

1 Supplemental Information

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3 Effects of Mercury and Thallium Concentrations on High Precision Determination of
4 Mercury Isotope Composition by Neptune Plus Multiple Collector Inductively Coupled
5 Plasma Mass Spectrometry

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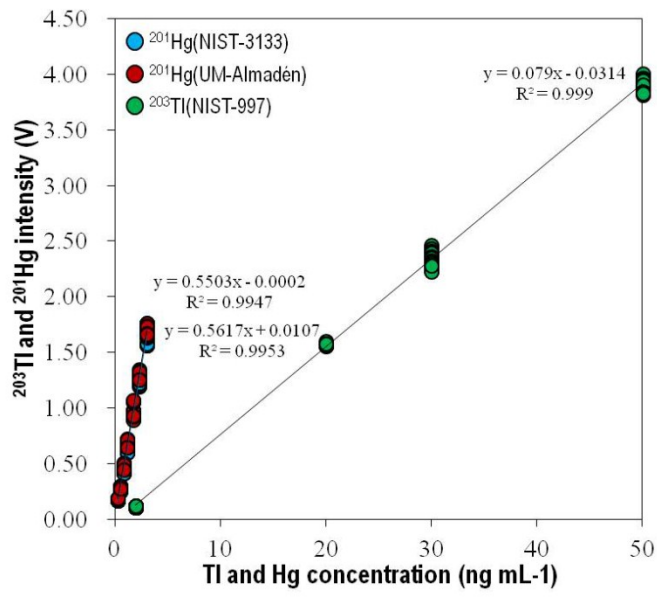
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25 **Figure S1** Correlations between ^{201}Hg intensity and Hg concentrations, ^{203}Tl intensity and Tl
26 concentrations of the standard solutions.

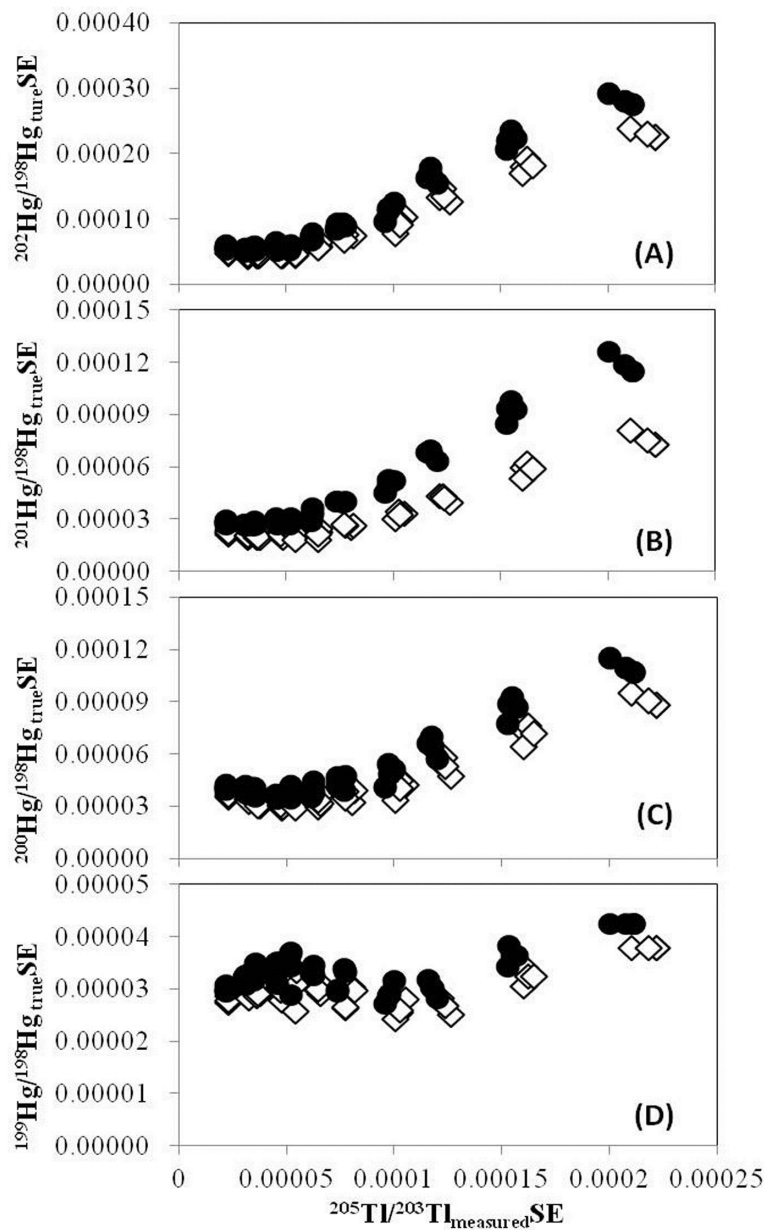


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28 **Figure S2** Relations between the SE for Hg isotope ratios and the SE for Tl isotope ratios.

29 Dark circles represent that measurements were based on NIST-3133 of 0.5 ng mL⁻¹ Hg;

30 tubular diamonds represent that measurements were based on NIST-3133 of 1.0 ng mL⁻¹ Hg;



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32 **Table S1** Mass-bias corrected $^{xxx}\text{Hg}/^{198}\text{Hg}_{\text{true}}$ ratios of NIST SRM 3133 measured by different Hg and Tl concentrations.

Hg concentration ng mL ⁻¹	Tl concentration ng mL ⁻¹	Tl/Hg intensity ratio	N*	^{199}Hg / $^{198}\text{Hg}_{\text{true}}$	2sd	^{200}Hg / $^{198}\text{Hg}_{\text{true}}$	2sd	^{201}Hg / $^{198}\text{Hg}_{\text{true}}$	2sd	^{202}Hg / $^{198}\text{Hg}_{\text{true}}$	2sd
0.3	2	0.28	5	1.68939	0.00040	2.30805	0.00102	1.31485	0.00076	2.96724	0.00234
0.5	2	0.16	5	1.69005	0.00012	2.30949	0.00034	1.31605	0.00026	2.97079	0.00076
0.8	2	0.11	5	1.69073	0.00024	2.31160	0.00054	1.31784	0.00050	2.97633	0.00144
1.2	2	0.07	5	1.69168	0.00016	2.31407	0.00042	1.31996	0.00036	2.98258	0.00128
1.7	2	0.05	5	1.69254	0.00026	2.31613	0.00082	1.32170	0.00072	2.98767	0.00240
2.3	2	0.04	5	1.69354	0.00028	2.31861	0.00072	1.32382	0.00062	2.99388	0.00200
3	2	0.03	5	1.69470	0.00042	2.32178	0.00148	1.32652	0.00124	3.00201	0.00380
0.3	20	4.16	5	1.68889	0.00046	2.30809	0.00026	1.31492	0.00026	2.96911	0.00030
0.5	20	2.56	5	1.68878	0.00016	2.30805	0.00026	1.31485	0.00010	2.96914	0.00034
0.8	20	1.58	5	1.68888	0.00004	2.30822	0.00002	1.31500	0.00004	2.96949	0.00010
1.2	20	1.06	5	1.68891	0.00006	2.30831	0.00010	1.31506	0.00004	2.96975	0.00016
1.7	20	0.73	5	1.68901	0.00006	2.30851	0.00006	1.31523	0.00004	2.97022	0.00010
3	20	0.4	5	1.68920	0.00004	2.30900	0.00004	1.31565	0.00006	2.97140	0.00016
0.3	30	6.36	5	1.68930	0.00030	2.30827	0.00016	1.31507	0.00020	2.96886	0.00040
0.5	30	3.79	5	1.68948	0.00020	2.30852	0.00020	1.31518	0.00004	2.96897	0.00012
0.8	30	2.36	5	1.68960	0.00014	2.30863	0.00008	1.31531	0.00010	2.96914	0.00024
1.2	30	1.54	5	1.68973	0.00004	2.30881	0.00012	1.31543	0.00008	2.96940	0.00016
1.7	30	1.09	5	1.68991	0.00010	2.30902	0.00014	1.31563	0.00010	2.96976	0.00028
2.3	30	0.81	5	1.69009	0.00014	2.30930	0.00008	1.31585	0.00008	2.97025	0.00020
3	30	0.6	5	1.69030	0.00014	2.30958	0.00016	1.31610	0.00012	2.97074	0.00022
0.5	50	7.04	5	1.68986	0.00016	2.30872	0.00024	1.31545	0.00016	2.96882	0.00028
0.8	50	4.24	5	1.68993	0.00014	2.30885	0.00010	1.31552	0.00010	2.96891	0.00024
1.2	50	2.91	5	1.69004	0.00014	2.30893	0.00012	1.31560	0.00014	2.96894	0.00030
1.7	50	1.92	5	1.69020	0.00014	2.30910	0.00002	1.31575	0.00006	2.96916	0.00008
2.3	50	1.43	5	1.69033	0.00006	2.30925	0.00004	1.31586	0.00006	2.96936	0.00008

3	50	1.05	5	1.69052	0.00006	2.30940	0.00016	1.31602	0.00006	2.96959	0.00016
		[^] 0.64	[^] 18	[^] 1.6872	[^] 0.0001	[^] 2.3047	[^] 0.0001	[^] 1.3121	[^] 0.0001	[^] 2.9614	[^] 0.0003
			[#] 480	[#] 1.6881	[#] 0.0006	[#] 2.3061	[#] 0.0011	[#] 1.3139	[#] 0.0014	[#] 2.9635	[#] 0.0014
			^{\$} 41	^{\$} 1.6877	^{\$} 0.0005	^{\$} 2.3056	^{\$} 0.0015	^{\$} 1.3129	^{\$} 0.0013	^{\$} 2.9634	^{\$} 0.0038
			^{&} 7	^{&} 1.6892	^{&} 0.0001	^{&} 2.3096	^{&} 0.0001	^{&} 1.3164	^{&} 0.0001	^{&} 2.9731	^{&} 0.0001

33 *replicate NIST-3133 solutions; [^]Blum and Bergquist (2007); [#]Berni et al.(2016); ^{\$}Yang and Sturgeon (2009), uncertainties are estimated as random error
34 propagation; [&]Ridley and Stetson (2006)

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38 **References**

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40 J. D. Blum, B.A. Bergquist, *Anal. Bioanal. Chem.*, 2007, 388, 353-359.
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44 **Table S2** Hg isotopic composition for UM-Almadén measured with different Hg and Tl concentrations.

Hg concentrations ng mL ⁻¹	N*	Tl concentrations ng mL ⁻¹	$\delta^{202}\text{Hg}$ ‰	sd ‰	$\delta^{201}\text{Hg}$ ‰	sd ‰	$\delta^{200}\text{Hg}$ ‰	sd ‰	$\delta^{199}\text{Hg}$ ‰	sd ‰	$\Delta^{201}\text{Hg}$ ‰	sd ‰	$\Delta^{200}\text{Hg}$ ‰	sd ‰	$\Delta^{199}\text{Hg}$ ‰	sd ‰
0.30	4	2.0	-0.52	0.05	-0.47	0.10	-0.27	0.05	-0.14	0.11	-0.08	0.06	-0.01	0.04	-0.01	0.12
0.50	4	2.0	-0.39	0.14	-0.35	0.10	-0.19	0.08	-0.14	0.05	-0.05	0.02	0.00	0.05	-0.04	0.03
0.80	4	2.0	0.08	0.21	0.04	0.19	0.03	0.09	-0.01	0.04	-0.02	0.04	-0.01	0.03	-0.02	0.02
1.20	4	2.0	0.03	0.38	-0.02	0.27	0.01	0.17	-0.03	0.09	-0.04	0.03	-0.01	0.04	-0.03	0.05
1.70	4	2.0	-0.25	0.46	-0.23	0.35	-0.13	0.23	-0.11	0.09	-0.05	0.01	-0.01	0.03	-0.04	0.04
2.30	4	2.0	0.59	0.47	0.39	0.35	0.30	0.25	0.12	0.11	-0.06	0.01	0.01	0.01	-0.03	0.01
3.00	4	2.0	0.77	0.39	0.58	0.30	0.40	0.20	0.19	0.08	0.00	0.01	0.02	0.02	0.00	0.03
0.30	4	20.0	-0.51	0.06	-0.44	0.07	-0.26	0.06	-0.16	0.06	-0.05	0.05	0.00	0.03	-0.03	0.05
0.50	4	20.0	-0.49	0.04	-0.40	0.04	-0.24	0.04	-0.13	0.02	-0.04	0.04	0.00	0.04	-0.01	0.02
0.80	4	20.0	-0.53	0.02	-0.45	0.01	-0.27	0.02	-0.15	0.02	-0.06	0.02	0.00	0.01	-0.01	0.01
1.20	4	20.0	-0.49	0.03	-0.40	0.03	-0.23	0.02	-0.13	0.02	-0.03	0.02	0.01	0.01	-0.01	0.02
1.70	4	20.0	-0.53	0.03	-0.44	0.02	-0.26	0.02	-0.18	0.02	-0.05	0.01	0.01	0.01	-0.04	0.02
3.00	4	20.0	-0.53	0.03	-0.44	0.03	-0.27	0.01	-0.16	0.00	-0.05	0.01	0.00	0.00	-0.03	0.01
0.30	4	30.0	-0.51	0.10	-0.41	0.10	-0.21	0.05	-0.08	0.04	-0.02	0.05	0.05	0.01	0.05	0.03
0.50	4	30.0	-0.52	0.03	-0.44	0.01	-0.27	0.03	-0.16	0.04	-0.04	0.02	-0.01	0.02	-0.03	0.04
0.80	4	30.0	-0.51	0.01	-0.45	0.01	-0.24	0.02	-0.15	0.05	-0.07	0.01	0.01	0.02	-0.02	0.05
1.20	4	30.0	-0.52	0.02	-0.42	0.02	-0.25	0.01	-0.16	0.02	-0.04	0.02	0.01	0.01	-0.03	0.02
1.70	4	30.0	-0.47	0.02	-0.39	0.03	-0.22	0.02	-0.15	0.01	-0.04	0.02	0.01	0.01	-0.03	0.01
2.30	4	30.0	-0.52	0.04	-0.43	0.03	-0.26	0.01	-0.16	0.02	-0.05	0.01	0.00	0.01	-0.03	0.01
3.00	4	30.0	-0.49	0.02	-0.42	0.02	-0.24	0.02	-0.14	0.02	-0.06	0.02	0.01	0.01	-0.02	0.02
0.50	4	50.0	-0.49	0.03	-0.41	0.02	-0.22	0.05	-0.16	0.06	-0.04	0.03	0.02	0.04	-0.04	0.06
0.80	4	50.0	-0.49	0.05	-0.40	0.03	-0.24	0.02	-0.17	0.02	-0.03	0.02	0.01	0.00	-0.05	0.01
1.20	4	50.0	-0.52	0.03	-0.44	0.05	-0.26	0.02	-0.17	0.04	-0.05	0.03	0.00	0.01	-0.04	0.03
1.70	4	50.0	-0.54	0.02	-0.46	0.04	-0.27	0.02	-0.16	0.03	-0.05	0.04	0.01	0.02	-0.02	0.04
2.30	4	50.0	-0.52	0.02	-0.43	0.01	-0.26	0.01	-0.17	0.01	-0.04	0.01	0.01	0.01	-0.03	0.01
3.00	4	50.0	-0.51	0.01	-0.45	0.01	-0.25	0.02	-0.19	0.01	-0.07	0.02	0.01	0.03	-0.06	0.01

45 *replicate UM-Almadén solutions

Table S3 Hg isotope composition for reference standard materials. Measurements were calibrated using 20 ng mL⁻¹NIST SRM 997 Tl standard.

	Hg concentrations ng mL ⁻¹	N*	$\delta^{202}\text{Hg}$ ‰	sd ‰	$\delta^{201}\text{Hg}$ ‰	sd ‰	$\delta^{200}\text{Hg}$ ‰	sd ‰	$\delta^{199}\text{Hg}$ ‰	sd ‰	$\Delta^{201}\text{Hg}$ ‰	sd ‰	$\Delta^{200}\text{Hg}$ ‰	sd ‰	$\Delta^{199}\text{Hg}$ ‰	sd ‰
DOLT-2	0.5	3	-0.61	0.08	0.16	0.05	-0.27	0.03	0.59	0.07	0.61	0.03	0.04	0.03	0.74	0.03
DOLT-2	1.0	3	-0.66	0.06	0.13	0.05	-0.27	0.02	0.61	0.06	0.62	0.02	0.06	0.02	0.77	0.02
DORM-2	0.5	3	0.22	0.06	1.09	0.08	0.16	0.04	1.20	0.05	0.93	0.03	0.05	0.02	1.14	0.03
DORM-2	1.0	3	0.17	0.05	1.04	0.04	0.13	0.05	1.12	0.06	0.91	0.03	0.05	0.03	1.07	0.03
DORM-3	0.5	3	0.42	0.08	1.72	0.05	0.27	0.05	1.92	0.06	1.40	0.04	0.06	0.02	1.81	0.04
DORM-3	1.0	3	0.52	0.06	1.84	0.07	0.33	0.05	2.02	0.05	1.45	0.04	0.07	0.03	1.89	0.04
TORT-2	0.5	3	0.12	0.07	0.63	0.06	0.08	0.04	0.80	0.06	0.55	0.02	0.02	0.03	0.78	0.04
TORT-2	1.0	3	0.12	0.06	0.61	0.04	0.07	0.06	0.77	0.06	0.53	0.03	0.01	0.01	0.75	0.02
MESS-1	0.5	3	-2.05	0.05	-1.61	0.06	-0.99	0.04	-0.57	0.05	-0.07	0.03	0.03	0.02	-0.05	0.02
MESS-1	1.0	3	-2.10	0.05	-1.62	0.05	-1.03	0.03	-0.55	0.06	-0.04	0.02	0.02	0.02	-0.02	0.01
NIST-2711	0.5	3	-0.21	0.04	-0.34	0.03	-0.10	0.03	-0.24	0.03	-0.18	0.02	0.01	0.01	-0.19	0.02
NIST-2711	1.0	3	-0.24	0.05	-0.36	0.05	-0.14	0.04	-0.27	0.04	-0.18	0.01	-0.02	0.02	-0.21	0.02

*replicate digest solutions