

Supplemental Tables 1-5.

Supplemental Figures 1-10

Supplemental Table 1. Summary of data for Dzombak & Sheldon, 2020.

Dataset	Total n	Horizons	Orders	Bulk geochemistry	Fe species	Clay content	Vegetation	Drainage	Soil moisture	Parent material
Dzombak and Sheldon	404	O, A, E, B (n=247), C, R	Entisols, Inceptisols, Alfisols, Ultisols, Oxisols, Aridisols, Andisols, Mollisols, Spodosols, Gelisols	yes	yes	yes	yes	yes	yes	yes
Smith et al., 2014	4857	Top 4 cm, A, C	N.D.	yes	no	yes ¹	yes	no	no	no

¹ Excluding 'Top 5 cm' horizon.

Supplemental Table 2. Sample information for samples used in creating new dataset. Samples came from University of Michigan labs (Sheldon, Cory), the NRCS Kellogg Soil Survey Lab (KSSL), or Polar Rock Repository (PRR). USDA soil series can be queried at <https://soilseries.sc.egov.usda.gov/osdname.aspx>. PRISM climate data can be accessed at <https://prism.oregonstate.edu/normals/>.

Sample ID	Latitude	Longitude	USDA Soil series	Order	Horizon	Parent material	Drainage ¹	Vegetation	Moisture regime	MAP (mm/yr) ²	Sample source	Climate data source	
¹ 0= poorly drained, 1=moderately poorly drained, 2=moderately well drained, 3=well drained, 4=excessively well drained													
² USDA soil series use 30-year averages, 1981-2010.													
³ Sources for select climate data: Jonsdottir et al., 2008 (average data for 1961-2000) and https://en.vedur.is/weather/articles/bigimg/1625?ListID=0 (1971-2000).													
Jónsdóttir, J.F.; Uvo, C.B.; Clarke, R.T. Trend analysis. In Icelandic discharge, temperature and precipitation series by parametric methods. <i>Hydrology Research</i> , 2008, 39, 425-436.													
C-1-15	30.201994	4	95.8580556	Katy	Alfisol	A	loam	2	Forest	Udic	1020	Sheldon lab	USDA Soil Series Page
C-1-65	30.201994	4	95.8580556	Katy	Alfisol	Bt	loam	2	Forest	Udic	1020	Sheldon lab	USDA Soil Series Page
C-1.5-15	30.201994	4	95.8580556	Katy	Alfisol	A	loam	2	Forest	Udic	1020	Sheldon lab	USDA Soil Series Page
C-1.5-35	30.201994	4	95.8580556	Katy	Alfisol	A	loam	2	Forest	Udic	1020	Sheldon lab	USDA Soil Series Page
C-2-17	32.488611	1	94.3458333	Bernaldo	Alfisol	Bt	loam	3	Forest	Udic	1118	Sheldon lab	USDA Soil Series Page
C-2-57	32.488611	1	94.3458333	Bernaldo	Alfisol	Bt	loam	3	Forest	Udic	1118	Sheldon lab	USDA Soil Series Page
C-3-13	33.7675	89.8463889	Loring	Alfisol	Bt	loess	2	Developed forest	Udic	1257	Sheldon lab	USDA Soil Series Page	
C-4-10	36.074166	7	89.4586111	Memphis	Alfisol	Bt	loess	3	Forest	Udic	1245	Sheldon lab	USDA Soil Series Page
C-4-20	36.074166	7	89.4586111	Memphis	Alfisol	Bt	loess	3	Forest	Udic	1245	Sheldon lab	USDA Soil Series Page
C-5-24	37.557492	86.938583	Wellston	Alfisol	Bt	loess	3	Forest	Udic	1016	Sheldon lab	USDA Soil Series Page	
C-5.5-20	37.557492	86.938583	Wellston	Alfisol	BE	loess	3	Forest	Udic	1016	Sheldon lab	USDA Soil Series Page	
C-6-11	39.507031	85.160228	Bonnell	Alfisol	Bt	loess	3	Forest	Udic	1067	Sheldon lab	USDA Soil Series Page	
C-6-61	39.507031	85.160228	Bonnell	Alfisol	Bt	loess	3	Forest	Udic	1067	Sheldon lab	USDA Soil Series Page	
C-7-13	41.707575	85.011494	Wawasee	Alfisol	E	till	3	Forest	Udic	940	Sheldon lab	USDA Soil Series Page	

C-7-43	41.707575	85.011494	Wawasee	Alfisol	Bt	till	3	Forest Grasslan	Udic	940	Sheldon lab	USDA Soil Series Page
MS-2	46.4923	109.8419	Musselshell	Inceptisol	B	loam	3	d	Ustic	305	Sheldon lab	USDA Soil Series Page
MS-6	46.4923	109.8419	Musselshell	Inceptisol	B	loam	3	Grasslan d	Ustic	305	Sheldon lab	USDA Soil Series Page
MS-10	46.4923	109.8419	Musselshell	Inceptisol	B	loam	3	Grasslan d	Ustic	305	Sheldon lab	USDA Soil Series Page
MS-13	46.4923	109.8419	Musselshell	Inceptisol	B	loam	3	Grasslan d	Ustic	305	Sheldon lab	USDA Soil Series Page
MS-18	46.4923	109.8419	Musselshell	Inceptisol	B	loam	3	Grasslan d	Ustic	305	Sheldon lab	USDA Soil Series Page
MS-22	46.4923	109.8419	Musselshell	Inceptisol	B	loam	3	Grasslan d	Ustic	305	Sheldon lab	USDA Soil Series Page
ENC-5	35.953889	105.925278	Encantado	Inceptisol	Bk	granite	4	Cultivate d	Ustic	355	Sheldon lab	USDA Soil Series Page
ENC-40	35.953889	105.925278	Encantado	Inceptisol	BCK	granite	4	Cultivate d	Ustic	355	Sheldon lab	USDA Soil Series Page
MONT-1-15	36.391944	105.903056	Montecito	Aridosol	Btk	loam	3	Shrublan d	Ustic	355	Sheldon lab	USDA Soil Series Page
MONT-1-40	36.391944	105.903056	Montecito	Aridosol	Bk	loam	3	Shrublan d	Ustic	355	Sheldon lab	USDA Soil Series Page
CL-40	43.833972	97.992861	Clarno	Mollisol	Bk	clay	1	Cultivate d	Ustic	558	Sheldon lab	USDA Soil Series Page
CL-45	43.833972	97.992861	Clarno	Mollisol	Bk	clay	1	Cultivate d	Ustic	558	Sheldon lab	USDA Soil Series Page
DAV-0	43.764556	98.0275	Davison	Mollisol	A	till	1	Cultivate d	Aquic	584	Sheldon lab	USDA Soil Series Page
DAV-30	43.764556	98.0275	Davison	Mollisol	Bk	till	1	Cultivate d	Aquic	584	Sheldon lab	USDA Soil Series Page
KR1-50	44.427528	96.783778	Kranzburg	Mollisol	Bw Bw/B	clay	3	Cultivate d	Udic	558	Sheldon lab	USDA Soil Series Page
KR1-60	44.427528	96.783778	Kranzburg	Mollisol	k	clay	3	Cultivate d	Udic	558	Sheldon lab	USDA Soil Series Page
KR2-10	44.427528	96.783778	Kranzburg	Mollisol	A Bw/B	clay	3	Cultivate d	Udic	558	Sheldon lab	USDA Soil Series Page
KR2-40	44.427528	96.783778	Kranzburg	Mollisol	k	clay	3	Cultivate d	Udic	558	Sheldon lab	USDA Soil Series Page
AC-2	35.481972	112.175	Aut/Cross	Mollisol	Bk	alluvium	3	Grasssla nd	Ustic	558	Sheldon lab	USDA Soil Series Page
SL1-0	44.696583	95.322806	Swanlake	Mollisol	A	till	3	Grasslan d,	Udic	640	Sheldon lab	USDA Soil Series Page

SL1-50	44.696583	95.322806	Swanlake	Mollisol	Bk	till	3	cultivate d Grasslan d, cultivate d Grasslan d, cultivate d Grasslan d, cultivate d Shrublan d	Udic	640	Sheldon lab	USDA Soil Series Page
sl3-50	44.696583	95.322806	Swanlake	Mollisol	Bk	till	3	d Grasslan d, cultivate d Grasslan d, cultivate d Shrublan d	Udic	640	Sheldon lab	USDA Soil Series Page
SL3-60	44.696583	95.322806	Swanlake	Mollisol	Bk	till	3	d Shrublan d	Udic	640	Sheldon lab	USDA Soil Series Page
PL2-5	37.023333	103.9075	Plughat	Mollisol	Bt	loess	3	d Shrublan d	Ustic	381	Sheldon lab	USDA Soil Series Page
PL2-35	37.023333	103.9075	Plughat	Mollisol	Bk	loess	3	d Shrublan d	Ustic	381	Sheldon lab	USDA Soil Series Page
MOM-1	33.685	111.927	Momoli	Aridosol	Bk	alluvium	4	d Shrublan d	Aridic	301	Sheldon lab	USDA Soil Series Page
MOM-2	33.685	111.927	Momoli	Aridosol	Bk	alluvium	4	d Shrublan d	Aridic	301	Sheldon lab	USDA Soil Series Page
TS-6	32.206333	110.994917	Delthorny	Aridosol		colluvium	3	d Shrublan d	Aridic	279	Sheldon lab	USDA Soil Series Page
TS-10	32.206333	110.994917	Delthorny	Aridosol		colluvium	3	d Shrublan d	Aridic	279	Sheldon lab	USDA Soil Series Page
GS7	32.814556	112.136333	Cipriano	Aridosol		alluvium	3	d Cultivate d	Aridic	232	Sheldon lab	USDA Soil Series Page
CL-45 un	43.833972	97.992861	Clarno	Mollisol	Bk	clay	1	d Cultivate d	Ustic	558	Sheldon lab	USDA Soil Series Page
DAV-30 un	43.764556	98.0275	Davison	Mollisol	Bk	clay	1	d Cultivate d	Aquic	584	Sheldon lab	USDA Soil Series Page
ENC-5 un	35.953889	105.925278	Encantado	Inceptisol	Bk	granite	4	d Shrublan d	Ustic	355	Sheldon lab	USDA Soil Series Page
MONT-1-40 un	36.391944	105.903056	Montecito	Aridosol	Bk	loam	3	d Cultivate d	Ustic	355	Sheldon lab	USDA Soil Series Page
KR1-60 un	44.427528	96.783778	Kranzburg	Mollisol	Bw	clay	3	d Grasslan d, cultivate d	Udic	558	Sheldon lab	USDA Soil Series Page
SL1-50 un	44.427528	96.783778	Swanlake	Mollisol	Bk	sand	3	d	Udic	640	Sheldon lab	USDA Soil Series Page

SL3-60 un	44.427528	96.783778	Swanlake	Mollisol	Bk	sand	3	Grassland, cultivated	Udic	640	Sheldon lab	USDA Soil Series Page
KR2-10 un	44.427528	96.783778	Kranzburg	Mollisol	A	clay	3	Cultivated	Udic	558	Sheldon lab	USDA Soil Series Page
USAL	39.55	123.4384	Usal	Mollisol	B	sandstone	3	Forest	Udic	1270	Sheldon lab	USDA Soil Series Page
COH	40.0982	122.1746	Cohasset	Alfisol	B	volcanic	3	Forest	Xeric	1321	Sheldon lab	USDA Soil Series Page
MIN	40.6329	123.0623	Minersville	Inceptisol	B	granitic colluvium	0		Xeric	1524	Sheldon lab	USDA Soil Series Page
HODA	39.1347	121.171	Hoda	Alfisol	B	granodiorite	3	Forest Shrubland	Xeric	1524	Sheldon lab	USDA Soil Series Page
BLCK	43.2429	124.1057	Blacklock	Spodosol	B	sand igmet	0	d	Aquic	1778	Sheldon lab	USDA Soil Series Page
STG	39.9927	120.8039	Stagpoint	Ultisol	B	colluvium	3	Forest	Ustic	1981	Sheldon lab	USDA Soil Series Page
PUTT	39.0916	120.8039	Putt	Inceptisol	B	glacial	2	Forest	Xeric	1524	Sheldon lab	USDA Soil Series Page
TINK	39.2694	121.018	Tinker	Inceptisol	B	glacial	2	Forest Forest/ag	Udic	1651	Sheldon lab	USDA Soil Series Page
LOR	39.2694	121.018	Lorack	Alfisol	B	glacial igmet	3	riculture	Xeric	1778	Sheldon lab	USDA Soil Series Page
DEJ	39.9927	120.8039	Dejonah	Ultisol	B	colluvium	3	Forest	Ustic	1969	Sheldon lab	USDA Soil Series Page
IP	40.745	123.8695	Ishi Pishi	Alfisol	B	ultramafic	3	Forest	Xeric	1905	Sheldon lab	USDA Soil Series Page
PA	39.55	123.4384	Pardaloe	Inceptisol	B	silt			Xeric	1520	Sheldon lab	USDA Soil Series Page
PT-60	44.519389	97.08075	Poinsett	Mollisol	Bw	loess	3	Grassland	Udic	559	Sheldon lab	USDA Soil Series Page
NUN-1-0	40.243	105.224972	Nunn	Mollisol	A	loess	3	Grassland, cultivated	Ustic	356	Sheldon lab	USDA Soil Series Page
NUN-1-60	40.243	105.224972	Nunn	Mollisol	Bk	loess	3	Grassland, cultivated	Ustic	356	Sheldon lab	USDA Soil Series Page
NUN-2-35	40.243	105.224972	Nunn	Mollisol	Btk	loess	3	Grassland, cultivated	Ustic	356	Sheldon lab	USDA Soil Series Page
NUN-2-50	40.243	105.224972	Nunn	Mollisol	Bk	loess	3	d, Grassland	Ustic	356	Sheldon lab	USDA Soil Series Page

TR-10	34.441667	106.427222	Hassell	Aridosol	A/Bt	redbed siltstone	3	cultivate d Shrublan	Aridic	356	Sheldon lab	USDA Soil Series Page
TR-60	34.441667	106.427222	Hassell	Aridosol	Btk	redbed siltstone	3	d Shrublan	Aridic	356	Sheldon lab	USDA Soil Series Page
TR-80	34.441667	106.427222	Hassell	Aridosol	By	redbed siltstone	3	d Shrublan	Aridic	356	Sheldon lab	USDA Soil Series Page
SC-0	34.649389	106.343194	Witt	Aridosol	A	eolian	3	d Shrublan	Aridic	280	Sheldon lab	USDA Soil Series Page
SC-20	34.649389	106.343194	Witt	Aridosol	Btk	eolian	3	d Shrublan	Aridic	280	Sheldon lab	USDA Soil Series Page
SC-40	34.649389	106.343194	Witt	Aridosol	Bk	eolian	3	d Shrublan	Aridic	280	Sheldon lab	USDA Soil Series Page
SC-80	34.649389	106.343194	Witt	Aridosol	C	eolian	3	d Shrublan	Aridic	280	Sheldon lab	USDA Soil Series Page
PK-1-5	35.513889	106.113333	Panky	Aridosol	Bt	alluvium	3	d Develope	Aridic	280	Sheldon lab	USDA Soil Series Page
PK-1-20	35.513889	106.113333	Panky	Aridosol	Bk	alluvium	3	d Develope	Aridic	280	Sheldon lab	USDA Soil Series Page
PK-1-40	35.513889	106.113333	Panky	Aridosol	Bk	alluvium	3	d Develope	Aridic	280	Sheldon lab	USDA Soil Series Page
PK-2-5	35.513889	106.113333	Panky	Aridosol	Bt	alluvium	3	d Shrublan	Aridic	280	Sheldon lab	USDA Soil Series Page
PET-30	36.362444	105.851956	Petaca	Aridisol		basaslt	3	d Shrublan	Aridic	559	Sheldon lab	USDA Soil Series Page
PET-40	36.362444	105.851956	Petaca	Aridisol		basalt	3	d Cultivate	Aridic	559	Sheldon lab	USDA Soil Series Page
OM-1-20	44.452056	94.732083	Omsrud	Mollisol	Bk	till	3	d Cultivate	Udic	711	Sheldon lab	USDA Soil Series Page
OM-1-30	44.452056	94.732083	Omsrud	Mollisol	Bk	till	3	d Cultivate	Udic	711	Sheldon lab	USDA Soil Series Page
OM-1-70	44.452056	94.732083	Omsrud	Mollisol	C	till	3	d Cultivate	Udic	711	Sheldon lab	USDA Soil Series Page
BU-1-40	44.455194	97.003278	Buse	Mollisol	Bk	till	3	d Cultivate	Udic	500	Sheldon lab	USDA Soil Series Page
BU-1-50	44.455194	97.003278	Buse	Mollisol	Bk	till	3	d Grasslan	Udic	500	Sheldon lab	USDA Soil Series Page
HET-0	44.323389	97.434028	Hetland	Mollisol	A	lacustrine	3	d/agricul ture	Udic	584	Sheldon lab	USDA Soil Series Page

HET-10	44.323389	97.434028	Hetland	Mollisol	Bt	lacustrine	3	Grassland/agriculture	Udic	584	Sheldon lab	USDA Soil Series Page
HET-20	44.323389	97.434028	Hetland	Mollisol	Bt	lacustrine	3	Grassland/agriculture	Udic	584	Sheldon lab	USDA Soil Series Page
HET-30	44.323389	97.434028	Hetland	Mollisol	Bk	lacustrine	3	Grassland/agriculture	Udic	584	Sheldon lab	USDA Soil Series Page
HET-40	44.323389	97.434028	Hetland	Mollisol	Bk	lacustrine	3	Grassland/agriculture	Udic	584	Sheldon lab	USDA Soil Series Page
HET-50	44.323389	97.434028	Hetland	Mollisol	C	lacustrine	3	Grassland/agriculture	Udic	584	Sheldon lab	USDA Soil Series Page
HET-60	44.323389	97.434028	Hetland	Mollisol	C	lacustrine	3	Grassland/agriculture	Udic	584	Sheldon lab	USDA Soil Series Page
HET-70	44.323389	97.434028	Hetland	Mollisol	C	lacustrine	3	Grassland/agriculture	Udic	584	Sheldon lab	USDA Soil Series Page
HET-80	44.323389	97.434028	Hetland	Mollisol	C	lacustrine	3	Grassland/agriculture	Udic	584	Sheldon lab	USDA Soil Series Page
BT-30	43.814833	98.029083	Betts	Inceptisol	Bw	till	3	Grassland	Ustic	533	Sheldon lab	USDA Soil Series Page
BT-45	43.814833	98.029083	Betts	Inceptisol	Bk	till	3	Grassland	Ustic	533	Sheldon lab	USDA Soil Series Page
ENC-10	35.953889	105.925278	Encantado	Inceptisol	Bk	granite	4	Cultivated	Ustic	355	Sheldon lab	USDA Soil Series Page
ENC-15	35.953889	105.925278	Encantado	Inceptisol	Bk	granite	4	Cultivated	Ustic	355	Sheldon lab	USDA Soil Series Page
ENC-20	35.953889	105.925278	Encantado	Inceptisol	Bk	granite	4	Cultivated	Ustic	355	Sheldon lab	USDA Soil Series Page
ENC-30	35.953889	105.925278	Encantado	Inceptisol	BCK	granite	4	Cultivated	Ustic	355	Sheldon lab	USDA Soil Series Page
ENC-40	35.953889	105.925278	Encantado	Inceptisol	BCK	granite	4	Cultivated	Ustic	355	Sheldon lab	USDA Soil Series Page
ENC-50	35.953889	105.925278	Encantado	Inceptisol	BCK	granite	4	Cultivated	Ustic	355	Sheldon lab	USDA Soil Series Page
ENC-60	35.953889	105.925278	Encantado	Inceptisol	C	granite	4	Cultivated	Ustic	355	Sheldon lab	USDA Soil Series Page

PC-40	37.023333	103.9075	Plughat	Mollisol	Bk	alluvium	3	Shrubland d	Ustic	381	Sheldon lab	USDA Soil Series Page
PC-85	37.023333	103.9075	Plughat	Mollisol	R	alluvium	3	Shrubland d	Ustic	381	Sheldon lab	USDA Soil Series Page
PL2-0	37.023333	103.9075	Plughat	Mollisol	A	alluvium	3	Shrubland d	Ustic	381	Sheldon lab	USDA Soil Series Page
PL2-10	37.023333	103.9075	Plughat	Mollisol	Bt	alluvium	3	Shrubland d	Ustic	381	Sheldon lab	USDA Soil Series Page
SL-1-50	44.696583	95.322806	Swanlake	Mollisol	Bk	clay	3	Cultivate d	Udic	711	Sheldon lab	USDA Soil Series Page
DAV-30	43.764556	98.0275	Davison	Mollisol	Bk	clay	1	Cultivate d	Aquic	584	Sheldon lab	USDA Soil Series Page
TS-6	32.206333	110.994917	Delthorny	Aridosol		alluvium			Aridic	152	Sheldon lab	USDA Soil Series Page
TS-10	32.206333	110.994917	Delthorny	Aridosol		alluvium redbed			Aridic	152	Sheldon lab	USDA Soil Series Page
Tr-0	34.441667	106.427222	Hassell	Aridosol	A	siltstone redbed	3	Shrubland d	Aridic	356	Sheldon lab	USDA Soil Series Page
TR-10	34.441667	106.427222	Hassell	Aridosol	A/Bt	siltstone redbed	3	Shrubland d	Aridic	356	Sheldon lab	USDA Soil Series Page
TR-20	34.441667	106.427222	Hassell	Aridosol	Bt	siltstone redbed	3	Shrubland d	Aridic	356	Sheldon lab	USDA Soil Series Page
TR-30	34.441667	106.427222	Hassell	Aridosol	Bt	siltstone redbed	3	Shrubland d	Aridic	356	Sheldon lab	USDA Soil Series Page
TR-40	34.441667	106.427222	Hassell	Aridosol	Bt	siltstone redbed	3	Shrubland d	Aridic	356	Sheldon lab	USDA Soil Series Page
TR-60	34.441667	106.427222	Hassell	Aridosol	Btk	siltstone redbed	3	Shrubland d	Aridic	356	Sheldon lab	USDA Soil Series Page
TR-70	34.441667	106.427222	Hassell	Aridosol	By	siltstone redbed	3	Shrubland d	Aridic	356	Sheldon lab	USDA Soil Series Page
TR-80	34.441667	106.427222	Hassell	Aridosol	By	siltstone	3	Shrubland d	Aridic	356	Sheldon lab	USDA Soil Series Page
SC-0	34.649389	106.343194	Witt	Aridosol	A	eolian	3	Shrubland d	Aridic	280	Sheldon lab	USDA Soil Series Page
SC-20	34.649389	106.343194	Witt	Aridosol	Btk	eolian	3	Shrubland d	Aridic	281	Sheldon lab	USDA Soil Series Page
SC-30	34.649389	106.343194	Witt	Aridosol	Bk	eolian	3	Shrubland d	Aridic	282	Sheldon lab	USDA Soil Series Page
SC-40	34.649389	106.343194	Witt	Aridosol	Bk	eolian	3	Shrubland d	Aridic	283	Sheldon lab	USDA Soil Series Page
SC-50	34.649389	106.343194	Witt	Aridosol	Bk	eolian	3	Shrubland d	Aridic	283	Sheldon lab	USDA Soil Series Page
SC-60	34.649389	106.343194	Witt	Aridosol	C	eolian	3	Shrubland d	Aridic	283	Sheldon lab	USDA Soil Series Page

SC-80	34.649389	106.343194	Witt	Aridosol	C	aeolian	3	Shrubland	Aridic	283	Sheldon lab	USDA Soil Series Page
SC-85	34.649389	106.343194	Witt	Aridosol	C	aeolian	3	Shrubland	Aridic	283	Sheldon lab	USDA Soil Series Page
USDA-01	20.80519	-156.2473	Amalu	Inceptisol	B	aeolian, volcanic	1	Forest	Aquic	3000	NRCS KSSL	USDA Soil Series Page
USDA-02	18.31278	-66.815	Moteado	Oxisol	B	colluvium volcanic	0	Forest	Aquic	5080	NRCS KSSL	USDA Soil Series Page
USDA-03			Littleton	Andisol	B	ash	3	Forest	Udic	2500	NRCS KSSL	USDA Soil Series Page
USDA-04			Tinker	Inceptisol	B	glacial	2	Forest	Udic	1651	NRCS KSSL	USDA Soil Series Page
USDA-05	18.31306	-65.82417	Yunque	Oxisol	B	colluvium	2	Forest	Udic	4699	NRCS KSSL	USDA Soil Series Page
USDA-06	18.12558	-66.97467	Nipe	Oxisol	B	sepiolitic volcanic	3	Developed	Udic	1448	NRCS KSSL	USDA Soil Series Page
USDA-07			Klaus	Spodosol	B	ash	3	Forest	Ustic	2032	NRCS KSSL	USDA Soil Series Page
USDA-08			Samsriver	Spodosol	B	till volcanic	2	Forest	Aquic	4826	NRCS KSSL	USDA Soil Series Page
USDA-09			Owyhigh	Spodosol	B	ash	3	Forest	Udic	2200	NRCS KSSL	USDA Soil Series Page
USDA-10	19.90853	-155.1916			B						NRCS KSSL	
USDA-11			Solleks	Andisol	B	colluvium	3	Forest Shrubland	Udic Perudic	3048	NRCS KSSL	USDA Soil Series Page
USDA-12	22.06824	-159.398	Halii	Oxisol	B	basalt	2			3810	NRCS KSSL	USDA Soil Series Page
USDA-13	20.08217	-155.6723			B					2012	NRCS KSSL	USDA Soil Series Page
USDA-14	18.31222	-65.815			B					2317	NRCS KSSL	USDA Soil Series Page
USDA-15	19.963	-155.3324			B					4671	NRCS KSSL	USDA Soil Series Page
USDA-16	20.80422	-156.2022	Olinda	Andisol	B	basalt, ash volcanic s,	3	shrubland/forest	Ustic Perudic	1270	NRCS KSSL	USDA Soil Series Page
USDA-17	9.473056	138.0583	Yap	Oxisol	B	tuff	3	Forest/agriculture		3099	NRCS KSSL	USDA Soil Series Page
USDA-18			Sorethumb	Andisol	B	colluvium	3	Forest	Udic	2794	NRCS KSSL	USDA Soil Series Page
USDA-19			Lorack?	Alfisol	B	glacial	3	Forest	Xeric	1778	NRCS KSSL	USDA Soil Series Page
USDA-20	19.80112	-155.1523			B					2186	NRCS KSSL	USDA Soil Series Page
USDA-21	22.14782	-159.6144	NA	Inceptisol	B					1334	NRCS KSSL	USDA Soil Series Page
USDA-22	20.02658	-155.3206			B						NRCS KSSL	
USDA-23			Kydaka	Inceptisol	B	glacial	0	Forest	Aquic	2159	NRCS KSSL	USDA Soil Series Page

USDA-24	6.955278	158.2142	Umpump	Oxisol	B	basalt	2	Agriculture	Udic	4699	NRCS KSSL	USDA Soil Series Page
USDA-25	40.745	123.8695	Ishi Pishi	Alfisol	B	ultramafic	3	Forest	Xeric	1905	NRCS KSSL	USDA Soil Series Page
STD55				Alfisol		till		Forest shrubland -			Sheldon lab	
USDA-26	37.15664	-114.4369	Cave	Aridisol	Bk	alluvium	3	grazing shrubland -	Aridic	196	NRCS KSSL	USDA Soil Series Page
USDA-27	37.15664	-114.4369	Cave	Aridisol	Bkqm	alluvium	3	grazing shrubland -	Aridic	113	NRCS KSSL	USDA Soil Series Page
USDA-28	36.26582	-115.2056	Las Vegas	Aridisol	B	alluvium	3	grazing shrubland -	Aridic	113	NRCS KSSL	USDA Soil Series Page
USDA-29	36.26582	-115.2056	Las Vegas	Aridisol	Bk	alluvium	3	grazing shrubland -	Aridic	113	NRCS KSSL	USDA Soil Series Page
USDA-30	36.26582	-115.2056	Las Vegas	Aridisol	Bkm	alluvium	3	grazing woodland/cropland	Aridic	1265	NRCS KSSL	USDA Soil Series Page
USDA-31	48.94314	-122.3518	Blainegate	Mollisol	Bg	marine terrace	0	woodland/cropland	Aquic	1265	NRCS KSSL	USDA Soil Series Page
USDA-32	48.94314	-122.3518	Blainegate	Mollisol	Bg	marine terrace	0	woodland/cropland shrubland	Aquic	312	NRCS KSSL	USDA Soil Series Page
USDA-33	40.16627	-120.0313	Epot	Aridisol	Btn	lacustrine	3	d shrubland	Aridic	312	NRCS KSSL	USDA Soil Series Page
USDA-34	40.16627	-120.0313	Epot	Aridisol	Btkn	lacustrine	3	d shrubland	Aridic	312	NRCS KSSL	USDA Soil Series Page
USDA-35	40.16627	-120.0313	Epot	Aridisol	Bcn	lacustrine	3	d shrubland	Aridic	312	NRCS KSSL	USDA Soil Series Page
USDA-36	40.16627	-120.0313	Epot	Aridisol	Byn	lacustrine	3	d shrubland	Aridic	312	NRCS KSSL	USDA Soil Series Page
USDA-37	40.16627	-120.0313	Epot	Aridisol	Byn	lacustrine	3	d shrubland grassland/shrubland	Aridic	317	NRCS KSSL	USDA Soil Series Page
USDA-38	47.83455	-119.8428	Chelan	Mollisol	Bw	loess, ash	3	and woodland	Xeric	884	NRCS KSSL	USDA Soil Series Page
USDA-39	47.8551	-120.6904	Choralmont	Andisol	Bw	ash	3	d woodland	Xeric	884	NRCS KSSL	USDA Soil Series Page
USDA-40	47.8551	-120.6904	Choralmont	Andisol	Bw	volcanic ash	3	d woodland	Xeric	884	NRCS KSSL	USDA Soil Series Page

USDA-41	47.8551	-120.6904	Choralmont	Andisol	Bw	volcanic ash	3	woodland	Xeric	884	NRCS KSSL	USDA Soil Series Page
USDA-42	47.8551	-120.6904	Choralmont	Andisol	Bw	volcanic ash	3	woodland	Xeric	948	NRCS KSSL	USDA Soil Series Page
USDA-43	20.08245	-155.8478	Kawaihae	Aridisol	Bw	volcanic ash	3	shrubland	Aridic	948	NRCS KSSL	USDA Soil Series Page
USDA-44	20.08245	-155.8478	Kawaihae	Aridisol	Bw	volcanic ash	3	shrubland	Aridic	328	NRCS KSSL	USDA Soil Series Page
USDA-45	35.82505	-105.9759	El Rancho	Aridisol	Bw	sed rocks	3	shrubland	Aridic	328	NRCS KSSL	USDA Soil Series Page
USDA-46	35.82505	-105.9759	El Rancho	Aridisol	Bw	sed rocks	3	shrubland	Aridic	328	NRCS KSSL	USDA Soil Series Page
USDA-47	35.82505	-105.9759	El Rancho	Aridisol	Bw	sed rocks	3	shrubland	Aridic	328	NRCS KSSL	USDA Soil Series Page
USDA-48	35.82505	-105.9759	El Rancho	Aridisol	BC	sed rocks	3	shrubland	Aridic	328	NRCS KSSL	USDA Soil Series Page
USDA-49	37.09918	-108.8301	Salamander	Aridisol	Bk	eolian	3	shrubland	Aridic	254	NRCS KSSL	USDA Soil Series Page
USDA-50	37.09918	-108.8301	Salamander	Aridisol	Bk	eolian	3	shrubland	Aridic	254	NRCS KSSL	USDA Soil Series Page
STD I				Alfisol		till		forest shrubland		864	Sheldon lab	
USDA-51	37.09918	-108.8301	Salamander	Aridisol	Bk	eolian	3	shrubland	Aridic	254	NRCS KSSL	USDA Soil Series Page
USDA-52	37.09918	-108.8301	Salamander	Aridisol	By	eolian	3	shrubland	Aridic	254	NRCS KSSL	USDA Soil Series Page
USDA-53	37.09918	-108.8301	Salamander	Aridisol	By	eolian	3	shrubland	Aridic	254	NRCS KSSL	USDA Soil Series Page
USDA-54	39.46131	-118.9407	Appian	Aridisol	Btkn	lacustrine	3	shrubland	Aridic	128	NRCS KSSL	USDA Soil Series Page
USDA-55	39.46131	-118.9407	Appian	Aridisol	Btkn y	lacustrine	3	shrubland	Aridic	128	NRCS KSSL	USDA Soil Series Page
USDA-56	39.46131	-118.9407	Appian	Aridisol	BC	lacustrine	3	shrubland	Aridic	128	NRCS KSSL	USDA Soil Series Page
USDA-57	40.5621	-119.8666	Wylo	Mollisol	Bt	colluvium	3	grassland/shrubland and grassland/shrubland	Xeric	261	NRCS KSSL	USDA Soil Series Page
USDA-58	40.5621	-119.8666	Wylo	Mollisol	Bt	colluvium	3	grassland/shrubland and grassland/shrubland	Xeric	261	NRCS KSSL	USDA Soil Series Page
USDA-59	40.5621	-119.8666	Wylo	Mollisol	Btq	colluvium	3	grassland/shrubland and	Xeric	261	NRCS KSSL	USDA Soil Series Page

USDA-60	45.14945	-112.8811	Nicholson	Alfisol	Bt	loess	2	forest; developed cropland forest; developed	Udic	273	NRCS KSSL	USDA Soil Series Page
USDA-61	45.14945	-112.8811	Nicholson	Alfisol	Btk	loess	2	forest; developed cropland forest; developed	Udic	273	NRCS KSSL	USDA Soil Series Page
USDA-62	45.14945	-112.8811	Nicholson	Alfisol	Bk	loess	2	forest; developed cropland forest; developed	Udic	273	NRCS KSSL	USDA Soil Series Page
USDA-63	45.14945	-112.8811	Nicholson	Alfisol	Bk	loess	2	forest; developed cropland forest; developed	Udic	273	NRCS KSSL	USDA Soil Series Page
USDA-64	45.14556	-112.8875	Woodie	Mollisol	Btk	alluvium	3	grassland/herbaceous grassland/herbaceous	Ustic	273	NRCS KSSL	USDA Soil Series Page
USDA-65	45.14556	-112.8875	Woodie	Mollisol	Bk	alluvium	3	grassland/herbaceous grassland/herbaceous	Ustic	273	NRCS KSSL	USDA Soil Series Page
USDA-66	45.14556	-112.8875	Woodie	Mollisol	Bkq	alluvium	3	grassland/herbaceous grassland/herbaceous	Ustic	273	NRCS KSSL	USDA Soil Series Page
USDA-67	45.14556	-112.8875	Woodie	Mollisol	Bkq	alluvium	3	grassland/herbaceous grassland/herbaceous	Ustic	273	NRCS KSSL	USDA Soil Series Page
USDA-68	45.23323	-112.9148	Ermont	Alfisol	Bt	colluvium	3	grassland/herbaceous grassland/herbaceous	Ustic	287	NRCS KSSL	USDA Soil Series Page
USDA-69	45.23323	-112.9148	Ermont	Alfisol	Bt	colluvium	3	grassland/herbaceous grassland/herbaceous	Ustic	287	NRCS KSSL	USDA Soil Series Page
USDA-70	45.23323	-112.9148	Ermont	Alfisol	BC	colluvium	3	grassland/herbaceous grassland/herbaceous	Ustic	287	NRCS KSSL	USDA Soil Series Page
USDA-71	32.53112	-106.7908	P-coll		Bk					271	NRCS KSSL	PRISM 30-year
USDA-72	32.53112	-106.7908	P-coll		Bssk					271	NRCS KSSL	PRISM 30-year
USDA-73	32.53112	-106.7908	P-coll		Bssk					271	NRCS KSSL	PRISM 30-year
USDA-74	32.53112	-106.7908	P-coll		Bk					271	NRCS KSSL	PRISM 30-year

USDA-75	32.53112	-106.7908	P-coll	Alfisol	Bk	till	forest		271	NRCS KSSL	PRISM 30-year
STD II									864	Sheldon lab	
USDA-76	32.53112	-106.7908	P-coll		Bk				273	NRCS KSSL	PRISM 30-year
USDA-77	32.54695	-106.7106	T-Tayl		Bk				273	NRCS KSSL	PRISM 30-year
USDA-78	32.54695	-106.7106	T-Tayl		Bk				273	NRCS KSSL	PRISM 30-year
USDA-79	32.54695	-106.7106	T-Tayl		Bk				273	NRCS KSSL	PRISM 30-year
USDA-80	32.54695	-106.7106	T-Tayl		Bkb				273	NRCS KSSL	PRISM 30-year
USDA-81	32.54695	-106.7106	T-Tayl		Bkb				281	NRCS KSSL	PRISM 30-year
USDA-82	32.48917	-106.7817	C-grav		BAk Bkm/ Bk				281	NRCS KSSL	PRISM 30-year
USDA-83	32.48917	-106.7817	C-grav		Bk				281	NRCS KSSL	PRISM 30-year
USDA-84	32.48917	-106.7817	C-grav		Bk				281	NRCS KSSL	PRISM 30-year
USDA-85	32.48917	-106.7817	C-grav		Btk				281	NRCS KSSL	PRISM 30-year
USDA-86	32.48917	-106.7817	C-grav		B'k				281	NRCS KSSL	PRISM 30-year
USDA-87	41.08431	-114.774	Urmafot	Mollisol	Bk	alluvium	3	grasslan d/herbac eous Xeric	267	NRCS KSSL	USDA Soil Series Page
USDA-88	41.08431	-114.774	Urmafot	Mollisol	Bkq	alluvium	3	grasslan d/herbac eous Xeric	267	NRCS KSSL	USDA Soil Series Page
USDA-89	41.08431	-114.774	Urmafot	Mollisol	Bkq m	alluvium	3	grasslan d/herbac eous Xeric	267	NRCS KSSL	USDA Soil Series Page
USDA-90	39.08725	-118.6955	Theon	Aridisol	Bt	colluvium	3	shrublan d Aridic	124	NRCS KSSL	USDA Soil Series Page
USDA-91	39.08725	-118.6955	Theon	Aridisol	Btk	colluvium	3	shrublan d Aridic	124	NRCS KSSL	USDA Soil Series Page
USDA-92	39.244	-119.2319	Cleaver	Aridisol	Bt	alluvium	3	shrublan d Aridic	139	NRCS KSSL	USDA Soil Series Page
USDA-93	39.244	-119.2319	Cleaver	Aridisol	Btk Bkq	alluvium	3	shrublan d Aridic	139	NRCS KSSL	USDA Soil Series Page
USDA-94	39.244	-119.2319	Cleaver	Aridisol	m	alluvium	3	shrublan d Aridic	139	NRCS KSSL	USDA Soil Series Page
USDA-95	39.244	-119.2319	Cleaver	Aridisol	Bkq	alluvium	3	shrublan d Aridic	139	NRCS KSSL	USDA Soil Series Page
USDA-96	39.244	-119.2319	Cleaver	Aridisol	Bkq	alluvium	3	shrublan d Aridic	139	NRCS KSSL	USDA Soil Series Page

USDA-97	39.244	-119.2319	Cleaver	Aridisol	Bkqy	alluvium	3	shrubland	Aridic	139	NRCS KSSL	USDA Soil Series Page
USDA-98	39.244	-119.2319	Cleaver	Aridisol	Bkqy	alluvium	3	shrubland	Aridic	139	NRCS KSSL	USDA Soil Series Page
USDA-99	40.27042	-118.6711	Grumblen	Aridisol	Bt	colluvium	3	shrubland	Aridic	202	NRCS KSSL	USDA Soil Series Page
USDA-100	40.27042	-118.6711	Grumblen	Aridisol	Bt	colluvium	3	shrubland	Aridic	202	NRCS KSSL	USDA Soil Series Page
USDA-101	40.27042	-118.6711	Grumblen	Aridisol	Btk	colluvium	3	shrubland	Aridic	202	NRCS KSSL	USDA Soil Series Page
STD III				Alfisol		till		forest		864	Sheldon lab	
ISL-03	64.500712	-14.479277	(NA)	Inceptisol		basalt	3	herbaceous	Perudic	1340	Sheldon lab	See 3.
ISL-04	64.500712	-14.479277	(NA)	Inceptisol		basalt	3	herbaceous	Perudic	1340	Sheldon lab	See 3.
ISL-05	64.500712	-14.479277	(NA)	Inceptisol		basalt	3	herbaceous	Perudic	1340	Sheldon lab	See 3.
ISL-12			(NA)	Andisol		basalt	3	herbaceous		400	Sheldon lab	See 3.
ISL-13	65.462470	-15.65281	(NA)	Andisol		basalt	3	herbaceous	Ustic	400	Sheldon lab	See 3.
ISL-14	65.462470	-15.65281	(NA)	Andisol		basalt	3	herbaceous	Ustic	400	Sheldon lab	See 3.
ISL-15	65.462470	-15.65281	(NA)	Andisol		basalt	3	herbaceous	Ustic	400	Sheldon lab	See 3.
ISL-16	65.462470	-15.65281	(NA)	Andisol		basalt	3	herbaceous	Ustic	400	Sheldon lab	See 3.
ISL-20			(NA)			basalt		microbial			Sheldon lab	See 3.
ISL-21	64.911960	-14.64604	(NA)	spring soil crust		basalt		microbial		800	Sheldon lab	See 3.
ISL-24	64.911960	-14.64604	(NA)	spring soil crust		basalt		microbial		800	Sheldon lab	See 3.
ISL-25	64.834145	-14.666149	(NA)	moss		basalt		moss		1500	Sheldon lab	See 3.
ISL-27	64.834145	-14.666149	(NA)	spring soil crust		basalt		microbial		1500	Sheldon lab	See 3.
ISL-28SP	64.655300	-14.37104	(NA)	spring soil crust		basalt		microbial		1500	Sheldon lab	See 3.
ISL-28SOIL	64.834145	-14.666149	(NA)	spring soil crust - entisol		basalt	1	microbial /moss		1500	Sheldon lab	See 3.

ISL-29	64.655300	-14.37104	(NA)	Inceptisol	basalt	1	herbaceous	Perudic	2500	Sheldon lab	See 3.
ISL-30	64.655300	-14.37104	(NA)	Inceptisol	basalt	1	herbaceous	Perudic	2500	Sheldon lab	See 3.
ISL-31	64.655300	-14.37104	(NA)	Inceptisol	basalt	1	herbaceous	Perudic	2500	Sheldon lab	See 3.
ISL-32	64.655300	-14.37104	(NA)	Inceptisol	basalt	1	herbaceous	Perudic	2500	Sheldon lab	See 3.
ISL-34	64.224033	-15.693379	(NA)	Inceptisol	basalt	1	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-35	64.224033	-15.693379	(NA)	Inceptisol	basalt	1	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-38	63.952410	-17.59163	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-39	63.952410	-17.59163	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-40	63.952410	-17.59163	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-42	63.952410	-17.59163	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-43	63.952410	-17.59163	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-44			(NA)		basalt		moss			Sheldon lab	
ISL-48			(NA)	sand - entisol	basalt	3	barren			Sheldon lab	
ISL-49	63.890129	-17.716404	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-50	63.890129	-17.716404	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-51	63.890129	-17.716404	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-52	63.890129	-17.716404	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-53	63.890129	-17.716404	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-54	63.890129	-17.716404	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-55	63.890129	-17.716404	(NA)	Inceptisol	basalt	3	herbaceous	Perudic	1500	Sheldon lab	See 3.
ISL-57	63.632210	-18.41555	(NA)	Entisol	basalt	3	moss		2000	Sheldon lab	See 3.
ISL-58	63.632210	-18.41555	(NA)	Entisol	basalt	3	moss		2000	Sheldon lab	See 3.

ISL-59	63.632210	-18.41555	(NA)	Entisol	basalt	3	moss		2000	Sheldon lab	See 3.
ISL-60	63.632210	-18.41555	(NA)	Entisol	basalt	3	moss		2000	Sheldon lab	See 3.
ISL-61S			(NA)	soil crusts	basalt				2000	Sheldon lab	See 3.
ISL-61M			(NA)	soil crusts	basalt				2000	Sheldon lab	See 3.
ISL-64	63.625680	-18.41198	(NA)	Entisol	basalt	3	moss		2000	Sheldon lab	See 3.
ISL-65	63.625680	-18.41198	(NA)	Entisol	basalt	3	moss		2000	Sheldon lab	See 3.
ISL-67	63.82809	-20.066617	(NA)	Inceptisol	basalt	3	herbaceous	Udic	1500	Sheldon lab	See 3.
ISL-68	63.82809	-20.066617	(NA)	Inceptisol	basalt	3	herbaceous	Udic	1500	Sheldon lab	See 3.
ISL-69	63.82809	-20.066617	(NA)	Inceptisol	basalt	3	herbaceous	Udic	1500	Sheldon lab	See 3.
ISL-70	63.82809	-20.066617	(NA)	Inceptisol	basalt	3	herbaceous	Udic	1500	Sheldon lab	See 3.
ISL-71	63.82809	-20.066617	(NA)	Inceptisol	basalt	3	herbaceous	Udic	1500	Sheldon lab	See 3.
ISL-72	63.82809	-20.066617	(NA)	Inceptisol	basalt	3	herbaceous	Udic	1500	Sheldon lab	See 3.
ISL-73	63.82809	-20.066617	(NA)	Inceptisol	basalt	3	herbaceous	Udic	1500	Sheldon lab	See 3.
ISL-02	64.500712	-14.479277	(NA)	Inceptisol	basalt			Perudic	1340	Sheldon lab	See 3.
ISL-11			(NA)	entisol	basalt					Sheldon lab	
ISL-17	65.462470	-15.65281	(NA)	biological soil crust	basalt				400	Sheldon lab	See 3.
ISL-22	64.911960	-14.64604	(NA)	spring soil crust	basalt				800	Sheldon lab	See 3.
ISL-23	64.911960	-14.64604	(NA)	spring soil crust	basalt				800	Sheldon lab	See 3.
ISL-33	64.224033	-15.693379	(NA)	Inceptisol	basalt				1500	Sheldon lab	See 3.
ISL-37			(NA)	biological soil crust	basalt					Sheldon lab	
ISL-41	63.952410	-17.59163	(NA)	Inceptisol	basalt			Perudic	1500	Sheldon lab	See 3.
ISL-63	63.625680	-18.41198	(NA)	Entisol	basalt			Perudic	2000	Sheldon lab	See 3.
ISL-75	64.054860	-20.84564	(NA)	Inceptisol	Bt basalt	3	sparse herbaceous/barren	Udic	2000	Sheldon lab	See 3.

ISL-76	64.054860	-20.84564	(NA)	Inceptisol	Bt	basalt	3	sparse herbaceo us/barren	Udic	2000	Sheldon lab	See 3.
ISL-77	64.054860	-20.84564	(NA)	Inceptisol	Bt	basalt	3	sparse herbaceo us/barren	Udic	2000	Sheldon lab	See 3.
ISL-78	64.054860	-20.84564	(NA)	Inceptisol	Bt	basalt	3	sparse herbaceo us/barren	Udic	2000	Sheldon lab	See 3.
ISL-79	64.054860	-20.84564	(NA)	Inceptisol	Bt	basalt	3	sparse herbaceo us/barren	Udic	2000	Sheldon lab	See 3.
ISL-81	64.94102	-22.905099	(NA)	Inceptisol		basalt	1	herbaceo us	Udic	2500	Sheldon lab	See 3.
ISL-82	64.94102	-22.905099	(NA)	Inceptisol		basalt	1	herbaceo us	Udic	2500	Sheldon lab	See 3.
ISL-83	64.94102	-22.905099	(NA)	Inceptisol		basalt	1	herbaceo us	Udic	2500	Sheldon lab	See 3.
ISL-84	64.94102	-22.905099	(NA)	Inceptisol		basalt	1	herbaceo us	Udic	2500	Sheldon lab	See 3.
ISL-85	64.94102	-22.905099	(NA)	Inceptisol		basalt	1	herbaceo us	Udic	2500	Sheldon lab	See 3.
ISL-86	64.94102	-22.905099	(NA)	Inceptisol		basalt	1	herbaceo us	Udic	2500	Sheldon lab	See 3.
ISL-87	64.94102	-22.905099	(NA)	Inceptisol		basalt	1	herbaceo us	Udic	2500	Sheldon lab	See 3.
ISL-WO			(NA)	entisol		basalt	3	barren			Sheldon lab	
ISL-WO2	17.75694	-64.83806	(NA)	entisol		basalt	3	barren			Sheldon lab	
STD100	32.82211	-90.71566		Alfisol	B	till					Sheldon lab	
USDA102	18.35472	-65.02611	Maho Bay	Mollisol	Bw1	volcanic	3	grasslan d	Ustic	1016	NRCS KSSL	USDA Soil Series Page
USDA103	61.16667	10.08333	Commerce	Inceptisol	Bt	alluvium	1	cropland grasslan	Aquic	1372	NRCS KSSL	USDA Soil Series Page
USDA104	61.16667	10.08333	Cramer	Mollisol	Bh	igneous	3	d	Ustic	1016	NRCS KSSL	USDA Soil Series Page
USDA105	18.37028	-64.74694	Skualdras 1	Spodosol	B					595	NRCS KSSL	USDA Soil Series Page
USDA106	20.56083	-88.82694	Skualdras 1	Spodosol	Bw					595	NRCS KSSL	USDA Soil Series Page
USDA107	20.41228	-89.75761	Maho Bay	Mollisol	Bw1	volcanic	3	grasslan d	Ustic	1016	NRCS KSSL	USDA Soil Series Page

USDA108	20.41228	-89.75761		Ultisol	Bw1					1154	NRCS KSSL	
USDA109	19.75232	-90.13679		Ultisol	Bss1					1156	NRCS KSSL	
USDA110	17.74889	-64.69028		Ultisol	Btss1					1156	NRCS KSSL	
USDA111	17.74889	-64.69028		Alfisol	Bw1					1040	NRCS KSSL	
USDA112	17.9575	-66.86195	Solitude	Inceptisol	Bg	marine sediments	2	coastal	Aquic	1016	NRCS KSSL	USDA Soil Series Page
USDA113	17.97083	-66.86584	Solitude	Inceptisol	Bt	marine sediments	2	coastal	Aquic	1016	NRCS KSSL	USDA Soil Series Page
USDA114	62.54167	30.18889			B					770	NRCS KSSL	
USDA115	62.94889	28.02639			Bhs					770	NRCS KSSL	
USDA116	18.1575	-67.03889	Suvispaa		Bs1					617	NRCS KSSL	USDA Soil Series Page
USDA117	73.20222	-119.5555	Ryona		Bw1					624	NRCS KSSL	USDA Soil Series Page
USDA118	30.76611	-91.173688	Rosario	Oxisol	Bw1	serpentinit e	3	forest	Udic	1448	NRCS KSSL	USDA Soil Series Page
USDA119	45.9375	-123.3461	Green Cabin #5		Bt					300	NRCS KSSL	
USDA120	17.98389	-66.87694	Olivier	Alfisol	Bt1	loess	1	cropland	Udic	1549	NRCS KSSL	USDA Soil Series Page
USDA121	18.15111	-66.993611	Jory	Ultisol	Bk	colluvium	3	cropland	Xeric	1143	NRCS KSSL	USDA Soil Series Page
USDA122	10.39305	-85.319444	La Covana	Aridisol	Bo1	limestone serpentinit e	3	forest	Aridic Perudi c	813	NRCS KSSL	USDA Soil Series Page
USDA123			Cerro Gordo	Oxisol	2Bk		3	forest		2007	NRCS KSSL	USDA Soil Series Page
USDA124			Bagatzi		Bw1					1540	NRCS KSSL	
USDA125	18.35083	-64.758611	Pandura	Inceptisol		igneous	3	grasslan d	Udic	2032	NRCS KSSL	USDA Soil Series Page
std 100	18.553611	-72.156111			Bw1					864	Sheldon lab	
USDA126	18.553611	-72.156111	Susannaberg	Mollisol	Bw1	volcanic	3	develope d	Ustic	1016	NRCS KSSL	USDA Soil Series Page
USDA127					Bk1					1281	NRCS KSSL	USDA KSSL data
USDA128					Bt					1281	NRCS KSSL	USDA KSSL data
USDA129	34.66706	-93.32047			Btk1						NRCS KSSL	
USDA130	34.66706	-93.32047			BE						NRCS KSSL	
USDA131	55.77043	-131.964			Bt					1257	NRCS KSSL	PRISM 30-year
USDA132	44.55813	-123.9595			Bh					1257	NRCS KSSL	PRISM 30-year
USDA133	44.2748	-124.022	(unnamed)	Spodosol	Bw					2540	NRCS KSSL	PRISM 30-year

USDA134	64.61618	-150.2025	Tolovana	Andisol	Bw1	colluvium	3	forest/developed	Udic	2159	NRCS KSSL	USDA Soil Series Page
USDA135	57.73292	-135.435	Formader	Andisol	Bw1	basalt	3	forest	Udic	2159	NRCS KSSL	USDA Soil Series Page
USDA136	59.24957	-138.7352	(unnamed)	Gelisol	Bh					305	NRCS KSSL	PRISM 30-year
USDA137	42.74648	-124.1509	Yakobi	Spodosol	Bhs	till	1	forest	Udic	1524	NRCS KSSL	USDA Soil Series Page
USDA138	67.57127	-149.7928	(unnamed)	Gelisiol?	Bw					3937	NRCS KSSL	PRISM 30-year
USDA139	69.12843	-148.5907		Inceptisol?	Bw					1496	NRCS KSSL	PRISM 30-year
USDA140	68.50793	-149.1865	(unnamed)	Gelisol	Bg					450	NRCS KSSL	PRISM 30-year
USDA141	30.69707	-90.94689		Gelisol	Bw					250	NRCS KSSL	PRISM 30-year
USDA142	63.48283	-151.1693		Gelisol	2Bt1					250	NRCS KSSL	PRISM 30-year
USDA143	69.6044	-148.64639	Bonn	Alfisol	2Bw	terrace	0	forest/grassland	Aquic	1384	NRCS KSSL	PRISM 30-year
USDA144	69.6044	-148.64639		Gelisol	Bg1					550	NRCS KSSL	PRISM 30-year
USDA145	62.62889	-150.77417		Gelisol	Bw1					200	NRCS KSSL	PRISM 30-year
USDA146	59.6980556	-150.71167		Gelisol	Bhs					200	NRCS KSSL	PRISM 30-year
USDA147	68.129722	-149.47806		Spodosol	Bw					1000	NRCS KSSL	PRISM 30-year
USDA148				Spodosol	Bw1					1000	NRCS KSSL	USDA KSSL data
USDA149				Gelisol						350	NRCS KSSL	USDA KSSL data
std 100				Alfisol		till		forest		864	Sheldon lab	
ANT-01		(NA)		Entisol/sediment		alluvium		barren			PRR	
ANT-02		(NA)		Entisol/sediment		alluvium		barren			PRR	
ANT-03		(NA)		Entisol/sediment		alluvium		barren			PRR	
ANT-04		(NA)		Entisol/sediment		alluvium		barren			PRR	
ANT-05		(NA)		Entisol/sediment		alluvium		barren			PRR	
ANT-06		(NA)		Entisol/sediment		alluvium		barren			PRR	
ANT-07		(NA)		Entisol/sediment		alluvium		barren			PRR	
ANT-08		(NA)		Entisol/sediment		alluvium		barren			PRR	

ANT-09			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-10			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-11			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-12			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-13			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-14			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-15			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-16			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-17			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-18			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-19			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-20			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-21			(NA)	Entisol/se diment		alluvium	barren		PRR
ANT-22			(NA)	Entisol/se diment		alluvium	barren		PRR
STD55				Alfisol		alluvium	forest	864	Sheldon lab
AK-6901			(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
AK-6902			(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
AK-6904			(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
AK-6906			(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
17-6203	68.856	148.015	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
17-6204	68.843	148.034	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab

17-6206	68.974	148.200	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
17-6210	68.644	149.582	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
16-6211	68.611	149.312	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
17-6211a	69.909	149.553	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
17-6212a	69.909	149.553	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
17-6213a	70.339	149.022	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
16-6221	68.625	149.136	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
16-6228a	68.843	148.034	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
16-6230t	69.348	147.589	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
16-6230b	69.348	147.589	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
TT	68.624	149.615	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
TWS-A	68.610	149.313	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
IWS-A	68.624	149.602	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
16-6211-R	68.611	149.312	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
17-6211A-R	69.909	149.553	(NA)	Gelisol	O	0	herbaceo us	Perma frost	Cory lab
STD100				Alfisol		till	forest		864 Sheldon lab

Supplemental Table 3. Bulk geochemical data for new samples.

Sample ID	Al %	Ca %	K %	Na %	CIA	P (ppm)	Fe %	% Clay content
C-1-15								10
C-1-65								25
C-1.5-15								10
C-1.5-35								10
C-2-17								5
C-2-57								25
C-3-13								25
C-4-10								12
C-4-20								12
C-5-24								15
C-5.5-20								15
C-6-11								15
C-6-61								40
C-7-13								15
C-7-43								20
MS-2	5.7	8.16	1.82	1.4	29.1	720	2.86	15
MS-6	6.85	2	2.42	1.89	51.0	580	3.28	15
MS-10	6.72	1.96	2.21	1.66	52.4	850	3.88	15
MS-13	5.11	1.25	1.95	1.07	54.4	710	2.16	15
MS-18	6.6	3.05	1.9	0.91	50.4	1040	3.57	15
MS-22						560		15
ENC-5	5.88	3.14	1.89	1.03	46.6	630	2.27	
ENC-40	5.96	6.22	1.72	1.65	34.1		5.15	
MONT-1-15	6.11	3.53	1.69	0.89	46.7	400	2.7	45
MONT-1-40	5.24	7.46	1.54	0.83	30.3	450	2.32	45
CL-40	5.99	3.44	1.72	0.81	46.9	740	2.89	25
CL-45								25
DAV-0	5.58	2.18	1.71	0.95	51.6	830	2.63	

DAV-30								
KR1-50	4.42	9.73	1.29	0.68	23.0	580	2.11	27
KR1-60								20
KR2-10								28
KR2-40	4.89	10	1.41	0.66	24.3	600	2.4	30
AC-2								40
SL1-0								27
SL1-50	3.02	11.8	1.02	0.96	14.6	610	1	24
sl3-50	3.35	9.98	1.12	1.03	17.8	700	1.25	24
SL3-60	3.44	10.15	1.15	1.09	17.9	710	1.26	22
PL2-5								32
PL2-35								32
MOM-1								12
MOM-2	6.83	1.79	2.23	1.55	54.2	1360	4.25	12
TS-6	7.07	3.24	2.36	1.25	48.7	920	3.87	18
TS-10	6.4	6.82	1.89	0.98	35.5	910	3.32	18
GS7	5.81	5.54	2.09	1.05	36.4	610	3.02	18
CL-45 un								25
DAV-30								
un								
ENC-5 un								
MONT-1-40 un								45
KR1-60 un								20
SL1-50 un								24
SL3-60 un								22
KR2-10 un								28
USAL	6.45	0.28	0.93	1.39	70.9	680	3.11	30
COH	11.95	0.4	0.68	0.58	87.6	240	5.41	30
MIN	8.49	2.13	1.93	2.48	54.4	690	2.95	14
HODA	8.2	2.05	2.54	2.2	53.6	600	2.91	40
BLCK	11.65	0.02	0.23	0.05	97.9	100	4.43	
STG	10.9	3.33	0.34	0.52	67.2	610	6.67	20

PUTT	6.74	2.08	1.32	1.08	57.5	350	3.5	
TINK	9.09	2.92	1.46	2.74	52.7	800	3.06	
LOR	11.05	2.83	1.3	0.12	69.5	940	8	
DEJ	13.05	0.41	0.38	0.33	91.6	770	8.02	20
IP	9.57	1.04	0.2	0.17	84.6	300	16.95	
PA	8.96	0.58	2.31	0.79	73.1	570	4.96	22
PT-60								
NUN-1-0	6.34	0.99	2.26	0.66	63.4	990	2.78	24
NUN-1-60	5.83	10.45	1.74	0.48	26.9	800	2.56	28
NUN-2-35	7.78	1.01	2.19	0.46	69.5	770	3.49	45
NUN-2-50	6.41	6.86	1.83	0.47	36.7	850	2.88	28
TR-10	6.18	3.41	0.87	1.13	48.7	260	3.49	28
TR-60	6.42	4.48	0.74	1.3	44.3	260	3.61	42
TR-80	6.7	0.78	1.88	0.68	68.1	430	3.21	40
SC-0	7.92	0.71	1.72	0.36	75.5	340	3.75	25
SC-20	5.64	7.41	0.61	1.22	32.3	200	3.34	28
SC-40	7.24	0.7	1.59	0.38	74.4	320	3.56	26
SC-80								28
PK-1-5	6.38	1.41	2.22	1.18	57.0	610	2.77	32
PK-1-20	7.33	1.03	2.27	0.99	64.0	560	3.17	32
PK-1-40	6.25	3.97	2.08	1.15	43.5	610	2.71	32
PK-2-5	6.48	1.17	2.44	1.52	56.2	520	2.91	32
PET-30	4.84	0.58	1.96	0.88	60.5	290	1.68	
PET-40	4.49	0.53	2.03	0.9	58.6	260	1.46	
OM-1-20	5.49	0.84	1.59	1.22	60.0	580	1.92	25
OM-1-30	4.45	0.66	1.28	0.99	60.3	400	1.75	25
OM-1-70								25
BU-1-40								26
BU-1-50								26
HET-0								42
HET-10								42
HET-20								47
HET-30								47

HET-40	47
HET-50	47
HET-60	38
HET-70	40
HET-80	40
BT-30	25
BT-45	30
ENC-10	
ENC-15	
ENC-20	
ENC-30	
ENC-40	
ENC-50	
ENC-60	
PC-40	30
PC-85	
PL2-0	22
PL2-10	31
SL-1-50	24
DAV-30	
TS-6	
TS-10	
Tr-0	28
TR-10	28
TR-20	42
TR-30	42
TR-40	42
TR-60	42
TR-70	40
TR-80	40
SC-0	25
SC-20	28
SC-30	26

SC-40								26
SC-50								25
SC-60								25
SC-80								28
SC-85								25
USDA-01	5.11	0.09	0.26	0.02	94.0	750	29.9	10
USDA-02	13.6	0.01	0.06	0.02	99.4	280	10.75	60
USDA-03	8.76	3.22	1.19	2.63	51.5	900	3.77	5
USDA-04	8.09	2.95	1.19	2.61	50.7	750	2.91	6
USDA-05	12.8	0.01	0.01	0.01	99.7	1280	15.7	60
USDA-06	9.51	0.01	0.1	0.01	99.0	250	29.2	50
USDA-07	8.69	1.68	0.7	1.76	64.4	1870	4.45	5
USDA-08	6.72	0.07	1.64	1	73.7	480	3.09	19
USDA-09	7.87	2.31	0.91	2.37	54.7	510	4.01	5
USDA-10	8.31	0.03	0.77	0.05	92.9	820	20.4	
USDA-11	9.15	0.07	0.68	0.9	85.0	700	5.23	35
USDA-12	10.6	0.01	0.06	0.02	99.3	1770	34	12
USDA-13	14.45	0.02	0.31	0.23	96.6	1220	0.55	
USDA-14	13.3	0.01	0.01	0.01	99.8	630	6.5	
USDA-15	10.9	0.1	0.12	0.04	97.6	2730	11.85	
USDA-16	8.03	0.03	0.31	0.02	96.7	1330	20	25
USDA-17	13.75	0.15	0.04	0.02	98.2	60	9.96	56
USDA-18	8.17	0.06	1.83	0.87	77.6	930	4.9	
USDA-19	9.77	3.76	1.25	0.11	61.7	740	6.87	22
USDA-20	11.25	0.2	0.65	0.05	93.5	2980	5.93	
USDA-21	11.7	0.02	0.11	0.03	98.8	1060	16.3	
USDA-22	13.3	0.06	0.37	0.03	97.3	5340	12.4	
USDA-23	3.35	0.09	0.43	0.32	80.9	140	0.87	13
USDA-24	12.15	0.01	0.01	0.01	99.7	2910	24.7	30
USDA-25	2.12	0.17	0.07	0.04	86.7	220	15.7	45
STD55							2.05	
USDA-26	5.83	4.8	2.06	1.01	39.1	270	2.98	15
USDA-27	4.14	11.5	1.94	1.34	18.4	480	1.6	15

USDA-28	1.63	13.45	0.67	0.27	7.9	240	0.9	18
USDA-29	1.93	14.05	0.78	0.25	8.9	210	0.96	18
USDA-30	7.82	2.25	1.54	2.33	53.4	990	2.97	18
USDA-31	8.35	1.48	1.06	1.76	63.5	330	4.67	25
USDA-32	8.32	1.6	1.2	1.82	61.9	170	4.75	25
USDA-33	7.53	6.39	1.59	1.72	39.1	920	3.87	30
USDA-34	7.94	7.21	1.49	2.13	37.5	800	3.86	30
USDA-35	8.15	6.2	1.5	2.38	40.1	770	3.94	30
USDA-36	7.87	7.22	1.44	2.35	36.9	900	3.46	30
USDA-37	8.07	4.97	1.55	2.45	43.1	630	3.8	30
USDA-38	1.4	23.7	0.53	0.26	4.1	240	0.54	5
USDA-39	8.47	2.41	1.16	2.63	54.3	1410	2.72	2
USDA-40	8.27	2.33	1.17	2.54	54.4	1700	2.98	2
USDA-41	8.55	2.51	1.19	2.63	54.0	1350	3.15	2
USDA-42	7.82	2.41	1.34	2.43	52.7	1010	2.77	2
USDA-43	14.25	0.12	0.29	0.15	96.4	1620	12.8	10
USDA-44	14.7	0.16	0.18	0.24	95.9	1420	11.3	10
USDA-45	5.98	3.41	2.19	0.86	45.7	640	2.65	26
USDA-46	5.46	3.03	2.16	1.03	44.6	600	2.23	26
USDA-47	5.45	3.06	2.15	0.98	44.7	600	2.22	26
USDA-48	5.74	3.3	2.2	0.92	44.9	590	2.42	26
USDA-49	4.69	7.45	1.56	0.56	28.5	390	1.74	24
USDA-50	3.18	21	0.53	0.78	9.7	300	1.14	24
STD I							2.05	
USDA-51	3.52	12.35	0.61	0.87	16.3	320	1.52	24
USDA-52	3	13.25	0.59	0.73	13.6	370	1.21	24
USDA-53	3.37	10.65	0.79	0.54	17.8	450	1.43	24
USDA-54	7.89	3.18	2.35	2.67	46.6	1110	3.62	30
USDA-55	8.24	2.72	2.2	2.92	48.9	840	2.95	30
USDA-56	8.11	2.54	2.13	2.99	49.1	780	3.05	30
USDA-57	9.18	2.74	1.3	2.49	55.0	540	4.89	42
USDA-58	9.09	2.33	1.12	2.06	59.0	530	4.93	42
USDA-59	9.02	2.08	1.03	1.75	61.8	580	5.18	42

USDA-60	5.32	3.43	1.69	0.65	44.8	600	2.11	25
USDA-61	4.16	12.15	1.46	0.6	18.7	600	1.66	25
USDA-62	1.95	1.54	1.23	0.03	39.7	60	0.53	25
USDA-63	4.25	0.9	1.29	0.08	65.9	110	1.44	25
USDA-64	2.66	11.8	0.92	0.02	13.8	210	0.82	23
USDA-65	1.56	14.1	1.04	0.02	7.3	120	0.46	23
USDA-66	1.45	13.9	0.96	0.02	7.0	120	0.43	23
USDA-67	1.44	8.19	1.02	0.02	10.9	100	0.38	23
USDA-68	7.4	1.25	1.95	0.76	65.4	340	1.71	27
USDA-69	6.42	0.9	1.83	0.81	65.2	360	1.96	27
USDA-70	7.71	1.25	2.18	0.55	66.8	210	1.29	27
USDA-71	8.95	1.34	2.84	0.65	66.4	1510	4.15	
USDA-72	8.89	1.22	2.85	0.66	67.0	1510	4.11	
USDA-73	8.98	1.19	2.86	0.65	67.4	1530	4.19	
USDA-74	9.17	1.2	2.96	0.67	67.4	1570	4.31	
USDA-75	8.81	1.18	2.86	0.67	67.0	1570	4.16	
STD II							2.05	
USDA-76	8.26	1.19	2.78	0.68	65.7	1450	3.9	
USDA-77	4.92	8.67	1.97	0.67	26.3	480	2.12	
USDA-78	3.23	16.25	1.37	0.49	12.1	300	1.32	
USDA-79	3.48	14.85	1.44	0.56	13.9	260	1.45	
USDA-80	4.68	10.9	1.66	0.73	21.9	350	1.94	
USDA-81	4.73	10.5	1.7	0.83	22.5	340	1.95	
USDA-82	5.83	2.26	2.4	1.33	48.2	400	3.26	
USDA-83	4.53	12.3	1.71	0.91	19.4	670	2.24	
USDA-84	4.3	10.45	1.78	1.01	20.7	800	2.39	
USDA-85	5.58	3.85	2.22	1.2	40.7	650	2.8	
USDA-86	5.6	6.17	2.24	1.2	33.2	730	2.6	
USDA-87	4.35	14.3	1.29	0.71	17.2	520	1.81	22
USDA-88	4.34	13.75	1.25	0.72	17.7	400	1.85	22
USDA-89	3.2	17.15	0.9	0.6	11.6	320	1.24	22
USDA-90	7.15	6.33	1.51	1.42	38.9	900	4.14	30
USDA-91	7.14	9.13	1.23	1.33	32.7	830	3.78	30

USDA-92	8.29	2.59	1.83	2.01	53.8	500	4.86	27
USDA-93	7.75	2.52	1.61	1.84	53.8	440	4.72	27
USDA-94	5.27	12.2	0.94	1.16	22.2	990	2.74	27
USDA-95	6.95	8.01	1.1	1.67	34.0	690	3.64	27
USDA-96	7.26	5.64	1.15	1.52	41.6	720	4.09	27
USDA-97	6.97	4.4	1.15	1.67	44.5	790	3.7	27
USDA-98	7.35	5.45	1.24	1.59	42.2	1010	3.66	27
USDA-99	8.58	2.7	1.8	1.77	55.2	660	4.32	40
USDA-100	8.49	2.58	1.68	1.6	56.6	680	4.55	40
USDA-101	7.69	3.16	1.18	0.95	55.4	830	5.55	40
STD III							2.05	
ISL-03	7.63	5.3	0.39	1.56	45.2	1810	11.65	
ISL-04	8.45	3.52	0.3	1.11	57.5	2130	11.8	
ISL-05	9.67	2.93	0.19	0.69	66.4	1870	11.05	
ISL-12	7.57	7.4	0.28	1.7	38.4	1010	9.73	
ISL-13	7.44	6.34	0.32	1.55	41.3	1130	9.55	
ISL-14	7.42	6.36	0.28	1.52	41.3	1080	9.69	
ISL-15	7.37	6.38	0.27	1.51	41.1	1100	9.63	
ISL-16	7.56	7.38	0.24	1.69	38.5	930	10	
ISL-20	8.86	3.3	0.21	0.9	61.1	1790	9.97	
ISL-21	10.05	3.46	0.38	1.21	61.3	1810	7.18	
ISL-24	8.52	4.87	0.35	1.35	50.4	1420	9.24	
ISL-25	7.25	4.91	0.36	1.4	46.0	1630	8.12	
ISL-27	7.16	5.72	0.4	1.63	42.0	1210	8.11	
ISL-28SP	7.93	5.94	0.39	1.64	43.8	1560	10.45	
ISL-28SOIL	7.59	5.51	0.3	1.37	45.1	1530	9.73	
ISL-29	8.06	4.9	0.46	1.51	48.1	1750	9.94	
ISL-30	7.77	6.13	0.43	1.79	42.2	1590	9.33	
ISL-31	6.87	4.47	0.32	1.35	46.8	1440	13.65	
ISL-32	7.35	4.86	0.28	1.31	47.0	1400	7.9	
ISL-34	7.75	5.63	0.33	1.53	44.7	1580	8.2	
ISL-35	7.74	5.85	0.33	1.57	43.8	1530	8.15	

ISL-38	7.14	6.16	0.39	1.68	40.4	1490	9.7
ISL-39	7.88	5.79	0.39	1.49	44.5	1560	10.25
ISL-40	7.91	6.31	0.38	1.63	42.6	1520	10.5
ISL-42	7.76	6.2	0.42	1.69	42.2	1960	10.3
ISL-43	7.95	6.05	0.38	1.6	43.6	1510	10
ISL-44	7.08	6.9	0.45	2.01	37.2	1330	10
ISL-48	7.13	6.86	0.45	2	37.5	1300	9.97
ISL-49	6.77	6.13	0.42	1.77	38.9	1450	9.36
ISL-50	7.36	6.12	0.45	1.8	40.8	1550	9.97
ISL-51	7.52	6.9	0.48	2.01	38.6	1540	10.6
ISL-52	7.44	6.21	0.49	1.87	40.6	1520	10.05
ISL-53	7.25	6.37	0.49	1.94	39.3	1420	9.88
ISL-54	7.33	5.95	0.44	1.78	41.3	1610	10.1
ISL-55	7.55	6.07	0.45	1.78	41.7	1660	10.3
ISL-57	7.21	6.6	0.42	1.97	38.6	1560	10.45
ISL-58	7.22	7.08	0.37	1.97	37.4	1460	10.5
ISL-59	7.16	6.94	0.38	1.97	37.5	1470	10.4
ISL-60	7.32	6.48	0.46	1.93	39.3	2080	11
ISL-61S	7.31	6.6	0.43	1.97	38.9	1620	10.7
ISL-61M	7.23	6.38	0.47	2	39.1	1560	10.25
ISL-64	7.37	6.7	0.39	1.94	38.9	1590	10.85
ISL-65	7.41	6.72	0.42	1.95	38.9	1720	10.9
ISL-67	7.87	3.77	1.72	3.87	42.1	1380	7
ISL-68	6.94	5.23	0.81	2.07	40.9	2470	10.3
ISL-69	6.84	4.73	0.76	1.89	42.9	2250	9.92
ISL-70	6.92	5.79	0.66	2.03	39.4	2850	11.15
ISL-71	7.15	4.63	0.69	1.82	44.7	2270	10.45
ISL-72	7.02	4.67	0.75	1.91	43.7	2190	10.35
ISL-73	7.04	4.74	0.72	1.86	43.7	2150	10.5
ISL-02	7.38	5.09	0.44	1.52	45.2		
ISL-11	7.05	7.48	0.25	1.72	36.5		
ISL-17							
ISL-22	8.43	4.8	0.38	1.4	50.2		

ISL-23								
ISL-33								
ISL-37								
ISL-41								
ISL-63	5.9	5	0.42	1.7	39.6			
ISL-75	8.61	2.76	0.27	0.87	63.6	2520		
ISL-76	9	2.46	0.26	0.95	66.1	1890		
ISL-77	8.81	2.63	0.35	1.04	63.8	2120		
ISL-78	9.01	2.1	0.37	0.95	68.2	1570		
ISL-79	9.56	2.47	0.18	0.64	69.5	1510		
ISL-81								
ISL-82								
ISL-83								
ISL-84								
ISL-85	9.57	4.73	0.23	0.93	55.7	2150	8.2	
ISL-86	9.59	6.67	0.29	1.25	47.4	1810	5.86	
ISL-87	8.17	3.98	0.38	1.01	54.6	2520	6.59	
ISL-WO	6.83	6.42	0.47	1.98	37.7	3420	9.67	
ISL-WO2						1340		
STD100	4.08	0.7	1.29	1	57.6		2.05	
USDA102	5.5	0.14	1.45	0.41	76.7	260	2.62	28
USDA103	11.3	0.14	0.49	0.07	94.9	1570	10.45	35
USDA104	4.86	19.5	0.75	0.12	15.3	700	3.38	37
USDA105	8.03	0.15	0.13	0.02	96.2	500	28	
USDA106	9.55	3.75	0.33	1.19	58.9	120	6.19	
USDA107	11.05	0.79	1.59	1.19	75.6	150	4.22	28
USDA108	10.55	2.55	0.67	0.11	72.4	1510	8.7	
USDA109	2.81	23.4	0.47	0.14	8.1	230	1.92	
USDA110	5.94	1.32	1.18	1.78	55.9	290	2.64	
USDA111	6.16	1.87	1.57	1.96	51.1	1380	3	
USDA112	8.11	0.02	0.04	0.01	99.2	330	38.6	17
USDA113	1.57	7.09	0.64	0.2	13.3	230	1.93	17
USDA114	13.75	0.39	0.84	0.05	92.2	260	6.15	

USDA115	13.75	0.25	0.47	0.06	94.9	170	6.18	
USDA116	13.85	0.24	0.44	0.08	95.1	130	6.36	
USDA117	13.35	0.18	0.23	0.04	96.8	60	4.82	
USDA118	7.68	2.22	1.54	2.41	52.7	810	3.86	35
USDA119	7.78	1.98	1.63	2.51	53.6	560	3.32	
USDA120	9.26	3.55	0.68	1.4	57.3	250	7.5	30
USDA121	6.03	0.68	1.89	0.89	64.9	490	2.34	50
USDA122	8.66	1.87	0.52	1	68.1	230	9.89	
USDA123	3.58	0.16	1.39	1	60.4	550	1.47	30
USDA124	4.29	0.36	1.5	1.34	58.1	560	1.52	
USDA125	9.26	1.95	1.64	1.32	63.6	420	5.82	20
std 100						3810		
USDA126	3.53	0.11	0.48	0.07	86.3		1.34	45
USDA127	6.99	1.26	1.02	1.53	62.5	430	3.91	
USDA128	9.53	0.27	1.47	0.68	81.4	610	4.54	
USDA129	6.48	4.99	0.28	1.42	43.0	620	8.24	
USDA130	7.17	1.53	1.49	1.5	59.7	360	3.71	
USDA131	3.2	0.12	0.52	0.11	83.1	2310	1.21	
USDA132	5.43	0.26	1.08	0.71	73.8	360	2.78	
USDA133	6.8	1.92	0.7	1.64	57.7	1500	3.97	
USDA134	6.88	0.84	1.67	1.25	64.7	820	3.58	30
USDA135	6.39	0.67	1.37	1.55	63.5	700	4.37	25
USDA136	5.76	0.4	1.48	1.08	67.1	1250	3.02	
USDA137	11	0.16	0.18	0.14	95.6	2470	14.05	12
USDA138	9.25	0.32	1.14	0.52	83.5	1020	4.08	
USDA139	3.81	9.22	0.75	0.35	22.2	590	2.18	
USDA140	2.82	0.26	0.55	0.54	67.4	100	1.11	
USDA141	3.95	9.05	0.78	0.37	23.1	630	2.33	
USDA142	7.51	0.6	1.73	1.5	66.6	1010	4.83	
USDA143	3.69	0.08	0.91	0.14	80.4	1080	3.98	20
USDA144	7.65	0.18	1.99	1.24	71.4	600	4.14	
USDA145	1.35	32.3	0.19	0.13	3.0	550	1.26	
USDA146	5.06	14.3	0.44	0.42	20.2	830	6.16	

USDA147	5.15	14.95	0.41	0.44	19.7	740	6.32
USDA148	1.4	31.4	0.23	0.09	3.2	750	1.23
USDA149	9.29	4.07	0.51	0.53	59.0	270	6.34
std 100							2.05
ANT-01							
ANT-02	8.94	0.62	2.5	0.97	70.7	510	3.13
ANT-03	6.55	1.1	1.85	5.26	42.3	280	2.76
ANT-04	6.34	5.74	1.32	1.47	38.0	710	7.47
ANT-05	7.55	3.1	2.64	1.71	48.5	870	3.51
ANT-06	8.39	2.02	1.07	1.83	59.9	1270	7.46
ANT-07	0.79	3.78	0.1	0.46	12.2	140	16.85
ANT-08	8.68	0.59	2.98	0.6	70.9	480	2.43
ANT-09	8.36	2.9	2.91	1.55	52.0	880	4.1
ANT-10	4.39	1.27	1.32	10	23.4	160	1.82
ANT-11							
ANT-12	3.81	22	1.09	0.13	11.1	230	1.71
ANT-13	5.51	7.16	2.38	1.1	30.5	690	2.07
ANT-14	7.67	0.65	2.85	1.05	65.3	760	3.79
ANT-15	7.05	4.05	1.99	2.25	42.7	1840	5.81
ANT-16	6.67	5.13	1.28	1.54	41.0	280	4.13
ANT-17	4.11	1.05	1.48	5.21	32.5	170	0.73
ANT-18	4.51	3.27	0.78	0.88	43.0	350	4.61
ANT-19	8.29	2.58	3.47	0.9	54.5	620	4.57
ANT-20	6.36	1.91	2.2	2.67	46.8	670	2.98
ANT-21	7.47	2.85	1.76	1.75	51.3	640	3.93
ANT-22	6.26	2.61	2.66	0.73	50.2	530	2.74
STD55							2.05
AK-6901							
AK-6902							
AK-6904							
AK-6906							
17-6203							
17-6204							

17-6206	
17-6210	
16-6211	
17-6211a	
17-6212a	
17-6213a	
16-6221	
16-6228a	
16-6230t	
16-6230b	
TT	
TWS-A	
IWS-A	
16-6211-R	
17-6211A-	
R	
STD100	2.05

Supplemental Table 4. Fe speciation data for new samples. (Ascorbic-extractable, Fe_{asc}; acetate-extractable, Fe_{acet}; dithionite-citrate-bicarbonate extractable, Fe_{dith}; and ammonium oxalate-extractable, Fe_{ox}.)

	Sample ID	Order	Fe-asc	Fe-acet	Fe-dith	Fe-ox	Fe ³⁺ /Fe ²⁺
	All values in ppm.						
C-1-15	Alfisol		2923	769	3353	697	1.4
C-1-65	Alfisol		1226	981	5126	1316	5.3
C-1.5-15	Alfisol		0	637	2173	724	
C-1.5-35	Alfisol		1637	1318	3696	760	2.7
C-2-17	Alfisol		0	268	5714	387	
C-2-57	Alfisol		806	611	16629	470	21.2
C-3-13	Alfisol		3557	1831	15696	1830	4.9
C-4-10	Alfisol		7654	1894	7250	1616	1.2
C-4-20	Alfisol		9665	3185	11785	2462	1.5
C-5-24	Alfisol		4197	1204	12160	852	3.1
C-5.5-20	Alfisol		3630	901	9719	2328	3.3
C-6-11	Alfisol		534	432	6877	2131	16.9
C-6-61	Alfisol		1493	725	7936	1582	6.4
C-7-13	Alfisol		0	616	2926	340	
C-7-43	Alfisol		1566	656	6287	1093	4.7
MS-2	Inceptisol		588	768	9241	2019	19.2
MS-6	Inceptisol		2220	699	7751	1877	4.3
MS-10	Inceptisol		1094	1574	9557	5880	14.1

MS-13	Inceptisol	1596	765	6625	2059	5.4
MS-18	Inceptisol	0	247	6592	3152	
MS-22	Inceptisol	0	292	9187	3865	
ENC-5	Inceptisol	668	261	5821	1879	11.5
ENC-40	Inceptisol	0	183	21164	14813	
MONT-1-15	Aridosol	857	987	11624	2871	16.9
MONT-1-40	Aridosol	752	827	11358	2697	18.7
CL-40	Mollisol	2602	1373	10676	1962	4.9
CL-45	Mollisol	3109	1299	11482	1888	4.3
DAV-0	Mollisol	1386	583	5812	1100	5.0
DAV-30	Mollisol	3041	1035	7142	1192	2.7
KR1-50	Mollisol	1936	1563	16280	3351	10.1
KR1-60	Mollisol	1356	1187	10974	1857	9.5
KR2-10	Mollisol	1512	841	8305	1861	6.7
KR2-40	Mollisol	1729	1119	14904	1997	9.8
AC-2	Mollisol	201	768	15324	3952	96.0
SL1-0	Mollisol	1084	600	4104	972	4.7
SL1-50	Mollisol	78	249	1357	389	22.4
sl3-50	Mollisol	953	531	2294	360	2.8
SL3-60	Mollisol	861	395	1561	427	2.3
PL2-5	Mollisol	1286	802	18596	3241	17.0
PL2-35	Mollisol	842	916	19019	3469	26.7
MOM-1	Aridosol	0	285	14210	4897	
MOM-2	Aridosol	133	380	14621	5720	153.4
TS-6	Aridosol	17	346	12837	6940	1136.9
TS-10	Aridosol	13	241	11923	8077	1571.3
GS7	Aridosol	0	224	9711	3724	
CL-45 un	Mollisol	1523	2366	10920	1861	8.4
DAV-30 un	Mollisol	1507	2756	7332	1278	5.7

ENC-5 un	Inceptisol	0	215	8054	2837	
MONT-1-40 un	Aridosol	494	1259	11279	2161	27.2
KR1-60 un	Mollisol	469		13552	1432	31.9
SL1-50 un	Mollisol	251		1352	261	6.4
SL3-60 un	Mollisol	975		1810	352	2.2
KR2-10 un	Mollisol	1680		7050	1325	5.0
USAL	Mollisol	6626	8558	163064	3487	25.1
COH	Alfisol	3263	7942	178775	4922	56.3
MIN	Inceptisol	1171	1501	14775	3630	15.7
HODA	Alfisol	1919	2631	29335	6232	18.5
BLCK	Spodosol	828	2274	266443	1333	323.3
STG	Ultisol	4057	3931	217463	6134	55.1
PUTT	Inceptisol	2495	4350	84858	3967	35.6
TINK	Inceptisol	2098	4032	51762	1790	25.5
LOR	Alfisol	2087	3246	419312	9652	205.6
DEJ	Ultisol	3665	6553	342378	32891	102.4
IP	Alfisol	2523	5678	957238	71322	407.6
PA	Inceptisol	2271	5991	202443	8265	92.8
PT-60	Mollisol	2814	7582	74716	3171	27.7
NUN-1-0	Mollisol	369	1793	79233	2617	221.8
NUN-1-60	Mollisol	145	1250	76567	2299	544.6
NUN-2-35	Mollisol	355	0	100734	3426	293.6
NUN-2-50	Mollisol	245	0	84445	3142	357.3
TR-10	Aridosol	0	0	194028	2192	
TR-60	Aridosol	0	0	201243	1941	
TR-80	Aridosol	0	0	225937	3862	
SC-0	Aridosol	675	3817	98433	2468	149.4
SC-20	Aridosol	670	5380	91771	1837	139.7
SC-40	Aridosol	600	4008	122301	3000	208.7

SC-80	Aridosol	634	3817	102373	2967	166.3
PK-1-5	Aridosol	0	754	81165	7360	
PK-1-20	Aridosol	0	1007	74807	5627	
PK-1-40	Aridosol	0	548	68355	6465	
PK-2-5	Aridosol	0	314	84197	10051	
PET-30	Aridisol	412	452	27130	1742	70.1
PET-40	Aridisol	421	448	21183	1229	53.2
OM-1-20	Mollisol	1545	1188	34530	1038	23.0
OM-1-30	Mollisol	1437	1535	35131	927	25.1
OM-1-70	Mollisol	1217	1416	23151	676	19.6
BU-1-40	Mollisol	1148	2997	57880	2057	52.2
BU-1-50	Mollisol	1802	1548	96257	2245	54.7
HET-0	Mollisol	2747	1548	43991	2981	17.1
HET-10	Mollisol	2992	1660	45941	3259	16.4
HET-20	Mollisol	3320	1871	46435	3414	15.0
HET-30	Mollisol	2541	2159	49121	3421	20.7
HET-40	Mollisol	2933	1852	54241	3457	19.7
HET-50	Mollisol	3403	2072	68368	3555	21.1
HET-60	Mollisol	3072	2644	72182	3824	24.7
HET-70	Mollisol	3320		76096	3557	24.0
HET-80	Mollisol	3352	3132	82291	3479	25.6
BT-30	Inceptisol	1163	2326	63161	1688	55.8
BT-45	Inceptisol	1419	2243	62249	1753	45.1
ENC-10	Inceptisol	0	142	56831	3219	
ENC-15	Inceptisol	0	44	64697	4579	
ENC-20	Inceptisol	0		37254	9198	
ENC-30	Inceptisol	0	41	70943	4940	
ENC-40	Inceptisol	0	40	81909	11737	
ENC-50	Inceptisol	0	16	143420	13269	

ENC-60	Inceptisol	0	19	85832	6128	
PC-40	Mollisol	265	1750	84424	2977	330.4
PC-85	Mollisol	223	1473	72535	3006	338.2
PL2-0	Mollisol	0	888	88241	3664	
PL2-10	Mollisol	111	918	82552	3572	777.5
SL-1-50	Mollisol	162	523	9232	308	58.7
DAV-30	Mollisol	1374	2116	55980	1855	42.1
TS-6	Aridosol	189	460	83809	11177	502.1
TS-10	Aridosol	0	284	78400	10184	
Tr-0	Aridosol	0	285	203111	2684	
TR-10	Aridosol	0	335	204543	2323	
TR-20	Aridosol	0	288	218844	2675	
TR-30	Aridosol	0	279	206364	2862	
TR-40	Aridosol	0	260	213977	2529	
TR-60	Aridosol	0	289	207543	2162	
TR-70	Aridosol	0	295	237898	3847	
TR-80	Aridosol	0	244	233945	3077	
SC-0	Aridosol	590	1763	100836	2931	175.9
SC-20	Aridosol	677	2533	112616	2856	170.7
SC-30	Aridosol	656	2520	119203	3327	186.8
SC-40	Aridosol	661	2276	116978	3247	181.9
SC-50	Aridosol	417	1457	100206	3306	248.1
SC-60	Aridosol	395	1417	98490	3248	257.6
SC-80	Aridosol	492	1665	100369	3188	210.4
SC-85	Aridosol	554	1494	102220	3613	190.9
USDA-01	Inceptisol	55931	2336	115200	68442	3.3
USDA-02	Oxisol	754	1027	60401	10205	93.6
USDA-03	Andisol	1028	1142	2366	3942	6.1
USDA-04	Inceptisol	1687	1044	5482	4135	5.7

USDA-05	Oxisol	1074	0	84708	40119	116.2
USDA-06	Oxisol	829	0	93806	51918	175.7
USDA-07	Spodosol	2380	1254	5635	5217	4.6
USDA-08	Spodosol	6874	1539	4637	3216	1.1
USDA-09	Spodosol	6793	1988	1470	4965	0.9
USDA-10		20771	1937	68468	56141	6.0
USDA-11	Andisol	16495	2145	13004	2704	1.0
USDA-12	Oxisol	2769	0	93068	136408	82.9
USDA-13		120	0	1692	2365	33.8
USDA-14		0	0	38619	2918	
USDA-15		9274	1555	39106	47987	9.4
USDA-16	Andisol	22346	1805	53017	77329	5.8
USDA-17	Oxisol	43	0	52095	13691	1514.1
USDA-18	Andisol	11425	2139	8915	2133	1.0
USDA-19	Alfisol	589	0	31430	6316	64.1
USDA-20		5644	1111	14856	17565	5.7
USDA-21	Inceptisol	17040	2587	44082	11310	3.3
USDA-22		3136	1061	43654	604	14.1
USDA-23	Inceptisol	419	1043	1079	675	4.2
USDA-24	Oxisol	1375	0	82780	122296	149.1
USDA-25	Alfisol	689	0	32969	93884	184.1
STD55	Alfisol			5770	2373	
USDA-26	Aridisol	0	0	3906	8002	
USDA-27	Aridisol	54	1054	1483	4634	113.7
USDA-28	Aridisol	0	0	1517	1702	
USDA-29	Aridisol	0	0	1350	1985	
USDA-30	Aridisol	969	0	3411	3899	7.5
USDA-31	Mollisol	2424	0	11574	4232	6.5
USDA-32	Mollisol	364	0	8326	5160	37.1

USDA-33	Aridisol	0	0	1945	6721	
USDA-34	Aridisol	0	0	2109	6884	
USDA-35	Aridisol	125	0	2493	5511	64.3
USDA-36	Aridisol	0	0	2347	5336	
USDA-37	Aridisol	0	0	3038	4715	
USDA-38	Mollisol	0	0	502	1139	
USDA-39	Andisol	396	0	2638	4312	17.5
USDA-40	Andisol	646	0	3130	3733	10.6
USDA-41	Andisol	460	0	2974	3390	13.8
USDA-42	Andisol	379	0	1847	2297	10.9
USDA-43	Aridisol	2412	0	37116	28218	27.1
USDA-44	Aridisol	1392	0	29389	23983	38.3
USDA-45	Aridisol	0	0	3479	1848	
USDA-46	Aridisol	0	0	3004	1567	
USDA-47	Aridisol	0	0	3133	1531	
USDA-48	Aridisol	0	0	3025	1536	
USDA-49	Aridisol	0	0	3230	1346	
USDA-50	Aridisol	0	0	2039	885	
STD I	Alfisol	2546	1017	3271	2794	2.4
USDA-51	Aridisol	0	0	2608	2462	
USDA-52	Aridisol	0	1032	2918	1308	
USDA-53	Aridisol	0	1048	4139	1004	
USDA-54	Aridisol	0	0	2924	5372	
USDA-55	Aridisol	0	0	2659	3718	
USDA-56	Aridisol	0	0	3176	5580	
USDA-57	Mollisol	81	0	5368	9157	178.9
USDA-58	Mollisol	75	0	5449	9648	201.0
USDA-59	Mollisol	29	0	5563	7898	458.7
USDA-60	Alfisol	0	0	3044	2774	

USDA-61	Alfisol	0	0	2140	1938	
USDA-62	Alfisol	0	0	1079	994	
USDA-63	Alfisol	0	0	3495	1203	
USDA-64	Mollisol	0	0	1519	822	
USDA-65	Mollisol	0	0	951	633	
USDA-66	Mollisol	0	0	889	618	
USDA-67	Mollisol	0	0	733	661	
USDA-68	Alfisol	125	0	2610	1786	35.2
USDA-69	Alfisol	4	0	3519	2331	1351.6
USDA-70	Alfisol	0	0	2530	1937	
USDA-71		111	0	5741	3242	80.6
USDA-72		82	0	5533	3311	108.1
USDA-73		56	0	5579	3199	155.6
USDA-74		92	0	6038	3163	99.9
USDA-75		83	0	6190	3152	112.6
STD II	Alfisol	2440	1134	3258	2641	2.4
USDA-76		48	0	5028	3689	180.3
USDA-77		0	0	3522	3113	
USDA-78		0	0	2288	3211	
USDA-79		0	0	2520	1883	
USDA-80		0	0	3668	2077	
USDA-81		0	0	4126	1934	
USDA-82		0	0	5057	9825	
USDA-83		0	0	2908	6255	
USDA-84		0	0	2815	7228	
USDA-85		0	0	4326	7135	
USDA-86		0	0	3731	5930	
USDA-87	Mollisol	0	0	1790	3079	
USDA-88	Mollisol	0	0	1831	3179	

USDA-89	Mollisol	0	0	813	3062	
USDA-90	Aridisol	0	0	5058	7137	
USDA-91	Aridisol	0	0	4766	6805	
USDA-92	Aridisol	0	0	4950	10849	
USDA-93	Aridisol	0	0	5037	13086	
USDA-94	Aridisol	0	0	1581	6247	
USDA-95	Aridisol	0	0	1876	9060	
USDA-96	Aridisol	0	0	2492	8798	
USDA-97	Aridisol	0	0	2961	5665	
USDA-98	Aridisol	0	0	2964	4706	
USDA-99	Aridisol	0	0	5703	5461	
USDA-100	Aridisol	0	0	5851	6033	
USDA-101	Aridisol	57	0	5052	11590	292.9
STD III	Alfisol	2371	0	3294	2962	2.6
ISL-03	Inceptisol	1946	130	34792	22993	29.7
ISL-04	Inceptisol	2539	1136	67046	19437	34.1
ISL-05	Inceptisol	2814	2093	75306	33565	38.7
ISL-12	Andisol	833	0	8225	11250	23.4
ISL-13	Andisol	1435	33	17860	16960	24.3
ISL-14	Andisol	1662	146	19662	18520	23.0
ISL-15	Andisol	2032	390	20870	16912	18.6
ISL-16	Andisol	2115	37	11277	10022	10.1
ISL-20		1403	735	58259	29700	62.7
ISL-21	spring soil crust	948	875	24869	24204	51.8
ISL-24	spring soil crust	2067	614	28255	25708	26.1
ISL-25	moss	3316	445	19459	17004	11.0
ISL-27	spring soil crust	2846	278	10238	13055	8.2
ISL-28SP	spring soil crust		358	27342	15241	

ISL-28SOIL	spring soil crust - entisol	1957	409	32136	18129	25.7
ISL-29	Inceptisol	2126	665	41225	25834	31.5
ISL-30	Inceptisol	1413	143	35204	27003	44.0
ISL-31	Inceptisol	2950	48	157850	34349	65.1
ISL-32	Inceptisol	1719	317	37259	12545	29.0
ISL-34	Inceptisol	1340	488	13458	12650	19.5
ISL-35	Inceptisol	1752	688	11088	8741	11.3
ISL-38	Inceptisol	2420	244	13804	14395	11.7
ISL-39	Inceptisol	2964	213	23192	28327	17.4
ISL-40	Inceptisol	3040	385	21882	18753	13.4
ISL-42	Inceptisol	3185	228	16494	16372	10.3
ISL-43	Inceptisol	8950	181	13535	8864	2.5
ISL-44		1785	0	1729	4576	3.5
ISL-48	sand - entisol	2002	0	2464	4912	3.7
ISL-49	Inceptisol	5178	282	5880	9610	3.0
ISL-50	Inceptisol	6657	463	9776	7742	2.6
ISL-51	Inceptisol	4284	40	5885	5626	2.7
ISL-52	Inceptisol	7114	48	9843	10225	2.8
ISL-53	Inceptisol	5527	0	7532	7573	2.7
ISL-54	Inceptisol	6270	102	14437	8738	3.7
ISL-55	Inceptisol	10150	1508	14342	9524	2.4
ISL-57	Entisol	6217	33	4554	6454	1.8
ISL-58	Entisol	2908	29	2984	4881	2.7
ISL-59	Entisol	3611	33	4338	4899	2.6
ISL-60	Entisol	6806	119	9102	6400	2.3
ISL-61S	soil crusts	6218	98	5552	7240	2.1
ISL-61M	soil crusts	5901	25	6233	7589	2.3
ISL-64	Entisol	7490	145	5872	6948	1.7

ISL-65	Entisol	7290	190	5520	6678	1.7
ISL-67	Inceptisol	1784	27	3341	5579	5.0
ISL-68	Inceptisol	9688	1387	10306	9511	2.0
ISL-69	Inceptisol	10921	237	13816	11716	2.3
ISL-70	Inceptisol	10782	400	8664	6593	1.4
ISL-71	Inceptisol	12273	2137	21638	9837	2.6
ISL-72	Inceptisol	11777	3083	17474	13057	2.6
ISL-73	Inceptisol	11787	2562	20717	10495	2.6
ISL-02	Inceptisol	14630	562	17975	17837	2.4
ISL-11	sand - entisol	1335	0	4539	9026	10.2
ISL-17	biological soil crust	4764	30	9388	12495	4.6
ISL-22	spring soil crust	6345	383	18491	14824	5.3
ISL-23	spring soil crust	8138	247	15355	20354	4.4
ISL-33	Inceptisol	11139	668	9969	9060	1.7
ISL-37	biological soil crust	9936	0	8691	17415	2.6
ISL-41	Inceptisol	7219	34		16357	2.3
ISL-63	Entisol	4975	22		7764	1.6
ISL-75	Inceptisol	31848	788		23091	0.7
ISL-76	Inceptisol	18078	167		32237	1.8
ISL-77	Inceptisol	28669	450		23733	0.8
ISL-78	Inceptisol	16498	170		30159	1.8
ISL-79	Inceptisol	18295	110		34849	1.9
ISL-81	Inceptisol	16623	370		4609	0.3
ISL-82	Inceptisol	18393	466		6915	0.4
ISL-83	Inceptisol	27808	663		9447	0.3
ISL-84	Inceptisol	12452	532		6221	0.5
ISL-85	Inceptisol	26495	1052		11867	0.4
ISL-86	Inceptisol	7814	575		10634	1.4
ISL-87	Inceptisol	17979	819		8407	0.5

ISL-WO	sand - entisol	2579	0		7088	2.7
ISL-WO2	sand - entisol	8827	41		9171	1.0
STD100	Alfisol	4013			3263	0.8
USDA102	Mollisol	498	70	11373	1103	25.1
USDA103	Inceptisol	3161	206	65798	8042	23.4
USDA104	Mollisol	253	30	19130	2818	86.6
USDA105	Spodosol	4009	309	109900	51480	40.3
USDA106	Spodosol	186	0	7599	7767	82.8
USDA107	Mollisol	1243	171	16618	6909	18.9
USDA108	Ultisol	391	0	53922	11736	168.0
USDA109	Ultisol	184	124	1179	1450	14.3
USDA110	Ultisol	1750	944	9591	1054	6.1
USDA111	Alfisol	877	426	5826	1665	8.5
USDA112	Inceptisol	1727	184	127364	118404	142.3
USDA113	Inceptisol	53	16	712	162	16.5
USDA114		518	0	52061	3863	107.9
USDA115		352	0	53305	2589	158.8
USDA116		325	0	53316	3319	174.0
USDA117		392	0	39871	3389	110.4
USDA118	Oxisol	4838	1115	5800	1462	1.5
USDA119		782	72	3989	1164	6.6
USDA120	Alfisol	2421	237	15951	5720	8.9
USDA121	Ultisol	831	72	3622	1579	6.3
USDA122	Aridisol	28960	107	42337	9030	1.8
USDA123	Oxisol	89970	2135	1701	350	0.0
USDA124		112505	3007	1602	343	0.0
USDA125	Inceptisol	30024	42	13770	2035	0.5
std 100		45420	510	4659	1991	0.1
USDA126	Mollisol	28899	48	5005	679	0.2

USDA127		147129	911	5452	590	0.0
USDA128		87179	321	18032	3260	0.2
USDA129		153679	1149	2526	1339	0.0
USDA130		34127	458	10280	2419	0.4
USDA131		13809	72	3644	485	0.3
USDA132		6743	223	2821	1362	0.6
USDA133	<i>Spodosol</i>	8448	304	4122	1054	0.6
USDA134	Andisol	3073	168	6494	1296	2.5
USDA135	Andisol	6137	261	11144	4214	2.5
USDA136	<i>Gelisol</i>	7213	4330	3827	1332	0.7
USDA137	Spodosol	10310	231	43743	14902	5.7
USDA138	Gelisiol?	1112	272	6208	1351	6.8
USDA139	Inceptisol?	1054	97	6163	1188	7.0
USDA140	Gelisol	242	0	1478	592	8.5
USDA141	Gelisol	1268	84	6162	1222	5.8
USDA142	Gelisol	3878	100	4529	1910	1.7
USDA143	Alfisol	2611	100	34675	1669	13.9
USDA144	Gelisol	7859	206	20999	1327	2.8
USDA145	Gelisol	757	0	1536	1586	4.1
USDA146	Gelisol	525	19	4328	11628	30.4
USDA147	Spodosol	632	26	4608	13812	29.2
USDA148	Spodosol	511		1286	509	3.5
USDA149	Gelisol	2387	31	5799	1214	2.9
std 100	Alfisol	2944		5339	1160	2.2
ANT-01	Entisol/sediment	510	1423	684	2254	5.8
ANT-02	Entisol/sediment	481	0	3546	2006	11.5
ANT-03	Entisol/sediment	848	130	1099	4357	6.4
ANT-04	Entisol/sediment	1386	0	4431	11258	11.3
ANT-05	Entisol/sediment	637	68	1138	4364	8.6

ANT-06	Entisol/sediment	5461	0	16731	4465	3.9
ANT-07	Entisol/sediment	824	46	7033	29723	44.6
ANT-08	Entisol/sediment	603	0	2139	2444	7.6
ANT-09	Entisol/sediment	938	35	1849	4579	6.9
ANT-10	Entisol/sediment	606	31	748	2863	6.0
ANT-11	Entisol/sediment	504	28	0	410	0.8
ANT-12	Entisol/sediment	669	0	3376	548	5.9
ANT-13	Entisol/sediment	519	23	1312	1098	4.6
ANT-14	Entisol/sediment	733	22	504	1070	2.1
ANT-15	Entisol/sediment	672	20	1269	8381	14.3
ANT-16	Entisol/sediment	475	19	349	1162	3.2
ANT-17	Entisol/sediment	457	0	1164	236	3.1
ANT-18	Entisol/sediment	623	17	1383	5494	11.0
ANT-19	Entisol/sediment	610	0	2572	937	5.8
ANT-20	Entisol/sediment	807	15	968	962	2.4
ANT-21	Entisol/sediment	986	14	2349	3278	5.7
ANT-22	Entisol/sediment	687	14	940	1162	3.1
STD55	Alfisol	3191	13	1458	1089	0.8
AK-6901	Gelisol	14473	19	4097	1466	0.4
AK-6902	Gelisol	3317		645	955	0.5
AK-6904	Gelisol	9882		543	4279	0.5
AK-6906	Gelisol	11813		1090	470	0.1
17-6203	Gelisol	10855		9233		
17-6204	Gelisol	3212		8365		
17-6206	Gelisol	2721		5644		
17-6210	Gelisol	8303		2686		
16-6211	Gelisol	19760		3232		
17-6211a	Gelisol	6752		1942		
17-6212a	Gelisol	762		739		

17-6213a	Gelisol	3103	1093
16-6221	Gelisol	8354	1252
16-6228a	Gelisol	19202	12789
16-6230t	Gelisol	2855	1679
16-6230b	Gelisol	47240	18260
TT	Gelisol	6196	3007
TWS-A	Gelisol	6980	3310
IWS-A	Gelisol	5500	908
16-6211-R	Gelisol	6764	
17-6211A-R	Gelisol	21593	
STD100	Alfisol	2936	2500

Supplemental Table 5. Pyrite data for new samples.

Sample ID	Order	Pyrite (wt %)	Pyrite (density-normalized)
All values in ppm.			
C-1-15	Alfisol	0.12862979	0.076565351
C-1-65	Alfisol	0.09396897	0.055933911
C-1.5-15	Alfisol	0.1389673	0.082718631
C-1.5-35	Alfisol		0
C-2-17	Alfisol	1.26408	0.752428571
C-2-57	Alfisol	0.95338776	0.567492714
C-3-13	Alfisol		0
C-4-10	Alfisol	1.26047863	0.750284899
C-4-20	Alfisol	1.22556233	0.729501387
C-5-24	Alfisol	0.8768547	0.521937321
C-5.5-20	Alfisol	0.02179717	0.012974506
C-6-11	Alfisol	0.0889526	0.052947976
C-6-61	Alfisol	1.14435127	0.68116147
C-7-13	Alfisol	1.44547977	0.860404625
C-7-43	Alfisol	1.21957349	0.725936601
C-4-20	Alfisol	0.08613134	0.051268655

C-7-13	Alfisol	0.09429412	0.056127452
ENC-5	Aridosol	0.08111566	0.050697288
ENC-40	Aridosol	1.34204651	0.838779069
MONT-1-15	Aridosol	0.05829091	0.036431819
MONT-1-40	Aridosol	0.09533878	0.059586738
AC-2	Aridosol	0.05829091	0.036431819
MOM-1	Aridosol	1.11513043	0.696956519
MOM-2	Aridosol	0.07783353	0.048645956
TS-6	Aridosol	0.08743636	0.054647725
TS-10	Aridosol	0.12688654	0.079304088
GS7	Aridosol	1.19868249	0.749176556
ENC-40	Aridosol	0.67585946	0.422412163
AC-2	Aridosol	0.05608163	0.035051019
MOM-2	Aridosol	0.03937193	0.024607456
MONT-1-40	Aridosol	0.06223412	0.038896325
ENC-5	Aridosol	0.05964651	0.037279069
BH-01-01	Histosol	0.07452108	1.064586857
BH-01-02	Histosol	0.01862275	0.266039286
BH-01-03	Histosol	0.1710627	2.443752857
BH-01-05	Histosol	0.04680025	0.668575
BH-01-07	Histosol	0.0294016	0.420022857
BH-1-02	Histosol	0.01862275	0.266039286
BH-1-07	Histosol	0.0294016	0.420022857
4BH-02	Histosol	0.04022585	0.574655
4BH-05	Histosol	0.04509142	0.644163143
5BH-05	Histosol	0.09609992	1.372856
6BH-02	Histosol	0.42960647	6.137235286
6BH-05	Histosol	0.09732707	1.390386714
7BH-03	Histosol	0.07180589	1.025798429

7BH-4 (or 9)	Histosol	0.05396375	0.770910714
8BH-02	Histosol	0.06559591	0.937084429
8BH-05	Histosol	0.03114637	0.444948143
MS-2	Inceptisol	1.1742907	0.889614167
MS-6	Inceptisol	1.09606838	0.830354833
MS-10	Inceptisol	1.16750289	0.884471886
MS-13	Inceptisol	1.05983471	0.802905083
MS-18	Inceptisol	0.07398462	0.056048955
MS-22	Inceptisol	0.93968966	0.711886106
MS-18	Inceptisol	0.07514063	0.05692472
CL-40	Mollisol	0.83393064	0.587275099
CL-45	Mollisol	0.15984069	0.112563866
DAV-0	Mollisol	0.11249123	0.079219176
DAV-30	Mollisol	0.1157467	0.081511761
KR1-50	Mollisol	0.05373184	0.037839324
KR1-60	Mollisol	0.07851429	0.055291754
KR2-10	Mollisol	0.08717221	0.06138888
KR2-40	Mollisol	0.68351269	0.481346965
SL1-0	Mollisol	0.11347079	0.079909007
SL1-50	Mollisol	0.12520473	0.088172345
sl3-50	Mollisol	0.14128136	0.099493915
SL3-60	Mollisol	1.08677966	0.765337789
PL2-5	Mollisol	0.73119298	0.514924634
PL2-35	Mollisol	0.07891692	0.055575296
KR1-60	Mollisol	0.12230983	0.086133683
SL3-60	Mollisol	0.06068139	0.042733373
KR1-50	Mollisol	0.0498342	0.035094507
KR1-60	Mollisol	0.11379042	0.080134099
KR2-10	Mollisol	0.16119553	0.113517979

SL1-50	Mollisol	0.08694237	0.061227021
SL3-60	Mollisol	0.05328532	0.037524873
DAV-30	Mollisol	0.95648619	0.673581824
CL-45	Mollisol	0.05641056	0.039725746

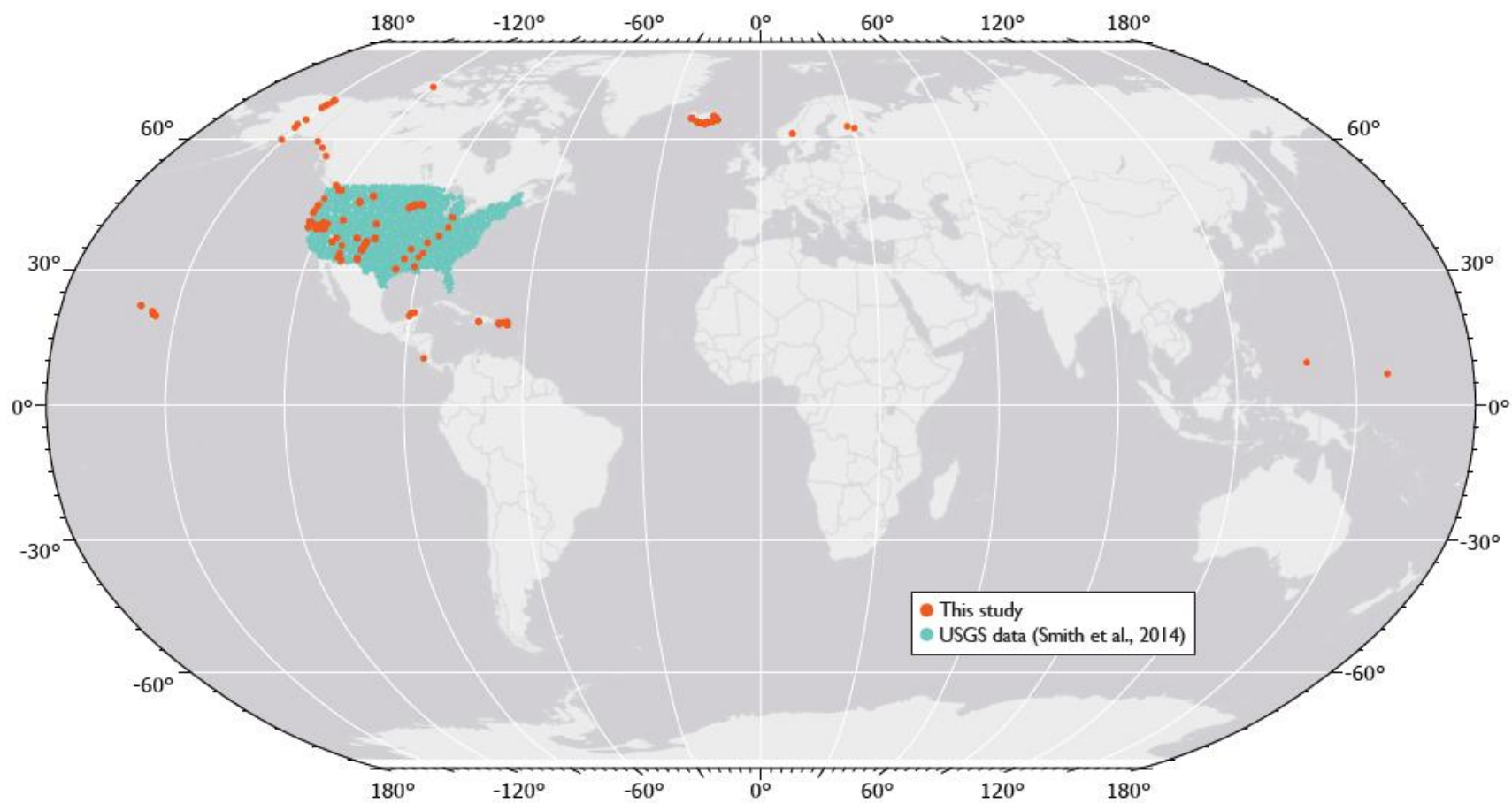


Figure S1. Map of modern soils used in this work, both new compilation (orange dots) and from the USGS soil geochemical database (blue dots; Smith et al., 2014).

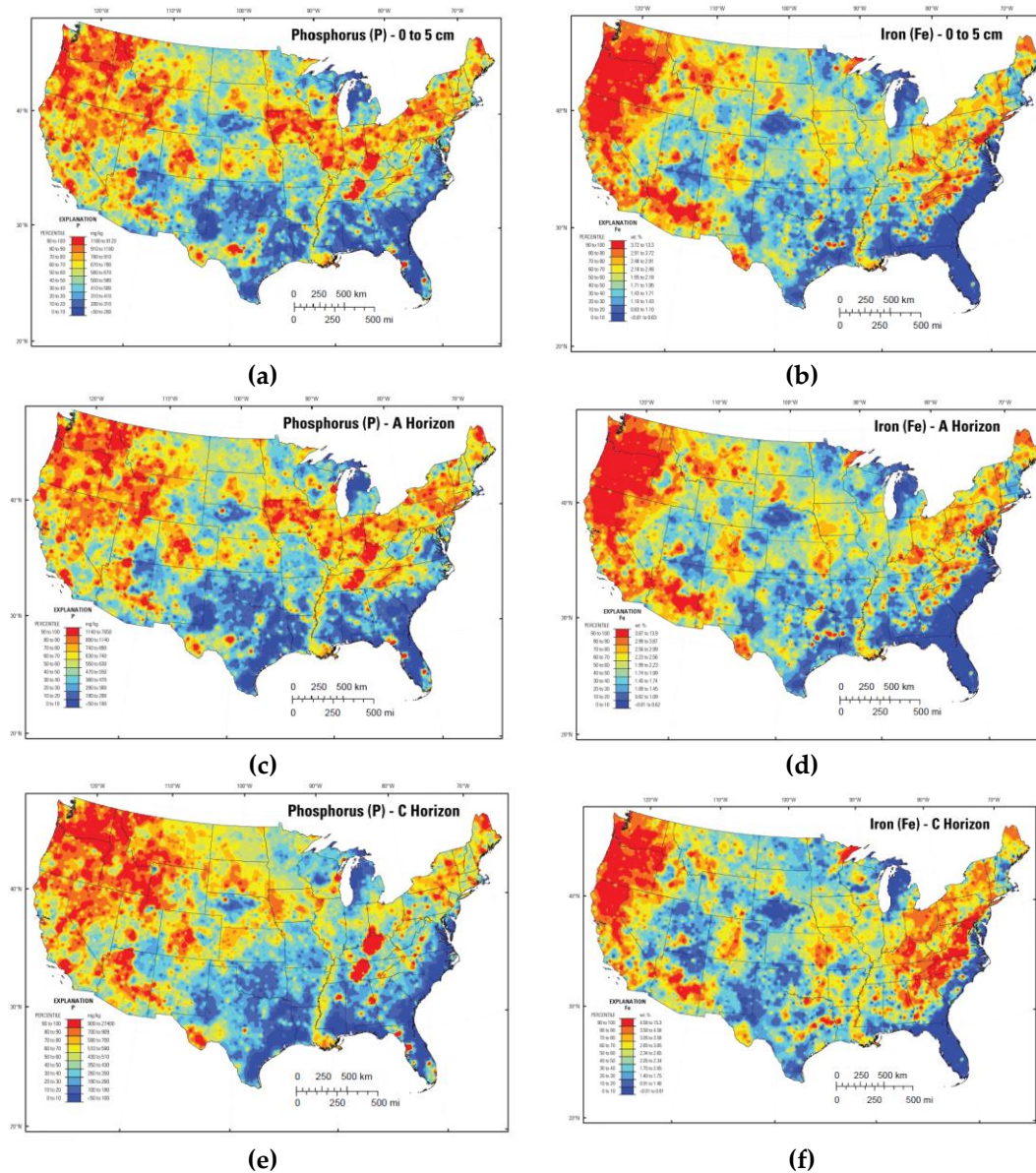


Figure S2. From Smith et al. (2014). Soil P (left column) and Fe (right column) concentrations in Top 0–5 cm, A horizon, and C horizons.

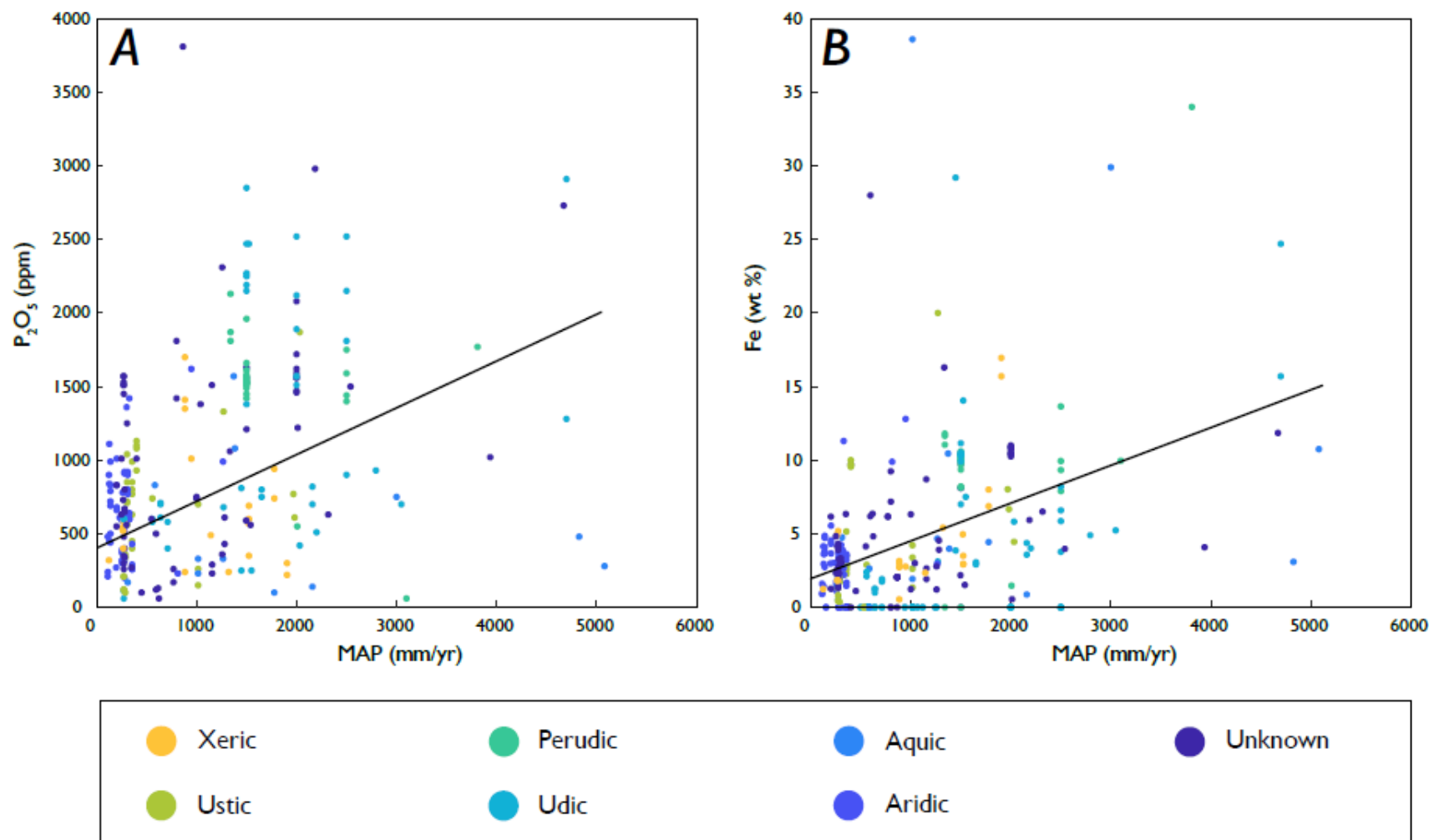


Figure S3. New soils (all horizons) from this study, colored by soil moisture regime, plotted as mean annual precipitation (MAP) versus P and Fe. Solid lines are linear least-squares regressions. (A) No strong correlation between MAP and P ($n = 250$; $R^2 = 0.13$, $p = 10^{-14}$), or within moisture regimes. (B) No strong correlation between MAP and total Fe ($n = 251$; $R^2 = 0.18$, $p = < 10^{-16}$), or within soil moisture regimes.

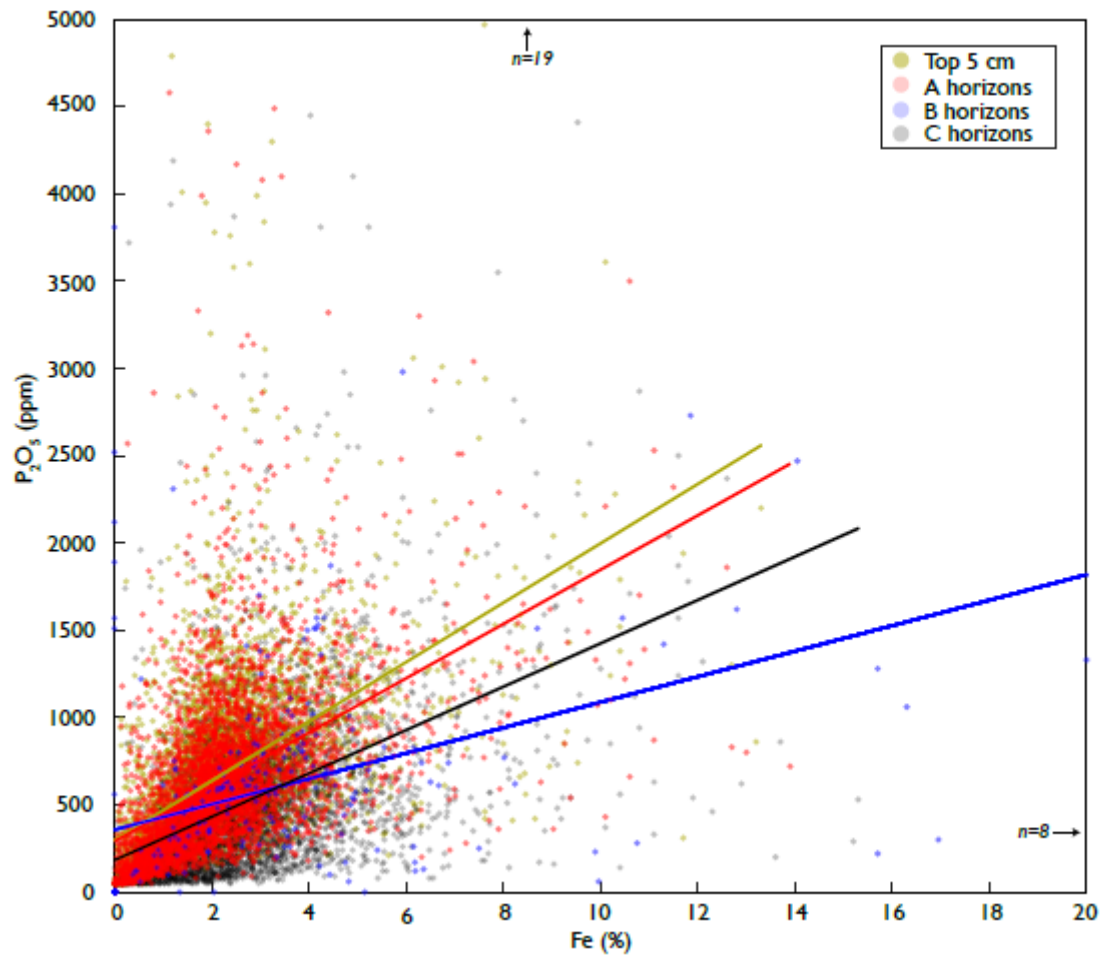


Figure S4. There exists a general weak positive correlation between total Fe and P in soils, with variation between horizons. Solid lines are linear least-square regressions for Top 5 cm (yellow), A horizons (red), B horizons (blue), and C horizons, (black). R^2 values for Top 5, A, B, and C horizons are 0.24, 0.24, 0.27, and 0.11; for all, $p < 10^{-16}$.

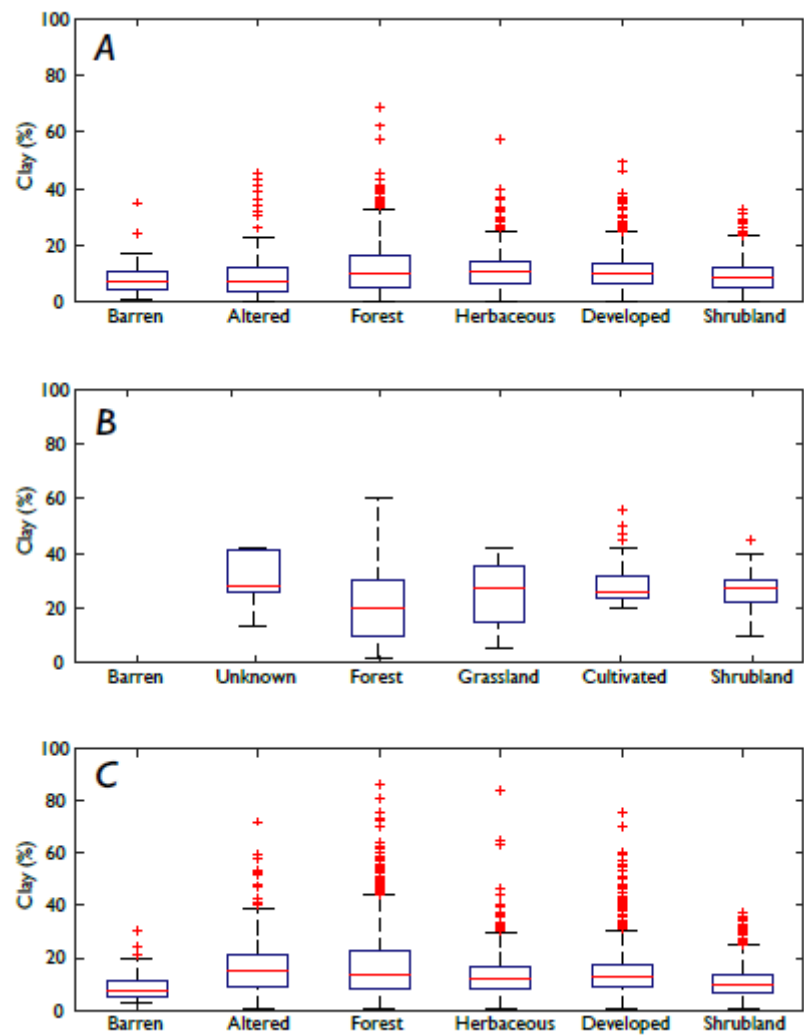


Figure S5. (A) Clay content, binned by vegetation type, in A horizons. (B) Clay content, binned by vegetation type, in B horizons. (C) Clay content, binned by vegetation type, in C horizons.

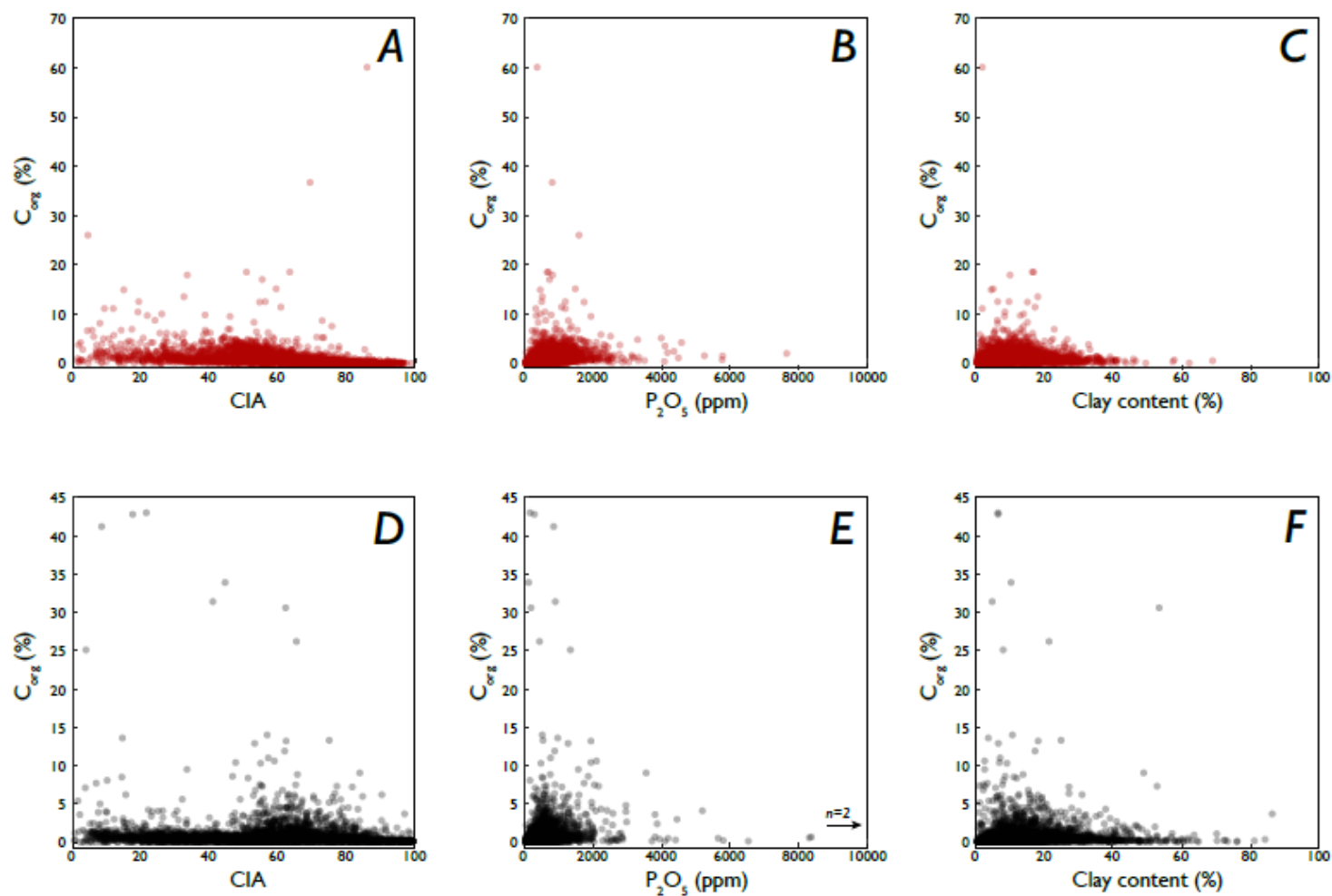


Figure S6. (A) CIA and organic carbon, in A horizons (R^2 0.09). (B) Total P and organic carbon, in A horizons (R^2 = 0.05). (C) Clay content and organic carbon, in A horizons (R^2 <0.01). (D) CIA and organic carbon, in C horizons. (R^2 <0.01). (E) Total P and organic carbon, in C horizons. (R^2 = 0.02). (F) Clay content and organic carbon, in C horizons (R^2 <0.01).

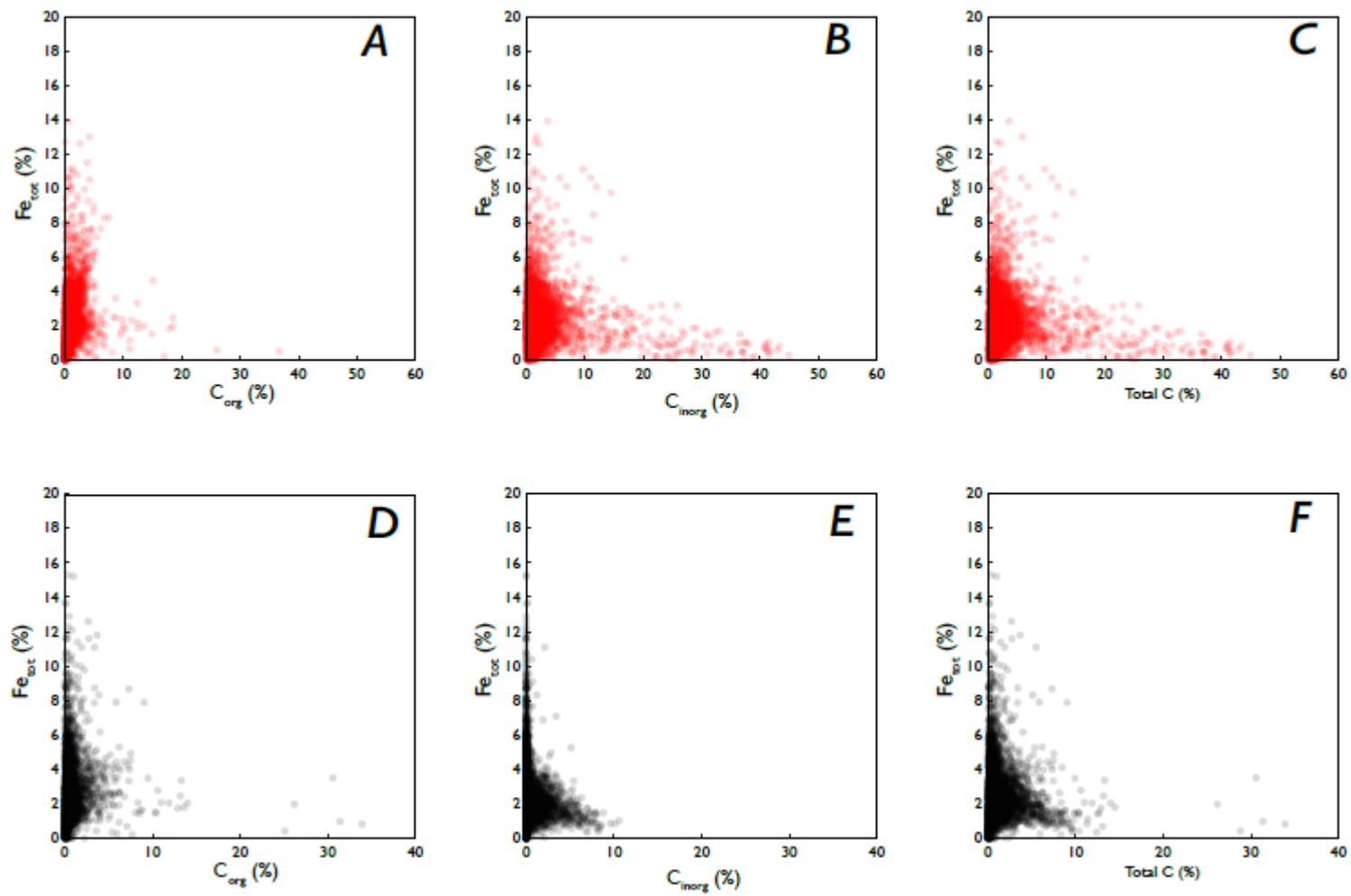


Figure S7. (A) C_{org} and Fe_{tot} , A horizons ($R^2 = 0.04$). (B) C_{inorg} and Fe_{tot} , A horizons ($R^2 < 0.01$). (C) Fe_{tot} and C_{tot} , A horizons. ($R^2 < 0.01$). (D) C_{org} and Fe_{tot} , C horizons. ($R^2 < 0.01$). (E) C_{inorg} and Fe_{tot} , C horizons. ($R^2 = 0.04$). (F) C_{tot} and Fe_{tot} , C horizons. ($R^2 < 0.01$).

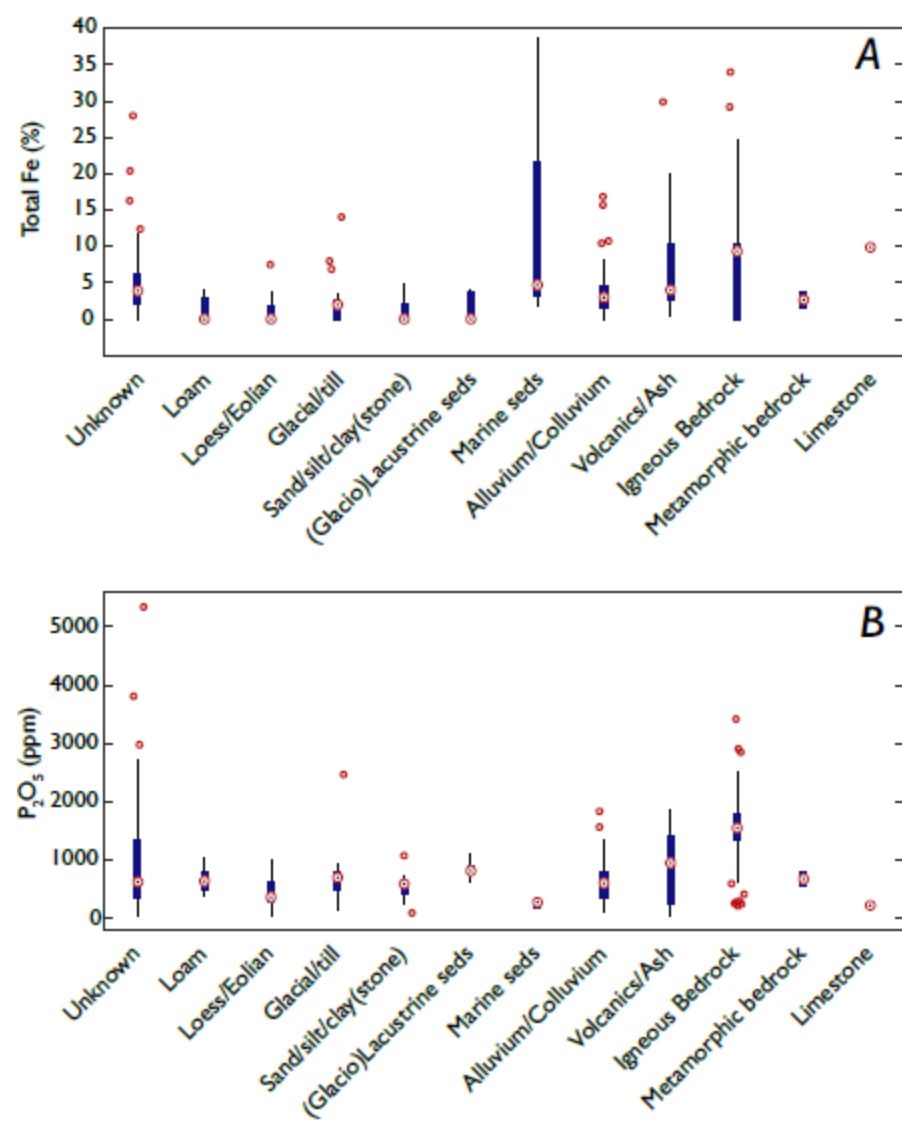


Figure S8. (A) Total Fe in soils, binned by parent material. (B) Total P in soils, binned by parent material. Dashed grey lines are crustal averages[77].

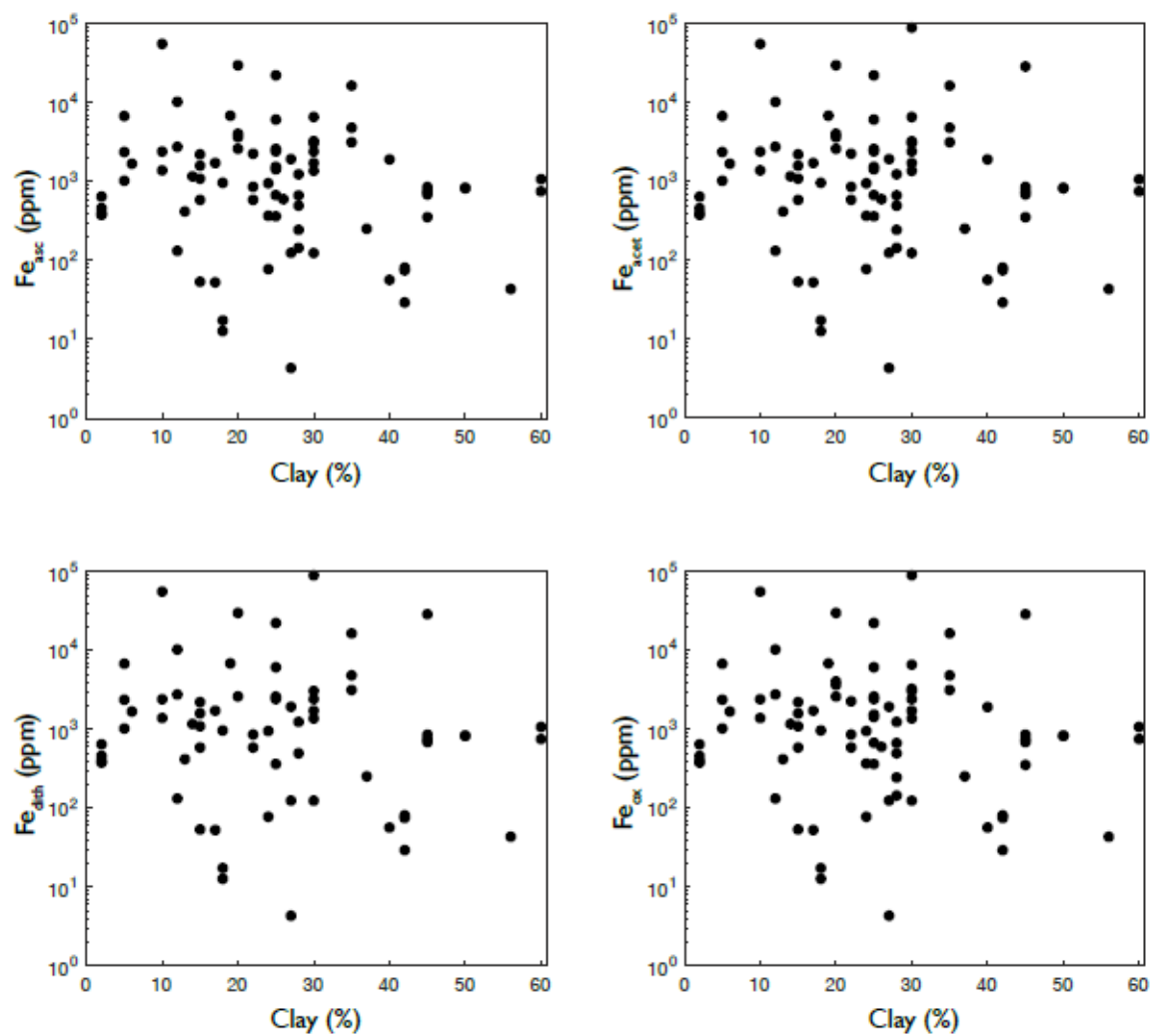


Figure S9. Clay content and Fe species in B horizons; note log scale on y-axis. (A) No correlation ($R^2 = 0.07$) between clay and Fe_{asc}. (B) No correlation ($R^2 = 0.02$) between clay and Fe_{acet}. (C) No correlation ($R^2 = 0.12$) between clay content and Fe_{dth}. (D) No correlation ($R^2 < 0.01$) between clay content and Fe_{ox}.

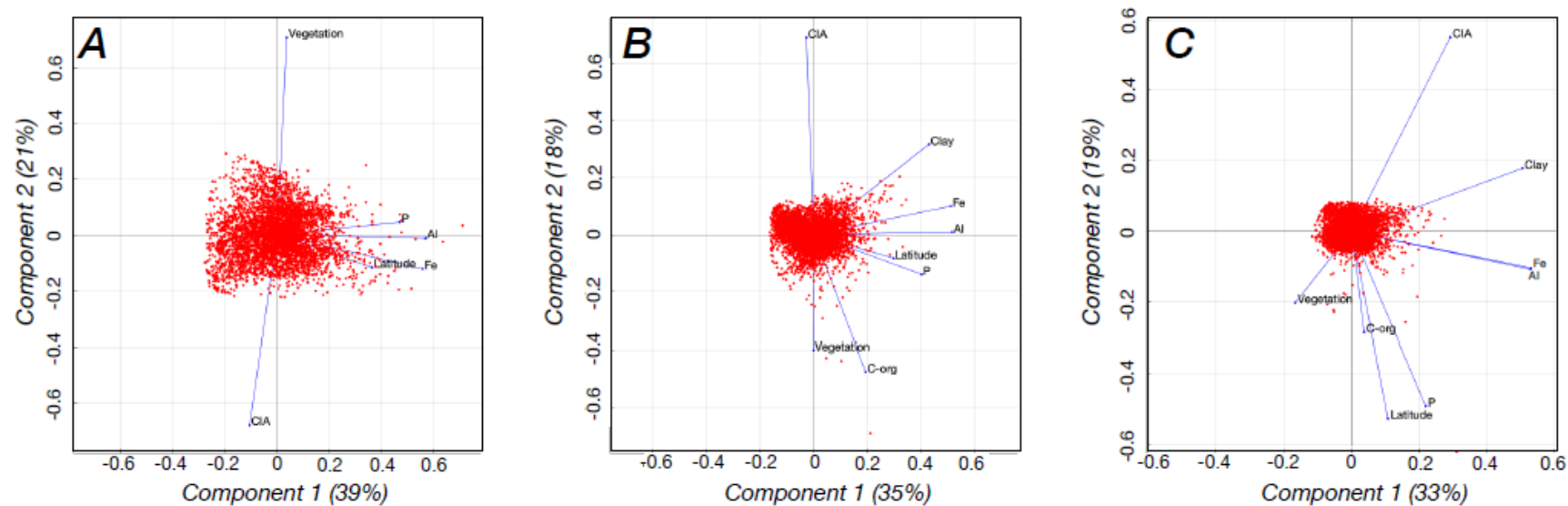


Figure S10. Principle Components Analysis (PCA) for USGS soils. (A) PCA for Top 5 cm (with 60% of variance explained by components 1 and 2). No clay or organic carbon data were available for this horizon. (B) PCA for A horizon (with 53% of variance explained by components 1 and 2). (C) PCA for C horizon (with 52% of variance explained by components 1 and 2).