Title: Characterizing the oxygen isotopic composition of phosphate sources to aquatic ecosystems

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Table S1. $\delta^{18}O_p$ of solid, semi-solid, and leachate potential phosphate sources

Sample	Percent PO_4 in material	$\delta^{18}O_p$ (‰)
Chemical fertilizers		
Brand 1 tomato food	18	22.3
Brand 1 lawn food	6	15.5
Brand 2 starter plus	10	17.2
Brand 3 greens fertilizer		22.3
Semi-processed fertilizer ore, Israel		
Phosphorite Ore 1		19.3
Phosphorite Ore 2		18.2
Processing step 1		19.6
Processing step 2		21.6
Processing step 3		21.3
Final product 1		19.0
Final product 2		21.6
Final product 3		19.8
Aerosol samples, Israel		
Deploy 1		14.2
Deploy 2		24.9
Deploy 8		22.3
Detergents		
Brand 1 gel	4.0	15.5
Brand 1 tablets	8.0	18.0
Brand 1 original powder	7.4	16.8

Brand 2 powder	4.5	17.8
Brand 3 gel	4.3	17.5
Brand 4 liquid	6.5	18.6
Brand 4 tablets	8.7	13.3
Toothpaste		
Brand 1 cavity protection	0.76	17.7
Soil Leachate		
Arka, Israel		18.5 ± 0.6
(avg. of 5 soil samples)		
Feces Leachates		
Dog feces		15.7
Goose feces		18.3

Percent PO_4 in material was obtained from the product labels.

Combined sampling and analytical error for all samples is 0.4 ‰

Table S2. $\delta^{18}O_p$ of water soluble phosphate from vegetation leachates.

Plant Sample	Condition	$\delta^{18}O_p$ (‰)	Average $\delta^{18}O_p$(‰)± SD
Cedar	Live	16.2	16.5 ± 0.55
	Dead	17.1	
	Decayed	16.1	
Cinaquapin Bush	Live	17.2	18.2 ± 1.18
	Dead	19.5	
	Decayed	17.9	
Jeffrey Pine	Live	20	17.2 ± 2.43
	Dead	15.9	
	Decayed	15.7	
Lodgepole Pine	Live	14.5	15.0 ± 1.04
	Dead	14.3	
	Decayed	16.2	
Manzanita	Live	17.3	15.5 ± 1.63
	Dead	14.2	
	Decayed	14.9	
Red Fir	Live	23.1	18.5 ± 4.06
	Dead	16.8	
	Decayed	15.5	
Squaw Carpet	Live	17.1	17.7 ± 1.40
	Dead	19.3	
	Decayed	16.7	
Sugarpine	Live	16.7	16.8 ± 1.55
	Dead	18.4	
	Decayed	15.3	

Plant Sample	Condition	$\delta^{18}O_p$ (‰)	Average $\delta^{18}O_p$(‰)± SD
White Fir	Live	16.6	15.6 ± 1.17
	Dead	15.8	
	Decayed	14.3	

Table S3. δ^{18}Op of waste water treatment plant samples

Treatment Plant	Sample Date	Treatment Stage	$\delta^{18}O_p$(‰)	offset from predicted equilibrium** (‰)
Bay Area*	10/28/2005	final effluent	8.4	0.1
Bay Area	10/29/2005	final effluent	11.1	-1.5
Bay Area	10/29/2005	final effluent	9.1	-0.6
Bay Area	1/11/2006	Primary effluent	14.2	-1.9
Bay Area	1/11/2006	Activated sludge	12.7	0.2
Bay Area	1/11/2006	Secondary effluent	12.5	0.3
Bay Area	1/11/2006	Dual filtration	12.5	0.4
Bay Area	1/11/2006	Chlorinated	12.3	0.5
Bay Area	1/11/2006	Final effluent	12.3	0.5
Idaho WWTP 1	6/28/2007	Final effluent	8.7	-4.0
Idaho WWTP 2	6/28/2007	Final effluent	9.0	-4.2
Ohio WWTP	7/14/2008	Final effluent	13.6	-0.9

*All Bay Area WWTP samples are from the same WWTP located in the San Francisco Bay Area, California

**Reported as the measured $\delta^{18}O_p$ minus the predicated equilibrium value calculated using the equation $T(°C) = 111.4 – 4.3 (\delta^{18}O_p - \delta^{18}O_w)$ (Longinelli and Nuti 1973).

Table S4. $\delta^{18}O_p$ values for various fresh water samples.

Location	Date	$\delta^{18}O_p$(‰)	$\delta^{18}O_w$(‰)	offset from predicted equilibrium* (‰)
San Joaquin River Mainstem				
SJR River Mile 56.2	8/31/2006	13.3	-11.7	4.3
SJR River Mile 56.2	11/9/2006	12.5	-11.0	1.1
SJR River Mile 72.2	11/9/2006	10.6	-10.8	-1.1
SJR River Mile 77.4	11/9/2006	10.9	-10.7	-0.7
SJR River Mile 99.4	11/9/2006	12.9	-10.0	0.6
SJR River Mile 108.6	11/9/2006	14.0	-10.2	1.9
SJR River Mile 125.1	11/9/2006	11.8	-9.8	1.4
SJR River Mile 131.9	11/2/2006	13.3	-11.3	2.1
SJR River Mile 131.9	11/9/2006	12.8	-10.8	1.2
Tributaries to San Joaquin River				
French Camp Slough	11/9/2006	12.4	-10.9	1.2
Miller Lake	8/31/2006	12.0	-11.0	2.7
Tuolumne River	8/31/2006	12.4	-12.4	3.9
Tuolumne River	11/9/2006	11.5	-12.2	1.1
Harding Drain	8/31/2006	9.5	-11.5	0.2
Marshall Road Drain	8/31/2006	13.8	-10.7	3.6
Orestimba Creek	8/31/2006	14.3	-9.7	2.9
Merced River	11/9/2006	9.2	-12.5	-0.8
Los Banos Creek	11/2/2006	15.2	-9.0	2.0
Mud Slough	11/2/2006	16.4	-8.3	2.6
Mud Slough upstream	11/2/2006	15.5	-8.5	1.8
Salt Slough	11/2/2006	15.1	-9.2	1.9

Location	Date	$\delta^{18}O_p$(‰)	$\delta^{18}O_w$(‰)	offset from predicted equilibrium* (‰)
Volta Wasteway	11/2/2006	11.8	-11.0	0.8
Ground Water near San Joaquin River				
Newman East Well 14.5 ft	9/6/2006	20.5	-10.28	0.7
Newman East Well 107.5 ft	9/6/2006	22.4	-7.84	-3.2
Tributaries to Lake Tahoe				
Blackwood Creek	12/02/06	9.2	-13.4	-3.2
Trout Creek	12/02/06	11.3	-15.4	1.1
Upper Truckee River	12/02/06	12.1	-13.6	0.1
Ward Creek	12/02/06	9.8	-13.7	-1.9
Tributaries to Lake Erie				
Chagrin River mouth	6/29/2006	12.4	-7.0	-2.2
Chagrin River mouth	10/4/2006	13.3	-7.9	-0.9
Cuyahoga River mouth	8/4/2005	12.3	-7.0	-0.2
Cuyahoga River mouth	6/29/2006	12.8	-6.9	-0.9
Cuyahoga River mouth	10/4/2006	12.2	-7.6	-2.1
Detroit River mouth	6/28/2006	10.5	-6.4	-4.0
Detroit River mouth	10/2/2006	11.7	-7.9	-2.8
Detroit River mouth	10/3/2006	11.7	-6.7	-4.0
Grand River mouth	6/29/2006	12.8	-6.6	-1.4
Maumee River mouth	8/2/2005	10.5	-6.5	-2.1
Raisin River mouth	6/28/2006	12.1	-6.6	-1.7
St. Clair River mouth	10/2/2006	15.2	-6.6	-0.6

* Reported as the measured $\delta^{18}O_p$ minus the predicated equilibrium value calculated using the equation $T(°C) = 111.4 – 4.3 (\delta^{18}O_p - \delta^{18}O_w)$ (Longinelli and Nuti 1973).