atmosphere

MDPI

Supplemental Materials for:

Air/Surface Exchange of Gaseous Elemental Mercury at Different Landscapes in Mississippi, USA

James V. Cizdziel [1,*], Yi Zhang [1], Divya Nallamothu [1], Steve Brewer [2] and Zhiqiang Gao [1]

[1] Department of Chemistry and Biochemistry, University of Mississippi, University, MS 38677, USA
[2] Department of Biology, University of Mississippi, University, MS 38677, USA
* Correspondence: Cizdziel@olemiss.edu

Received: 08 August 2019; Accepted: 06 September 2019; Published: date

Table S1. Total-Hg and loss-on-ignition (LOI) data for study soils.

Soil Type	Hg (ng g^{-1})	SD	LOI (%)
Agriculture (Lafayette County)	17.1	0.9	1.27
Delta Agri. (Dundee)	21.8	0.9	1.95
Mowed field	26	2	NA
Grass (lawn)	26.6	0.2	1.65
Forest	40.9	2.9	3.21
Delta Agri. (Dowling)	42.4	0.7	2.83
Wetland (Sky Lake)	127	23	NA

Table S2. Ambient air gaseous elemental mercury (GEM) (ng·m^{-3}) concentrations at each site.

Site	Summer			Winter		
	Range	Median	Mean ± SD	Range	Median	Mean ± SD
Forest	0.44–2.28	1.02	1.06 ± 0.31	1.16–1.37	1.26	1.26 ± 0.05
Grass lawn	0.20–1.66	0.94	0.93 ± 0.40	1.18–1.99	1.45	1.48 ± 0.19
Wetland	0.62–4.50	1.09	1.23 ± 0.59	NA		
Field Station	0.62–3.32	1.39	1.57 ± 0.67			
Agriculture cotton field	0.17–1.59	1.08	0.94 ± 0.40	0.90–1.42	1.19	1.19 ± 0.16
Delta (Dundee)	0.69–2.29	1.47	1.48 ± 0.21	1.36–1.61	1.45	1.45 ± 0.06
Delta (Dowling)	0.18–1.89	1.28	1.17 ± 0.47	0.88–1.42	1.12	1.13 ± 0.14

Table S3. Gaseous elemental mercury (GEM) fluxes and ancillary data for natural landscapes worldwide. Data in parentheses are correlation coefficients between Hg fluxes and listed parameters, with red italic values being significant ($p<0.05$).

Location	Classification of Soil	Time Period	Hg flux (ng m^{-2} h^{-1})	Hg inlet conc. (ng m^{-3})	Substrate Hg (ng g^{-1})	Air temp. (°C)	Solar Rad (W m^{-2})	Reference
USA, MS	Forest	2013 and 2014	−0.93–6.71	0.44–2.28	40.9	*26.45*	*25*	This study
	Grassland		1.34–11.41	0.20–1.66	26.6	23.84	*33*	
	Agriculture		0.08–5.46	0.17–1.59	17.1	24.91	*84*	
	Wetland		1.74–13.1		127	23.3	1.5	
	Delta Dundee		−0.58–2.47	0.69–2.29	21.8	*24.54*	*59*	
	Delta Dowling		−0.52–4.87	0.18–1.89	42.4	*24.54*	*53*	
Canada	Forest	Summer 1997, '99	−0.4–2.2	NA	0.15–0.33	15.6–19.6	NA	[29]
	Agriculture	1995, 1999, 2000	1.1–2.9		0.006–0.100	10.1–12.7		
	Sand	Aug 2001	0.44			14.8		
	Rock/hill	Summer 1997-'00	−0.03–1.7		0.005–0.25	17.3–19.7		
	Shales	July 1997, 2001	9.1–213.5		0.358–1.6	11.9–20.1		
	Cinnabar	July 1997	91.8		179.5	16.6		
	Mineralized soil	June 1996	1760		124.6 (0.49)	17.1		
USA	Agriculture	May 2003-May 2004	−1.4–5.0	1.4–3.7 (−0.34)	29–35	(0.44)	*(−0.71)*	[23]
	Desert		−1.5–4.2	0.2–4.0 *(0.50)*	12–30	*(0.23)*	(−0.67)	
	Grassland	July 2003-Aug 2004	−0.9–9.7	0.5–3.2 *(0.25)*	10–55	(0.20)	(0.46)	
	Mixed forest		−0.2–3.8	1–2.3 *(−0.56)*	32–60	*(0.39)*	*(0.62)*	
	Pine forest		−0.3–3.7	0.7–1.4 *(−0.55)*	40	*(0.51)*	*(0.52)*	
Sweden	Forest lake	May 1988	0.19–19.5	1.59–4.16	NA	0.4–24	NA	[39]
	Forest	Dec 1987–June 1989	−2.0–1.4	2.06–3.01		−10–20		
China	Landfill	Nov 2003	−72.48–308.7	175–1406		NA		[40]
USA, NY	Forest	2005, 2006	−2.5–27.2	NA		(0.44)	(0.16)	[24]
Finland	Wetland	May 2000	−0.3–0.6	1.3	NA	11–21 *(0.86)*		[32]
	Forest	Aug 2007	−1.0–3.5					
China, Sichuan	Agriculture	Dec 2005–Sep 2006	−4.1–132	2.09–10.91	100	4.2–29	72.1	[21]
	Grassland		−18.7–13.4	1.93–8.32	170	3.6–25.8	53.7	
	Bare soil		−4.7–94.8	2.74–5.52	130	24.2	64.4	
	Broadleaf forest	Aug 2006	0.5–9.3	1.34–8.54	125	17.5–22.9	93.9	
	Pine forest		−0.6–10.6	0–2.66	80	17.1	92.9	
USA, TN	Forest	Jan-Feb 2004	−0.4–3.3	1.7–4.8	92	9	209	[16]
		Mar-May 2004	−1.2–1.2	1.3–3.3		19	110	
		Summer 2004	−0.1–1.0	0.9–2.4		25	70	
		Sep-Nov 2004	0–2.9	1.3–1.9		16	103	
USA, ME	Forest	May-June 2005	−0.1–2.5	1.4–2.4	69	13–21 *(0.72)*	26–844*(0.89)*	[16]
USA, NY			−0.5–0.5	1.1–1.6	50	9–26 *(0.18)*	17–392(0.12)	
USA, PA			−1.3–1.8	1.4–3.6	33	14–25 *(0.32)*	8–129 (0.11)	
USA, NJ			−0.3–0.7	1.5–2.2	13	16–19 *(0.65)*	17–416(0.22)	

USA, NC			−4.4–1.5	2.1–9.5	21	22–28 *(0.74)*	37–376(0.29)	
USA, SC			−5.1–1.9	1.5–13.2	47	17–26 (0.07)	6–317 (0.09)	
USA, MI	Shaded forest Open field	Summer 1998	−0.6–3.7 3.2–10.2	1.2–2.9 1.8–3.1	NA	NA	13–330 250–812	[19]

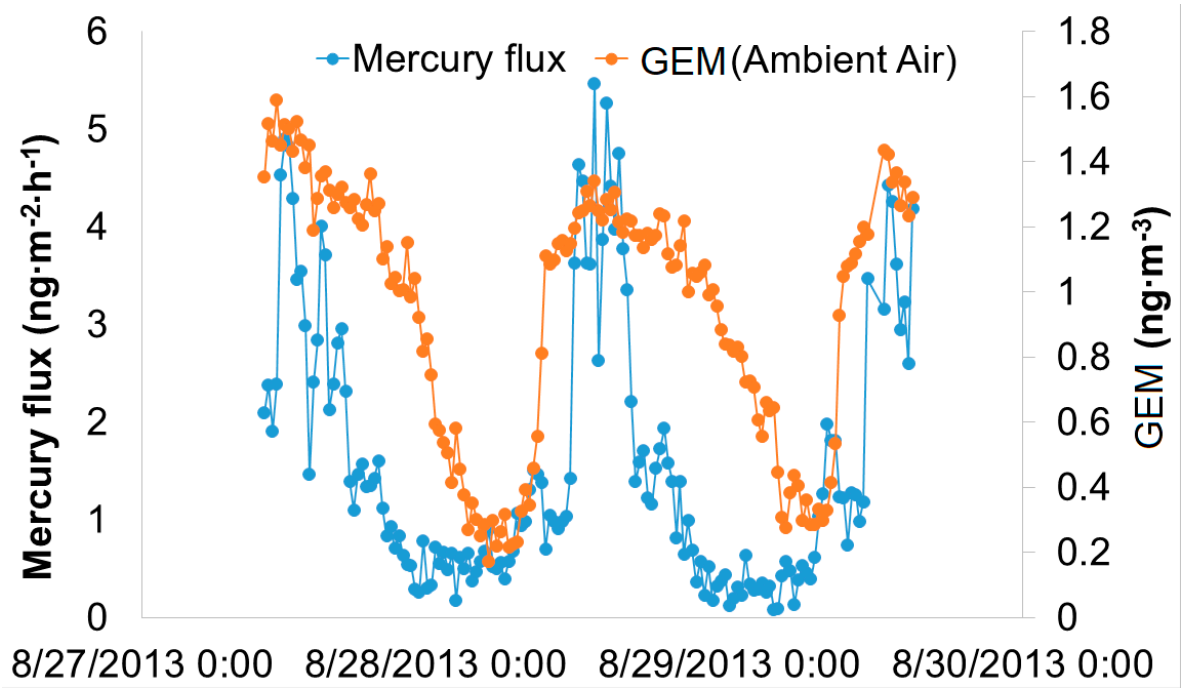

Figure S1. Gaseous elemental mercury (GEM) fluxes and GEM ambient air concentrations over agricultural soil from Lafayette County, Mississippi.