Supporting Information

Distribution of mercury species and mercury isotope ratios in soils and river suspended matter of a mercury mining area

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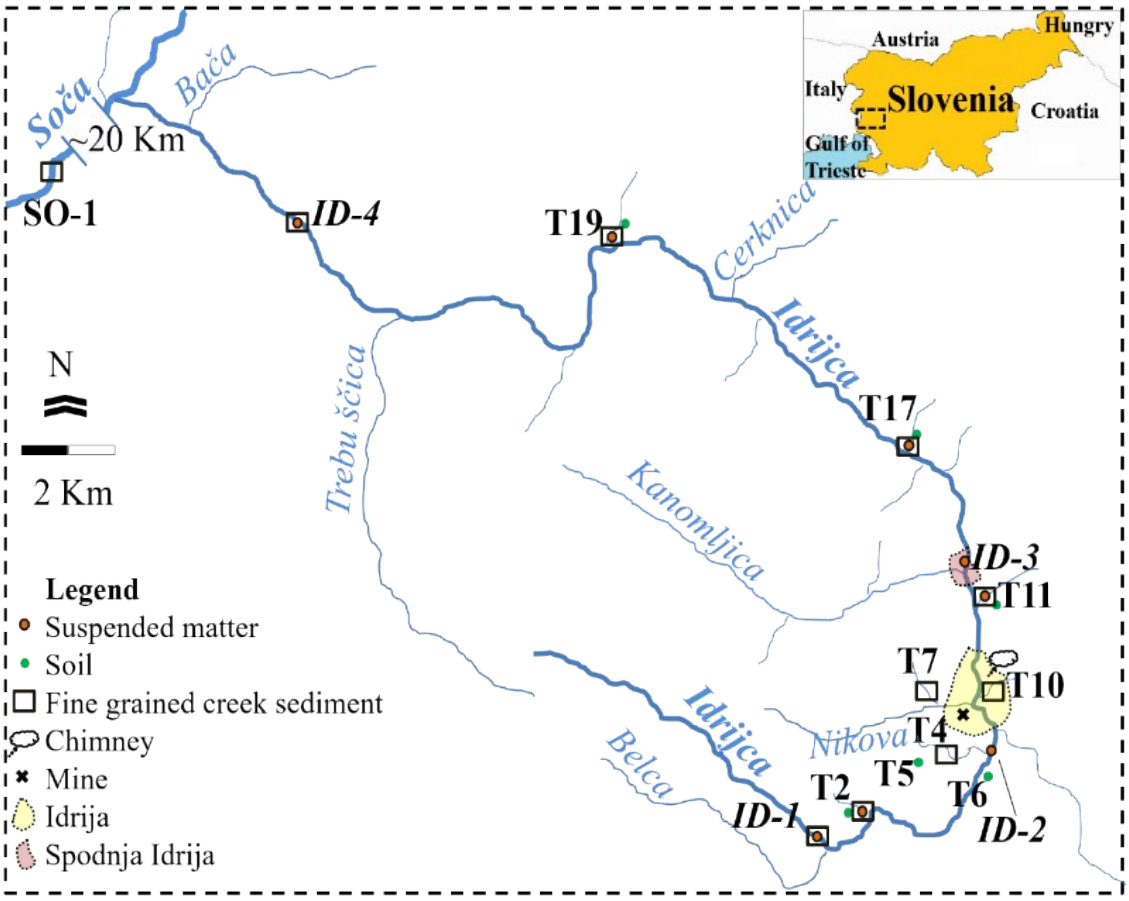

Fig. S1. Map showing the location of suspended matter, soil and fine-grained creek sediment samples. T-samples were collected in tributaries, ID-samples were collected at the Idrijca river and SO-sample at the Soča river (after Baptista-Salazar et al., 2017).

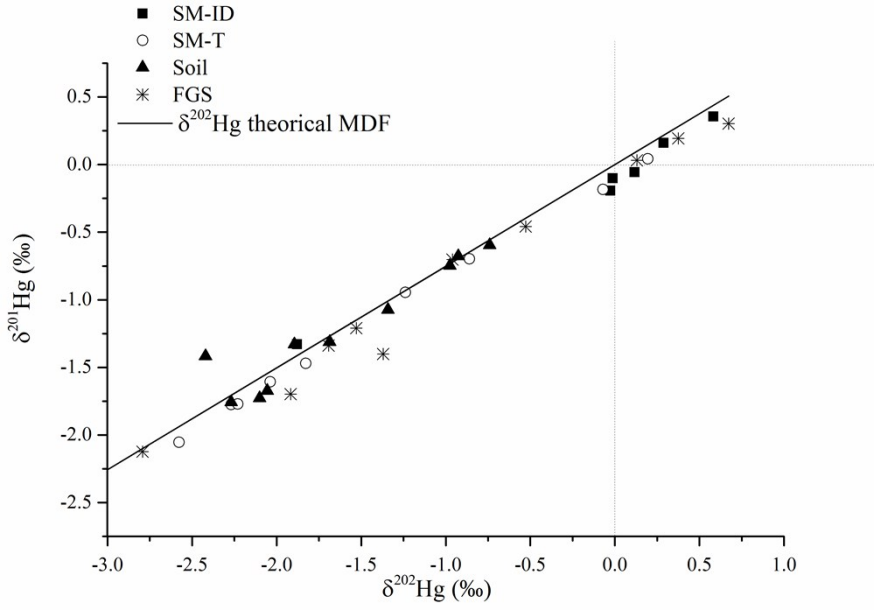

Fig. S2. Three-isotope plot δ^{201}Hg vs. δ^{202}Hg of particulate fractions (>0.45 μm) and theoretical mass-dependent fractionation (δ^{201}Hg= 0.7520 x δ^{202}Hg).

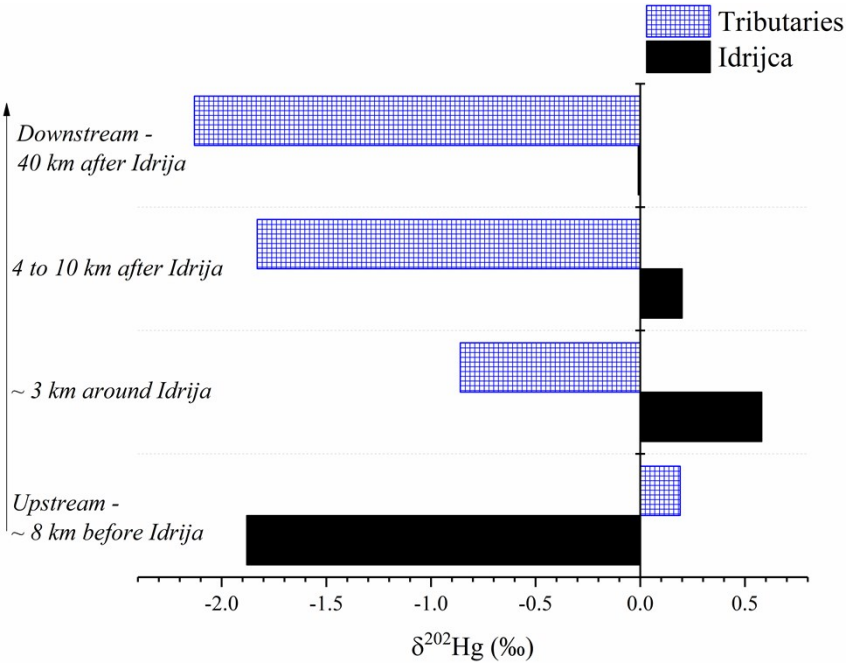

Fig. S3. Hg isotope composition (δ^{202}Hg) of suspended matter collected in the Idrijca river and its tributaries in relation to the distance with the mine

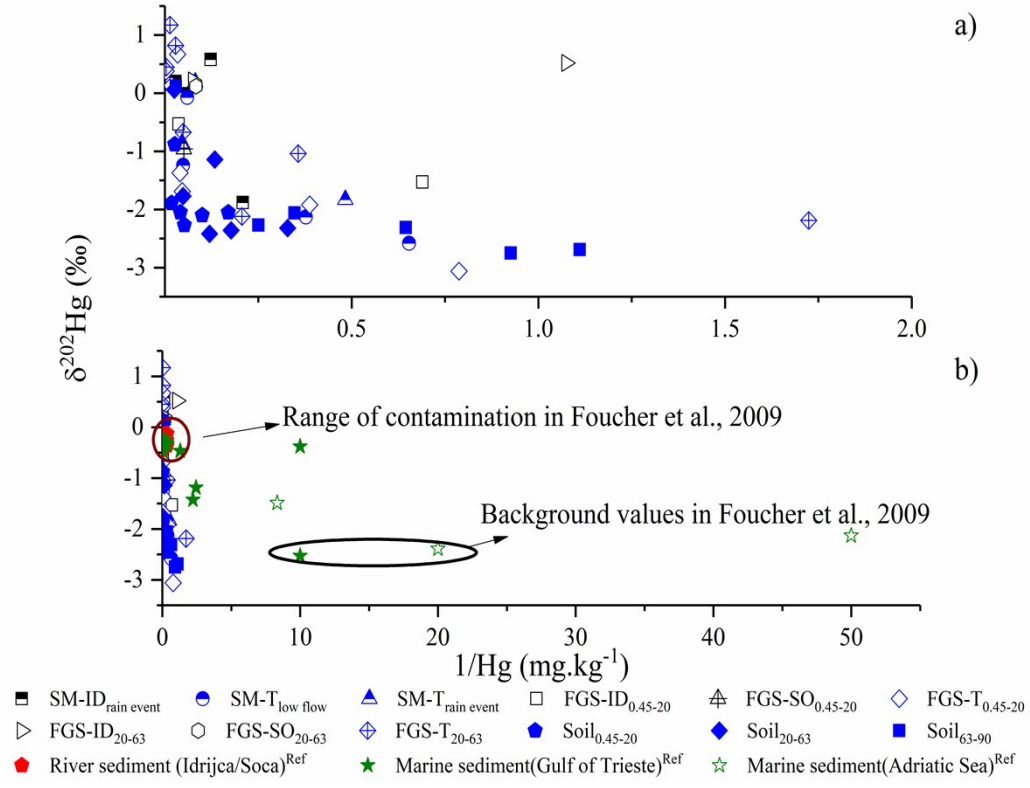

Fig. S4. Plot of δ^{202}Hg vs 1/[Hg] (mg.kg^{-1}) of suspended matter, sediments and soils from the Idrijca river and its tributaries (a), and also, those together with river and marine sediments in Foucher et al. 2009 (b). Particular-color represents main rivers and tributaries: ID and SO in black, T in blue, and marine samples in green. Also, each type of sample is represented by particular type and/or filling of the symbol: SM as half-solid, FGS as open, soils as solid symbols, marine sediments as stars, and river sediment (Idrijca/Soča) as red pentagons.

Table S1. Relative abundance of cinnabar and mercury bound to natural organic matter (NOM-Hg), Hg concentrations, and Hg isotope ratios in reference material (UM-Almadén, BCR-580 and PACS-2), suspended matter, soils and fine-grained sediments (FGS). Values are expressed in percentage (Hg-species, %) and per mil (Hg ratios, ‰). *n* represents the number of replicate measurements and uncertainty as 1SD.

Sample	Approx. distance from Idrija	Type	grain-size	Hg	Hg-species		Hg-isotope ratios													
					NOM-Hg	cinnabar		δ^{199}Hg	SD	δ^{200}Hg	SD	δ^{201}Hg	SD	δ^{202}Hg	SD	Δ^{199}Hg	SD	Δ^{200}Hg	SD	Δ^{201}Hg	SD
	km		µm	mg.kg^{-1}	%	%	n	‰		‰		‰		‰		‰		‰		‰	
UM-Almadén	-	Reference*	-	0.001	-	-	38	-0.16	0.08	-0.25	0.12	-0.44	0.12	-0.57	0.09	-0.02	0.06	-0.01	0.07	-0.02	0.05
BCR-580	-	CRM - Estuarine sediment**	-	132	-	-	3	-0.12	0.08	-0.19	0.08	-0.34	0.09	-0.42	0.06	-0.02	0.06	0.02	0.05	-0.02	0.06
PACS-2	-	CRM - Marine sediment	-	3.04	-	-	3	-0.25	0.10	-0.35	0.09	-0.5	0.08	-0.61	0.09	-0.10	0.07	-0.04	0.03	-0.02	0.00
$HgS_{combined\ sample}$	-	Idrija ore - red	-	729000	-	100	3	-0.29	0.05	-0.77	0.05	-1.13	0.15	-1.61	0.05	0.13	0.04	0.04	0.02	0.07	0.11
Hg(0)	-	Idrija ore - metallic Hg	-	13400	-	-	3	-0.20	0.08	-0.20	0.03	-0.56	0.06	-0.36	0.05	-0.09	0.07	0.03	0.00	-0.21	0.02
Hg(0)	-	Idrija ore - metallic Hg	-	13400	-	-	2	-0.51	0.10	-0.74	0.15	-0.83	0.07	-1.12	0.05	-0.19	0.09	-0.11	0.12	-0.07	0.03
ID-1	8.4	SM - rain event		4.79	100	0	1	-0.71	0.07	-1.01	0.02	-1.33	0.05	-1.88	0.07	-0.23	0.05	-0.06	0.02	0.08	0.00
ID-2	3.0	SM - rain event		8.15	88.6	11.4	1	-0.02	0.13	0.30	0.07	0.36	0.04	0.58	0.11	-0.17	0.10	0.00	0.01	-0.08	0.04
ID-3	4.0	SM - rain event[a]		34.9	54.8	35.1	2	0.00	0.04	0.15	0.07	0.05	0.08	0.20	0.11	0.00	0.01	0.04	0.01	-0.08	0.00
ID-4	31.7	SM - rain event		16.4	44.6	55.3	1	-0.22	0.07	-0.07	0.07	-0.19	0.10	-0.01	0.05	-0.21	0.06	-0.05	0.04	-0.17	0.06
T2	7.0	SM - low flow		16.7	67.4	32.6	1	-0.12	0.04	-0.08	0.09	-0.18	0.17	-0.07	0.13	-0.11	0.01	-0.04	0.02	-0.13	0.07
		SM - rain event	>0.45	12.3	65.9	34.1	1	-0.07	0.07	0.08	0.04	0.04	0.06	0.19	0.08	-0.12	0.05	-0.02	0.00	-0.10	0.00
T11	3.0	SM - low flow		20.6	87.6	12.4	1	-0.28	0.09	-0.56	0.06	-0.94	0.07	-1.24	0.08	0.03	0.07	0.07	0.02	-0.01	0.01
		SM - rain event[b]		21.6	41.6	46.5	1	-0.27	0.04	-0.43	0.12	-0.70	0.07	-0.86	0.07	-0.06	0.02	0.00	0.08	-0.05	0.02
T17	9.7	SM - low flow		1.53	91.1	8.92	1	-0.64	0.11	-1.26	0.12	-2.05	0.08	-2.58	0.10	0.00	0.08	0.04	0.07	-0.12	0.00
		SM - rain event[a]		2.07	44.6	-	1	-0.53	0.04	-0.89	0.14	-1.47	0.15	-1.83	0.05	-0.07	0.03	0.02	0.11	-0.10	0.11
T19	19	SM - low flow		2.65	99.9	0.10	2	-0.57	0.08	-1.07	0.06	-1.69	0.05	-2.13	0.07	-0.03	0.06	0.00	0.02	-0.09	0.00
ID-1	8.4	FGS_A	0.45-20	1.45	18.1	81.8	1	-0.33	0.07	-0.74	0.04	-1.21	0.05	-1.53	0.07	0.05	0.05	0.03	0.00	-0.06	0.00
		FGS_B	20-63	0.93	0.01	99.9	1	0.81	0.05	0.00	0.09	0.27	0.05	0.52	0.07	-0.13	0.03	0.01	0.05	-0.13	0.00
ID-4	31.7	FGS_A	0.45-20	27.2	13.5	86.5	3	-0.17	0.08	-0.27	0.11	-0.46	0.07	-0.53	0.12	-0.04	0.05	-0.01	0.05	-0.06	0.02
		FGS_B	20-63	13.3	5.80	93.8	1	0.05	0.08	0.11	0.14	0.11	0.07	0.22	0.09	-0.01	0.06	0.00	0.09	-0.05	0.00
SO-1	60	FGS_A	0.45-20	19.6	4.52	95.4	1	-0.21	0.06	-0.49	0.04	-0.70	0.08	-0.96	0.08	0.03	0.04	0.00	0.00	0.02	0.02
		FGS_B	20-63	12.0	2.12	97.7	1	-0.07	0.06	-0.02	0.04	-0.03	0.09	0.12	0.09	-0.10	0.04	-0.09	0.01	-0.12	0.02
T2	6.7	FGS_A	0.45-20	29.3	12.6	87.4	1	-0.20	0.12	0.35	0.05	0.30	0.14	0.67	0.07	-0.37	0.10	0.01	0.01	-0.20	0.09
		FGS_B	20-63	73.5	10.9	89.0	3	0.14	0.10	0.55	0.06	0.77	0.05	1.17	0.05	-0.15	0.09	-0.04	0.03	-0.11	0.01
T4	4	FGS_A	0.45-20	306	21.6	77.9	3	0.02	0.19	0.18	0.07	0.19	0.09	0.38	0.09	-0.07	0.17	-0.01	0.02	-0.09	0.02
		FGS_B	20-63	303	0.01	99.9	3	-0.10	0.09	0.09	0.11	0.23	0.09	0.45	0.11	-0.21	0.06	-0.14	0.05	-0.11	0.01
T7	2.3	FGS_A	0.45-20	24.7	20.1	79.7	3	-0.43	0.05	-0.72	0.15	-1.13	0.09	-1.37	0.08	-0.06	0.03	-0.02	0.11	-0.37	0.03
		FGS_B	20-63	20.6	0.01	99.9	1	-0.15	0.08	-0.33	0.04	-0.52	0.07	-0.67	0.12	0.01	0.05	0.01	0.02	-0.02	0.02
T10	0.6	FGS_A	0.45-20	55.5	58.2	41.8	1	-0.01	0.08	0.08	0.08	0.03	0.05	0.13	0.08	-0.04	0.06	0.02	0.04	-0.07	0.01
		FGS_B	20-63	34.7	52.9	47.0	1	0.14	0.06	0.38	0.09	0.60	0.06	0.82	0.09	-0.06	0.04	-0.03	0.04	-0.02	0.01
T11	2.75	FGS_A	0.45-20	21.4	85.2	14.7	1	-0.43	0.05	-0.82	0.11	-1.34	0.07	-1.69	0.13	0.00	0.02	0.03	0.04	-0.07	0.03
		FGS_B	20-63	2.80	58.2	41.8	2	-0.27	0.07	-0.38	0.07	-0.77	0.10	-1.04	0.08	-0.01	0.05	0.14	0.03	0.01	0.04
T17	9.7	FGS_A	0.45-20	1.27	84.3	14.7	2	-0.86	0.07	-1.54	0.06	-2.36	0.03	-3.06	0.13	-0.09	0.04	-0.01	0.01	-0.06	0.07
		FGS_B	20-63	0.58	97.0	2.52	1	-0.67	0.12	-1.07	0.06	-1.76	0.04	-2.19	0.07	-0.12	0.10	0.03	0.02	-0.11	0.01
T19	19	FGS_A	0.45-20	2.58	24.6	75.4	1	-0.61	0.04	-1.29	0.05	-1.70	0.04	-1.92	0.07	-0.12	0.02	-0.33	0.01	-0.26	0.01
		FGS_B	20-63	4.84	0.01	99.9	2	-0.59	0.08	-1.10	0.06	-1.62	0.15	-2.12	0.06	-0.05	0.06	-0.04	0.03	-0.02	0.10
T2	6.7	Soil	0.45-20	5.89	77.2	22.4	3	-0.61	0.06	-0.98	0.08	-1.67	0.07	-2.05	0.07	-0.09	0.04	0.05	0.04	-0.13	0.02
			20-63	3.04	98.1	0.99	1	-0.69	0.16	-1.18	0.19	-1.91	0.08	-2.32	0.09	-0.11	0.14	-0.02	0.14	-0.17	0.01
			63-90	3.99	97.0	1.99	1	-0.68	0.12	-1.18	0.02	-1.82	0.12	-2.27	0.12	-0.11	0.09	-0.03	0.04	-0.11	0.03
T5	5		0.45-20	56.2	97.2	1.95	3	-0.34	0.06	-0.95	0.15	-1.33	0.06	-1.89	0.08	-0.14	0.04	0.00	0.11	-0.10	0.00
			20-63[b]	39.1	72.5	5.72	1	-0.13	0.06	0.00	0.11	-0.01	0.07	0.06	0.08	-0.14	0.04	-0.03	0.07	-0.05	0.01
			63-90[b]	33.9	80.5	1.65	1	-0.09	0.06	0.07	0.10	-0.02	0.07	0.12	0.08	-0.12	0.04	0.01	0.06	-0.11	0.01
T6	3		0.45-20	10.0	84.1	15.0	1	-0.65	0.08	-1.11	0.10	-1.73	0.09	-2.10	0.06	-0.12	0.06	-0.05	0.07	-0.15	0.04
			20-63	5.64	95.4	3.67	1	-0.72	0.05	-1.20	0.04	-1.86	0.11	-2.36	0.07	-0.12	0.03	-0.01	0.00	-0.09	0.06
			63-90	2.88	95.1	4.53	1	-0.57	0.08	-1.04	0.07	-1.71	0.02	-2.06	0.09	-0.05	0.06	0.00	0.02	-0.17	0.05
T11	3		0.45-20	37.7	96.0	3.72	3	-0.22	0.08	-0.43	0.07	-0.67	0.07	-0.88	0.06	0.01	0.06	0.03	0.04	-0.01	0.02
			20-63	7.48	85.2	14.4	1	-0.29	0.16	-0.56	0.07	-0.87	0.08	-1.14	0.11	0.00	0.13	0.01	0.01	-0.01	0.00
			63-90	1.55	93.0	6.89	1	-0.66	0.09	-1.17	0.07	-1.77	0.09	-2.31	0.12	-0.08	0.06	-0.01	0.01	-0.04	0.00
T17	10		0.45-20	24.1	91.8	7.74	3	-0.43	0.06	-0.91	0.04	-1.36	0.10	-2.05	0.06	0.09	0.04	0.12	0.01	0.18	0.05
			20-63	20.6	95.7	3.34	3	-0.42	0.07	-0.9	0.07	-1.39	0.10	-1.77	0.07	0.03	0.05	-0.01	0.03	-0.06	0.05
			63-90	1.08	97.6	1.51	1	-0.77	0.05	-1.47	0.11	-2.07	0.10	-2.75	0.06	-0.08	0.03	-0.09	0.08	0.00	0.05
T19	19		0.45-20	19.1	95.6	4.06	1	-0.62	0.18	-1.17	0.14	-1.76	0.07	-2.27	0.07	-0.05	0.16	-0.03	0.10	-0.05	0.02
			20-63	8.35	78.1	21.6	1	-0.68	0.08	-1.26	0.16	-1.88	0.06	-2.42	0.08	-0.07	0.06	-0.04	0.12	-0.06	0.00
			63-90	0.90	99.2	0.51	1	-0.73	0.07	-1.39	0.04	-2.13	0.04	-2.69	0.09	-0.05	0.05	-0.04	0.01	-0.11	0.03
							** reference values*	*-0.17*	*0.01*	*-0.27*	*0.01*	*-0.46*	*0.02*	*-0.56*	*0.03*	*-0.04*	*0.02*	*0.00*	*0.01*	*-0.03*	*0.01*
							*** reported values in Liu et al., 2011*	*-0.14*	*0.01*	*-0.24*	*0.02*	*-0.38*	*0.03*	*-0.46*	*0.04*	*-0.02*	*0.01*	*-0.01*	*0.02*	*-0.03*	*0.02*

a. HgO: ID-3= 10.1%, and $T17_{rain\ event}$=55.4%

b. Hg(0): $T11_{rain\ event}$= 11.9%, $T5_{20-63}$=21.78%, and $T5_{63-90}$=17.85%

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