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*Supplement of*

## **Temporal evolution of main ambient PM<sub>2.5</sub> sources in Santiago, Chile, from 1998 to 2012**

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## Supplementary material

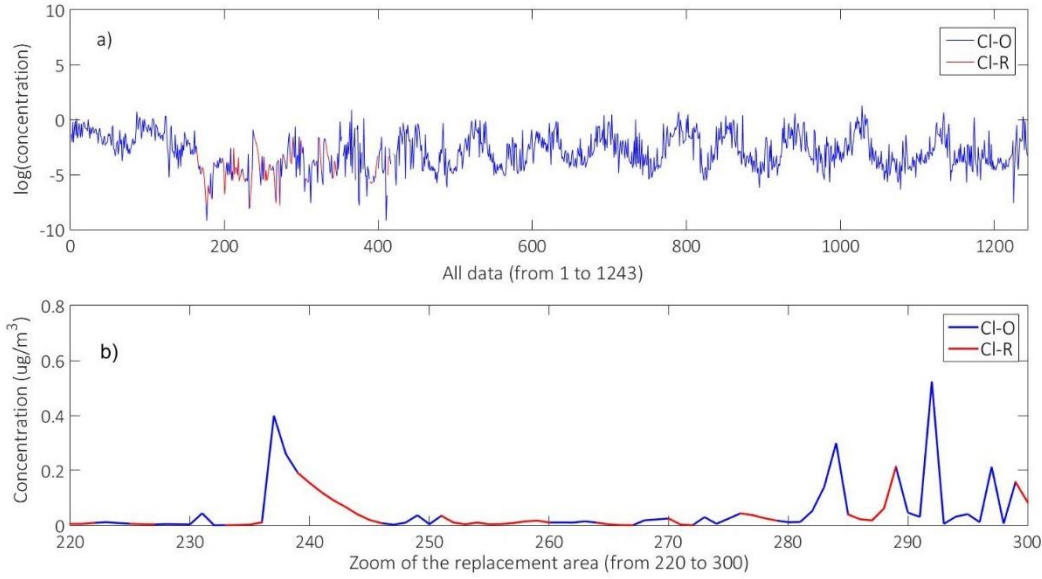
**Table S 1 Summary of previous Santiago source apportionment studies (each column shows percentage contribution to PM2.5).**

Reference	(Rojas et al., 1990)	(Artaxo, 1996)	(Artaxo, 1998)	(Artaxo, 1999)	(Artaxo, 1999)	(Moreno et al., 2010)	(Jorquera and Barraza, 2012)	(Jorquera and Barraza, 2012)	(Villalobos et al., 2015)
Location in Santiago	Downtown	Downtown	Downtown	Downtown	East	Downtown	Las Condes	Las Condes	San Joaquin
Time period considered	January-February 1987	July-august 1996	July-august 1998	June-December 1999	June-December, 1999	1998-2007	1999	2004	2013
Sulfates	49					13.6	19	16	
Sulfates + As				39	15				
Sulfates + copper smelters			9.7						
Copper smelters		8.7					11	10	
Sulfates + industry		64							
Residual oil combustion + industry			23.2						
Residual oil combustion	13	1.9				13.6			
Motor vehicles + industry					70				
Motor vehicles		16	35.8	40		12.3	28	31	
Wood burning							25	29	19
Wood burning + car exhausts	5.6								

Solid dust + wood burning	26								
Solid dust		15.5	31.3	17	7	24.6	4	4	
Solid dust + industry	6.4								
metallurgical				4					
Marine aerosol							13	10	
Diesel emission									8
Gasoline vehicles									9
Ion nitrate									18
Ion sulfates									5
Ion ammonium									8
Secondary organic aerosol									7

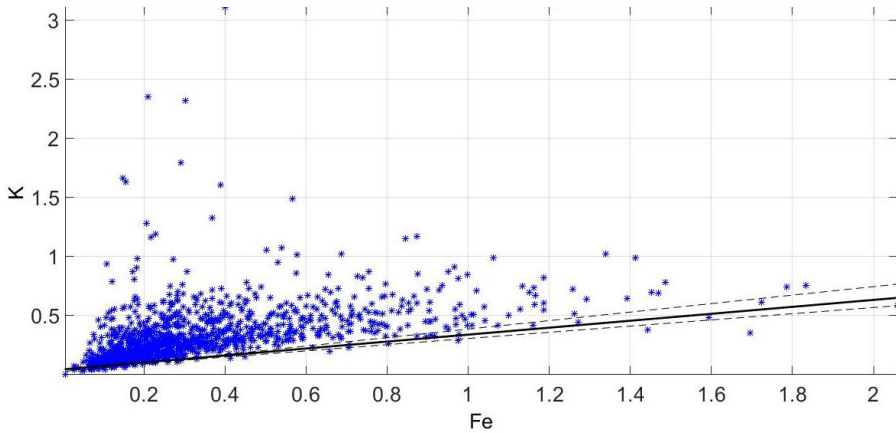
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**Figure S1** Example of replacement of missing data. Original data for Cl (in blue) with missing data filled using a custom-written algorithm (in red). Shown are a) Cl concentration on a logarithmic scale, b) zoom of a data range with small and large filled data gaps

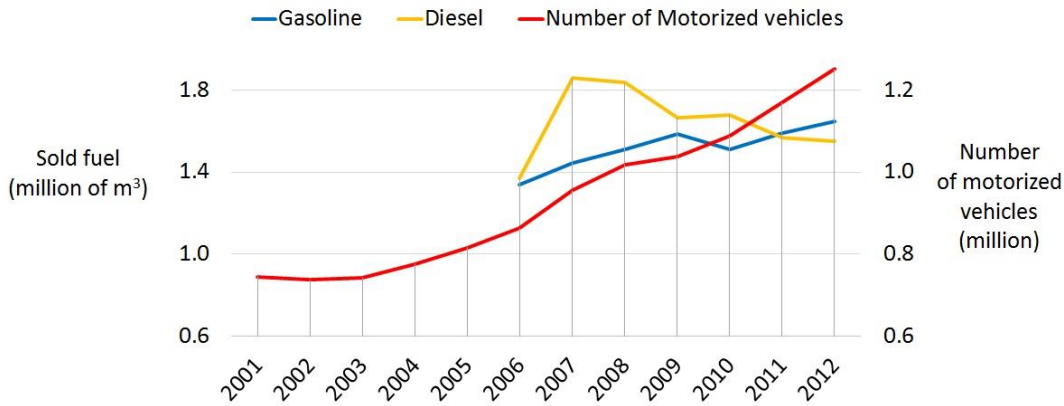


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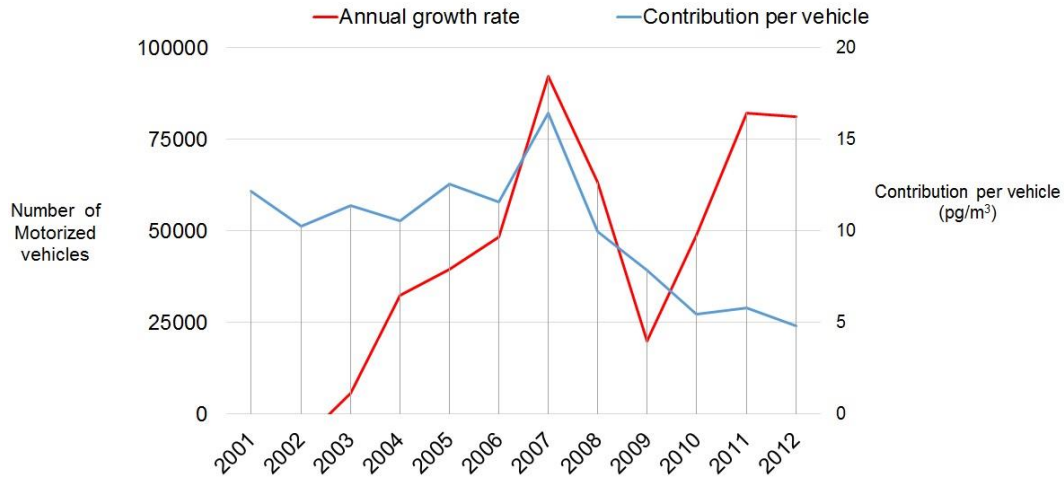
**Figure S2** K-Fe edge plot. To provide a tracer associated with wood burning we added the non-soil potassium parameter Kns calculated as  $Kns = K - 0.3 \cdot Fe$ , from the K-Fe edge plot



**Figure S3** Trend in Santiago motorized vehicles numbers (data provided by National institute of statistics, [www.ine.cl](http://www.ine.cl)) as well as sold vehicle fuel (data provided by Superintendence of electricity and fuels, [www.sec.cl](http://www.sec.cl)).



**Figure S4 Trend in Santiago vehicles annual growth rate (data provided by National institute of statistics, www.ine.cl) and contribution per vehicle to PM2.5 Santiago's levels. The contribution per vehicle was calculated by the dividing annual median motor vehicles contribution (from PMF) by the number of motorized vehicles in each year.**



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**Figure S5 Monthly precipitation anomalies from the mean in downtown Santiago, 1960-2015. Source: <http://explorador.cr2.cl/>**

