SUPPORTING INFORMATION

Estimation of speciated and total mercury dry deposition at monitoring locations in eastern and central North America

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Table S1. Population density within the 15km radius circle surrounding each site and defined site categories. Also shown in the last column is the fraction of each land use category (LUC) within the 1 km circle surrounding each site (number in brackets are LUC number defined in Zhang et al., (2003).

AMNet Site ID	Site Name	Grid count	Area (km²)	Max / km²	Mean / km²	Std / km²	Site category	Fraction of each LUC with 1 km circle. LUC number in bracket.
MD08	Piney Reservoir	41	712	1085	137	208	rural	0.1(3), 0.25(7), 0.05(11), 0.1(12), 0.1(13), 0.4(14)
MD99	Beltsville	42	729	9231	3026	2081	suburban	0.306(5), 0.189(7), 0.034(11), 0.002(14), 0.344(21), 0.122(25)
MS12	Grand Bay NERR	39	677	3156	336	655	rural	0.002(1), 0.137(5), 0.4(11), 0.004(13), 0.423(20), 0.032(21)
NH06	Thompson Farm	43	747	1780	524	400	rural	0.05(1), 0.005(3), 0.03(13), 0.125(15), 0.02(23), 0.77(25)
NJ05	Brigantine	43	747	6243	649	1233	subrural	0.239(3), 0.063(4), 0.034(7),0.003(15), 0.128(21), 0.406,(23), 0.127(25)
NJ30	New Brunswick	42	729	10928	4001	2417	urban	0.082(3), 0.124(7), 0.249(15), 0.438(21), 0.108(23)
NJ32	Chester	42	729	5784	1050	927	suburban	0.23(7), 0.03 (11), 0.047(15), 0.565(21), 0.115(23), 0.01 (24)
NJ54	Elizabeth Lab	39	677	32464	10274	7111	urban	0.042 (3), 0.028(11), 0.889(21), 0.041(23)
NS01	Kejimkujik National Park	42	729	12	7	3	rural	0.67(4), 0.33(25)
NY06	Bronx	42	729	83589	18880	21433	urban	0.05(7) 0.95(21)
NY20	Huntington Wildlife	44	764	6	3	1	rural	0.4(3), 0.15(23), 0.45(25)
NY43, NY95	Rochester	42	729	10854	2859	2638	suburban	1.0(21)
OH02	Athens Super Site	42	729	2908	238	454	rural	0.4(7), 0.1(11), 0.25(13), 0.25(25)
OK99	Stilwell	42	729	404	63	67	rural	0.015(1), 0.002(5), 0.208(7), 0.014(11), 0.04(13), 0.671(14), 0.043(21), 0.002(24), 0.005(25)
UT96	Antelope Island	44	764	4850	1181	1448	suburban	0.003(11), 0.627(14), 0.279(15), 0.072(20), 0.019(21)
UT97	Salt Lake City	42	729	10671	3827	3323	urban	0.004(1), 0.004(11), 0.01(14), 0.01(20), 0.972(21)
VT99	Underhill	45	781	408	108	70	rural	0.05(1), 0.15(4), 0.3(7), 0.1(11), 0.2(13), 0.2(14)
WV99	Canaan Valley Institute	41	712	31	16	3	rural	0.03 (1), 0.97 (25)
ELA	Experimental Lakes Area	50	868	0	0	0	rural	0.25(4), 0.75(25)

(i) The population estimates are from the 2010 Gridded Population of the World - GPW v3 database prepared by the Center for International Earth Science Information Network (CIESIN), Columbia University; and Centro Internacional de Agricultura Tropical (CIAT), 2005. http://sedac.ciesin.columbia.edu/gpw/

(ii) Grid and Area: number of population grid cells and their total area used for statistics calculation; the original grids are ~ 4.64 km x 4.64 km.

(iii) Definition of LUC number: 1. water; 2. ice; 3. inland lake; 4. evergreen needleleaf trees; 5. evergreen broadleaf trees; 6. deciduous needleleaf trees; 7. deciduous broadleaf trees; 8. tropical broadleaf trees; 9. drought deciduous trees; 10. evergreen broadleaf shrubs; 11. deciduous shrubs; 12. thorn shrubs; 13. short grass and forbs; 14. long grass; 15. crops; 16. rice; 17. sugar; 18. maize; 19. cotton; 20. irrigated crops; 21. urban; 22. tundra; 23. swamp; 24. desert; 25. mixed wood forests; 26. transitional forest.

Table S2. Litterfall measurements collected at selected MDN sites following from Risch et al., 2012a.

MDN site number	Site name	Latitude	Longitude	Elevation (m)	Co-located monitoring[a] at MDN site	Prevalent tree species in study plot	Forest cover class of study plot	National Land Cover Database[b] class for study plot	Annual litterfall deposition ($\mu g/m^2$)
GA09	Okefenokee	30.74	-82.13	47	NTN	pine, oak	mixed	transitional	5.4 ± 0.1
IN20	Roush Lake	40.84	-85.46	244	NTN	maple, poplar, ash, cherry	deciduous	row crops	13.9 ± 5.2
IN21	Clifty Falls	38.76	-85.42	256	none	maple, poplar, ash	deciduous	forest and residential	16.0 ± 1.2
IN26	Fort Harrison	39.86	-86.02	260	none	oak, maple, poplar, cherry	deciduous	urban	17.4 ± 5.5
IN34	Indiana Dunes	41.63	-87.09	208	NTN	oak, maple, hickory	deciduous	pasture	18.7 ± 5.7
KY10	Mammoth Cave	37.13	-86.15	236	NTN	oak, maple, hickory, ash	deciduous	pasture	12.6 ± 0.1
MD08	Piney Reservoir	39.71	-79.01	769	NTN, AMNet	oak, maple, cherry	deciduous	deciduous forest	15.3 ± 2.1
MD99	Beltsville	39.03	-76.82	46	NTN, AMNet	oak, maple, beech, sweetgum	deciduous	urban	15.5 ± 1.0
MI48	Seney	46.29	-85.95	216	NTN	red pine, jack pine, balsam fir, birch	coniferous	woody wetland	7.4 ± 0.4
MN16	Marcell	47.53	-93.47	431	NTN	aspen, maple	deciduous	deciduous forest	3.8 ± 0.4
MN98	Blaine	45.14	-93.22	275	none	aspen, maple	deciduous	not determined	7.8 ± 0.3
NY68	Biscuit Brook	41.99	-74.50	634	NTN, CASTNET	beech, maple	deciduous	deciduous forest	15.3 ± 1.0
OH02	Athens	39.31	-82.12	275	AMNet	oak, maple, hickory, cherry	deciduous	pasture	18.8 ± 2.8
PA13	Allegheny Portage	40.46	-78.56	739	none	oak, maple, beech, cherry	deciduous	commercial industrial	13.6 ± 4.0
SC05	Cape Romaine	32.94	-79.66	3	NTN	oak, hickory, sweetgum, pine	mixed	residential	9.3 ± 0.2
TN11	Smoky Mountains	35.66	-83.59	640	NTN, CASTNET	maple, poplar, birch, pine, hemlock	deciduous	mixed forest	14.9 ± 4.7
VA28	Shenandoah	38.52	-78.44	1,074	NTN, CASTNET	birch, locust, oak, pine	mixed	deciduous forest	7.8 ± 0.8
VT99	Underhill	44.53	-72.87	399	NTN, AMNet, AirMon	birch, maple, beech, hemlock, spruce	mixed	deciduous forest	11.3 ± 1.8
WI09	Popple River	45.80	-88.40	421	NTN	birch, maple, aspen, fir	mixed	herbaceous wetland	10.0 ± 1.1
WI31	Devil's Lake	43.44	-89.68	389	none	cottonwood, maple, oak, elm	deciduous	pasture	4.6 ± 1.0
WI36	Trout Lake	46.05	-89.65	501	NTN	pine, fir, spruce	coniferous	evergreen forest	7.6 ± 1.4
WI99	Lake Geneva	42.58	-88.50	288	NTN	oak, basswood, ash, elm	deciduous	deciduous forest	14.3 ± 1.3
WV99	Canaan Valley	39.06	-79.42	988	AMNet	birch, maple, beech, hemlock, spruce	mixed	pasture	9.9 ± 0.3

[a]MDN, Mercury Deposition Network; NTN, National Trends Network; AMNet, Atmospheric Mercury Network; CASTNET, Clean Air Status and Trends Network; AirMon, Atmospheric Integrated Research Monitoring Network. [b] Multi-Resolution Land Characteristics Consortium (2001).

Table S3. Seasonal averages ±standard deviation of speciated Hg ambient concentrations (GEM in ng m^{-3} and GOM and PBM in pg m^{-3}) from monitoring data collected during the years of 2008 and 2009. Spring: Mar., Apr. and May; Summer: Jun., Jul. and Aug.; Fall: Sep., Oct. and Nov.; Winter: Dec., Jan. and Feb.

	GEM				GOM				PBM			
Site Code	Spring	Summer	fall	winter	Spring	Summer	fall	winter	Spring	Summer	fall	winter
MD08	1.54 ± 0.19	1.25 ± 0.26	1.21 ± 0.19	1.54 ± 0.2	35.88 ± 34.79	9.95 ± 11.88	19.02 ± 29	22.17 ± 30.19	8.09 ± 6.81	3.2 ± 2.3	4.21 ± 3.61	10.35 ± 9.29
MD99	1.5 ± 0.22	1.39 ± 0.24	0.98 ± 0.07	1.34 ± 0.17	5.14 ± 7.4	3.6 ± 8.01	0.46 ± 0	2.85 ± 4.55	7.54 ± 6.26	5.35 ± 3.88	0.65 ± 0.12	6.41 ± 8.75
MS12	1.45 ± 0.27	1.36 ± 0.17	1.29 ± 0.14	1.45 ± 0.33	8.19 ± 22.21	9.53 ± 16.54	6.46 ± 11.26	4.53 ± 10.26	3.24 ± 3.42	2.79 ± 5.85	5.14 ± 8.85	5.59 ± 6.27
NH06	1.51 ± 0.14	1.26 ± 0.21	1.05 ± 0.15	1.39 ± 0.18	5.51 ± 6.68	1.58 ± 2.68	1.49 ± 1.82	3.42 ± 3.54	4.24 ± 5.28	2.45 ± 1.74	0.85 ± 1.2	4.25 ± 4.56
NJ05		1.76 ± 0.59	1.35 ± 0.13	1.45 ± 0.08		22.7 ± 10.81	1.03 ± 1.65	1.14 ± 0.98		20 ± 12.57	1.98 ± 2.56	4.68 ± 4.15
NJ30	2.13 ± 0.35	2.25 ± 1.35	1.82 ± 0.23		3.51 ± 6.27	1.79 ± 2.65	1.59 ± 2.6		10.2 ± 8.8	3.66 ± 4.99	3.55 ± 16.93	
NJ32	1.98 ± 0.77	1.97 ± 0.77	1.38 ± 0.25	1.22 ± 0.36	8.57 ± 9.92	2.76 ± 3.63	4.93 ± 9.08	9.29 ± 10.12	9.13 ± 12.13	5.02 ± 8.24	10.82 ± 14.07	40.29 ± 34.86
NJ54	1.78 ± 0.64	1.67 ± 0.48	1.6 ± 1.02	1.9 ± 0.63	8.7 ± 11.57	2.48 ± 1.59	5.68 ± 6.15	5.48 ± 5.83	6.57 ± 4.41	5.61 ± 4.03	7.65 ± 26.37	19.85 ± 41.24
NS01	1.58 ± 0.35	1.27 ± 0.26	1.17 ± 0.22	1.45 ± 0.09	4.09 ± 6.22	2.86 ± 3.55	0.53 ± 0.58	0.49 ± 0.33	7.98 ± 8.1	1.76 ± 1.31	1.28 ± 1.2	5.8 ± 4.87
NY06	1.62 ± 0.29	1.58 ± 0.38	1.4 ± 0.34	1.43 ± 0.39	11.68 ± 15.87	7.62 ± 8.68	5.21 ± 5.97	3.69 ± 3.29	9.3 ± 7.4	4.97 ± 4.08	5.13 ± 5.4	10.93 ± 11.93
NY20	1.3 ± 0.35	1.25 ± 0.3	1.37 ± 3.1	1.61 ± 0.5	1.59 ± 3.33	1.07 ± 2.52	0.53 ± 0.61	1.42 ± 4.13	2.49 ± 3.06	1.65 ± 3.06	0.92 ± 2.15	7.61 ± 14.3
NY43	1.56 ± 0.65	1.52 ± 0.3	1.49 ± 0.35	1.72 ± 0.29	13.74 ± 19	3.81 ± 5.73	2.76 ± 5.23	3.92 ± 5.69	11.06 ± 8.34	5.59 ± 3.79	4.67 ± 5.47	16.15 ± 14.09
NY95	1.49 ± 0.17	1.38 ± 0.19	1.38 ± 0.6	1.47 ± 0.15	10.51 ± 15.39	5.4 ± 6.5	12.71 ± 11.59	6.88 ± 7.77	10.35 ± 6.99	6.11 ± 3.33	12.52 ± 7.53	16.43 ± 10.52
OH02	1.54 ± 3.72	1.4 ± 0.78	1.36 ± 0.2	1.41 ± 0.18	20.18 ± 76.8	7.91 ± 14.66	14.3 ± 21.67	6.18 ± 7.88	14.23 ± 113.6	5.57 ± 14.27	5.06 ± 4.26	10.09 ± 9.87
OK99	1.43 ± 0.16	1.24 ± 0.25	1.26 ± 0.15	1.49 ± 0.18	3.87 ± 5.51	2.76 ± 5.57	1.47 ± 2.08	2.04 ± 2.66	4.79 ± 3.3	4.21 ± 2.47	2.82 ± 1.91	5.66 ± 4.09
UT96		1.59 ± 0.2	1.51 ± 0.23	1.54 ± 0.21		22.23 ± 22.98	9.66 ± 13.24	3.16 ± 3.61		14.75 ± 10.17	13.41 ± 11.72	29.83 ± 32.72
UT97	2.14 ± 0.76	2.21 ± 0.76	2.12 ± 1.36	2.03 ± 0.62	18.7 ± 33.89	26.75 ± 36.91	25.9 ± 45.02	19.07 ± 28.38	10.2 ± 23.61	9.1 ± 9.63	23.54 ± 192.1	21.29 ± 29.41
VT99	1.63 ± 0.18	1.35 ± 0.26	1.27 ± 0.16	1.63 ± 0.21	7.12 ± 12.28	1.16 ± 2.16	1.32 ± 3.1	2.56 ± 2.9	16.98 ± 16.91	3.75 ± 2.81	4.18 ± 4.05	20.37 ± 20.87
WV99	1.67 ± 0.12		1.37 ± 0.09	1.64 ± 0.2	15.12 ± 10.57		9.86 ± 8.61	20.08 ± 7.42	15.86 ± 8.28		6.98 ± 6.24	18.67 ± 6.22
ELA	1.34 ± 0.18	1.23 ± 0.16	1.15 ± 0.14	1.34 ± 0.12	3.32 ± 5.02	0.74 ± 0.82	0.51 ± 0.53	0.69 ± 1.01	6.55 ± 15.58	3.47 ± 2.44	2.32 ± 2.11	8.38 ± 16.49

Figure S1. Seasonal average concentrations for (a) GOM (pg m^{-3}), (b) PBM (pg m^{-3}) and (c) GEM (ng m^{-3}).

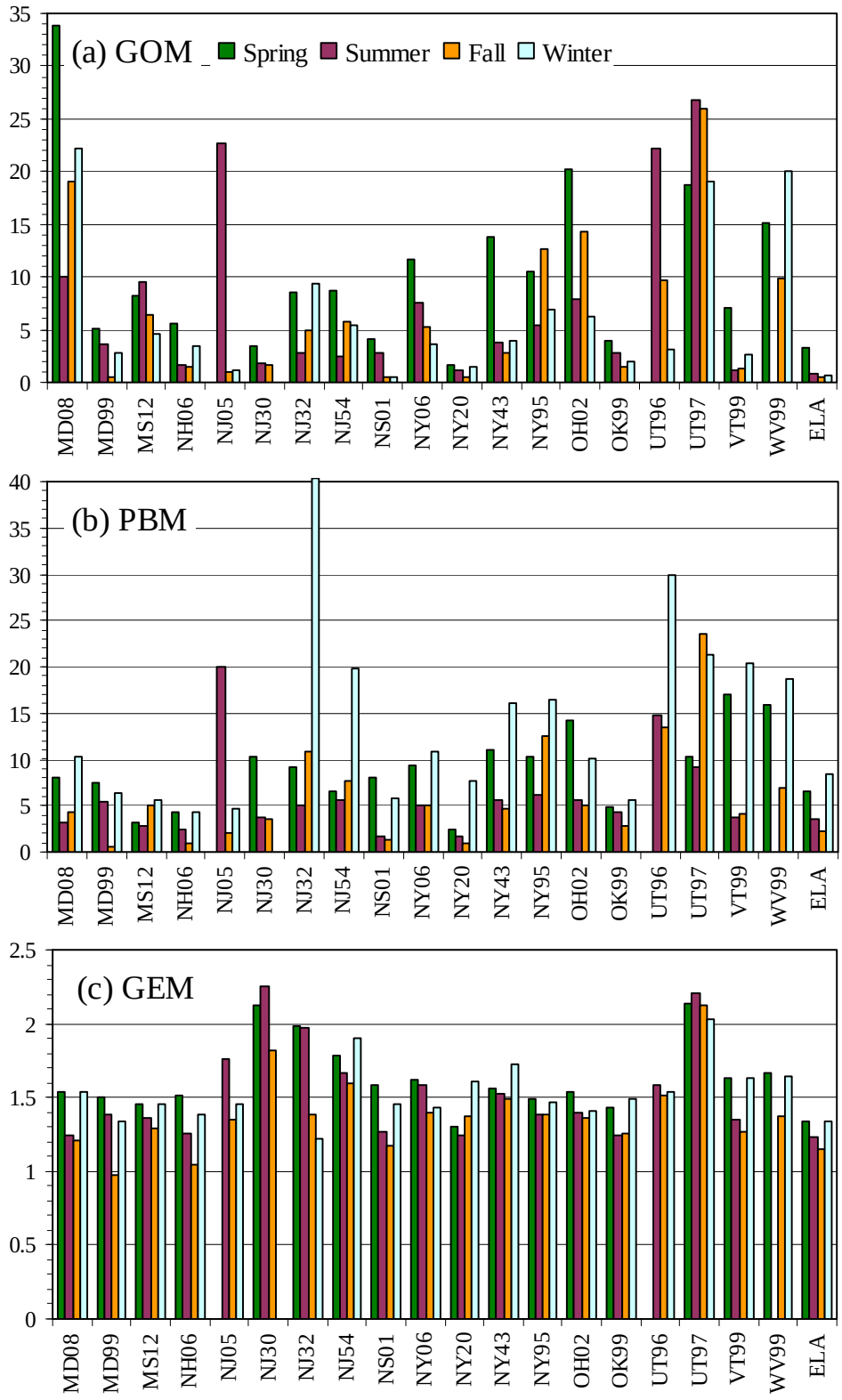

Figure S2. Average diurnal cycle and monthly V_d (left columns) and normalized V_d by their respective annual average V_d (right columns) from 2009 data at Kejimkujik forest site.