12	xx
Sun	06/04/2009	48	27	38	34	xx
Tue	07/04/2009	42	26	28	25	x
Wed	08/04/2009	52	30	39	34	
Thu	09/04/2009	46	25	48	34	