Supporting Information

Tracing and Quantifying Anthropogenic Mercury Sources in Soils of Northern France Using Isotopic Signatures

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6 pages (including title page)

4 Figures (SI-S1 to SI-S4)

Additional description of urban top soil samples in the city of Metz (Northeastern France)

Cadastral Hg emission inventory: The inventory of the emission sources of mercury for the city of Metz is documented by the public institution in charge of the air quality in the Lorraine Region (Association de surveillance de la qualité de l'air. www.atmolor.org). Cadastral data are calculated using the combination of the raw flux of each activity division and the emission factors associated with the activity. Methodological guide used for the calculations can be found:

http://www.atmo-alsace.net/medias/fichiers/Methologie_inventaire_V2006.pdf.

Regarding the city of Metz, the inventory was done with the available data for the year 2002.

Land use: All soils sampled are free of regular use such as gardening or municipal reworking. Soils were sampled in grass fields, for example along small roads, school backwards, parks and beside trails along small woods. No site was reworked since at least 10 years because most were already sampled in 2000 for establishing reference values of metal concentrations in soils of the city of Metz. The average and median Hg concentration in the 2000 samples are very similar to that obtained for the 2008 samples suggesting no major change of the Hg atmospheric deposition for the last 10 years."

Figure SI-S1: Map of the studied area in the urban area of the city of Metz (Northeastern France) where the 14 sampling sites, elevation curves and land uses are represented. Sample points are located 1) in valleys along rivers: SJ40 (166m), MC10 (165m), MC05 (165m), SJ01 (168m) SJ02 (170m), SJ52 (170m), SJ30 (168m), 2) down the hill SJ47 (175m), SJ21 (190m), MB05 (195m) and 3) on the plateau: SJ27 (210m), SJ38 (215m), SJ14 (220m), SJ12 (230m). The CGFPP and the MSWI are located on the southwest corner within the valley at an altitude of 165m. Both chimneys have a height of 35m.

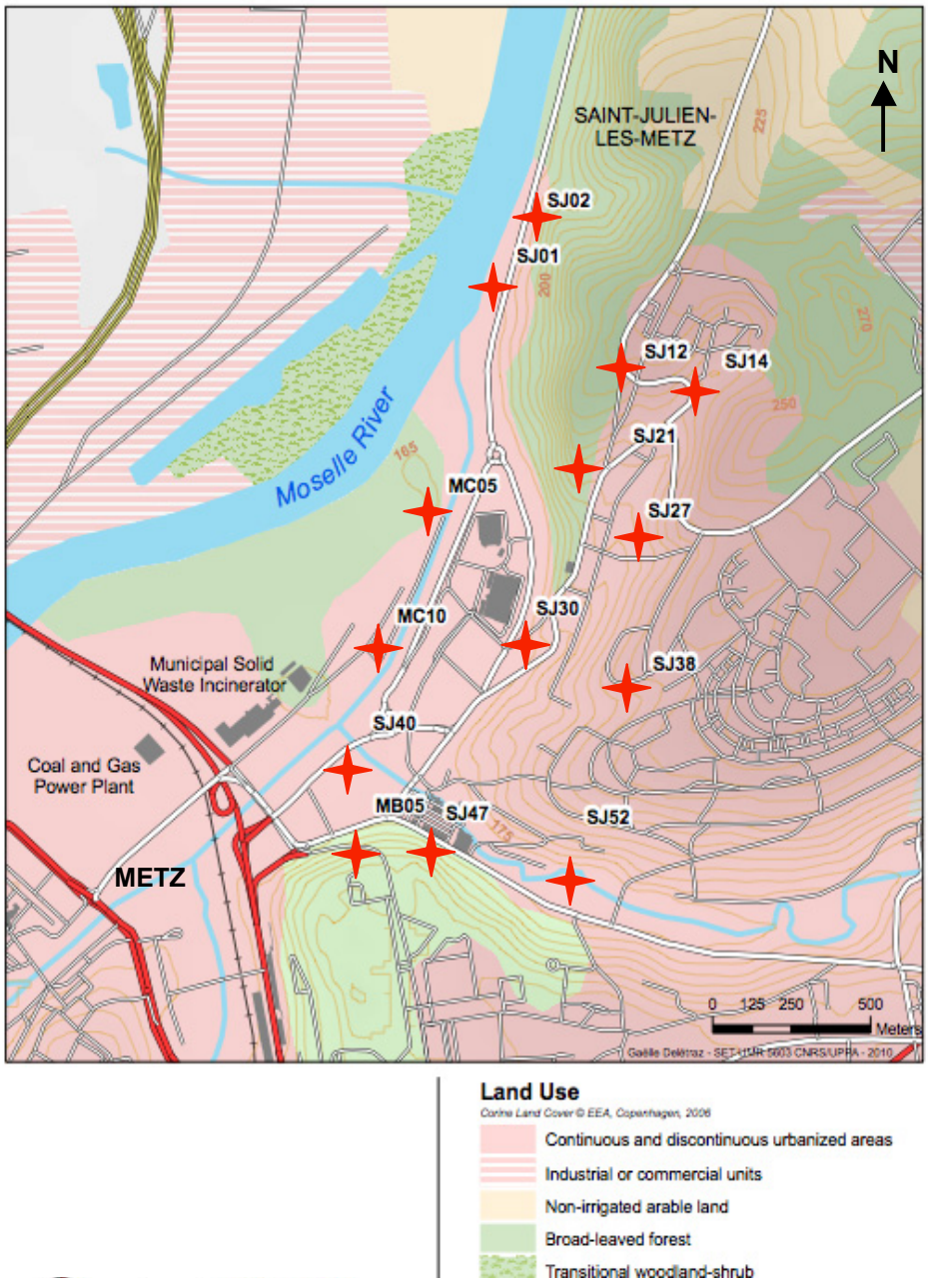

Figure SI-S2: Three-isotope diagram where the $\delta^{199}Hg$ (‰) is plotted as a function of the $\delta^{202}Hg$ (‰) for all the samples measured in this study: soil reference material NIST-2711 (open plus sign), fly ash reference material BCR-176R (square filled with cross), soils around the Pb-Zn smelter (filled circles), dusts from the Zn-Pb smelter (filled squares), soils from Metz in north-eastern France (grey diamonds) and urban background soils from Metz in north-eastern France (open diamonds).

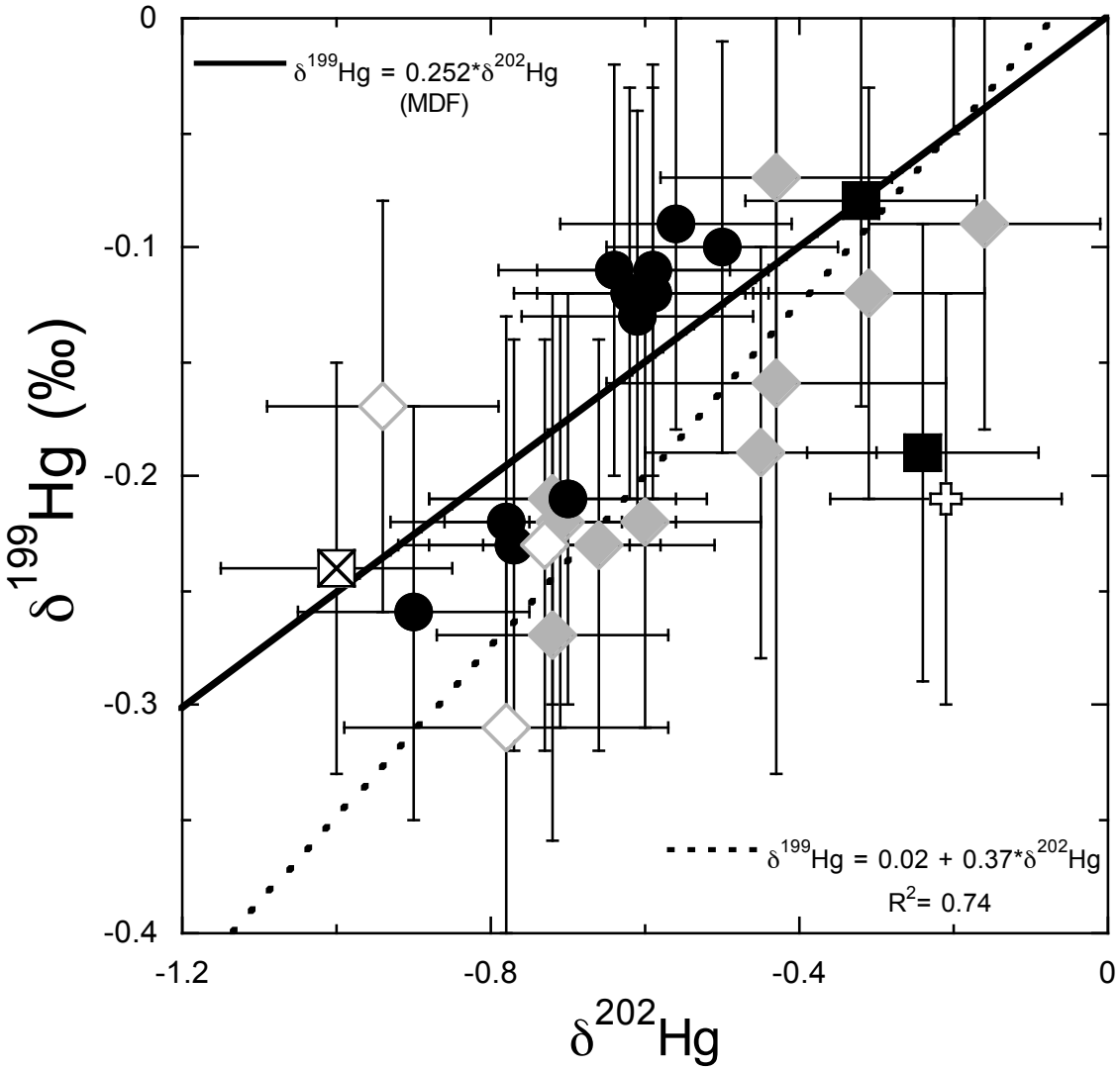

Figure SI-S3: Δ^{199}Hg (‰) against Δ^{201}Hg (‰) (symbols as Fig. SI-S2). The 1:1 and the 1.65:1 lines correspond to empirical ratios that characterize isotope fractionation related to magnetic isotope effect and nuclear field shift effect respectively.

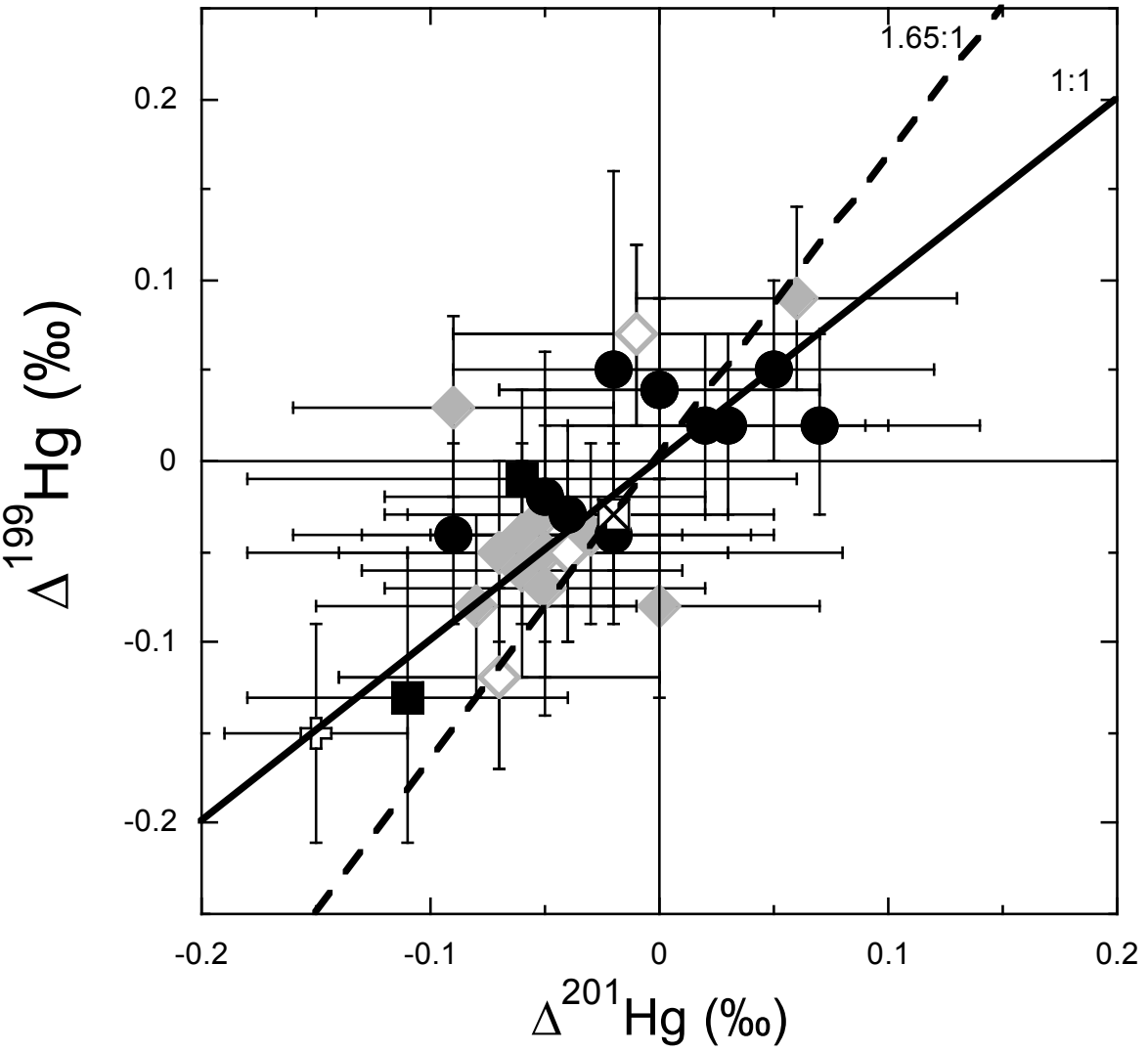

Figure SI-S4: Δ^{199}Hg (‰) against δ^{202}Hg (‰) (symbols as Fig. SI-S2). This diagram shows that there is no significant relationship between δ^{202}Hg and Δ^{199}Hg in the soils of the city of Metz.