

Supplement of Biogeosciences, 12, 6737–6749, 2015
<http://www.biogeosciences.net/12/6737/2015/>
doi:10.5194/bg-12-6737-2015-supplement
© Author(s) 2015. CC Attribution 3.0 License.



Biogeosciences  Open Access

Supplement of

Mercury in coniferous and deciduous upland forests in northern New England, USA: implications of climate change

J. B. Richardson and A. J. Friedland

Correspondence to: J. B. Richardson (justin.richardson@dartmouth.edu)

The copyright of individual parts of the supplement might differ from the CC-BY 3.0 licence.

1 Table S1: Soil morphology and soil properties

Site	Stand	Horizon	Depth	Soil mass	% Sand	% Clay	pH	Total Hg	C (g kg ⁻¹)	N (g kg ⁻¹)
			cm	Mg ha ⁻¹	%	%	log unit	ng g ⁻¹	mg g ⁻¹	mg g ⁻¹
Jay Mt.	Conifer	Oi	0 – 2	12	-	-	3.44	130	399	17
		Oe	2 – 5	17	-	-	3.58	176	430	18
		Oa	5 – 19	53	-	-	3.67	202	310	15
		E	19 – 21	104	74.7	6.8	4.12	35	42	2
		Bhs	21 – 36	97	64.6	10.6	4.15	69	57	3
		BC	36 – 57	267	62.1	9.3	4.63	86	55	3
Jay Mt.	Deciduous	Oi	0 – 2	9	-	-	3.97	124	401	17
		Oe	2 – 4	8	-	-	3.92	171	430	18
		Oa	4 – 12	27	-	-	3.75	151	210	11
		E	12 – 14	67	74.8	6.8	4.07	50	41	3
		Bhs	14 – 29	182	69.5	10.0	4.40	87	55	3
		BC	29 – 41	235	65.7	8.1	4.50	75	48	3
Mt. Mansfield	Conifer	Oi	0 – 2	16	-	-	3.22	305	431	18
		Oe	2 – 4	86	-	-	3.30	359	447	18
		Oa	4 – 19	311	-	-	3.44	225	425	18
		E	19 – 27	204	60.1	3.7	4.12	14	22	1
		Bhs	27 – 45	229	51.4	8.7	4.07	71	55	2
		BC	45 – 60	499	58.9	8.1	4.42	63	24	1
Mt. Mansfield	Deciduous	Oi	0 – 2	9	-	-	3.89	75	452	19
		Oe	2 – 4	84	-	-	4.09	121	459	19
		Oa	4 – 9	113	-	-	3.76	226	294	14
		E	9 – 13	211	62.6	6.2	4.14	13	19	1
		Bhs	13 – 36	299	62.6	8.7	4.13	70	65	3
		B	36 – 56	341	56.4	6.9	4.57	73	30	1

2

3

4

5 Table S1: Soil morphology and soil properties (continued)

Site	Vegetation type	Horizon	Depth cm	Soil mass Mg ha ⁻¹	% Sand %	% Clay %	pH log unit	Total Hg ng g ⁻¹	C (g kg ⁻¹) mg g ⁻¹	N (g kg ⁻¹) mg g ⁻¹
Mt. Ellen	Conifer	Oi	0–2	10	-	-	3.86	141	417	18
		Oe	2–8	42	-	-	3.70	302	445	18
		Oa	8–25	278	-	-	3.33	153	463	19
		E	25–28	29	73.3	6.2	3.29	5	3	1
		Bhs	28–46	149	68.8	10.6	4.03	69	94	3
		BC	46–65	102	72.0	8.7	4.42	78	66	2
Mt. Ellen	Deciduous	Oi	0–2	7	-	-	3.46	120	402	17
		Oe	2–4	31	-	-	3.90	213	404	17
		Oa	4–9	171	-	-	3.80	293	283	14
		E	9–11	18	59.6	7.5	4.29	28	42	2
		Bhs	11–26	135	62.9	9.3	4.24	78	53	3
		BC	26–43	91	61.2	7.4	4.63	50	31	2
Mt. Killington	Conifer	Oi	0–1	12	-	-	3.58	151	470	19
		Oe	1–3	33	-	-	3.38	261	462	19
		Oa	3–8	65	-	-	3.27	322	292	14
		E	8–20	167	70.2	4.3	4.13	18	5	1
		Bhs	20–39	221	61.4	10.6	4.17	48	28	1
		BC	39–55	442	60.2	6.2	4.50	94	37	1
Mt. Killington	Deciduous	Oi	0–2	8	-	-	3.90	72	440	18
		Oe	2–5	59	-	-	4.04	101	468	19
		Oa	5–12	183	-	-	3.62	212	340	15
		E	12–18	160	68.2	4.4	4.27	15	33	2
		Bhs	18–38	235	62.1	8.6	4.36	48	58	2
		B/C	38–53	391	66.5	5.6	4.64	65	21	1

6

7

8

9 Table S1: Soil morphology and soil properties (continued)

Site	Vegetation type	Horizon	Depth	Soil mass	% Sand	% Clay	pH	Total Hg	C (g kg ⁻¹)	N (g kg ⁻¹)
			cm	Mg ha ⁻¹	%	%	log unit	ng g ⁻¹	mg g ⁻¹	mg g ⁻¹
Chase Mt.	Conifer	Oi	0 – 3	14	-	-	3.49	134	461	19
		Oe	3 – 6	17	-	-	3.22	217	455	19
		Oa	6 – 18	33	-	-	3.21	313	361	16
		E	18 – 21	22	57.6	8.1	4.09	64	56	3
		Bs	21 – 35	276	49.2	8.7	4.52	40	37	2
		BC	35 – 53	404	49.5	8.7	4.16	19	10	1
Chase Mt.	Deciduous	Oi	0 – 2	7	-	-	3.69	70	406	17
		Oe	2 – 4	19	-	-	4.11	113	255	13
		Oa	4 – 8	116	-	-	3.96	98	126	7
		E	8 – 13	139	53.3	5.0	4.39	24	16	1
		Bs	13 – 28	242	59.5	4.7	4.31	68	48	3
		B	28 – 46	335	63.7	3.2	4.51	67	42	2
Mt. Madison	Conifer	Oi	0 – 2	12	-	-	4.16	100	382	17
		Oe	2 – 5	33	-	-	3.48	253	452	19
		Oa	5 – 15	180	-	-	3.60	210	401	17
		E	15 – 21	214	83.9	3.1	4.34	6	8	1
		Bhs	21 – 41	567	81.9	5.0	4.48	64	83	4
		BC	41 – 58	773	87.7	2.5	4.53	57	62	2
Mt. Madison	Deciduous	Oi	0 – 4	9	-	-	4.05	71	443	18
		Oe	4 – 7	37	-	-	3.96	148	450	19
		Oa	7 – 12	168	-	-	3.84	194	324	15
		E	12 – 16	236	76.4	2.5	4.44	12	19	1
		Bhs	16 – 38	364	77.7	4.3	4.23	67	92	4
		BC	38 – 57	643	84.4	1.9	4.84	58	67	2

10

11

12

13 Table S1: Soil morphology and soil properties (continued)

Site	Vegetation type	Horizon	Depth	Soil mass	% Sand	% Clay	pH	Total Hg	C (g kg ⁻¹)	N (g kg ⁻¹)
			cm	Mg ha ⁻¹	%	%	log unit	ng g ⁻¹	mg g ⁻¹	mg g ⁻¹
Mt. Moosilauke	Conifer	Oi	0–1	12	-	-	3.59	133	396	17
		Oe	1–4	52	-	-	3.91	159	401	17
		Oa	4–12	70	-	-	4.01	253	254	13
		A/E	12–18	40	69.9	6.1	4.55	89	53	3
		Bs	18–38	454	59.2	6.2	4.55	85	33	2
		B	38–51	437	67.0	3.7	4.71	77	46	2
Mt. Moosilauke	Deciduous	Oi	0–2	9	-	-	3.73	68	371	16
		Oe	2–4	55	-	-	4.04	131	346	16
		Oa	4–11	146	-	-	3.99	148	145	8
		A/E	11–15	61	74.6	5.6	4.48	89	51	3
		Bs	15–32	304	69.8	6.8	4.54	69	36	2
		B	32–44	121	69.6	5.5	4.70	89	20	1
Mt. Cardigan	Conifer	Oi	0–2	31	-	-	4.63	214	446	18
		Oe	2–4	24	-	-	4.42	300	149	9
		Oa	4–11	81	-	-	3.43	228	132	8
		E	11–17	592	68.8	2.5	4.33	12	23	2
		Bhs	17–37	106	71.3	10.0	4.41	150	64	4
		B	37–56	75	67.6	8.7	4.25	145	68	3
Mt. Cardigan	Deciduous	Oi	0–2	7	-	-	4.40	66	451	19
		Oe	2–4	22	-	-	4.30	173	229	12
		Oa	4–12	34	-	-	3.98	234	203	11
		E	12–19	129	72.6	7.5	4.63	39	35	2
		Bhs	19–38	433	65.1	10.0	4.38	90	88	5
		B	38–56	375	67.6	6.2	4.62	91	55	3

14 Table S2 Mercury pools and fluxes for the organic and mineral horizons. (*) indicates a significant difference between
 15 vegetation types using two sample t-tests ($p < 0.05$).

Site #	Dominant vegetation type	Litterfall Hg pool	†Atmospheric Hg deposition	‡Volatilization	Organic horizon Hg pool	Mineral soil Hg pool
		$\text{g ha}^{-1} \text{yr}^{-1}$	$\text{g ha}^{-1} \text{yr}^{-1}$	$\text{g ha}^{-1} \text{yr}^{-1}$	g ha^{-1}	g ha^{-1}
NH 1	Conifer	0.01	0.24	0.04	16	30
NH 2	Conifer	0.01	0.26	0.05	43	77
NH 3	Conifer	0.02	0.26	0.06	27	62
NH 4	Conifer	0.04	0.26	0.08	31	43
VT 1	Conifer	0.01	0.25	0.02	55	60
VT 2	Conifer	0.05	0.25	0.04	105	37
VT 3	Conifer	0.03	0.25	0.07	111	44
VT 4	Conifer	0.08	0.26	0.08	31	38
NH 1	Deciduous	0.12	0.24	0.04	13	40
NH 2	Deciduous	0.14	0.26	0.05	44	54
NH 3	Deciduous	0.17	0.26	0.06	30	61
NH 4	Deciduous	0.40	0.26	0.08	11	44
VT 1	Deciduous	0.28	0.25	0.02	8	33
VT 2	Deciduous	0.49	0.25	0.04	38	34
VT 3	Deciduous	0.20	0.25	0.07	42	60
VT 4	Deciduous	0.10	0.26	0.08	47	73
Mean	Conifer	0.03 ± 0.01	0.25 ± 0.01	0.06 ± 0.01	$52 \pm 13^*$	49 ± 6
Mean	Deciduous	$0.24 \pm 0.05^*$	0.25 ± 0.01	0.06 ± 0.01	29 ± 6	50 ± 5

16 † Annual atmospheric deposition of Hg (wet + dry deposition) at the 16 stands was interpolated from Miller et al. (2005) and Yu et al.
 17 (2014).

18 ‡ Annual volatilization (evasion) rates of Hg from organic horizons at the eight sites were estimated from Yu et al. (2014) and fall
 19 within ranges from Grigal et al (2000) and Schlüter (2000).

20