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**Sediment Magnetic Data and Thermomagnetic Determinations of
Holocene and Pleistocene Soils and Their Parent Materials From
Zanesville, Ohio: Contributions to Quaternary Paleoclimate Studies
of Midcontinent Loess Deposits**

by

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INTRODUCTION

This report presents sediment magnetic data from Holocene and Pleistocene soil and parent loess material from relatively thin loess deposits along the Muskingum Valley, near Zanesville, Ohio. These data were collected as part of a broader study of the magnetic properties of midcontinent soils and loess. The ultimate objective is to better understand the types, properties, and origin of magnetic minerals in midcontinent soils and loess and their relations to past amounts of precipitation. The magnetic data presented here are part of a larger study by the U.S. Geological Survey of North American paleoclimates during the last interglacial period (about 130 to 70 ka).

The sampled section is located 0.56 km east of the Muskingum River, in the SW1/4, NE1/4, of Sec. 29, T13N, R12W. A description of the upper part of the section (the part studied here), along with particle size, chemical, and mineralogical data, can be found in Rutledge and others (1975a, 1975b). The profile studied is the T2S1 site of Rutledge and others (1975a). Analyses were conducted on Loveland loess, the Sangamon soil developed in Loveland loess, the Farmdale Soil, Peoria Loess, and the modern soil developed in Peoria loess.

METHODS

Sampling

In a single vertical traverse, samples were collected from a modern soil profile developed in the Peoria loess through the Sangamon soil developed in Loveland loess. Samples were collected as representative "channel" samples from each of the major soil units (e.g., the A1 horizon, the Bt horizon, etc.). Each soil sample was collected from material over the exposed depth range of the soil horizon.

For the analysis of magnetic properties such as magnetic susceptibility and laboratory induced magnetizations, splits of the soil and loess samples were packed into plastic cubes that are capable of holding approximately 3.2 cm³ of material. Each sample and cube were weighed, and the average weight of an empty sample holder was subtracted from the gross weight in order to get the true weight of the sample.

Magnetic Susceptibility

A susceptibility meter, operating at a sensitivity better than 10⁻⁵ volume SI was used to measure low frequency (LFMS, at 600 Hz) and high-frequency (HFMS, at 6000 Hz) magnetic susceptibility of soil and loess samples. In addition, the frequency dependence of magnetic susceptibility (FDMS) and the percentage of FDMS (%FDMS), were calculated using the following formulas:

$$FDMS = LFMS - HFMS,$$

and

$$\%FDMS = [(LFMS - HFMS)/LFMS] \times 100.$$

Magnetic susceptibility data are listed in Table 1.

Laboratory Induced Magnetizations

An anhysteretic remanent magnetization was imparted to each sample by placing it in a slowly decaying alternating field with a peak field of 100 mT while it was subjected to a DC bias of 0.1 mT. The ARM was then measured using a high-speed spinner magnetometer operating at 90 Hz. Following the ARM acquisition experiments, an impulse magnetizer was used to impart isothermal remanent magnetizations (IRMs) to each specimen. Each specimen was given an initial IRM in an induction of 1.2 T (i.e., $IRM_{1.2T}$), and the resultant magnetization was measured using the spinner magnetometer. Each sample was then given an oppositely directed IRM in an induction of 0.3 T ($IRM_{-0.3T}$) and the remanence was again measured with the magnetometer. The "hard" isothermal remanent magnetization (HIRM) and the S parameter were then calculated as:

$$HIRM = (IRM_{1.2} + IRM_{-0.3})/2,$$

$$\text{and } S = -IRM_{-0.3}/IRM_{1.2},$$

as suggested by King and Channel (1991).

Induced magnetization data and the HIRM and S parameters are listed in Table 1.

Thermomagnetic Determinations

Curie temperatures were determined for magnetic minerals separated from several bulk sediment/soil samples. Separation of the magnetic phases was made by dispersing the soil or loess sample in distilled water, along with a small amount of a surfactant, in an ultrasonic cleaner. The resultant slurry was then pumped past a permanent magnet using a technique similar to that described by Petersen and others (1986). The resultant magnetic separates were rinsed with acetone to remove water and then allowed to dry in air.

Curie temperatures of the soil and loess samples were investigated using two different types of thermomagnetic devices. The first consisted of sensitive

electrobalance similar to that described by Larson and others (1975). In this device, saturation magnetization in an applied field of 0.2 to 0.45 T was measured as a function of temperature. The samples were heated in air up to a maximum temperature of about 660°C (approximately 15°C/min) and then allowed to cool to near room temperature. Each sample consisted of about 0.15 to 0.40 mg of magnetic material separated from the magnetic separate using a hand magnet. Thermomagnetic curves obtained using the Curie balance are given in Figure 1.

The second device used in the thermomagnetic experiments measured magnetic susceptibility as a function of temperature. In this device, the magnetic separate was placed in dry Al_2O_3 powder in a quartz tube. A platinum temperature sensor was then inserted into the tube such that the end of the sensor was nearly in contact with the magnetic separate. The sample was then heated in a series of steps to a peak temperature of 630 to 660°C and then cooled. Magnetic susceptibility was measured approximately every 3°C by inserting the furnace assembly into a coil and switching off the furnace current. Thermomagnetic experiments were performed both in an atmospheric environment and by allowing a low flow (approximately 0.05 liters/min) of argon to pass over the sample. The magnetic susceptibility of all samples were corrected for the diamagnetic susceptibility of the quartz tube and Al_2O_3 powder by subtracting the average susceptibility of a "blank" sample consisting of a tube containing an approximately equivalent amount of Al_2O_3 to that used in each experiment.

Experiments at the U.S. Geological Survey sediment magnetism laboratory (Denver) have shown that the Curie temperature of individual samples determined using this device, held in a constant position from experiment to experiment, are reproducible to about 1 to 2°C (in the absence of significant phase changes during the experiments). The presence of temperature gradients in the furnace system and inherent uncertainties in the position of samples in individual heating experiments, however, indicates that the uncertainty in the determination of Curie temperatures for individual samples is probably on the order of 4 to 5°C (one standard deviation). Thermomagnetic curves of magnetic susceptibility vs. temperature are shown in Figure 2; analytical data obtained during these experiments are listed in Table 2.

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REFERENCES

- King, J.W., and Channel, J.E.T., 1991, Sedimentary magnetism, environmental magnetism, and magnetostratigraphy: Reviews of Geophysics, Supplement, p. 358-370.
- Larson, E.E., Hoblitt, R.P., and Watson, D.E., 1975, Gas-mixing techniques in thermomagnetic analysis: Geophysical Journal of the Royal Astronomical Society, v. 43, p. 607-620.
- Petersen, N., Von Dobonek, T., and Vali, H., 1986, Fossil bacterial magnetite in deep-sea sediments from the South Atlantic Ocean: Nature, v. 320, p. 611-615.
- Rutledge, E.M., Holowaychuk, N., Hall, G.F., and Wilding, L.P., 1975a, Loess in Ohio in relation to several possible source areas: I. Physical and chemical properties: Soil Science Proceedings, v. 39, p. 1125-1132.
- Rutledge, E.M., Wilding, L.P., Hall, G.F., and Holowaychuk, N., 1975b, Loess in Ohio in relation to several possible source areas: II. Elemental and mineralogical composition: Soil Science Society of America Proceedings, v. 39, p. 1133-1139.

Figure 1. Thermomagnetic curves of saturation magnetization vs. temperature for magnetic separates of soil and loess samples from the Zanesville loess profile. For each sample the sample depth given is the true depth of the sample midpoint. All thermomagnetic determinations were made in air.

Figure 2. Thermomagnetic curves of magnetic susceptibility vs. temperature for magnetic separates of soil and loess samples from the Zanesville loess profile. Thermomagnetic experiments were either conducted in air or in a flowing argon environment as specified on each plot. Depth measurements as in Fig. 1.

OH-1 Magnetic Separate
Unit: Modern Soil Ap
Depth: 0.12 m
Blank Corrected, In Air

OH-9 Magnetic Separate
Unit: C1 Soil Horizon
Depth: 0.12 m
Blank Corrected, In Argon

OH-11 Magnetic Separate
Unit: C3 Soil Horizon
Depth: 2.04 m
Blank Corrected, In Argon

Table 1. Sediment Magnetic Data for the Zanesville profile, Ohio.

Sample No: a unique number assigned to loess and/or sediment samples that are placed in approximately 3.2 cm³ plastic boxes.

Depth (m): the depth in the section from the modern soil down from which the sample was collected.

Unit: the lithologic unit from which the sample was derived; in this case, the "units" are soil horizons, as described by Rutledge and others (1975a).

Mass (g): Sample mass after correction for weight of the empty sample box.

LFMS (m³/kg): the low-frequency magnetic susceptibility obtained by multiplying the LFMS (emu/g) by $4\pi/1000$ to obtain units of m³/kg.

HFMS (m³/kg): the high- frequency magnetic susceptibility (in m³/kg) obtained by multiplying the HFMS (emu/g) by $4\pi/1000$ to obtain units of m³/kg.

FDMS (m³/kg): Frequency dependent magnetic susceptibility = LFMS-HFMS in units of m³/kg.

%FDMS: the percent frequency dependent magnetic susceptibility = [(LFMS-HFMS)/LFMS] × 100.

ARM (Am²/kg): the raw moment of the anhysteretic remanent magnetization divided by the sample mass to obtain units of Am²/kg.

IRM 1.2T (Am²/kg): the raw moment of the isothermal remanent magnetization acquired in an induction of 1.2 T, divided by the sample mass to obtain units of Am²/kg.

IRM-0.3T (Am²/kg): the raw moment of the isothermal remanent magnetization acquired after first exposing the sample to an induction of 1.2 T, followed by the application of an oppositely directed induction of 0.3T. The moment of the IRM has been divided by the sample mass to obtain units of Am²/kg.

HIRM: the "hard" isothermal remanent magnetization obtained by the formula: (IRM_{1.2T}+IRM_{-0.3T})/2, in units of Am²/kg.

S: The S parameter defined as: -IRM_{-0.3T}/IRM_{1.2T} (dimensionless).

ARM/MS: the ratio of the anhysteretic remanent magnetization divided by the low frequency magnetic susceptibility, in A/m

SIRM/MS: the ratio of the isothermal remanent magnetization at 1.2T divided by the low frequency magnetic susceptibility, in A/m.

MS/SIRM: the inverse of the SIRM/MS, in m/A.

ARM/SIRM: The ratio of the anhysteretic remanent magnetization divided by the isothermal remanent magnetization, dimensionless.

Table 1. Sediment Magnetic Data For The Zanesville profile, Ohio.

Sample No.	Depth (m)	Unit	Mass (g)	LFMS (m3/kg)	HFMS (m3/kg)	FDMS (m3/kg)	%FDMS	ARM (Am2/kg)	IRM 1.2T (Am2/kg)	IRM-0.3T (Am2/kg)	HIRM (Am2/kg)	S	ARM/MS (A/m)	SIRM/MS (A/m)	MS/SIRM (m/A/m)	ARM/SIRM
OH-1	0.12	Ap	4.3677	1.8800E-06	1.7900E-06	9.0000E-08	4.79	6.160E-04	2.210E-02	-2.110E-02	5.000E-04	0.95	327.7	11755	8.507E-05	2.7873E-02
OH-2	0.28	B1t	4.5789	1.0100E-06	9.3000E-07	8.0000E-08	7.92	3.910E-04	6.550E-03	-6.200E-03	1.750E-04	0.95	387.1	6485	1.542E-04	5.9695E-02
OH-3	0.38	B21t	4.3791	7.9400E-07	7.4400E-07	5.0000E-08	6.30	1.890E-04	4.770E-03	-4.480E-03	1.450E-04	0.94	238.0	6008	1.665E-04	3.9623E-02
OH-4	0.47	B21t	4.4008	7.4000E-07	6.9900E-07	4.1000E-08	5.54	1.450E-04	4.590E-03	-4.320E-03	1.350E-04	0.94	195.9	6203	1.612E-04	3.1590E-02
OH-5	0.56	B22t	4.5971	7.0500E-07	6.7300E-07	3.2000E-08	4.54	1.260E-04	4.520E-03	-4.290E-03	1.150E-04	0.95	178.7	6411	1.560E-04	2.7876E-02
OH-6	0.66	B22t	4.4051	6.6400E-07	6.3900E-07	2.5000E-08	3.77	1.020E-04	4.470E-03	-4.220E-03	1.250E-04	0.94	153.6	6732	1.485E-04	2.2819E-02
OH-7	0.80	B31t	4.1501	7.3610E-07	6.6058E-07	7.5519E-08	10.26	8.020E-05	3.368E-03	-3.183E-03	9.274E-05	0.94	109.0	4576	2.185E-04	2.3809E-02
OH-8	0.99	B32t	4.3853	6.1700E-07	5.9700E-07	2.0000E-08	3.24	1.040E-04	4.560E-03	-4.290E-03	1.350E-04	0.94	168.6	7391	1.353E-04	2.2807E-02
OH-9	1.37	C1	3.6800	5.3660E-07	5.3390E-07	2.6977E-09	0.50	4.890E-05	2.949E-03	-2.799E-03	7.506E-05	0.95	91.1	5496	1.819E-04	1.6581E-02
OH-10	1.81	C2	3.7669	6.1929E-07	6.1436E-07	4.9377E-09	0.80	5.770E-05	3.271E-03	-3.109E-03	8.078E-05	0.95	93.2	5281	1.893E-04	1.7641E-02
OH-11	2.04	C3	4.5669	6.3000E-07	6.2500E-07	5.0000E-09	0.79	7.400E-05	4.820E-03	-4.580E-03	1.200E-04	0.95	117.5	7651	1.307E-04	1.5353E-02
OH-12	2.26	C4	4.3014	6.7974E-07	6.7351E-07	6.2262E-09	0.92	6.840E-05	3.271E-03	-3.109E-03	8.078E-05	0.95	100.6	4812	2.078E-04	2.0912E-02
OH-13	2.53	C5/IIAb	4.9935	4.9700E-07	4.8500E-07	1.2000E-08	2.41	1.080E-04	4.270E-03	-3.870E-03	2.000E-04	0.91	217.3	8592	1.164E-04	2.5293E-02
OH-14	2.69	IIAb1	4.9460	4.3200E-07	4.0900E-07	2.3000E-08	5.32	1.130E-04	3.460E-03	-3.050E-03	2.050E-04	0.88	261.6	8009	1.249E-04	3.2659E-02
OH-15	2.81	IIAb2	5.0342	4.4600E-07	4.1800E-07	2.8000E-08	6.28	1.190E-04	3.060E-03	-2.660E-03	2.000E-04	0.87	266.8	6861	1.458E-04	3.8889E-02
OH-16	2.94	IIAb/B1b	4.5912	3.3300E-07	3.1000E-07	2.3000E-08	6.91	7.430E-05	2.090E-03	-1.770E-03	1.600E-04	0.85	223.1	6276	1.593E-04	3.5550E-02
OH-17	3.09	IIIB211b	4.3699	3.7200E-07	3.5300E-07	1.9000E-08	5.11	6.770E-05	2.430E-03	-2.120E-03	1.550E-04	0.87	182.0	6532	1.531E-04	2.7860E-02
OH-18	3.28	IIIB221b	4.1710	3.8000E-07	3.6500E-07	1.5000E-08	3.95	6.070E-05	2.420E-03	-2.170E-03	1.250E-04	0.90	159.7	6368	1.570E-04	2.5083E-02
OH-19	3.51	IIIB311b	4.3656	3.8500E-07	3.7700E-07	8.0000E-09	2.08	4.810E-05	2.680E-03	-2.450E-03	1.150E-04	0.91	124.9	6961	1.437E-04	1.7948E-02
OH-20	3.77	IIIB321b	4.4328	3.4600E-07	3.4300E-07	3.0000E-09	0.87	3.450E-05	2.460E-03	-2.280E-03	9.000E-05	0.93	99.7	7110	1.407E-04	1.4024E-02
OH-21	4.08	IIIC1	4.7471	3.2100E-07	3.2000E-07	1.0000E-09	0.31	3.620E-05	2.760E-03	-2.570E-03	9.500E-05	0.93	112.8	8598	1.163E-04	1.3116E-02
OH-22	4.41	IIIC1	4.5745	3.2000E-07	3.1900E-07	1.0000E-09	0.31	3.300E-05	2.540E-03	-2.340E-03	1.000E-04	0.92	103.1	7938	1.260E-04	1.2992E-02
OH-23	4.87	IIIC2	4.8661	5.0400E-07	4.7800E-07	2.6000E-08	5.16	8.840E-05	7.360E-03	-3.700E-03	1.830E-03	0.50	175.4	14603	6.848E-05	1.2011E-02

Table 2. Magnetic Susceptibility vs. Temperature Data For Some Samples From the Zanesville Loess Profile, Ohio.

Sample No: A unique number assigned to loess and/or sediment samples.

Heating time (sec): The time in seconds during the progressive heating experiment.

Heating susceptibility: The raw susceptibility value ($\times 10^{-6}$ SI) for the sample during the progressive heating experiment.

Heating susceptibility corrected: The corrected susceptibility value ($\times 10^{-6}$ SI) during progressive heating after subtracting out the diamagnetic effects of the quartz tube and Al_2O_3 powder.

Cooling time (sec): The time in seconds during the progressive cooling of the sample following the attainment of peak heating temperatures.

Cooling susceptibility: The raw susceptibility value ($\times 10^{-6}$ SI) for the sample during progressive cooling.

Cooling susceptibility corrected: The corrected susceptibility value ($\times 10^{-6}$ SI) during cooling after subtracting out the diamagnetic effects of the quartz tube and Al_2O_3 powder.

Table 2. Magnetic Susceptibility vs. Temperature For Some Samples From The Zanesville Profile.

Sample No.	Heating Time (sec)	Heating Temperature (°C)	Heating Susceptibility (raw)	Heating Susceptibility (corrected)	Cooling Time (sec)	Cooling Temperature (°C)	Cooling Susceptibility (raw)	Cooling Susceptibility (corrected)
OH-1	0	25	231.5	371.7	2692	650	-142.1	3.5
OH-1	18	26	230.4	370.6	2709	650	-145.8	-0.2
OH-1	34	29	231.6	371.8	2726	648	-150.6	-5.0
OH-1	51	33	233.0	373.3	2743	646	-144.2	1.4
OH-1	68	38	234.9	375.2	2761	644	-145.1	0.4
OH-1	85	43	236.6	377.0	2778	642	-146.7	-1.2
OH-1	101	48	239.3	379.7	2795	639	-139.6	5.9
OH-1	118	53	241.4	381.8	2812	635	-143.8	1.7
OH-1	135	57	242.5	383.0	2829	632	-141.5	3.9
OH-1	151	62	243.9	384.4	2846	629	-143.5	1.9
OH-1	168	66	247.7	388.3	2863	625	-141.3	4.1
OH-1	185	70	249.0	389.6	2880	622	-141.9	3.4
OH-1	201	74	250.1	390.7	2897	618	-140.6	4.7
OH-1	218	78	251.6	392.3	2915	615	-139.3	6.0
OH-1	235	82	253.6	394.3	2932	611	-137.7	7.5
OH-1	251	86	254.1	394.8	2949	607	-133.6	11.6
OH-1	268	90	256.9	397.7	2966	603	-134.7	10.5
OH-1	285	94	257.4	398.2	2983	599	-129.8	15.3
OH-1	301	98	258.8	399.6	3000	595	-125.9	19.2
OH-1	318	101	261.6	402.5	3017	591	-121.4	23.7
OH-1	335	105	262.5	403.4	3032	587	-111.4	33.6
OH-1	351	109	265.6	406.5	3048	584	-100.6	44.4
OH-1	368	113	266.7	407.7	3063	580	-83.2	61.8
OH-1	384	117	267.6	408.6	3079	577	-57.5	87.5
OH-1	401	120	269.3	410.3	3094	573	-32.7	112.3
OH-1	418	124	272.3	413.4	3110	570	-14.9	130.0
OH-1	434	128	272.2	413.3	3125	566	-1.2	143.7
OH-1	451	132	275.4	416.5	3141	563	11.5	156.4
OH-1	468	135	278.3	419.5	3156	559	23.0	167.8
OH-1	484	139	279.6	420.8	3172	556	33.5	178.3
OH-1	501	143	280.4	421.6	3187	552	43.9	188.6
OH-1	518	147	281.8	423.1	3203	549	54.4	199.2
OH-1	534	151	283.8	425.1	3218	545	64.7	209.4
OH-1	551	155	286.9	428.2	3234	542	74.9	219.6
OH-1	567	159	287.6	429.0	3250	538	86.0	230.7
OH-1	584	162	290.8	432.2	3265	535	96.2	240.8
OH-1	601	166	290.2	431.6	3281	532	106.6	251.2
OH-1	617	170	294.5	436.0	3296	528	116.3	260.8
OH-1	634	174	296.4	437.9	3312	525	126.3	270.8
OH-1	650	178	296.4	437.9	3328	521	142.3	286.8
OH-1	667	182	298.6	440.2	3345	517	155.0	299.4
OH-1	684	186	300.5	442.1	3363	513	166.7	311.1
OH-1	700	190	303.8	445.4	3380	509	176.8	321.2
OH-1	717	194	304.5	446.2	3397	505	185.9	330.2
OH-1	733	198	305.1	446.8	3414	501	196.2	340.5
OH-1	750	202	306.8	448.5	3430	497	204.0	348.3
OH-1	766	206	308.9	450.7	3447	494	210.2	354.4
OH-1	783	210	309.7	451.5	3464	490	217.1	361.3
OH-1	799	214	311.5	453.3	3481	486	226.9	371.1
OH-1	816	218	314.4	456.3	3499	482	233.8	377.9
OH-1	833	222	314.4	456.3	3516	478	244.8	388.9
OH-1	849	226	314.7	456.6	3533	474	251.8	395.9
OH-1	866	230	317.7	459.7	3550	470	254.7	398.7
OH-1	882	234	318.7	460.7	3567	467	257.6	401.6
OH-1	899	238	320.0	462.0	3584	463	258.8	402.8
OH-1	916	242	321.2	463.3	3601	459	258.8	402.7
OH-1	932	247	327.8	469.9	3618	455	259.0	402.9
OH-1	949	250	324.4	466.5	3635	451	258.5	402.4
OH-1	965	255	326.1	468.3	3652	446	260.9	404.7
OH-1	982	259	325.9	468.1	3669	442	259.7	403.5
OH-1	998	262	329.7	471.9	3686	438	255.6	399.4
OH-1	1015	266	324.0	466.3	3703	434	257.6	401.3
OH-1	1031	270	322.8	465.1	3720	430	254.1	397.8
OH-1	1048	274	327.9	470.3	3737	425	256.2	399.8

Table 2. Magnetic Susceptibility vs. Temperature For Some Samples From The Zanesville Profile.

Sample No.	Heating Time (sec)	Heating Temperature (°C)	Heating Susceptibility (raw)	Heating Susceptibility (corrected)	Cooling Time (sec)	Cooling Temperature (°C)	Cooling Susceptibility (raw)	Cooling Susceptibility (corrected)
OH-1	1065	278	327.7	470.1	3754	421	253.8	397.4
OH-1	1081	282	325.3	467.7	3771	417	254.5	398.1
OH-1	1098	287	323.5	466.0	3788	413	254.3	397.8
OH-1	1114	291	320.5	463.0	3805	409	253.2	396.7
OH-1	1131	295	320.9	463.4	3822	405	252.0	395.5
OH-1	1148	299	320.9	463.5	3839	401	251.9	395.3
OH-1	1164	303	321.2	463.8	3856	396	250.3	393.7
OH-1	1181	307	320.7	463.3	3873	392	250.2	393.6
OH-1	1198	311	319.9	462.6	3890	388	249.7	393.0
OH-1	1215	316	319.6	462.3	3907	385	248.3	391.6
OH-1	1231	320	316.9	459.6	3924	381	248.1	391.4
OH-1	1248	324	316.9	459.7	3941	377	248.0	391.2
OH-1	1265	328	315.1	457.9	3958	373	246.5	389.7
OH-1	1281	332	315.1	457.9	3975	369	247.1	390.3
OH-1	1298	336	312.6	455.5	3992	365	244.7	387.8
OH-1	1315	340	316.5	459.4	4009	361	245.9	389.0
OH-1	1332	344	311.8	454.8	4026	357	243.6	386.7
OH-1	1348	349	316.1	459.1	4043	353	246.2	389.2
OH-1	1365	353	310.7	453.7	4060	349	244.3	387.3
OH-1	1382	357	312.4	455.5	4077	345	242.5	385.5
OH-1	1399	361	309.4	452.5	4094	342	242.8	385.7
OH-1	1415	365	310.5	453.6	4111	337	242.8	385.7
OH-1	1432	369	307.6	450.8	4127	334	242.1	385.0
OH-1	1449	373	308.3	451.5	4144	329	241.1	383.9
OH-1	1466	377	308.2	451.4	4161	325	238.6	381.4
OH-1	1482	381	308.4	451.7	4178	322	239.4	382.2
OH-1	1499	385	304.3	447.6	4195	318	238.6	381.3
OH-1	1516	390	301.1	444.4	4212	314	238.1	380.8
OH-1	1532	394	306.8	450.2	4229	310	236.0	378.7
OH-1	1549	398	301.2	444.6	4246	306	238.4	381.0
OH-1	1566	402	301.8	445.2	4263	302	236.8	379.4
OH-1	1583	406	305.7	449.2	4279	299	235.6	378.2
OH-1	1600	410	303.9	447.4	4296	295	234.9	377.4
OH-1	1616	414	302.7	446.3	4313	291	234.6	377.1
OH-1	1633	418	302.9	446.5	4330	287	233.0	375.5
OH-1	1650	422	299.5	443.1	4347	283	231.6	374.0
OH-1	1667	426	299.9	443.6	4364	280	232.3	374.7
OH-1	1683	431	296.4	440.1	4381	276	232.1	374.5
OH-1	1700	435	297.7	441.4	4397	272	230.1	372.4
OH-1	1717	439	298.8	442.6	4414	268	230.2	372.5
OH-1	1734	443	296.3	440.1	4431	264	229.3	371.6
OH-1	1751	447	300.5	444.3	4448	260	227.9	370.1
OH-1	1768	451	293.4	437.3	4465	257	226.8	369.0
OH-1	1785	455	293.0	436.9	4481	253	226.7	368.9
OH-1	1802	459	293.5	437.4	4498	249	225.5	367.6
OH-1	1819	463	290.5	434.5	4515	245	225.2	367.3
OH-1	1836	467	287.3	431.3	4532	242	225.5	367.6
OH-1	1853	470	282.8	426.8	4548	238	223.0	365.0
OH-1	1870	474	286.8	430.9	4565	234	222.5	364.5
OH-1	1886	479	281.4	425.5	4582	230	222.3	364.3
OH-1	1903	483	269.9	414.0	4599	226	220.1	362.0
OH-1	1920	487	258.7	402.9	4615	223	219.8	361.7
OH-1	1937	491	255.7	399.9	4632	219	217.9	359.8
OH-1	1954	495	239.6	383.8	4649	215	217.5	359.3
OH-1	1971	498	223.6	367.9	4666	212	217.6	359.4
OH-1	1988	502	210.2	354.5	4682	208	215.9	357.7
OH-1	2004	506	202.9	347.2	4699	204	215.3	357.0
OH-1	2021	511	192.1	336.5	4716	201	214.8	356.5
OH-1	2038	515	170.8	315.2	4732	198	215.4	357.1
OH-1	2055	519	168.6	313.1	4749	194	214.0	355.7
OH-1	2072	522	153.8	298.3	4766	190	212.6	354.2
OH-1	2089	526	144.6	289.1	4783	186	211.2	352.8
OH-1	2106	530	136.2	280.8	4800	183	209.6	351.2
OH-1	2122	534	123.6	268.2	4816	179	209.1	350.6

Table 2. Magnetic Susceptibility vs. Temperature For Some Samples From The Zanesville Profile.

Sample No.	Heating Time (sec)	Heating Temperature (°C)	Heating Susceptibility (raw)	Heating Susceptibility (corrected)	Cooling Time (sec)	Cooling Temperature (°C)	Cooling Susceptibility (raw)	Cooling Susceptibility (corrected)
OH-1	2137	537	114.7	259.3	4833	176	207.2	348.7
OH-1	2153	540	105.8	250.4	4850	172	207.5	349.0
OH-1	2168	544	96.6	241.2	4866	169	206.1	347.5
OH-1	2184	547	87.2	231.9	4883	166	206.3	347.7
OH-1	2199	550	76.8	221.5	4899	162	204.3	345.7
OH-1	2214	554	66.2	211.0	4916	159	204.2	345.6
OH-1	2230	558	53.9	198.6	4933	156	203.1	344.4
OH-1	2245	561	40.8	185.7	4949	152	201.4	342.7
OH-1	2261	564	28.6	173.4	4966	149	202.5	343.8
OH-1	2276	567	14.9	159.7	4982	145	199.7	340.9
OH-1	2292	571	-1.2	143.7	4999	142	200.1	341.3
OH-1	2307	574	-22.7	122.2	5016	139	199.1	340.3
OH-1	2323	578	-49.7	95.2	5032	135	197.8	339.0
OH-1	2338	581	-75.7	69.3	5048	132	196.7	337.8
OH-1	2354	584	-96.8	48.3	5065	129	196.0	337.1
OH-1	2369	588	-107.3	37.8	5081	125	195.5	336.6
OH-1	2385	592	-113.4	31.7	5098	122	194.6	335.6
OH-1	2402	596	-125.2	19.9	5115	118	192.5	333.5
OH-1	2419	600	-126.7	18.5	5131	115	192.9	333.9
OH-1	2436	604	-130.8	14.4	5148	112	189.9	330.9
OH-1	2453	608	-131.7	13.5	5164	108	189.8	330.7
OH-1	2470	612	-138.8	6.5	5181	105	191.2	332.1
OH-1	2487	616	-136.5	8.8	5197	102	190.2	331.1
OH-1	2504	620	-140.4	4.9	5213	99	182.2	323.0
OH-1	2521	624	-141.6	3.8	5230	95	186.2	327.0
OH-1	2538	628	-141.4	4.0	5247	92	190.3	331.1
OH-1	2556	632	-142.4	3.0	5263	89	182.1	322.9
OH-1	2573	636	-143.5	2.0	5280	86	183.8	324.5
OH-1	2590	639	-140.8	4.7	5297	83	185.5	326.2
OH-1	2607	643	-142.8	2.7	5313	80	183.6	324.3
OH-1	2624	646	-144.8	0.7	5330	77	181.8	322.5
OH-1	2641	648	-138.0	7.6	5347	74	179.6	320.2
OH-1	2658	650	-136.2	9.4	5363	71	181.7	322.3
OH-1	2675	650	-139.4	6.2	5380	68	181.5	322.1
OH-9	0	25	-21.7	118.5	2626	654	-140.7	4.9
OH-9	16	25	-21.7	118.5	2643	654	-143.3	2.3
OH-9	32	28	-21.6	118.6	2660	652	-142.7	2.9
OH-9	47	32	-21.5	118.8	2676	651	-145.4	0.2
OH-9	62	37	-21.4	119.0	2693	649	-143.7	1.9
OH-9	78	42	-21.3	119.1	2710	646	-144.7	0.8
OH-9	93	46	-21.1	119.3	2727	643	-141.4	4.1
OH-9	109	50	-20.6	119.9	2744	640	-140.1	5.4
OH-9	124	55	-20.0	120.4	2761	636	-143.0	2.5
OH-9	139	59	-20.4	120.1	2778	632	-148.3	-2.9
OH-9	155	63	-20.0	120.5	2795	629	-142.4	3.0
OH-9	170	67	-19.3	121.2	2813	625	-144.7	0.7
OH-9	185	71	-19.1	121.6	2830	622	-144.5	0.8
OH-9	201	75	-19.0	121.6	2847	617	-144.1	1.2
OH-9	216	79	-18.8	121.9	2864	614	-140.6	4.7
OH-9	231	82	-18.3	122.4	2881	610	-140.5	4.7
OH-9	247	86	-17.8	123.0	2898	605	-142.1	3.1
OH-9	262	89	-18.1	122.7	2915	602	-144.9	0.3
OH-9	277	93	-17.7	123.1	2932	598	-142.3	2.8
OH-9	293	96	-17.6	123.3	2949	594	-140.3	4.8
OH-9	308	100	-16.6	124.2	2966	590	-139.5	5.6
OH-9	323	103	-16.6	124.3	2983	586	-134.7	10.3
OH-9	339	107	-16.3	124.6	2998	583	-116.2	28.8
OH-9	354	110	-16.0	125.0	3014	579	-99.4	45.6
OH-9	369	113	-15.5	125.4	3029	576	-86.2	58.8
OH-9	385	117	-15.4	125.6	3045	573	-78.6	66.4
OH-9	400	120	-15.1	125.9	3061	569	-74.7	70.2
OH-9	415	124	-15.0	126.0	3076	566	-72.5	72.3
OH-9	431	127	-14.2	126.9	3092	562	-72.0	72.8

Table 2. Magnetic Susceptibility vs. Temperature For Some Samples From The Zanesville Profile.

Sample No.	Heating Time (sec)	Heating Temperature (°C)	Heating Susceptibility (raw)	Heating Susceptibility (corrected)	Cooling Time (sec)	Cooling Temperature (°C)	Cooling Susceptibility (raw)	Cooling Susceptibility (corrected)
OH-9	446	131	-14.1	127.1	3107	558	-72.1	72.7
OH-9	461	135	-13.3	127.8	3123	555	-71.1	73.7
OH-9	477	138	-12.8	128.4	3138	551	-70.7	74.1
OH-9	492	142	-13.1	128.1	3154	547	-70.7	74.0
OH-9	507	145	-12.0	129.3	3169	543	-70.7	74.0
OH-9	523	149	-11.6	129.7	3185	540	-70.1	74.5
OH-9	538	152	-11.8	129.6	3200	536	-70.3	74.3
OH-9	553	156	-10.6	130.7	3215	533	-70.5	74.1
OH-9	569	159	-10.1	131.2	3231	529	-70.4	74.1
OH-9	584	163	-10.5	130.9	3246	525	-70.3	74.2
OH-9	599	166	-10.1	131.3	3262	522	-70.3	74.2
OH-9	614	170	-9.4	132.1	3277	518	-70.3	74.2
OH-9	630	174	-8.7	132.7	3293	515	-70.3	74.1
OH-9	645	178	-9.0	132.5	3308	511	-70.5	73.9
OH-9	660	181	-8.7	132.8	3324	507	-70.4	74.0
OH-9	675	185	-7.6	133.9	3339	503	-70.4	73.9
OH-9	691	188	-7.5	134.2	3355	500	-70.5	73.7
OH-9	706	192	-7.4	134.3	3370	496	-70.5	73.8
OH-9	721	196	-6.0	135.7	3385	493	-70.7	73.5
OH-9	737	200	-6.5	135.2	3401	489	-71.0	73.2
OH-9	752	203	-5.6	136.2	3416	486	-70.3	73.8
OH-9	767	207	-5.3	136.5	3432	482	-70.6	73.6
OH-9	783	211	-5.2	136.6	3447	478	-70.8	73.3
OH-9	798	215	-5.2	136.6	3462	475	-71.2	72.9
OH-9	813	218	-4.2	137.6	3478	471	-70.9	73.1
OH-9	829	222	-4.5	137.4	3493	467	-70.8	73.2
OH-9	844	226	-3.3	138.7	3509	464	-71.0	73.0
OH-9	859	229	-3.6	138.4	3524	460	-71.2	72.8
OH-9	875	233	-2.4	139.6	3540	456	-71.6	72.3
OH-9	890	237	-3.3	138.8	3555	453	-71.3	72.6
OH-9	905	240	-2.6	139.4	3571	449	-71.6	72.2
OH-9	921	244	-2.1	140.0	3586	446	-71.6	72.2
OH-9	936	248	-2.7	139.4	3602	442	-71.6	72.2
OH-9	951	252	-2.0	140.1	3617	438	-72.0	71.7
OH-9	967	256	-2.2	140.0	3633	434	-71.7	72.1
OH-9	982	259	-2.4	139.8	3648	431	-71.8	71.9
OH-9	997	263	-3.0	139.3	3663	427	-72.0	71.6
OH-9	1012	267	-3.5	138.8	3679	423	-72.3	71.3
OH-9	1028	270	-3.4	138.9	3694	419	-72.5	71.1
OH-9	1043	274	-4.3	138.0	3710	415	-72.1	71.5
OH-9	1058	278	-5.4	137.0	3725	411	-72.2	71.3
OH-9	1073	282	-6.6	135.9	3740	408	-72.2	71.3
OH-9	1089	286	-8.6	133.9	3756	404	-72.3	71.2
OH-9	1104	290	-10.1	132.4	3771	400	-72.7	70.7
OH-9	1119	294	-11.9	130.6	3787	397	-72.7	70.7
OH-9	1134	297	-13.8	128.7	3802	393	-72.6	70.8
OH-9	1149	301	-15.5	127.1	3818	389	-73.0	70.3
OH-9	1165	305	-16.6	126.0	3833	385	-72.9	70.4
OH-9	1180	309	-18.1	124.6	3848	382	-73.1	70.2
OH-9	1195	313	-19.9	122.8	3864	378	-73.6	69.7
OH-9	1210	316	-20.6	122.1	3879	374	-73.1	70.1
OH-9	1226	320	-22.3	120.4	3895	370	-73.3	69.9
OH-9	1241	324	-23.4	119.3	3910	367	-73.5	69.6
OH-9	1256	327	-24.4	118.5	3925	363	-73.4	69.7
OH-9	1271	331	-25.2	117.7	3941	360	-73.5	69.6
OH-9	1286	335	-26.2	116.7	3956	356	-73.9	69.2
OH-9	1301	339	-27.2	115.7	3971	352	-73.5	69.5
OH-9	1316	343	-28.2	114.8	3987	349	-74.3	68.7
OH-9	1332	346	-29.4	113.6	4002	345	-73.6	69.3
OH-9	1347	350	-30.0	113.0	4017	341	-74.5	68.5
OH-9	1362	354	-31.0	112.0	4033	337	-74.2	68.7
OH-9	1377	358	-32.2	110.9	4048	334	-74.4	68.5
OH-9	1392	361	-32.7	110.4	4063	330	-74.4	68.4
OH-9	1407	365	-34.2	108.9	4079	326	-74.3	68.5

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Sample No.	Heating Time (sec)	Heating Temperature (°C)	Heating Susceptibility (raw)	Heating Susceptibility (corrected)	Cooling Time (sec)	Cooling Temperature (°C)	Cooling Susceptibility (raw)	Cooling Susceptibility (corrected)
OH-9	1422	369	-34.7	108.5	4094	323	-74.5	68.2
OH-9	1437	373	-36.0	107.2	4109	319	-74.6	68.1
OH-9	1452	376	-36.8	106.4	4125	316	-74.8	67.9
OH-9	1467	380	-37.4	105.9	4140	312	-75.1	67.6
OH-9	1482	384	-37.9	105.4	4155	308	-74.7	67.9
OH-9	1497	388	-37.4	105.9	4171	305	-75.0	67.6
OH-9	1512	391	-38.4	105.0	4186	302	-75.6	66.9
OH-9	1527	395	-38.2	105.2	4201	298	-75.9	66.6
OH-9	1542	399	-38.8	104.7	4217	295	-75.9	66.7
OH-9	1557	403	-38.8	104.7	4232	291	-75.5	67.0
OH-9	1572	407	-39.5	104.0	4247	287	-75.8	66.7
OH-9	1588	410	-39.6	103.9	4262	284	-76.3	66.2
OH-9	1603	414	-39.5	104.0	4278	280	-75.9	66.5
OH-9	1618	418	-40.2	103.4	4293	277	-76.4	66.0
OH-9	1633	421	-39.7	104.0	4308	273	-76.2	66.2
OH-9	1648	425	-39.3	104.4	4323	270	-76.2	66.1
OH-9	1663	429	-40.2	103.5	4339	266	-76.9	65.4
OH-9	1678	433	-40.6	103.1	4354	262	-76.6	65.6
OH-9	1693	436	-40.3	103.5	4369	259	-76.7	65.5
OH-9	1708	440	-40.5	103.3	4384	255	-76.7	65.5
OH-9	1723	444	-40.8	103.0	4400	251	-77.0	65.2
OH-9	1738	448	-40.2	103.6	4415	248	-76.7	65.4
OH-9	1753	451	-41.1	102.8	4430	244	-77.1	65.0
OH-9	1768	455	-40.8	103.1	4446	240	-76.9	65.2
OH-9	1783	459	-41.5	102.4	4461	237	-77.1	65.0
OH-9	1799	463	-41.6	102.4	4476	233	-77.4	64.6
OH-9	1814	467	-41.1	102.9	4491	230	-77.3	64.7
OH-9	1829	470	-41.1	103.0	4506	227	-77.4	64.6
OH-9	1844	474	-41.7	102.3	4521	223	-77.4	64.5
OH-9	1859	478	-41.7	102.4	4536	220	-77.7	64.2
OH-9	1875	481	-41.9	102.3	4551	216	-77.6	64.3
OH-9	1890	485	-42.0	102.2	4566	213	-77.8	64.0
OH-9	1905	488	-42.8	101.4	4582	209	-78.0	63.8
OH-9	1921	492	-42.9	101.4	4596	206	-77.9	63.9
OH-9	1936	496	-43.2	101.0	4612	203	-78.1	63.6
OH-9	1951	500	-43.3	101.0	4627	200	-78.1	63.6
OH-9	1966	503	-43.9	100.4	4642	196	-77.7	64.0
OH-9	1981	507	-43.9	100.4	4657	193	-78.2	63.4
OH-9	1996	511	-44.1	100.3	4672	189	-78.5	63.2
OH-9	2012	515	-44.7	99.7	4687	186	-78.4	63.2
OH-9	2027	519	-44.8	99.6	4702	183	-78.3	63.2
OH-9	2042	522	-44.8	99.7	4717	179	-78.6	63.0
OH-9	2057	526	-45.6	98.9	4732	176	-78.5	63.0
OH-9	2073	530	-46.6	98.0	4747	173	-78.9	62.6
OH-9	2088	534	-47.1	97.5	4762	170	-78.9	62.5
OH-9	2103	537	-47.2	97.4	4778	166	-78.6	62.8
OH-9	2118	541	-47.7	96.9	4793	163	-79.2	62.2
OH-9	2134	545	-48.3	96.4	4808	160	-79.0	62.4
OH-9	2149	548	-48.4	96.3	4823	156	-79.0	62.3
OH-9	2164	552	-49.8	95.0	4838	153	-79.2	62.1
OH-9	2180	556	-49.9	94.8	4853	150	-79.2	62.1
OH-9	2195	559	-50.7	94.1	4868	147	-79.0	62.3
OH-9	2210	563	-52.5	92.3	4883	143	-79.2	62.1
OH-9	2225	567	-54.6	90.2	4899	140	-79.1	62.1
OH-9	2241	570	-58.3	86.6	4914	137	-79.2	62.0
OH-9	2256	574	-65.8	79.2	4929	133	-79.2	61.9
OH-9	2272	577	-79.6	65.3	4944	130	-79.2	61.9
OH-9	2287	581	-103.0	42.0	4959	127	-79.3	61.8
OH-9	2304	585	-134.1	10.9	4974	124	-79.4	61.7
OH-9	2321	590	-137.0	8.1	4990	120	-79.5	61.5
OH-9	2338	594	-135.7	9.4	5005	117	-79.4	61.6
OH-9	2354	598	-139.3	5.8	5020	114	-79.4	61.6
OH-9	2371	603	-143.6	1.6	5036	111	-79.5	61.5
OH-9	2388	607	-143.2	2.0	5051	107	-79.4	61.5

Table 2. Magnetic Susceptibility vs. Temperature For Some Samples From The Zanesville Profile.

Sample No.	Heating Time (sec)	Heating Temperature (°C)	Heating Susceptibility (raw)	Heating Susceptibility (corrected)	Cooling Time (sec)	Cooling Temperature (°C)	Cooling Susceptibility (raw)	Cooling Susceptibility (corrected)
OH-9	2405	612	-142.3	3.0	5066	104	-79.3	61.6
OH-9	2422	616	-139.7	5.6	5081	101	-79.2	61.7
OH-9	2439	620	-138.0	7.3	5097	97	-79.6	61.3
OH-9	2456	624	-146.6	-1.2	5112	95	-79.5	61.3
OH-9	2473	628	-142.1	3.3	5127	92	-79.4	61.3
OH-9	2490	632	-145.5	-6.8	5142	88	-79.3	61.5
OH-9	2507	637	-144.8	0.7	5158	85	-79.4	61.3
OH-9	2524	641	-143.5	2.0	5173	82	-79.4	61.3
OH-9	2541	645	-141.0	4.5	5189	79	-79.1	61.5
OH-9	2558	649	-146.2	-0.6	5204	76	-79.4	61.3
OH-9	2575	652	-147.7	-2.1	5219	74	-79.3	61.3
OH-9	2592	653	-144.1	1.5	5234	71	-79.3	61.3
OH-9	2609	654	-144.7	0.9	5250	68	-79.3	61.3
OH-9					5265	66	-79.3	61.3
OH-9					5280	63	-79.3	61.3
OH-9					5296	61	-79.3	61.3
OH-9					5311	58	-79.4	61.1
OH-9					5327	56	-79.2	61.2
OH-9					5342	53	-79.3	61.1
OH-9					5357	50	-79.2	61.3
OH-9					5373	48	-79.2	61.2
OH-9					5388	45	-79.3	61.0
OH-9					5403	43	-79.2	61.2
OH-9					5419	41	-79.4	61.0
OH-9					5434	39	-79.3	61.0
OH-11	0	22	101.5	241.7	2626	651	-142.7	2.9
OH-11	17	23	101.1	241.3	2644	649	-141.9	3.7
OH-11	32	27	101.5	241.7	2661	648	-142.2	3.4
OH-11	48	31	101.5	241.8	2678	646	-142.8	2.7
OH-11	63	36	101.5	241.8	2695	643	-136.5	9.0
OH-11	79	41	102.2	242.5	2712	640	-141.5	4.0
OH-11	94	46	102.6	243.0	2729	638	-142.6	2.9
OH-11	109	50	103.1	243.5	2746	634	-141.8	3.6
OH-11	125	55	103.6	244.1	2763	630	-140.9	4.5
OH-11	141	59	104.3	244.8	2780	627	-142.8	2.6
OH-11	156	63	104.9	245.4	2797	623	-142.4	3.0
OH-11	172	67	105.4	246.0	2814	619	-141.6	3.7
OH-11	187	71	106.5	247.1	2832	616	-141.3	4.0
OH-11	203	75	106.9	247.5	2849	612	-139.3	6.0
OH-11	218	80	107.5	248.2	2866	608	-140.4	4.8
OH-11	234	83	108.1	248.8	2883	604	-141.0	4.2
OH-11	249	87	108.9	249.6	2900	600	-137.5	7.7
OH-11	264	90	109.3	250.1	2917	596	-141.2	3.9
OH-11	280	94	109.9	250.7	2934	592	-135.4	9.7
OH-11	295	97	110.8	251.6	2951	588	-131.5	13.5
OH-11	311	101	111.4	252.3	2968	584	-119.5	25.5
OH-11	326	104	111.8	252.7	2984	580	-89.2	55.8
OH-11	342	108	112.6	253.5	3000	577	-58.3	86.6
OH-11	357	111	113.0	253.9	3015	573	-38.0	107.0
OH-11	372	115	113.9	254.9	3031	569	-25.6	119.3
OH-11	388	119	114.6	255.6	3046	566	-21.0	123.9
OH-11	403	123	115.5	256.5	3062	562	-18.2	126.6
OH-11	419	127	116.2	257.3	3077	558	-17.4	127.4
OH-11	434	130	117.2	258.3	3093	555	-16.8	128.0
OH-11	450	134	118.2	259.3	3108	552	-16.3	128.5
OH-11	465	137	119.6	260.8	3124	548	-15.9	128.8
OH-11	481	141	120.8	262.0	3140	544	-15.8	128.9
OH-11	496	145	122.6	263.8	3155	541	-15.6	129.1
OH-11	511	148	125.1	266.4	3171	538	-15.2	129.5
OH-11	527	152	125.5	266.8	3186	535	-15.6	129.0
OH-11	542	156	126.6	267.9	3202	531	-15.6	129.0
OH-11	558	160	127.6	269.0	3218	528	-15.3	129.3
OH-11	573	164	128.8	270.2	3233	524	-15.5	129.0

Table 2. Magnetic Susceptibility vs. Temperature For Some Samples From The Zanesville Profile.

Sample No.	Heating Time (sec)	Heating Temperature (°C)	Heating Susceptibility (raw)	Heating Susceptibility (corrected)	Cooling Time (sec)	Cooling Temperature (°C)	Cooling Susceptibility (raw)	Cooling Susceptibility (corrected)
OH-11	588	167	129.5	270.9	3249	520	-15.5	129.0
OH-11	604	171	131.0	272.5	3264	517	-15.5	128.9
OH-11	619	174	131.9	273.4	3280	513	-15.5	128.9
OH-11	635	178	132.9	274.4	3295	509	-15.5	128.8
OH-11	650	182	133.8	275.4	3311	505	-15.7	128.7
OH-11	666	185	134.3	275.9	3326	501	-15.8	128.5
OH-11	681	189	135.8	277.4	3342	497	-15.9	128.3
OH-11	698	194	137.5	279.2	3358	494	-16.2	128.1
OH-11	716	198	139.5	281.2	3373	490	-16.3	127.9
OH-11	732	202	139.6	281.3	3389	486	-16.0	128.2
OH-11	749	206	141.8	283.6	3404	483	-16.3	127.9
OH-11	766	210	142.9	284.7	3420	479	-16.5	127.6
OH-11	783	215	143.8	285.6	3435	476	-16.5	127.6
OH-11	800	218	146.8	288.7	3451	472	-17.0	127.0
OH-11	817	222	146.1	288.0	3466	469	-17.0	127.1
OH-11	834	226	146.3	288.2	3482	465	-16.9	127.1
OH-11	851	231	147.8	289.8	3497	462	-17.2	126.8
OH-11	868	235	149.3	291.3	3513	458	-16.9	127.1
OH-11	885	239	150.4	292.4	3528	454	-17.3	126.6
OH-11	901	243	150.3	292.4	3544	451	-17.4	126.5
OH-11	918	247	149.8	291.9	3559	447	-17.6	126.3
OH-11	935	252	150.8	293.0	3575	443	-17.9	126.0
OH-11	952	256	150.2	292.4	3590	440	-18.0	125.8
OH-11	968	260	149.0	291.2	3606	436	-18.3	125.4
OH-11	985	264	150.0	292.3	3622	433	-18.2	125.5
OH-11	1002	268	148.7	291.0	3637	429	-18.7	124.9
OH-11	1019	272	146.1	288.4	3653	425	-18.5	125.1
OH-11	1035	276	143.6	286.0	3668	421	-19.0	124.6
OH-11	1052	280	140.1	282.5	3684	418	-19.2	124.4
OH-11	1067	284	135.1	277.5	3699	414	-19.2	124.4
OH-11	1083	288	130.6	273.1	3715	410	-19.5	124.0
OH-11	1098	292	125.3	267.8	3730	407	-19.8	123.7
OH-11	1113	296	119.8	262.3	3746	403	-20.0	123.5
OH-11	1128	299	114.8	257.4	3761	399	-20.1	123.4
OH-11	1143	303	110.0	252.6	3777	396	-20.3	123.1
OH-11	1158	307	105.6	248.2	3792	392	-20.3	123.1
OH-11	1174	310	101.8	244.5	3807	388	-20.5	122.8
OH-11	1189	314	98.0	240.6	3823	385	-20.7	122.6
OH-11	1204	318	94.5	237.2	3838	381	-20.8	122.5
OH-11	1219	322	91.3	234.1	3854	377	-20.9	122.3
OH-11	1234	325	88.5	231.3	3870	374	-20.9	122.3
OH-11	1249	329	86.1	228.9	3885	370	-21.4	121.8
OH-11	1264	333	83.4	226.3	3901	366	-21.6	121.6
OH-11	1279	336	81.1	223.9	3916	362	-21.5	121.6
OH-11	1294	340	78.6	221.5	3932	359	-22.2	120.9
OH-11	1310	344	76.1	219.1	3947	355	-22.0	121.1
OH-11	1325	347	73.7	216.6	3963	351	-22.0	121.0
OH-11	1340	351	71.7	214.7	3978	348	-22.3	120.7
OH-11	1355	355	69.5	212.5	3994	345	-22.2	120.8
OH-11	1370	359	67.3	210.4	4009	341	-22.8	120.1
OH-11	1385	363	65.1	208.2	4025	337	-22.6	120.3
OH-11	1400	366	63.0	206.1	4040	334	-23.3	119.6
OH-11	1415	370	60.8	203.9	4056	331	-22.9	119.9
OH-11	1430	374	59.6	202.8	4071	327	-23.5	119.3
OH-11	1445	378	57.9	201.1	4087	323	-23.6	119.2
OH-11	1460	382	56.9	200.2	4102	320	-23.7	119.0
OH-11	1475	385	55.8	199.1	4118	316	-23.8	118.9
OH-11	1490	389	55.4	198.7	4133	312	-24.3	118.4
OH-11	1505	393	54.8	198.1	4149	309	-24.4	118.3
OH-11	1520	397	54.1	197.5	4164	305	-24.5	118.2
OH-11	1535	401	53.6	197.0	4179	302	-25.0	117.6
OH-11	1550	405	53.4	196.8	4195	298	-24.5	118.0
OH-11	1565	409	53.0	196.5	4210	295	-24.5	118.0
OH-11	1580	413	53.0	196.5	4226	291	-24.9	117.6

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Sample No.	Heating Time (sec)	Heating Temperature (°C)	Heating Susceptibility (raw)	Heating Susceptibility (corrected)	Cooling Time (sec)	Cooling Temperature (°C)	Cooling Susceptibility (raw)	Cooling Susceptibility (corrected)
OH-11	1595	416	52.4	196.0	4241	287	-24.9	117.6
OH-11	1610	420	52.3	195.9	4272	280	-25.4	117.0
OH-11	1625	424	52.0	195.6	4288	277	-25.5	116.9
OH-11	1640	427	51.4	195.1	4303	273	-25.5	116.8
OH-11	1655	431	51.4	195.1	4318	270	-25.9	116.4
OH-11	1671	434	51.0	194.7	4334	266	-25.9	116.3
OH-11	1686	437	50.9	194.6	4349	263	-26.0	116.2
OH-11	1701	441	50.7	194.5	4364	259	-26.1	116.1
OH-11	1716	444	50.2	194.0	4380	256	-26.3	115.9
OH-11	1732	448	50.1	194.0	4395	252	-26.3	115.8
OH-11	1747	451	49.7	193.5	4410	248	-26.5	115.6
OH-11	1762	455	49.4	193.3	4426	245	-25.5	116.6
OH-11	1777	458	49.2	193.2	4441	241	-27.2	114.8
OH-11	1793	462	48.6	192.6	4456	237	-27.2	114.9
OH-11	1808	466	48.2	192.2	4472	234	-27.8	114.2
OH-11	1823	470	47.9	192.0	4487	230	-27.1	114.9
OH-11	1838	473	47.2	191.3	4502	227	-26.8	115.1
OH-11	1854	477	47.1	191.1	4518	223	-27.1	114.8
OH-11	1869	481	46.5	190.6	4533	220	-27.4	114.5
OH-11	1884	485	45.8	190.0	4548	216	-28.0	113.8
OH-11	1900	488	45.0	189.2	4564	213	-27.3	114.5
OH-11	1915	492	44.5	188.7	4579	209	-27.2	114.6
OH-11	1930	496	44.0	188.2	4594	206	-27.7	114.1
OH-11	1946	500	43.3	187.6	4610	203	-27.9	113.8
OH-11	1961	503	42.2	186.5	4625	200	-28.1	113.6
OH-11	1977	506	41.5	185.8	4640	196	-28.2	113.5
OH-11	1992	510	40.9	185.3	4655	193	-28.2	113.4
OH-11	2007	514	40.1	184.5	4671	189	-28.3	113.3
OH-11	2023	518	38.9	183.4	4686	186	-28.2	113.4
OH-11	2038	522	38.3	182.8	4702	183	-29.2	112.3
OH-11	2054	525	37.2	181.7	4717	180	-28.8	112.8
OH-11	2069	529	36.3	180.8	4732	176	-28.8	112.7
OH-11	2085	532	35.5	180.0	4747	173	-28.8	112.7
OH-11	2100	535	34.2	178.8	4762	170	-28.9	112.5
OH-11	2115	539	33.3	177.9	4778	167	-29.6	111.9
OH-11	2131	543	32.1	176.7	4793	163	-29.8	111.6
OH-11	2146	547	30.9	175.6	4808	160	-29.6	111.8
OH-11	2162	550	29.3	174.0	4824	157	-29.4	112.0
OH-11	2177	554	28.2	173.0	4839	154	-29.8	111.5
OH-11	2192	558	26.7	171.5	4854	151	-29.7	111.6
OH-11	2208	561	24.4	169.2	4869	147	-29.7	111.6
OH-11	2223	565	21.3	166.2	4885	144	-29.8	111.4
OH-11	2239	569	14.9	159.7	4900	141	-30.1	111.1
OH-11	2254	572	3.8	148.7	4915	138	-30.0	111.2
OH-11	2270	575	-16.0	128.9	4930	135	-30.4	110.8
OH-11	2285	579	-52.9	92.1	4945	132	-30.5	110.6
OH-11	2301	583	-92.5	52.5	4961	128	-29.9	111.2
OH-11	2319	587	-127.3	17.7	4976	125	-30.3	110.8
OH-11	2336	591	-135.3	9.8	4991	122	-30.1	110.9
OH-11	2353	595	-138.4	6.7	5006	119	-29.7	111.3
OH-11	2370	599	-138.2	6.9	5021	116	-30.5	110.5
OH-11	2387	603	-138.9	6.3	5036	113	-30.5	110.4
OH-11	2404	608	-140.9	4.3	5052	110	-30.4	110.5
OH-11	2421	612	-139.9	5.4	5067	107	-30.6	110.3
OH-11	2439	616	-138.9	6.4	5082	103	-30.6	110.2
OH-11	2456	620	-142.0	3.3	5097	100	-30.7	110.1
OH-11	2473	623	-142.6	2.8	5112	97	-30.7	110.1
OH-11	2490	627	-142.8	2.6	5127	94	-30.8	110.0
OH-11	2507	631	-142.1	3.3	5142	91	-30.4	110.4
OH-11	2524	635	-144.3	1.2	5157	88	-30.6	110.2
OH-11	2541	640	-145.2	0.3	5172	85	-30.5	110.2
OH-11	2558	644	-142.1	3.4	5187	82	-30.3	110.4
OH-11	2575	647	-143.4	2.2	5203	80	-30.6	110.1
OH-11	2592	650	-142.7	2.9	5218	77	-30.5	110.2

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Sample No.	Heating Time (sec)	Heating Temperature (°C)	Heating Susceptibility (raw)	Heating Susceptibility (corrected)	Cooling Time (sec)	Cooling Temperature (°C)	Cooling Susceptibility (raw)	Cooling Susceptibility (corrected)
OH-11	2609	651	-145.6	-1.2	5233	74	-30.6	110.0
OH-11					5248	71	-30.4	110.2
OH-11					5263	69	-30.9	109.7
OH-11					5278	66	-30.5	110.1
OH-11					5293	64	-30.2	110.3
OH-11					5308	62	-30.3	110.2
OH-11					5323	59	-30.8	109.7
OH-11					5339	57	-30.4	110.0
OH-11					5354	54	-30.5	110.0
OH-11					5368	51	-30.5	110.0
OH-11					5383	48	-30.4	110.0
OH-11					5398	46	-30.4	110.0
OH-11					5413	44	-30.4	109.9
OH-11					5428	42	-30.4	110.0
OH-11					5443	39	-30.4	110.0