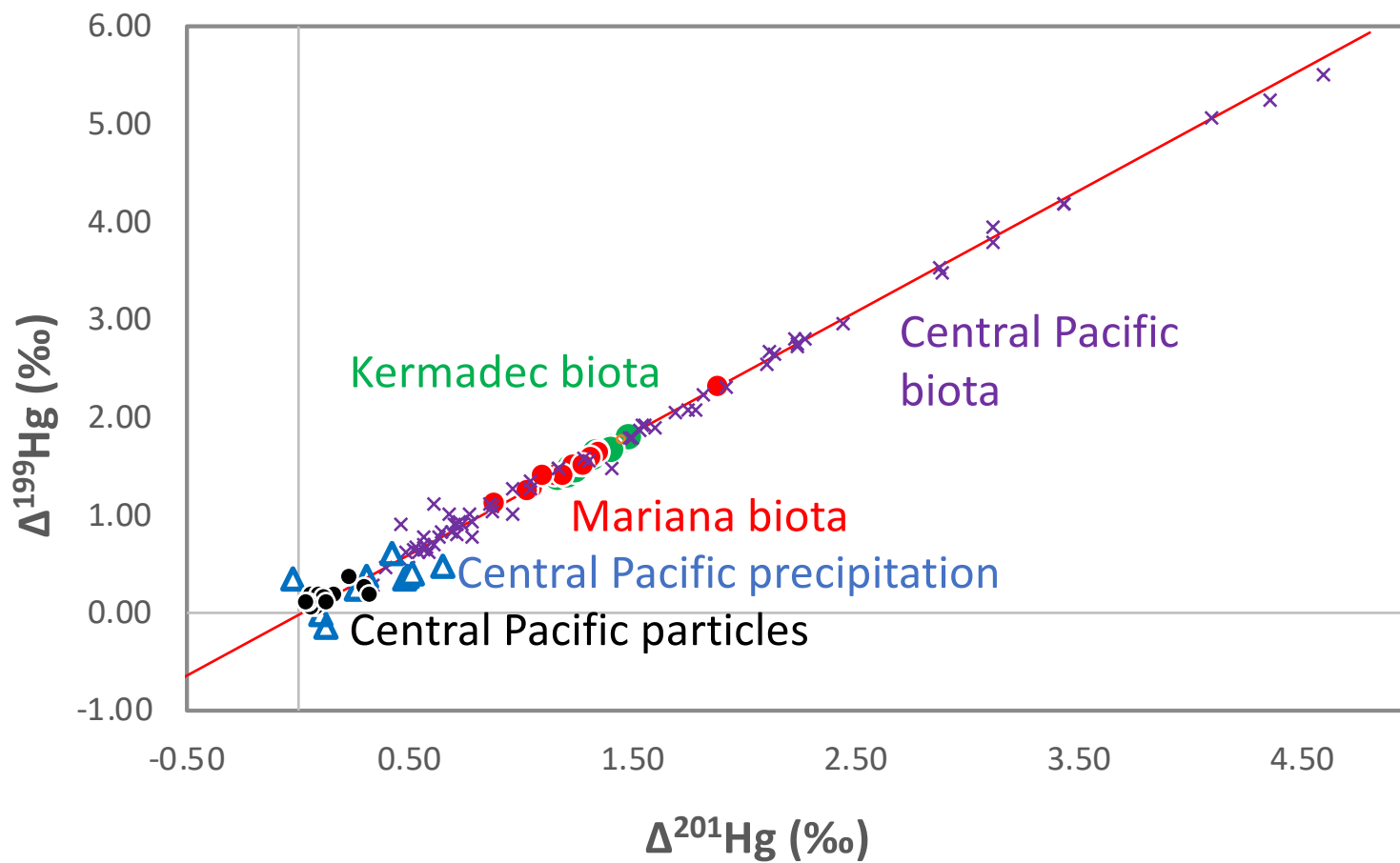


Figure SI-1 $\Delta^{199}\text{Hg}$ versus $\Delta^{201}\text{Hg}$ of all samples. Symbols are the same as in Figure 1. Line is a best fit (42) regression with slope of 1.24 ± 0.02 . See Table SI-2 for analytical uncertainty of isotope values.

Figure SI-2 $\Delta^{200}\text{Hg}$ versus $\Delta^{204}\text{Hg}$ of all samples. Symbols are the same as in Figure 1. Line is a best fit (42) regression with slope of -0.48 ± 0.08 . See Table SI-2 for analytical uncertainty of isotope values.

Blum Fig. SI-1



Blum Fig. SI-2

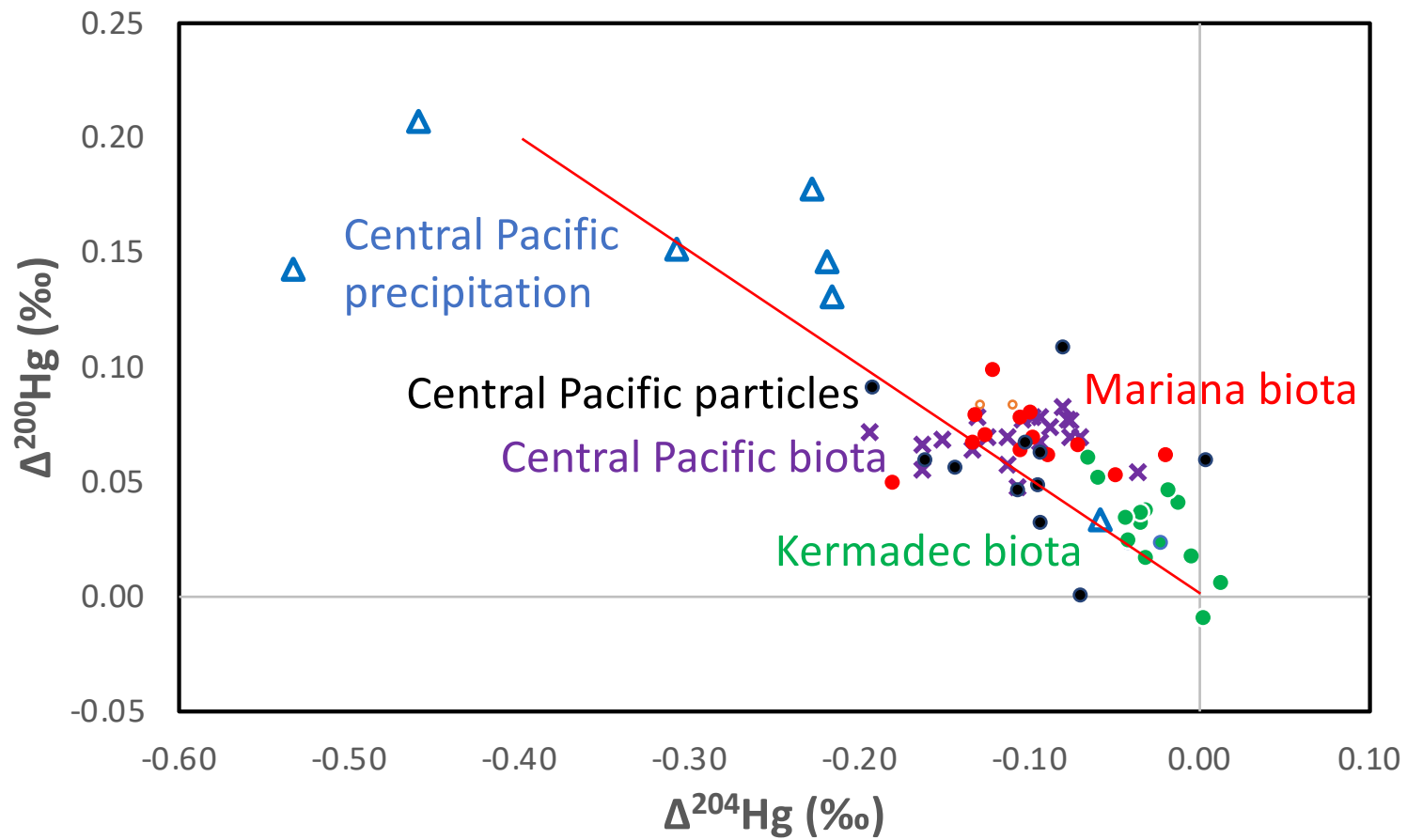


Table SI-1. Sample data and Hg isotope results (%) for hadal fauna from the Kermadec and Mariana deep-sea trenches.

Sample Type	Sample #	Trench	Deployment #	Latitude	Longitude	Species	Depth (m)	Length (cm)	Wet Weight (g)	Dry Weight (g)	Dry Mass Hg (ng/g)	Analysis Solution Hg (ng/g)	$\delta^{202}\text{Hg}$	$\Delta^{199}\text{Hg}$	$\Delta^{200}\text{Hg}$	$\Delta^{201}\text{Hg}$	$\Delta^{204}\text{Hg}$
Fish	100171	Kermadec	TR11	-35.6718	-178.8833	<i>Notoliparis kermadecensis</i>	7515	18.3	80		3708	5.0	1.05	1.56	0.02	1.33	-0.04
	100175	Kermadec	TR11	-35.6718	-178.8833	<i>Notoliparis kermadecensis</i>	7515	18.3	46		3089	5.0	1.04	1.56	0.02	1.33	0.00
	100310	Kermadec	TR16	-31.9135	-177.4822	<i>Notoliparis kermadecensis</i>	7251	21	94		3123	5.0	1.02	1.56	0.02	1.32	-0.02
	200033	Mariana	WT04	12.4151	144.9119	<i>Pseudoliparis swirei</i>	7495	12.6	45		1527						
	200039	Mariana	TR07	12.4235	144.8706	<i>Pseudoliparis swirei</i>	7497	21	150		3342	5.0	0.65	1.78	0.08	1.45	-0.13
	200070	Mariana	TR10	11.9128	144.9514	<i>Pseudoliparis swirei</i>	7841	17.2	65		2283	5.0	0.43	1.55	0.08	1.24	-0.11
Amphipod	100355 (I)	Kermadec	TR18	-31.9145	-176.9187	<i>Scopelocheirus schellenbergi</i>	5958	3.2	0.724	0.0666	5722	5.0	1.11	1.77	0.02	1.47	-0.04
	100355 (II)	Kermadec	TR18	-31.9145	-176.9187	<i>Scopelocheirus schellenbergi</i>	5958	2.5	0.235	0.0361	1500	5.0	0.85	1.45	0.03	1.20	-0.03
	100355 (III)	Kermadec	TR18	-31.9145	-176.9187	<i>Scopelocheirus schellenbergi</i>	5958	2	0.121	0.0208	2415	5.0	0.76	1.57	0.04	1.31	-0.03
	100355 (IV)	Kermadec	TR18	-31.9145	-176.9187	<i>Scopelocheirus schellenbergi</i>	5958	2.3	0.201	0.0254	13579	5.0	1.39	1.38	0.01	1.16	0.01
	100331 (I)	Kermadec	TR17	-31.8896	-177.5333	<i>Scopelocheirus schellenbergi</i>	6456	2.2	0.1701	0.0220	2365	5.0	0.56	1.48	0.02	1.23	-0.03
	100331 (II)	Kermadec	TR17	-31.8896	-177.5333	<i>Scopelocheirus schellenbergi</i>	6456	2.6	0.4176	0.1113	461	5.0	0.96	1.58	0.04	1.33	-0.01
	100331 (III)	Kermadec	TR17	-31.8896	-177.5333	<i>Scopelocheirus schellenbergi</i>	6456	3.5	1.0228	0.0887	12353	5.0	0.94	1.69	0.04	1.41	-0.03
	100331 (IV)	Kermadec	TR17	-31.8896	-177.5333	<i>Scopelocheirus schellenbergi</i>	6456	2.8	0.2651	0.0375	1924	5.0	1.07	1.79	0.05	1.48	-0.02
	100203A (I)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	1.1	0.0466	0.0094							
	100203A (II)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	1.4	0.0619	0.0129	505	3.0	0.82	1.40	-0.01	1.21	0.00
	100203A (III)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	1.5	0.0641	0.0154							
	100203B (I)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	1.6	0.0845	0.0175							
	100203B (II)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	1.4	0.0635	0.0156	615	3.0	0.94	1.67	0.05	1.40	-0.06
	100203B (III)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	0.8	0.0182	0.0041							
	100203C (I)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	1.6	0.0827	0.0168							
	100203C (II)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	1.2	0.0392	0.0104	664	3.0	0.73	1.63	0.03	1.34	-0.04
	100203C (III)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	1	0.0340	0.0084							
	100203D (I)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	1.5	0.0769	0.0199							
	100203D (II)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	1.1	0.0297	0.0078	408	2.3	0.74	1.46	0.06	1.24	-0.06
	100203D (III)	Kermadec	TR15	-31.9310	-177.3008	<i>Hirondellea dubia</i>	10005	1.3	0.0607	0.0158							
	200086A (I)	Mariana	TR12	11.8107	144.9945	<i>Hirondellea gigas?</i>	6898	1.8	0.1245	0.0214							
	200086A (II)	Mariana	TR12	11.8107	144.9945	<i>Hirondellea gigas?</i>	6898	1.5	0.1242	0.0185	430	2.3	0.02	1.13	0.08	0.88	-0.10
	200086B (I)	Mariana	TR12	11.8107	144.9945	<i>Hirondellea gigas?</i>	6898	2.1	0.2120	0.0278							
	200086B (II)	Mariana	TR12	11.8107	144.9945	<i>Hirondellea gigas?</i>	6898	1.2	0.0938	0.0165	326	2.3	0.19	1.41	0.10	1.18	-0.12
	200132A (I)	Mariana	TR19	12.2766	144.6202	<i>Hirondellea gigas?</i>	7626	1.1	0.0967								
	200132A (II)	Mariana	TR19	12.2766	144.6202	<i>Hirondellea gigas?</i>	7626	1.9	0.1269	0.0252	227	1.4	0.52	1.52	0.06	1.28	-0.09
	200132A (III)	Mariana	TR19	12.2766	144.6202	<i>Hirondellea gigas?</i>	7626	1.5	0.0888	0.0125							
	200132B (I)	Mariana	TR19	12.2766	144.6202	<i>Hirondellea gigas?</i>	7626	1.8	0.1478	0.0342							
	200132B (II)	Mariana	TR19	12.2766	144.6202	<i>Hirondellea gigas?</i>	7626	1.3	0.0700	0.0164	389	4.3	0.22	1.25	0.08	1.03	-0.11
	200132B (III)	Mariana	TR19	12.2766	144.6202	<i>Hirondellea gigas?</i>	7626	1.6	0.1155	0.0185							
	200132C (I)	Mariana	TR19	12.2766	144.6202	<i>Hirondellea gigas?</i>	7626	1.2	0.1090	0.0276							
	200132C (II)	Mariana	TR19	12.2766	144.6202	<i>Hirondellea gigas?</i>	7626	1.9	0.1723	0.0294	166	1.4	0.16	1.39	0.05	1.10	-0.18
	200132C (III)	Mariana	TR19	12.2766	144.6202	<i>Hirondellea gigas?</i>	7626	1	0.0726	0.0064							
200129 (I)	Mariana	WT14	12.0724	144.5930	<i>Hirondellea gigas</i>	10250	4.5	2.4971	0.6607	255	5.0	0.02	1.52	0.07	1.28	-0.10	
200129 (II)	Mariana	WT14	12.0724	144.5930	<i>Hirondellea gigas</i>	10250	4	1.5983	0.5066	162	5.0	0.23	1.50	0.05	1.26	-0.05	
200129 (III)	Mariana	WT14	12.0724	144.5930	<i>Hirondellea gigas</i>	10250	4.5	1.8601	0.5817	286	5.0	0.14	1.63	0.06	1.34	-0.10	
200129 (IV)	Mariana	WT14	12.0724	144.5930	<i>Hirondellea gigas</i>	10250	3	0.6138	0.2366	711	5.0	0.70	1.60	0.07	1.31	-0.07	
200129 (V)	Mariana	WT14	12.0724	144.5930	<i>Hirondellea gigas</i>	10250	2.6	0.3602	0.1267	170	3.0	0.06	1.40	0.06	1.16	-0.02	
200129 (VI)	Mariana	WT14	12.0724	144.5930	<i>Hirondellea gigas</i>	10250	3.2	0.6674	0.2404	483	5.0	0.51	1.50	0.07	1.23	-0.13	
200129 (VII)	Mariana	WT14	12.0724	144.5930	<i>Hirondellea gigas</i>	10250	3	0.9945	0.3291	431	5.0	0.10	1.27	0.07	1.05	-0.13	
200129 (VIII)	Mariana	WT14	12.0724	144.5930	<i>Hirondellea gigas</i>	10250	4.1	1.3642	0.4853	355	5.0	0.53	2.31	0.08	1.88	-0.13	

Table SI-2 Hg isotope values and 2SD uncertainties (%) for multiple preparations of standard reference materials. 2SD values in bold are used as estimates of the analytical uncertainty associated with corresponding sample isotope values in Table SI-2.

Reference Material	n Preparations	δ^{202}	2SD	Δ^{199}	2SD	Δ^{200}	2SD	Δ^{201}	2SD	Δ^{204}	2SD
UM-Almaden	5	-0.55	0.06	-0.02	0.02	0.00	0.01	-0.04	0.03	-0.01	0.02
NIST SRM3133	4	-0.02	0.03	0.00	0.02	-0.01	0.02	-0.01	0.02	-0.02	0.04
NRC TORT-3	4	0.06	0.04	0.69	0.02	0.06	0.02	0.56	0.03	-0.08	0.06
NRC DORM-4	1	0.49		1.80		0.06		1.46		-0.13	