Research Article

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Feasibility of applying viscous remanent magnetization (VRM) orientation in the study of palaeowind direction by loess magnetic fabric

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Abstract: The loess formation sampling method on the Chinese Loess Plateau generally involves the acquisition of samples from the basset section and the drilling core. Constraints imposed by the precision of the drilling machine operation make it difficult to determine the orientation of the samples due to the rotation of the core.

Although researchers have proposed solutions for reconstructing the north direction of the samples by adopting the viscous remanent magnetization (VRM) orientation, it remains uncertain whether this approach can be adopted in studies that use the magnetic fabric to trace the palaeomonsoonal direction, and the degree to which this approach will change the magnetic fabric results.

Based on the achievements of other researchers, we adopted the VRM orientation of the basset section samples oriented in the field. By determining how the VRM orientation changes the magnetic fabric of loess over different demagnetization temperature ranges, we can draw the preliminary conclusion that there is no significant difference between the magnetic fabric information of the loess obtained at 100–150°C VRM orientation and that obtained from the field orientation (the statistical bin size is 22.5°, significance level $\alpha = 0.05$). This indicates that the VRM orientation approach is feasible for studying non-oriented drilling core samples to determine the prevailing surface paleowind direction with appropriate precision.

Keywords: drilling core; VRM orientation; magnetic fabric; prevailing surface palaeowind direction

1 Introduction

The orientation distribution of magnetic minerals in rock or sediment is referred to as its magnetic fabric. From the macroscopic perspective, the magnetic susceptibility of rock or sediment is usually different when distributed in different directions, which is known as the anisotropy of magnetic susceptibility (AMS).

The AMS can be described by the sizes and directions of the maximum, intermediate and minimum axes of the AMS ellipsoid. As a geological analysis method, magnetic fabric analysis was first used by Graham [1] to study the fabric of rocks, and has since been widely applied in research on sedimentary processes and to distinguish the transport power direction of sediments [2–15].

Studies of the AMS of modern aeolian sediments have proved that there is a correlation between the direction of the maximum axes' declination of the anisotropic ellipsoid and the wind direction [11, 16, 17]. To use the magnetic fabric of loess to trace its palaeowind direction, it is necessary to obtain information about the original direction or attitude of the loess samples, and, in addition, a sample mode of the basset section is usually taken to identify the field orientation [11].

In recent years, there have been large numbers of drilling technology applications in loess sampling, which has resulted in the availability of many core samples of loess. However, due to missing information about the original direction, those core samples cannot be used in mag-

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netic fabric tracing research. Viscous remanent magnetization (VRM) is the remanent magnetization of magnetic minerals from the long-term presence of an applied magnetic vector field below the Curie temperature. The direction of the geomagnetic field has remained generally stable for about 0.78 Ma, so the VRM has had enough time to record the northern direction of the geomagnetic field. Measuring the VRM to reconstruct the direction of the core samples has long been proposed by researchers [18–23], but the accuracy of this method in matching the precision of the magnetic fabric technique when tracing the palaeowind direction has not yet been reported. In this research, our objective was to conduct some preliminary experiments regarding this issue.

Regarding the principle of VRM for determining the orientation of a drilling core, Yue *et al.* [18] has considered this issue in detail and this will not be repeated here. We emphasize that loess is very different from hard rock, in having a certain plastic deformation capacity, so there may be a bigger VRM error at some core-sample levels than others along the length of the core [20]. To obtain more reliable directions for each sample, we suggest that each sample taken from the loess drilling core be measured with respect to their AMS and VRM.

Will there be any obvious difference if we use the VRM direction rather than the geographic direction of a sediment to calculate the palaeowind direction? Which palaeowind direction distribution calculated in which temperature range will be closest to the palaeowind direction distribution obtained from the geographic direction? To answer these questions, we collected samples from the basset section to examine the feasibility of using the VRM orientation instead of the geographic direction in determining the palaeowind direction. (We did not use drilling core samples in this experiment, because the geographical location of the core samples is difficult to obtain, and there is no way to determine the difference between the magnetic fabric positioned by VRM and that by field orientation.)

2 Sampling and measuring methods

The Duanjiapo section is located in the northern Duanjiapo village of Lantian County, which is about 25 km southeast of Xi'an in the province of Shaanxi (109.2° E, 34.2° N, see Figure 1), which is in a semi-humid monsoon climate zone. The loess formation in this section of the slope is continuous and complete, and the basset sediments are clear with a thickness of about 132 m. The loess sequence was di-

vided into three formations—the Wucheng (S_{15} - L_{34} , ~1.3–2.8 Ma), Lishi (S_1 - L_{15} , ~0.07–1.3 Ma) and Malan (L_1 , ~0.01–0.07 Ma) [24–30]. The bottom of Wucheng is in contact with red clay that belongs to the Neogene system and the Malan Loess is overlain by the Holocene soil (S_0). Yue *et al.* [31], Sun *et al.* [32] and Zheng *et al.* [33] have conducted detailed studies on this section. Their research had great significance in the stratigraphic identifications of this study.

Figure 1: Location of Duanjiapo section, Lantian, China.

The sampling sequences of the Duanjiapo section totals 15 m in length, including L_{32} , S_{32} , L_{33} , S_{33} , L_{34} and the upper layers of red clay. These samples were oriented using a geologic compass in the field, and were taken to the laboratory to be cut into cubes (2 cm × 2 cm × 2 cm). We performed AMS and remanent magnetization (thermal demagnetization) measurements. We measured the AMS using a Kappa Bridge MFK1A instrument with a frequency of 976 Hz, a magnetic field strength of 200 A/m and an accuracy of 2×10^{-8} SI.

In the thermal demagnetization process, we used an ASC TD-48 thermal demagnetization instrument at temperatures of 25°C, 50°C, 100°C, 125°C, 150°C, 200°C, 250°C, 300°C, 350°C, 400°C, 450°C, 500°C, 525°C, 550°C, 570°C and 585°C. Most of the samples' remanent magnetizations can be reduced to below 10% of the natural remanent magnetization (NRM) at 585°C, and the heating temperatures of the other samples went higher to 600°C, 610°C, 620°C, 630°C, 640°C, 650°C, 660°C, 670°C and

680°C. The results showed that all of the samples' remanent magnetizations went below 10% of the NRM. We measured the remanent magnetism of samples using a 2G-755 U-channel superconducting magnetometer, which has a measurement scope of $2.0 \times 10^{-12} - 2.0 \times 10^{-4} \text{ Am}^2$ and a sensitivity of $2.0 \times 10^{-12} \text{ Am}^2$ ($2.0 \times 10^{-9} \text{ emu}$). We performed demagnetization and remanent measurement in a zero-magnetic-field environment ($<150 \text{ nT}$).

The remanence measurement results show that the VRM of the sample was mostly removed at 150°C, and was almost removed at 300°C. The VRM declinations from the various demagnetization temperatures can be obtained by calculating the space coordinates. As a benchmark, we selected the declinations of NRM (hereinafter abbreviated as D_{NRM} . The NRM is the measured remnant magnetism of a natural sample with no demagnetization, which includes the depositional remanent magnetization, VRM and so on. Typically, the direction of NRM is not consistent with geographic north. D_{NRM} is the angle between the NRM direction and geographic north.) and declinations of VRM (hereinafter abbreviated as D_{VRM}) from some of the temperature ranges (25–50°C, 50–100°C, 100–150°C, 150–200 °C, 200–300°C) instead of the geographic north. Given these declinations, we determined whether there were significant differences in the declinations of the maximum axes of the AMS ellipsoid (hereinafter abbreviated as D_{AMS}) obtained from the field orientation, VRM orientation and NRM orientation.

3 Results and analysis

Figure 2 shows the distributions of D_{NRM} and D_{VRM} at various thermal demagnetization temperature ranges, with a distribution bin of 5°. The distributions of Figures 2a, 2c, 2d and 2e appear to be normal, so we fitted a Gaussian curve to the frequency distribution of the bar graph. In the fitting, to ensure that the distribution of the fitting curve was close to that shown in the bar chart, we eliminated declination values that deviated significantly from the average and would significantly increase the standard deviation. We can see that D_{VRM} in the demagnetization temperature range of 50–200°C is relatively concentrated, especially from 100–150°C. The distribution of D_{VRM} in the demagnetization temperature range of 100–150°C is most concentrated and had the smallest standard deviation (Figures 2c, 2d, 2e), so we predicted that the D_{VRM} from 100–150°C may be the most promising choice for replacing the samples' original north direction.

As reported by Yue *et al.* [18], the angle difference between the VRM direction of the drilling core samples and geographic north can be corrected by performing the same measurements on samples from the basset section near the drilling location. In this research, we used oriented samples from the basset section to simulate drilling core samples, and explored how the VRM orientation changed the AMS result when assuming that information about the direction of the basset samples was missing. Because our samples were taken from the basset section, we can correct the D_{VRM} value of the basset section itself. For instance, when we take the VRM direction as the north direction for re-calculating the D_{AMS} of the samples, we can directly use the average D_{VRM} value as the correction term δ , using the following formula:

$$D_{AMS} = D_{AMS0} - (D_{VRM} - \delta) = D_{AMS0} - D_{VRM} + \delta, \quad (1)$$

where:

D_{AMS0} is the declination of the maximum axes of the measured AMS ellipsoid, using geographic north as the benchmark direction.

D_{VRM} is the VRM declination.

δ is the average angle between geographic north and the VRM direction of samples from the basset section near the drilling location. Here, instead, we use the average value of each fitted Gaussian curve. Due to the disordered D_{VRM} distribution in the temperature ranges 25–50°C and 200–300°C (Figures 2b, 2f), the average D_{VRM} values of these two temperature ranges are not a good reflection of the distribution. The D_{VRM} of these two ranges cannot be corrected by the average D_{VRM} value, which is believed to be $\delta = 0$.

The calculated D_{AMS} value may be negative, and if so, must be converted (plus 360°) to guarantee that all D_{AMS} values are distributed in the 0–360° range.

Based on the NRM orientation, we can follow formula (1) to obtain the following formula:

$$D_{AMS} = D_{AMS0} - (D_{NRM} - \delta) = D_{AMS0} - D_{NRM} + \delta, \quad (2)$$

where:

D_{AMS0} is the declination of the maximum axes of the measured AMS ellipsoid, using geographic north as the benchmark direction.

D_{NRM} is the NRM declination.

δ is the average angle between geographic north and the NRM direction of samples from the basset section near the drilling location. Here, we used the average value of the fitted Gaussian curve rather than this value.

The calculated D_{AMS} value is likewise converted to guarantee that all D_{AMS} values fall within the 0–360° range.

Table 1: Table of D_{AMS} frequency distribution.

Bin	D_{AMS0}	D_{AMS1}	D_{AMS2}	D_{AMS3}	D_{AMS4}	D_{AMS5}	D_{AMS6}	D_{AMS7}
0-22.5°	9	15	18	18	15	18	19	17
22.5-45.0°	11	12	12	12	11	14	21	12
45.0-67.5°	11	9	8	8	11	14	18	9
67.5-90.0°	25	12	14	14	15	20	23	16
90.0-112.5°	37	28	30	30	23	26	18	25
112.5-135.0°	50	41	42	42	49	42	27	45
135.0-157.5°	40	45	41	41	39	47	26	44
157.5-180.0°	34	36	35	35	41	37	34	34
180.0-202.5°	20	32	31	31	24	18	26	30
202.5-225.0°	15	13	10	10	14	9	22	9
225.0-247.5°	19	12	23	23	17	23	14	19
247.5-270.0°	28	27	26	26	27	29	32	29
270.0-292.5°	21	31	31	31	28	30	32	28
292.5-315.0°	39	35	28	28	35	36	35	32
315.0-337.5°	26	36	42	42	35	32	33	38
337.5-360.0°	22	23	16	16	23	12	27	20
χ^2 value:	—	34.9	103	45.5	21.8	31.2	66.2	32.3

* D_{AMS1} is calculated from D_{NRM} , D_{AMS2} is calculated from 25-50°C D_{VRM} , D_{AMS3} is calculated from 50-100°C D_{VRM} , D_{AMS4} is calculated from 100-150°C D_{VRM} , D_{AMS5} is calculated from 150-200°C D_{VRM} , D_{AMS6} is calculated from 200-300°C D_{VRM} , D_{AMS7} is calculated from 50-200°C D_{VRM} .

After comparing the D_{AMS} values calculated using formulas (1) and (2) with the original D_{AMS0} value, we can draw the D_{AMS} distribution diagram as shown in Figure 3.

In the D_{AMS0} diagram (Figure 3a), we can see that the angle ranges 112.5–135.0° and 292.5–315.0° have the highest and second-highest distribution frequency, respectively. This indicates that the prevailing wind direction is almost NW–SE. Figures 3d, 3e and 3f show similar distributions to that in Figure 3a, and all show the highest distribution frequency at angles of 112.5–135.0°. These results indicate that taking the VRM direction as the north direction of the sample can obtain relatively reliable wind direction information. However, in Figures 3d, 3e and 3f, the frequency of the D_{AMS} distribution at angles of 112.5–135.0° is reduced, which indicates that the adoption of VRM orientation may result in weakening the advantage of the high-frequency wind direction. To quantitatively compare the impact of using the VRM orientation method on the D_{AMS} distribution at different demagnetization temperature ranges, we divided the circumferences into 16 equal bins, and Table 1 presents the statistical D_{AMS0} and D_{AMS} results.

In the table, we can see that the D_{AMS} frequency distribution is a discrete distribution. The D_{AMS0} distribution is the expected theoretical distribution, and each of the other distributions can be regarded as observational. Be-

cause the theoretical distribution reflects the distribution of the palaeowind direction, it cannot be described by any canonical distribution such as a Gaussian or Cauchy distribution. Therefore, we can only use a nonparametric test to determine the difference between these discrete distributions. We determined the differences between the observations and our theoretical results by performing a Pearson's chi-square test of the goodness of fit (a kind of nonparametric test suitable for the distributions of categorical data analysis):

Null hypothesis H_0 : the D_{AMS} distribution is consistent with the D_{AMS0} distribution (or, we can say there is no significant difference between the two).

The formula for the Pearson's chi-square test of the goodness of fit is as follows:

$$\chi^2 = \sum_{i=1}^n \frac{(f_i - F_i)^2}{F_i}, \quad (3)$$

where:

n is the number of bins, and $n = 16$, according to the statistical grouping scheme shown in Table 1,

f_i is the D_{AMS} frequency for bin i (observation data) and F_i is the D_{AMS0} frequency for bin i (theoretical data).

The basic reason for performing the Pearson's chi-square test of the goodness of fit is to determine how likely it is to find any observed differences between the sets of

Figure 2: (a) is frequency distribution chart of declination of NRM, and (b), (c), (d), (e), (f) are frequency distribution charts of VRM from different temperature ranges which are noted in the charts. The bin size of all the charts are 5°, and (a), (c), (d), (e) are fitted with gaussian curve with parameters.

Figure 3: The rose diagrams show the distribution of D_{AMS} , (a) is distribution of D_{AMS0} based on field orientation, (b) is distribution of D_{AMS1} calculated from D_{NRM} , (c) is distribution of D_{AMS2} calculated from 25–50 °C D_{VRM} , (d) is distribution of D_{AMS3} calculated from 50–100 °C D_{VRM} , (e) is distribution of D_{AMS4} calculated from 100–150 °C D_{VRM} , (f) is distribution of D_{AMS5} calculated from 150–200 °C D_{VRM} .

observation and theoretical results. The value of the chi-squared test, χ^2 , depends on the difference between distributions of the observation and theoretical results.

The smaller is the χ^2 value, the smaller will be the difference between the distributions of the observation and theoretical results. In the opposite case, the null hypothesis is more likely to be rejected, and will indicate that there is significant difference between these distributions.

The last row of Table 1 shows the χ^2 results for D_{AMS1-7} . At a significance level $\alpha = 0.05$, the chi-square table of critical values shows that for degrees of freedom of 15 ($n-1$, $n = 16$), the critical value is 25. Only the chi-square value of 21.8 from D_{AMS4} is smaller than this critical value of 25, which allows us to accept the null hypothesis and state that there is no significant difference between the calculated and theoretical results. The above test shows that the D_{AMS} distribution obtained from the VRM orientation is consistent with the D_{AMS0} distribution obtained by field orientation when the VRM is from a demagnetization temperature range of 100–150°C.

We also tried to divide the circumferences into 32 equal angle ranges to perform the Pearson's chi-square test of goodness of fit, and the results showed that there was no D_{AMS} distribution obtained from the VRM orientation that was consistent with the D_{AMS0} distribution obtained by field orientation. Therefore, we found that by using the VRM orientation in the palaeowind direction study traced by AMS, the resolution can reach 22.5° (360°/16), but cannot reach 11.25° (360°/32). These findings indicate that there may be an upper limit in the resolution when using VRM orientation to replace the field orientation in palaeowind direction studies traced by AMS.

4 Conclusions and discussion

In this study, we obtained the following results.

1. For field-oriented samples from the Duanjiapo section in Lantian, the distribution of the VRM direction from a demagnetization temperature range of 100–150°C is more concentrated than those from other demagnetization temperature ranges, and has the smallest standard deviation.
2. The distribution of the declinations of the maximum axes of the AMS ellipsoid based on VRM (100–150°C) orientation is closest to that based on the field orientation. There is no significant difference between them when the bin angle is 22.5° and the significance level $\alpha = 0.05$.

From the above results, when we consider the magnetic fabric to trace the palaeowind direction with a proper resolution of the wind direction, it is feasible to use the VRM orientation instead of the field orientation for loess samples for which the directions are difficult to mark during sampling (such as drilling core samples), but it may be necessary to pay close attention to the demagnetization temperature ranges when using VRM data.

Zeeden *et al.* [15] reported that the direction of lineation in different layers can change by about 90°. We agree with these authors that magnetic fabric properties should be divided into three intervals for analysis. The relationship between D_{AMS} and D_{VRM} can appear too complex when considering the whole sequence, and this relationship can be better analyzed in different layers.

Our conclusions in this paper are based only on samples from the Duanjiapo section in the Lantian area on the Chinese Loess Plateau. Readers are advised that other regions must be further researched and validated before being assured of the same conclusions.

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Table S1: Supplementary materials

relative depth (cm)	D _{AMS0}	D _{AMS1}	D _{AMS2}	D _{AMS3}	D _{AMS4}	D _{AMS5}	D _{AMS6}	D _{AMS7}	D _{VRM}	25-50°C D _{VRM}	50-100°C D _{VRM}	100-150°C D _{VRM}	150-200°C D _{VRM}	200-300°C D _{VRM}	50-200°C D _{VRM}
2	33	291.2	281.3	4.5	325.3	311.1	261.9	336.4	101.8	111.7	32.5	67.7	81.9	131.1	56.6
4	306	321.9	335.2	318.0	310.7	310.6	313.9	314.8	344.1	330.8	348.0	355.3	355.4	352.1	351.2
8	300	312.5	332.1	309.6	306.8	307.9	326.7	308.4	347.5	327.9	350.4	353.2	352.1	333.3	351.6
10	325	334.4	122.4	327.4	333.5	331.0	333.9	330.3	350.6	202.6	357.6	351.5	354.0	351.1	354.7
12	123	140.0	161.7	133.8	127.6	126.4	132.2	131.0	343.0	321.3	349.2	355.4	356.6	350.8	352.0
16	110	119.7	105.4	123.1	112.5	114.8	148.0	118.7	350.3	4.6	346.9	357.5	355.2	322.0	351.3
20	181	195.2	204.9	191.6	185.9	188.1	203.3	189.3	345.8	336.1	349.4	355.1	352.9	337.7	351.7
24	178	185.6	168.5	185.3	185.1	188.3	209.2	185.6	352.4	9.5	352.7	352.9	349.7	328.8	352.4
26	185	198.7	356.3	190.9	195.7	198.5	219.6	193.7	346.3	188.7	354.1	349.3	346.5	325.4	351.3
34	132	135.8	353.1	134.3	134.1	134.1	164.5	129.1	2.7	138.9	1.7	6.3	357.9	327.5	2.9
40	139	306.5	140.7	239.1	325.7	332.9	138.6	315.8	192.5	358.3	259.9	173.3	166.1	0.4	183.2
44	276	298.6	313.0	287.3	290.5	293.8	307.9	288.8	337.4	323.0	348.7	345.5	342.2	328.1	347.2
48	173	191.1	205.1	186.1	192.8	189.9	154.5	188.7	341.9	327.9	346.9	340.2	343.1	18.5	344.3
56	348	146.3	49.1	159.1	176.5	190.3	300.3	166.0	208.2	298.9	192.8	179.9	169.2	47.7	182.0
60	174	193.3	204.6	185.1	185.6	183.9	327.4	185.2	340.7	329.4	348.9	348.4	350.1	206.6	348.8
72	319	335.2	343.3	330.3	331.8	335.1	138.7	331.2	343.8	335.7	348.7	347.2	343.9	180.3	347.8
74	324	334.4	134.1	330.4	337.9	342.4	143.4	333.9	349.6	189.9	353.6	346.1	341.6	180.6	350.1
84	135	158.4	166.7	151.4	147.7	160.9	293.4	151.2	336.6	328.3	343.6	347.3	334.1	201.6	343.8
90	119	131.3	273.3	127.9	133.1	128.1	164.7	129.8	347.7	205.7	351.1	345.9	350.9	314.3	349.2
92	310	328.7	339.4	322.9	319.7	323.8	133.7	322.1	341.3	330.6	347.1	350.3	346.2	176.3	347.9
96	135	149.4	171.7	143.2	149.0	146.6	352.2	145.1	345.6	323.3	351.8	346.0	348.4	142.8	349.9
98	134	149.5	334.7	148.9	139.4	162.8	334.5	146.5	344.5	159.3	345.1	354.6	331.2	159.5	347.5
100	141	158.3	165.0	156.2	155.4	165.7	347.8	156.5	342.7	336.0	344.8	345.6	335.3	153.2	344.5
104	131	142.4	117.3	148.8	142.0	146.7	282.6	146.8	348.6	13.7	342.2	349.0	344.3	208.4	344.2
106	144	162.7	280.2	155.2	160.3	173.5	216.0	159.2	341.3	223.8	348.8	343.7	330.5	288.0	344.8
108	201	216.0	230.4	212.1	209.1	209.5	27.1	211.1	345.0	330.6	348.9	351.9	351.5	173.9	349.9
112	344	357.2	330.1	354.3	352.8	22.9	132.6	355.0	346.8	13.9	349.7	351.2	332.6	211.4	349.0
116	240	260.5	263.5	262.2	253.4	260.7	262.5	259.3	339.5	336.5	337.8	346.6	339.3	337.5	340.7
120	136	160.1	177.1	153.3	154.9	159.7	306.8	154.2	335.9	318.9	342.7	341.1	336.3	189.2	341.8
124	164	185.9	173.7	188.6	179.2	180.5	215.1	184.8	338.1	350.3	335.4	344.8	343.5	308.9	339.2
128	135	152.0	144.1	150.9	149.8	153.2	280.1	150.8	343.0	350.9	344.1	345.2	341.8	214.9	344.2
130	142	155.9	329.2	152.0	154.8	157.8	246.3	154.3	346.1	172.8	350.0	347.2	344.2	255.7	347.7
132	227	252.4	262.0	241.4	244.3	250.7	16.9	243.1	334.6	325.0	345.6	342.7	336.3	210.1	343.9
136	244	266.4	271.8	263.4	261.6	262.9	35.3	262.9	337.6	332.2	340.6	342.4	341.1	208.7	341.1
138	302	308.6	237.1	304.3	308.0	318.1	86.9	306.9	353.4	64.9	1.7	354.0	343.9	215.1	355.1
140	136	164.2	168.8	154.6	150.9	169.2	304.0	154.5	331.8	327.2	341.4	345.1	326.8	192.0	341.5
144	236	252.3	280.2	250.9	252.0	246.5	112.2	251.0	343.7	315.8	345.1	344.0	349.5	123.8	345.0
146	50	61.4	228.3	52.3	59.4	64.1	182.5	56.1	348.6	181.7	1.7	350.6	345.9	227.5	353.9
148	269	288.4	288.7	284.9	282.4	291.1	352.2	284.6	340.6	340.3	344.1	346.6	337.9	276.8	344.4
152	122	126.1	136.1	125.1	128.5	122.0	313.3	125.4	355.9	345.9	356.9	353.5	11.5	168.7	356.6

Table S1: ...continued

relative depth (cm)	D _{AMS0}	D _{AMS1}	D _{AMS2}	D _{AMS3}	D _{AMS4}	D _{AMS5}	D _{AMS6}	D _{AMS7}	D _{VRM}	25-50°C	50-100°C	100-150°C	150-200°C	200-300°C	50-200°C
154	121	125.9	274.2	119.1	125.3	124.3	255.1	120.9	355.1	206.8	5.9	355.7	356.7	225.9	0.1
156	134	153.3	170.1	146.3	143.1	143.0	206.1	145.0	340.7	323.9	347.7	350.9	351.0	287.9	349.0
162	148	152.4	291.4	148.5	154.0	154.5	192.7	150.1	355.6	216.6	3.5	354.0	353.5	315.3	357.9
164	354	16.9	17.6	10.2	11.9	27.6	175.6	6.0	343.6	336.4	347.7	350.5	337.9	178.4	348.0
168	31	48.2	45.0	40.0	42.4	42.2	171.0	41.0	342.8	346.0	351.0	348.6	348.8	220.0	350.0
170	162	166.9	69.3	170.1	172.2	177.6	79.6	172.0	355.1	92.7	351.9	349.8	344.4	82.4	350.0
172	318	286.1	340.7	276.0	248.8	254.0	265.7	257.8	38.4	337.3	45.9	77.6	75.5	52.3	60.2
176	97	106.1	98.0	106.8	105.7	100.3	307.4	105.8	350.9	359.0	350.2	351.3	356.7	149.6	351.2
178	109	118.9	276.9	110.8	120.1	121.3	286.3	115.8	350.1	192.1	358.2	348.9	347.7	182.7	353.2
180	76	91.1	98.1	89.0	82.8	90.7	288.4	87.3	344.9	337.9	347.0	353.2	345.3	147.6	348.7
184	152	166.8	206.5	158.0	159.3	164.9	337.0	159.2	345.2	305.5	354.0	352.7	347.1	175.0	352.8
188	285	297.1	304.9	288.9	292.9	299.1	62.1	290.6	347.9	340.1	356.1	352.1	345.9	222.9	354.4
192	194	212.6	243.3	206.3	208.0	207.6	300.0	207.0	341.4	310.7	347.7	346.0	346.4	254.0	347.0
194	155	173.2	35.9	162.4	167.8	178.7	302.0	166.3	341.8	119.1	352.6	347.2	336.3	213.0	348.7
196	130	151.8	152.0	148.4	144.1	154.7	285.2	147.7	338.2	338.0	341.6	345.9	335.3	204.8	342.3
200	168	185.4	204.9	183.6	180.6	179.9	344.5	182.2	342.6	323.1	344.4	347.4	348.1	183.5	345.8
202	113	120.6	0.3	120.5	123.8	128.1	257.0	122.7	352.4	112.7	352.5	349.2	344.9	216.0	350.3
204	145	166.2	180.5	159.8	155.2	166.2	306.8	159.0	338.8	324.5	345.2	349.8	338.8	198.2	346.0
208	137	151.5	161.4	149.3	145.8	147.6	252.8	147.9	345.5	335.6	347.7	351.2	349.4	244.2	349.1
210	129	326.8	349.8	318.3	313.3	326.9	90.5	317.5	162.2	139.2	170.7	175.7	162.1	38.5	171.5
212	305	325.3	335.6	318.4	319.1	327.2	343.1	319.4	339.7	329.4	346.6	345.9	337.8	321.9	345.6
216	126	145.8	171.2	134.5	139.9	142.4	244.8	137.3	340.2	314.8	351.5	346.1	343.6	241.2	348.7
218	143	152.6	6.9	150.2	154.2	156.1	279.5	152.5	350.4	136.1	352.8	348.8	346.9	223.5	350.5
220	136	154.1	167.1	147.2	148.8	149.2	246.4	147.8	341.9	328.9	348.8	347.2	346.8	249.6	348.2
224	311	323.9	350.3	315.9	323.7	327.2	6.2	319.6	347.1	320.7	355.1	347.3	343.8	304.8	351.4
226	298	305.8	299.5	300.4	312.4	308.4	30.8	304.7	352.2	358.5	1.6	345.6	349.6	267.2	353.3
228	114	129.1	146.3	122.1	123.7	124.2	132.7	122.7	344.9	327.7	351.9	350.3	349.8	341.3	351.3
232	125	142.6	159.1	136.0	137.0	139.7	290.9	136.7	342.4	325.9	349.0	348.0	345.3	194.1	348.3
234	136	148.2	283.5	140.8	147.9	154.1	329.6	144.8	347.8	212.5	355.2	348.1	341.9	166.4	351.2
236	120	140.0	149.9	132.6	131.2	142.4	281.0	133.0	340.0	330.1	347.4	348.8	337.6	199.0	347.0
240	112	130.0	108.2	130.9	124.8	131.6	253.0	129.2	342.0	3.8	341.1	347.2	340.4	219.0	342.8
242	112	133.4	331.5	133.4	132.5	137.0	113.2	133.5	338.6	140.5	338.6	339.5	335.0	358.8	338.5
244	251	277.6	282.8	269.6	269.1	274.8	53.4	269.8	333.4	328.2	341.4	341.9	336.2	197.6	341.2
248	174	200.3	228.6	190.0	192.0	183.8	349.5	190.2	333.7	305.4	344.0	342.0	350.2	184.5	343.8
256	181	197.5	183.8	195.3	194.4	195.3	321.8	195.1	343.5	357.2	345.7	346.6	345.7	219.2	345.9
258	170	194.4	171	186.1	186.1	189.9	326.0	186.7	335.6	152.9	343.9	343.9	340.1	204.0	343.3
260	224	252.7	235.6	244.8	246.6	246.6	31.7	245.2	331.3	348.4	339.2	337.4	344.1	192.3	338.8
264	265	299.8	285.4	284.3	282.2	293.7	77.9	284.0	325.2	339.6	340.7	342.8	331.3	187.1	341.0
266	83	103.4	299.3	98.9	101.4	112.4	338.4	101.8	339.6	143.7	344.1	341.6	330.6	104.6	341.2
268	61	90.0	129.2	82.7	80.2	89.6	235.1	82.3	331.0	291.8	338.3	340.8	331.4	185.9	338.7

Table S1: ...continued

relative depth (cm)	D _{AMS0}	D _{AMS1}	D _{AMS2}	D _{AMS3}	D _{AMS4}	D _{AMS5}	D _{AMS6}	D _{AMS7}	D _{VRM}	25-50°C D _{VRM}	50-100°C D _{VRM}	100-150°C D _{VRM}	150-200°C D _{VRM}	200-300°C D _{VRM}	50-200°C D _{VRM}
272	352	171	359.5	10.7	15.9	362.1	160.3	6.3	341.4	352.5	345.3	344.5	1.4	191.7	345.7
274	324	350.4	97.6	327.3	332.6	23.0	70.8	334.1	333.6	226.4	356.7	351.4	312.5	253.2	349.9
276	159	176.8	194.1	174.5	171.7	180.7	6.6	174.1	342.2	324.9	344.5	347.3	338.3	152.4	344.9
280	146	155.5	145.9	155.9	153.9	157.9	2.6	155.4	350.5	0.1	350.1	352.1	348.1	143.4	350.6
282	180	195.8	69.1	188.9	186.5	200.0	275.3	188.7	344.2	110.9	351.1	353.5	340.0	264.7	351.3
288	267	289.7	310.9	276.1	277.1	310.4	82.3	278.1	337.3	316.1	350.9	349.9	316.6	184.7	348.9
290	252	272.3	88.7	257.9	259.0	258.5	54.5	258.5	339.7	163.3	354.1	353.0	353.5	197.5	353.5
292	92	110.2	28.1	105.3	107.4	106.8	292.3	106.4	341.8	63.9	346.7	344.6	345.2	159.7	345.6
296	270	285.5	288.0	279.7	281.1	288.2	112.3	280.5	344.5	342.0	350.3	348.9	341.8	157.7	349.5
298	283	294.6	201.6	291.3	289.8	305.1	98.8	292.4	348.4	81.4	351.7	353.2	337.9	184.2	350.6
300	94	133.9	131.8	127.6	113.7	129.0	278.6	121.8	320.1	322.2	326.4	340.3	325.0	175.4	332.2
304	69	73.8	156.2	71.5	71.0	70.0	211.3	68.9	355.2	272.8	1.5	358.0	359.0	217.7	0.1
306	224	227.9	25.4	226.0	226.1	225.4	201.2	225.9	356.1	198.6	358.0	357.9	358.6	22.8	358.1
308	125	112.4	354.5	109.6	128.8	121.2	286.4	116.1	191	130.5	194	356.2	15.2	198.6	8.9
312	300	302.1	331.5	300.2	307.9	301.0	112.1	297.8	357.9	328.5	3.7	0.5	359.0	187.9	2.2
314	93	96.8	317.6	96.3	99.7	93.1	109.7	92.0	2.7	135.4	0.7	1.7	359.9	343.3	1.0
316	253	255.7	34.8	242.1	258.6	256.1	56.7	248.4	357.3	218.2	14.9	354.4	356.9	196.3	4.6
320	103	107.8	120.2	106.3	107.1	113.3	311.4	105.0	1.7	342.8	0.7	355.9	349.7	151.6	358.0
322	268	263.4	170.8	261.6	270.7	277.3	272.2	261.0	11.1	97.2	10.3	5.7	2.2	355.8	7.0
324	107	107.8	352.4	108.5	112.8	116.1	359.2	104.5	5.7	114.6	2.5	2.6	2.4	107.8	2.5
330	253	240.5	189.5	247.2	257.7	258.3	169.0	246.4	19.0	63.5	9.8	3.7	6.1	84.0	6.6
332	306	311.9	182.3	316.8	310.6	327.1	145.1	315.0	0.6	123.7	349.2	355.4	338.9	160.9	351.0
336	296	307.6	289.9	305.2	306.3	301.8	121.7	305.3	348.4	6.1	350.8	349.7	354.2	174.3	350.7
338	291	295.5	163.2	294.3	297.4	301.6	108.9	296.4	355.5	127.8	356.7	353.6	349.4	182.1	354.6
340	287	293.1	162.7	290.6	294.5	299.8	114.4	292.7	0.4	124.3	356.4	352.5	347.2	172.6	354.3
344	311	313.3	321.9	311.5	321.4	313.6	219.6	313.6	4.2	349.1	3.5	349.6	357.4	91.4	357.4
346	97	97.7	307.1	100.3	106.2	106.5	329.5	101.5	5.8	149.9	0.7	350.8	350.5	127.5	355.5
352	107	116.0	111.0	117.0	120.6	118.3	303.7	118.3	351.0	356.0	350.0	346.4	348.7	163.3	348.7
354	112	118.7	77.0	132.3	116.9	127.9	332.9	125.5	353.3	35.0	339.7	355.1	344.1	139.1	346.5
356	118	114.9	8.3	123.7	125.4	127.3	327.3	123.7	9.6	109.7	354.3	352.6	2.2	150.7	354.3
360	87	98.7	114.2	94.0	100.9	90.5	354.2	96.1	348.3	332.8	353.0	346.1	356.5	92.8	350.9
362	102	116.1	359.5	117.7	117.2	118.6	259.1	117.6	345.9	102.5	344.3	344.8	343.4	202.9	344.4
364	216	242.8	26.5	239.9	217.7	258.3	34.9	225.8	333.2	189.5	336.1	6.7	317.7	181.1	350.2
368	235	270.6	253.0	271.5	256.2	268.3	51.3	266.4	324.4	342.0	323.5	338.8	326.7	183.7	328.6
370	170	142.6	28.3	178.4	168.4	143.2	76.9	163.1	33.9	141.7	351.6	10.0	38.2	93.1	6.9
372	238	302.1	95.2	285.6	265.5	310.4	50.4	279.9	295.9	142.8	312.4	332.5	287.6	187.6	318.1
376	80	146.9	111.8	123.8	113.2	179.9	260.0	122.0	293.1	328.2	316.2	326.8	260.1	180.0	318.0
378	89	180.0	238.9	138.2	117.5	151.0	268.1	130.8	269.0	210.1	310.8	331.5	298.0	180.9	318.2
380	273	340.8	63.3	323.4	308.0	321.6	75.9	317.6	292.2	209.7	309.6	325.0	311.4	197.1	315.4
384	301	349.9	295.4	354.9	344.1	356.1	103.8	351.7	311.1	5.6	306.1	316.9	304.9	197.2	309.3

Table S1: ...continued

relative depth (cm)	D _{AMS0}	D _{AMS1}	D _{AMS2}	D _{AMS3}	D _{AMS4}	D _{AMS5}	D _{AMS6}	D _{AMS7}	D _{VRM}	25-50°C	50-100°C	100-150°C	150-200°C	200-300°C	50-200°C
386	305	32.1	1074	177	344.4	21.4	134.1	3.1	279.4	197.6	291.2	320.6	295.1	170.9	301.9
388	110	190.0	255.0	180.6	161.8	194.4	308.8	174.4	280.0	215.0	289.4	308.2	275.6	161.2	295.6
392	32	351.9	3.6	19.2	35.7	269.9	214.0	14.8	40.1	28.4	16.8	4.7	122.1	178.0	172
394	328	228.4	211.7	268.9	319.9	290.3	160.4	291.4	106.1	116.3	63.0	16.5	49.2	167.6	36.6
396	89	28.7	274.6	44.3	79.7	39.7	266.2	54.8	66.8	174.4	48.7	177	60.8	182.8	34.2
400	242	219.1	221.9	226.9	240.4	337.2	65.0	226.2	29.4	20.1	19.1	10.0	264.8	177.0	15.8
402	309	260.6	150.4	267.7	311.8	303.0	138.6	284.1	54.9	158.6	45.3	5.6	174	170.4	24.9
404	207	105.2	58.1	158.2	207.6	291.8	5.1	182.2	108.3	148.9	52.8	7.8	275.2	201.9	24.8
408	8	9.9	32.2	348.1	12.5	25.9	186.4	356.2	4.6	335.8	19.9	3.9	342.1	181.6	11.8
410	9	297.2	210.4	312.4	359.4	347.8	203.6	339.3	71.8	158.6	56.6	9.6	21.2	165.4	29.7
412	239	127.8	81.6	187.4	232.6	153.6	65.9	202.3	117.7	157.4	55.6	14.8	96.9	173.1	36.7
418	82	344.5	336.4	346.9	64.4	69.2	248.6	34.5	97.5	105.6	95.1	26.0	24.2	193.4	47.5
420	104	71	310.4	11.6	61.5	356.5	301.2	26.0	103.4	153.6	96.4	50.9	107.5	162.8	78.0
424	159	169.0	191.9	162.4	166.4	166.7	340.8	163.1	350.0	327.1	0.6	352.6	352.3	178.2	355.9
426	121	140.6	121.0	133.9	129.6	130.8	256.9	131.4	340.4		347.1	351.4	350.2	224.1	349.6
428	134	139.6	13.2	140.9	138.9	138.9	321.4	139.0	0.9	120.8	353.1	355.1	6.6	172.6	355.0
432	70	80.0	47.6	81.2	81.2	78.4	252.1	80.9	350.0	22.4	348.8	348.8	351.6	177.9	349.1
434	84	105.5	84.0	99.0	97.2	94.7	186.6	97.6	338.5		345.0	346.8	349.3	257.4	346.4
440	123	134.4	143.4	125.8	135.3	138.5	300.0	130.5	348.6	339.6	357.2	347.7	344.5	183.0	352.5
442	115	121.3	115.0	119.2	119.6	125.5	263.9	118.6	353.7		355.8	355.4	1.0	211.1	356.4
444	92	93.9	315.4	94.7	98.8	93.6	270.0	91.0	4.6	136.6	1.2	1.6	358.4	182.0	1.0
448	111	90.8	36.9	112.4	108.6	90.3	22.5	101.6	26.7	74.1	2.6	10.8	32.1	88.5	9.4
450	110	111.9	110.0	105.6	117.9	115.8	265.4	111.7	358.1		8.3	352.1	354.2	204.6	358.3
452	172	181.2	54.2	182.4	180.8	185.2	352.7	182.0	350.8	117.8	349.6	351.2	346.8	179.3	350.0
456	351	9.1	12.6	354.6	359.6	16.3	181.1	357.5	348.4	338.4	356.4	351.4	346.2	169.9	353.5
458	91	176.9	91.0	172.3	170.6	178.5	180.0	174.0	274.1		278.7	280.4	272.5	271.0	277.0
460	61	155.7	163.1	158.6	155.3	155.4	154.8	156.3	265.3	257.9	262.4	265.7	265.6	266.2	264.7
464	347	81.9	94.8	70.2	76.4	92.0	77.6	71.0	271.6	252.2	280.7	279.0	266.5	269.4	276.0
466	342	66.0	342.0	56.4	58.0	69.6	63.7	53.2	282.5		289.6	292.4	283.8	278.3	288.8
468	188	280.2	359.5	281.0	274.4	277.0	282.9	277.5	267.8	188.5	267.0	273.6	271.0	265.1	270.5
472	209	217.3	192.9	214.9	215.6	225.4	10.1	216.0	351.7	16.1	354.1	353.4	343.6	198.9	353.0
474	340	352.0	340.0	334.4	345.1	13.9	122.9	341.0	348.0		9.6	354.9	337.6	217.1	359.0
476	73	84.9	336.3	74.4	83.4	98.9	233.1	78.9	348.1	96.7	2.6	349.6	334.1	199.9	354.1
482	268	272.9	268.0	267.2	272.1	275.4	54.9	268.6	355.1		4.8	355.9	352.6	213.1	359.4
484	225	237.7	100.0	235.8	230.7	240.1	18.0	233.9	347.3	125.0	349.2	354.3	344.9	207.0	351.1
488	210	221.7	196.3	217.4	218.1	217.9	13.6	217.6	348.3	13.7	352.6	351.9	352.1	196.4	352.4
490	242	247.0	142.0	243.7	246.5	253.9	51.1	243.6	1.5	100.0	2.3	355.5	348.1	190.9	358.4
492	249	250.8	91.2	250.3	255.2	267.9	86.0	253.8	358.2	157.8	358.7	353.8	341.1	163.0	355.2
496	266	272.6	224.6	273.7	273.3	278.2	82.9	273.8	353.4	41.4	352.3	352.7	347.8	183.1	352.2
506	324	326.3	194.2	328.1	332.2	341.7	153.7	331.3	357.7	129.8	355.9	351.8	342.3	170.3	352.7

Table S1: ...continued

relative depth (cm)	D _{AMS0}	D _{AMS1}	D _{AMS2}	D _{AMS3}	D _{AMS4}	D _{AMS5}	D _{AMS6}	D _{AMS7}	D _{VRM}	25-50°C D _{VRM}	50-100°C D _{VRM}	100-150°C D _{VRM}	150-200°C D _{VRM}	200-300°C D _{VRM}	50-200°C D _{VRM}
508	336	340.3	162.2	333.1	336.5	346.7	204.8	334.3	2.2	173.8	6.9	359.5	349.3	131.2	1.7
512	249	258.4	210.2	255.9	258.8	264.3	321.8	257.3	350.6	38.8	353.1	350.2	344.7	287.2	351.7
514	271	272.6	136.3	271.0	276.2	279.9	282.2	274.5	358.4	134.7	360.0	354.8	351.1	348.8	356.5
516	249	249.9	140.0	260.4	255.5	261.5	20.3	258.4	359.1	109.0	348.6	353.5	347.5	228.7	350.6
520	256	258.4	171.2	262.4	261.7	264.7	312.1	262.4	357.6	84.8	353.6	354.3	351.3	303.9	353.6
522	299	301.4	183.4	299.5	308.1	313.3	34.8	304.8	357.6	115.6	359.5	350.9	345.7	264.2	354.2
524	131	139.3	11.7	142.8	146.3	154.7	248.3	145.4	351.7	119.3	348.2	344.7	336.3	242.7	345.6
528	157	164.6	82.5	163.4	167.7	173.7	271.7	165.3	352.4	74.5	353.6	349.3	343.3	245.3	351.7
530	330	339.0	156.8	333.3	337.2	347.8	112.7	336.6	351.0	173.2	356.7	352.8	342.2	217.3	353.4
532	330	337.4	186.6	335.4	338.4	350.8	62.4	338.2	352.6	143.4	354.6	351.6	339.2	267.6	351.8
536	158	164.8	61.5	172.3	167.4	178.4	280.6	171.3	353.2	96.5	345.7	350.6	339.6	237.4	346.7
538	183	186.2	81.8	183.7	192.7	197.8	241.2	190.0	356.8	101.2	359.3	350.3	345.2	301.8	353.0
540	246	249.3	71.1	245.5	253.2	259.9	337.7	248.0	356.7	174.9	4.5	352.8	346.1	268.3	358.0
544	174	185.6	190.0	183.1	186.1	190.0	213.3	184.4	348.4	344.0	350.9	347.9	344.0	320.7	349.6
546	197	199.8	32.4	185.8	204.7	206.6	231.1	194.9	3.7	164.6	15.2	352.3	350.4	325.9	2.1
548	166	167.4	20.7	166.5	170.1	182.7	189.4	169.6	358.6	145.3	359.5	355.9	343.3	336.6	356.4
552	9	23.4	350.8	24.6	20.3	29.6	52.8	23.8	345.6	18.2	344.4	348.7	339.4	316.2	345.2
556	315	320.1	192.8	315.7	322.7	323.1	321.3	319.5	1.4	122.2	359.3	352.3	351.9	353.7	355.5
560	303	311.0	262.1	316.0	313.0	319.1	334.5	315.4	352.0	40.9	347.0	350.0	343.9	328.5	347.6
562	256	268.7	347.6	271.1	260.2	267.2	292.6	265.4	347.3	268.4	344.9	355.8	348.8	323.4	350.6
564	261	261.1	151.8	282.9	267.8	276.0	279.5	275.3	359.9	109.2	338.1	353.2	345.0	341.5	345.7
568	257	265.4	229.6	268.1	265.9	269.5	283.1	267.6	351.6	27.4	348.9	351.1	347.5	333.9	349.4
570	279	288.1	359.6	291.3	283.3	288.4	293.1	287.1	350.9	279.4	347.7	355.7	350.6	345.9	351.9
572	300	306.7	111.7	303.4	302.5	307.0	313.7	303.5	353.3	188.3	356.6	357.5	353.0	346.3	356.5
576	146	165.0	87.0	171.3	160.5	169.8	197.9	167.7	341.0	59.0	334.7	345.5	336.2	308.1	338.3
580	161	165.5	41.1	169.4	168.2	172.3	148.0	169.2	2.0	119.9	351.6	352.8	348.7	13.0	351.8
584	264	272.7	258.4	260.1	276.4	276.2	287.8	271.6	351.3	5.6	7.9	347.6	347.8	336.2	352.4
586	270	275.5	267.7	269.0	276.0	282.4	284.3	274.5	354.5	2.3	5.0	354.0	347.6	345.7	355.5
588	243	256.7	53.4	254.4	253.9	258.8	248.6	255.0	346.3	189.6	348.6	349.1	344.2	354.4	348.0
592	238	247.1	218.2	243.2	251.9	251.4	261.9	249.5	350.9	19.8	354.8	346.1	346.6	336.1	348.5
594	290	291.8	217.2	318.1	293.5	299.6	298.3	302.7	358.2	72.8	331.9	356.5	350.4	351.7	347.3
596	275	290.3	121.1	297.4	288.2	288.7	290.5	290.9	344.7	153.9	337.6	346.8	346.3	344.5	344.1
600	286	291.9	271.3	289.3	295.0	299.0	297.2	293.7	354.1	14.7	356.7	351.0	347.0	348.8	352.3
602	267	279.1	20.3	272.3	279.7	277.4	286.9	276.8	347.9	246.7	354.7	347.3	349.6	340.1	350.2
604	118	129.6	244.7	121.2	123.1	125.9	98.6	122.4	348.4	233.3	0.8	354.9	352.1	19.4	355.6
608	158	168.4	199.2	163.5	167.8	165.5	170.0	165.6	349.6	318.8	354.5	350.2	352.5	348.0	352.4
610	150	164.1	61.2	167.9	163.6	160.0	159.9	164.5	345.9	88.8	342.1	346.4	350.0	350.1	345.5
616	130	142.7	150.8	136.7	144.3	144.8	155.7	140.8	347.3	339.2	353.3	345.7	345.2	334.3	349.2
618	144	164.5	249.1	155.8	152.7	162.4	157.9	155.7	339.5	254.9	348.2	351.3	341.6	346.1	348.3
620	100	116.9	41.9	202.7	106.5	108.3	143.0	122.1	343.1	58.1	257.3	353.5	351.7	317.0	337.9

Table S1: ...continued

relative depth (cm)	D _{AMS0}	D _{AMS1}	D _{AMS2}	D _{AMS3}	D _{AMS4}	D _{AMS5}	D _{AMS6}	D _{AMS7}	D _{VRM}	25-50°C D _{VRM}	50-100°C D _{VRM}	100-150°C D _{VRM}	150-200°C D _{VRM}	200-300°C D _{VRM}	50-200°C D _{VRM}
624	317	325.0	312.3	319.9	328.5	327.2	336.3	324.5	352.0	4.7	357.1	348.5	349.8	340.7	352.5
626	228	233.2	341.9	229.6	230.1	236.6	227.8	227.3	354.8	246.1	2.4	357.9	2.9	0.2	0.7
628	291	290.7	258.2	274.9	293.0	301.1	304.2	286.6	6.8	32.8	20.1	358.0	1.4	346.8	4.4
632	331	339.0	321.1	332.2	342.0	344.3	8.3	337.8	352.0	9.9	358.8	349.0	346.7	322.7	353.2
634	298	303.8	169.1	304.4	300.1	305.4	325.3	303.0	354.2	128.9	353.6	357.9	352.6	332.7	355.0
636	335	341.0	163.7	335.9	342.0	338.9	34.0	338.2	354.0	171.3	3.1	353.0	356.1	301.0	356.8
642	73	91.1	132.8	83.3	85.1	90.6	94.8	84.7	341.9	300.2	349.7	347.9	342.4	338.2	348.3
644	112	119.5	334.4	114.0	123.5	130.2	206.9	120.5	352.5	137.6	358.0	348.5	341.8	265.1	351.5
648	358	16.3	314.9	17.8	20.8	25.8	87.9	13.3	348.2	43.1	344.2	345.6	343.7	270.1	344.7
672	155	177.2	227.9	167.8	170.4	182.0	321.9	169.3	337.8	287.1	347.2	344.6	333.0	193.1	345.7
688	187	199.8	209.6	196.8	200.8	211.7	79.5	198.9	347.2	337.4	350.2	346.2	335.3	107.5	348.1
690	197	212.3	286.1	210.3	207.9	216.3	281.5	209.9	344.7	270.9	346.7	349.1	340.7	275.5	347.1
692	357	16.4	213.7	11.6	15.7	23.8	140.1	7.9	347.1	143.3	349.4	349.7	344.7	216.9	349.1
696	318	332.3	314.2	331.9	335.5	351.0	168.9	333.6	345.7	3.8	346.1	342.5	327.0	149.1	344.4
698	311	328.0	331.6	321.2	323.9	353.3	105.1	323.1	343.0	339.4	349.8	347.1	317.7	205.9	347.9
700	334	344.2	178.4	343.5	346.8	13.3	179.7	346.4	349.8	155.6	350.5	347.2	332.2	154.3	347.6
704	122	142.0	174.8	135.2	131.9	142.4	345.4	134.5	340.0	307.2	346.8	350.1	339.6	136.6	347.5
706	295	311.3	344.8	305.6	301.7	303.9	333.9	304.1	343.7	310.2	349.4	353.3	351.1	321.1	350.9
708	256	271.0	86.9	262.8	265.8	267.1	42.7	265.0	345.0	169.1	353.2	350.2	348.9	213.3	351.0
712	87	101.3	118.2	98.7	99.7	103.6	32.1	99.3	345.7	328.8	348.3	347.3	343.4	54.9	347.7
714	305	317.2	134.4	315.1	314.3	320.5	347.0	315.4	347.8	170.6	349.9	350.7	344.5	318.0	349.6
716	29	33.5	310.3	23.6	37.6	41.1	91.2	33.9	355.5	78.7	9.4	351.4	347.9	297.8	355.1
722	339	350.1	253.7	348.5	350.5	14.7	321.2	351.2	348.9	85.3	350.5	348.5	335.8	17.8	347.8
724	305	314.6	172.8	294.3	316.4	318.4	13.2	309.0	350.4	132.2	14.7	348.6	346.6	291.8	356.0
728	5	18.5	273.3	22.0	14.6	34.6	88.6	20.7	346.5	91.7	343.0	350.4	330.4	276.4	344.3
730	359	20.1	285.9	16.2	22.4	27.8	109.7	13.4	345.4	73.1	346.8	345.0	342.7	249.3	345.6
732	269	271.6	146.9	260.3	279.1	289.7	314.7	273.0	357.4	122.1	12.6	349.9	339.3	314.3	356.0
736	300	304.1	286.0	306.5	310.6	307.4	242.7	307.6	355.9	14.0	353.5	349.4	352.6	57.3	352.4
738	50	63.1	90.6	50.3	56.2	58.0	9.5	53.8	346.9	319.4	359.7	353.8	352.0	40.5	356.2
740	103	114.0	348.6	113.8	117.7	121.5	128.4	117.0	349.0	114.4	349.2	345.3	341.5	334.6	346.0
744	106	118.9	93.3	120.4	115.4	123.2	206.4	118.1	347.1	12.7	345.6	350.6	342.8	259.6	347.9
746	92	106.5	197.0	106.1	101.7	103.3	25.3	104.0	345.5	255.0	345.9	350.3	348.7	66.7	348.0
748	68	74.5	359.6	69.0	71.3	74.7	89.7	71.2	0.0	68.4	359.0	356.7	353.3	338.3	356.8
752	110	122.4	91.7	126.2	119.8	128.2	175.7	123.6	347.6	18.3	343.8	350.2	341.8	294.3	346.4
754	302	317.1	204.4	307.9	315.0	321.7	352.8	312.8	344.9	97.6	354.1	347.0	340.3	309.2	349.2
756	108	122.9	322.9	106.5	121.3	133.4	144.7	117.7	345.1	145.1	5.5	346.7	334.6	323.3	350.3
760	301	327.5	310.0	324.5	321.6	332.4	12.6	324.6	333.5	351.0	336.5	339.4	328.6	288.4	336.4
762	310	318.7	182.2	324.3	314.6	325.4	320.2	320.7	351.3	127.8	345.7	355.4	344.6	349.8	349.3
764	301	313.9	107.5	292.4	313.2	315.9	265.9	305.6	347.1	193.5	12.5	347.8	345.1	35.1	355.4
768	154	167.6	109.7	167.2	166.3	179.1	190.1	168.6	346.4	44.3	346.8	347.7	334.9	323.9	345.4

Table S1: ...continued

relative depth (cm)	D _{AMS0}	D _{AMS1}	D _{AMS2}	D _{AMS3}	D _{AMS4}	D _{AMS5}	D _{AMS6}	D _{AMS7}	D _{VRM}	25-50°C	50-100°C	100-150°C	150-200°C	200-300°C	50-200°C
770	341	349.0	276.4	347.8	349.0	355.8	86.8	349.2	352.0	64.6	353.2	352.0	345.2	254.2	351.8
772	55	73.5	263.3	65.7	69.5	78.8	149.1	69.2	341.5	151.7	349.3	345.5	336.2	265.9	345.8
776	165	183.7	264.8	177.6	175.9	181.2	202.2	177.4	341.3	260.2	347.4	349.1	343.8	322.8	347.6
778	32	56.2	26.6	43.3	51.4	60.9	85.5	49.1	335.8	5.4	348.7	340.6	331.1	306.5	342.9
780	123	154.5	38.3	137.1	140.5	155.8	205.4	141.7	328.5	84.7	345.9	342.5	327.2	277.6	341.3
784	222	233.8	171.3	244.5	238.6	253.3	231.3	243.6	348.2	50.7	337.5	343.4	328.7	350.7	338.4
786	232	248.4	321.5	239.6	238.6	245.7	263.3	240.3	343.6	270.5	352.4	353.4	346.3	328.7	351.7
788	219	222.3	121.6	216.7	220.6	237.6	258.4	219.9	356.7	97.4	6.3	358.4	341.4	320.6	359.1
792	324	322.9	233.4	325.4	329.5	322.7	284.5	322.4	7.6	90.6	358.6	2.9	12.8	39.5	1.6
794	234	251.3	217.3	242.7	250.5	256.2	295.7	247.2	342.7	16.7	351.3	343.5	337.8	298.3	346.8
796	257	262.6	133.4	259.0	265.6	283.1	284.6	264.4	354.4	123.6	358.0	351.4	333.9	332.4	352.6
800	309	336.0	20.8	328.4	323.8	344.6	24.5	328.2	333.0	288.2	340.6	345.2	324.4	284.5	340.8
802	270	273.6	288.7	275.6	270.3	271.6	279.4	272.0	2.9	341.3	354.4	359.7	9.9	350.6	358.0
804	310	306.5	134.8	308.3	315.9	305.1	216.3	304.7	10.0	175.2	5.6	2.5	16.4	93.7	5.3
808	293	295.0	340.2	305.6	295.9	277.7	247.9	299.3	358.0	312.8	347.4	357.1	26.7	45.1	353.7
810	81	103.2	130.3	93.2	98.5	113.3	146.8	97.3	337.8	310.7	347.8	342.5	327.7	294.2	343.7
812	170	197.1	248.4	188.8	192.0	203.1	212.0	192.5	332.9	281.6	341.2	338.0	326.9	318.0	337.5
816	279	289.0	234.3	292.1	286.5	291.8	295.6	290.3	350.0	44.7	346.9	352.5	347.2	343.4	348.7
818	183	192.5	20.7	193.2	190.0	191.8	214.5	192.0	350.5	162.3	349.8	353.0	351.2	328.5	351.0
820	242	248.0	61.5	240.0	242.7	245.8	194.8	240.3	0.5	180.5	6.0	359.3	356.2	47.2	1.7
824	212	241.5	311.2	230.8	227.0	246.5	254.5	231.0	330.5	260.8	341.2	345.0	325.5	317.5	341.0
826	125	157.3	212.6	143.9	146.3	162.0	164.9	147.4	327.7	272.4	341.1	338.7	323.0	320.1	337.6
828	258	274.2	24.6	254.6	271.0	283.8	284.6	266.3	343.8	233.4	7.3	347.0	334.2	333.4	351.7
832	62	264.3	69.8	246.6	260.9	275.8	282.0	256.8	157.7	352.2	175.4	161.1	146.2	140.0	165.2
834	321	337.2	326.4	331.6	334.9	347.0	8.2	334.3	343.8	354.6	349.4	346.1	334.0	312.8	346.7
836	134	147.2	355.6	143.2	144.3	156.6	175.8	145.4	346.8	138.4	350.8	349.7	337.4	318.2	348.6
840	286	309.0	357.0	302.6	309.1	319.8	317.4	306.1	337.0	289.0	343.4	336.9	326.2	328.6	339.9
844	90	116.6	187.6	98.4	113.8	118.2	122.5	108.3	333.4	262.4	351.6	336.2	331.8	327.5	341.7
848	82	115.4	353.9	100.6	105.2	126.4	184.5	104.1	326.6	88.1	341.4	336.8	315.6	257.5	337.9
850	305	320.2	65.6	293.7	321.2	315.6	338.0	305.3	344.8	239.4	15.3	343.8	349.4	327.0	359.7
852	117	139.0	52.5	137.8	128.6	155.4	148.6	136.4	338.0	64.5	339.2	348.4	321.6	328.4	340.6
856	350	22.2	306.8	13.6	24.0	34.4	24.8	12.8	334.3	43.2	340.3	334.4	327.1	325.2	337.2
858	351	29.3	146.7	14.9	20.1	49.5	50.3	14.2	328.2	204.3	340.1	339.3	312.9	300.7	336.8
860	282	310.0	154.2	296.6	306.7	316.9	317.1	304.8	332.0	127.8	345.4	335.3	325.1	324.9	337.2
864	7	356.8	326.8	9.6	359.3	14.3	351.4	3.6	10.2	40.2	357.4	7.7	4.1	15.6	3.4
866	131	133.2	125.6	116.9	131.6	141.6	132.3	124.2	4.3	5.4	18.1	359.4	0.9	358.7	6.8
868	354	336.5	271.7	327.6	342.5	348.7	345.6	331.5	24.0	82.3	30.3	19.9	16.8	8.4	22.5
872	193	194.4	211.4	189.6	190.8	195.7	194.7	184.1	5.1	341.6	7.4	10.6	8.8	358.3	8.9
874	175	179.3	260.5	169.3	169.5	186.4	179.3	165.5	2.2	274.5	9.7	13.9	0.1	355.7	9.5
876	223	209.3	142.5	197.4	218.5	229.5	214.5	207.9	20.2	80.5	29.6	12.9	4.9	8.5	15.1

Table S1: ...continued

relative depth (cm)	D _{AMS0}	D _{AMS1}	D _{AMS2}	D _{AMS3}	D _{AMS4}	D _{AMS5}	D _{AMS6}	D _{AMS7}	D _{VRM}	25-50°C D _{VRM}	50-100°C D _{VRM}	100-150°C D _{VRM}	150-200°C D _{VRM}	200-300°C D _{VRM}	50-200°C D _{VRM}
882	282	300.9	187.4	288.4	292.4	306.8	343.9	293.7	341.1	94.6	353.6	349.6	335.2	298.1	348.3
884	143	164.5	12.5	162.9	158.2	171.7	177.5	162.5	338.5	130.5	340.1	344.8	331.3	325.5	340.5
888	62	75.5	133.5	71.7	72.1	81.2	75.5	73.3	346.5	288.5	350.3	349.9	340.8	346.5	348.7
890	215	228.1	293.8	221.9	223.2	239.5	224.3	226.3	346.9	281.2	353.1	351.8	335.5	350.7	348.7
892	133	152.1	310.4	160.4	147.9	152.3	140.4	152.0	340.9	182.6	332.6	345.1	340.7	352.6	341.0
896	244	253.3	208.7	259.8	253.6	256.7	257.2	256.6	350.7	35.3	344.2	350.4	347.3	346.8	347.4
898	79	91.4	137.0	88.7	90.9	88.3	85.1	89.4	347.6	302.0	350.3	348.1	350.7	353.9	349.6
904	145	160.2	163.4	162.1	161.3	160.3	166.1	161.5	344.8	341.6	342.9	343.7	344.7	338.9	343.5
906	142	155.9	233.9	150.1	159.0	149.8	158.2	153.6	346.1	268.1	351.9	343.0	352.2	343.8	348.4
908	319	322.9	316.1	330.8	329.2	327.7	325.1	329.3	356.1	2.9	348.2	349.8	351.3	353.9	349.7
914	322	325.3	17.6	310.0	331.2	328.7	314.7	317.8	3.2	304.4	15.9	350.8	4.7	7.3	4.2
916	326	326.4	178.2	323.8	329.0	335.9	325.1	324.9	6.1	147.8	6.2	357.0	1.5	0.9	1.1
920	318	323.6	302.3	327.7	322.4	328.3	330.1	325.7	354.4	15.7	350.3	355.6	349.7	347.9	352.3
922	322	326.5	235.3	332.1	330.3	323.3	332.5	329.9	2.0	86.7	349.9	351.7	358.7	349.5	352.1
924	114	118.2	39.1	113.5	116.4	122.0	116.1	115.1	355.8	74.9	4.5	357.6	352.0	357.9	358.9
928	155	159.6	134.2	160.4	163.3	156.0	182.5	161.0	355.4	20.8	354.6	351.7	359.0	332.5	354.0
930	128	131.2	217.8	124.1	133.9	131.3	131.8	127.5	356.8	270.2	7.9	354.1	356.7	356.2	0.5
932	131	136.3	108.1	125.6	139.8	154.5	161.1	136.6	1.2	22.9	9.4	351.2	336.5	329.9	354.4
936	123	135.3	125.1	132.6	132.3	133.5	113.4	132.6	347.7	357.9	350.4	350.7	349.5	9.6	350.4
938	122	132.9	318.0	132.2	128.3	131.8	171.0	130.6	349.1	164.0	349.8	353.7	350.2	311.0	351.4
940	111	118.8	217.6	106.6	116.1	123.3	178.6	111.2	352.2	253.4	8.3	354.9	347.7	292.4	359.8
946	136	152.2	80.1	147.0	152.2	160.1	163.7	150.8	343.8	55.9	349.0	343.8	335.9	332.3	345.2
948	134	146.6	36.0	161.1	145.4	153.6	171.3	152.1	347.4	98.0	332.9	348.6	340.4	322.7	341.9
952	100	114.0	74.8	116.2	111.7	115.4	130.9	114.6	346.0	25.2	343.8	348.3	344.6	329.1	345.4
956	131	132.5	250.8	120.9	138.2	142.4	129.6	131.2	358.5	240.2	14.1	352.8	348.6	1.4	359.8
960	135	147.0	108.8	150.9	149.7	152.1	152.1	150.6	348.0	26.2	344.1	345.3	342.9	342.9	344.4
962	268	278.6	316.6	277.0	276.3	287.4	265.7	278.2	349.4	311.4	351.0	351.7	340.6	2.3	349.8
964	300	300.7	236.0	306.2	311.4	310.6	305.4	309.5	359.3	64.0	353.8	348.6	349.4	354.6	350.5
968	121	136.6	173.6	137.7	136.4	134.2	128.2	136.9	344.4	307.4	343.3	344.6	346.8	352.8	344.1
970	91	104.2	250.8	99.4	104.0	105.8	92.9	102.0	346.8	200.2	351.6	347.0	345.2	358.1	349.0
972	72	280.1	294.5	275.8	279.2	283.4	286.9	278.6	151.9	137.5	156.2	152.8	148.6	145.1	153.4
976	176	16.8	190.3	10.0	22.0	24.4	19.6	9.9	165.7	345.7	170.0	162.4	163.1	156.4	166.1
978	186	32.3	99.9	15.6	32.9	40.1	33.7	19.4	160.2	86.1	174.4	161.5	157.4	152.3	166.6
980	93	291.5	275.9	297.9	287.4	293.1	297.1	293.0	161.5	177.1	155.1	165.6	159.9	155.9	160.0
984	133	316.5	226.4	319.3	321.0	327.2	311.4	321.2	176.5	266.6	173.7	172.0	165.8	181.6	171.8
986	168	24.2	95.2	23.0	9.8	34.0	355.5	12.9	150.3	72.8	149.0	166.6	145.5	172.5	155.1
988	148	347.2	28.8	341.1	345.5	347.7	351.8	343.9	160.8	119.2	166.9	162.5	160.3	156.2	164.1
992	92	298.0	52.6	290.5	296.7	300.1	296.0	294.6	154.0	39.4	161.5	155.3	151.9	156.0	157.4
996	149	343.6	22.5	340.9	339.0	319.5	346.6	336.5	165.4	126.5	168.1	170.0	189.5	162.4	172.5
1010	164	169.2	314.6	172.9	169.7	172.4	171.3	169.4	354.8	209.4	351.1	354.3	3.1	352.7	354.6

Table S1: ...continued

relative depth (cm)	D _{AMS0}	D _{AMS1}	D _{AMS2}	D _{AMS3}	D _{AMS4}	D _{AMS5}	D _{AMS6}	D _{AMS7}	D _{VRM}	25-50°C D _{VRM}	50-100°C D _{VRM}	100-150°C D _{VRM}	150-200°C D _{VRM}	200-300°C D _{VRM}	50-200°C D _{VRM}
1018	310	316.9	271.2	329.9	313.0	315.8	315.1	319.3	353.1	38.8	340.1	357.0	354.2	354.9	350.7
1020	155	157.6	0.6	165.5	157.4	159.5	150.2	160.5	357.4	154.4	349.5	357.6	355.5	4.8	354.5
1024	160	200.4	9.6	200.5	199.1	200.2	193.7	199.9	319.6	150.4	319.5	320.9	319.8	326.3	320.1
1026	293	306.3	291.9	312.3	300.8	297.8	308.2	304.2	346.7	1.1	340.7	352.2	355.2	344.8	348.8
1028	71	73.9	341.9	102.0	76.2	81.0	88.9	81.0	3.6	89.1	329.0	354.8	1.4	342.1	350.0
1032	268	269.0	100.9	271.9	272.0	272.5	273.7	270.7	5.5	167.1	0.1	356.0	355.5	354.3	357.3
1034	221	228.4	165.3	239.0	231.4	222.1	239.8	231.2	352.6	55.7	342.0	349.6	10.4	341.2	349.8
1036	129	135.7	356.4	144.8	131.5	137.0	140.0	136.3	353.3	132.6	344.2	357.5	352.0	349.0	352.7
1040	68	66.6	284.2	69.8	80.8	82.5	79.4	76.9	7.9	143.8	2.2	347.2	345.5	348.6	351.1
1042	212	212.3	125.2	224.5	212.8	237.2	220.7	219.5	359.7	86.8	347.5	359.2	334.8	351.3	352.5
1044	260	254.0	150.9	257.6	267.2	262.2	264.2	255.6	12.5	109.1	6.4	1.2	9.3	355.8	4.4
1048	341	347.0	182.2	339.9	355.9	349.3	345.5	348.4	0.5	158.8	5.1	345.1	351.7	355.5	352.6
1050	299	308.5	44.3	306.4	304.5	300.0	310.4	299.5	350.5	254.7	352.6	2.9	10.5	348.6	359.5
1056	162	162.0	23.3	179.9	166.8	167.5	178.2	172.1	6.5	138.7	342.1	355.2	354.5	343.8	349.9
1064	172	180.0	29.5	200.0	175.8	190.0	186.1	185.7	352.0	142.5	332.0	356.2	342.0	345.9	346.3
1066	189	203.6	346.0	191.8	201.8	212.1	201.5	200.0	345.4	203.0	357.2	347.2	336.9	347.5	349.0
1068	174	176.3	59.5	171.2	178.0	181.0	183.7	171.5	4.2	114.5	6.8	4.4	353.0	350.3	2.5
1072	51	259.9	270.0	273.2	247.3	252.6	269.4	257.1	151.1	141.0	137.8	163.7	158.4	141.6	153.9
1074	53	69.3	139.4	60.1	61.7	77.0	63.3	63.9	343.7	273.6	352.9	351.3	336.0	349.7	349.1
1076	88	96.5	190.7	91.4	94.7	94.2	88.5	88.2	351.5	257.3	0.6	1.7	353.8	359.5	359.8
1080	341	347.5	197.4	358.8	352.4	357.3	357.5	355.4	353.5	143.6	342.2	348.6	343.7	343.5	345.6
1082	29	38.2	106.2	30.3	32.2	33.5	40.5	30.2	350.8	282.8	2.6	356.8	355.5	348.5	358.8
1084	294	313.6	207.1	307.9	331.7	309.9	332.0	320.1	340.4	86.9	346.1	322.3	344.1	322.0	333.9
1088	12	344.6	231.7	15.4	17.5	357.2	0.0	10.3	27.4	140.3	356.6	2.9	14.8	12.0	1.7
1090	168	184.5	226.9	165.9	183.5	184.4	199.8	176.7	343.5	301.1	6.0	344.5	343.6	328.2	351.3
1092	29	32.0	307.2	44.8	35.8	34.6	44.5	36.9	3.5	81.8	344.2	353.2	5.9	344.5	352.1
1096	163	165.4	26.2	175.3	177.3	183.0	179.7	177.0	4.1	136.8	347.7	345.7	340.0	343.3	346.0
1098	47	68.4	142.9	65.7	58.9	53.6	75.0	61.0	338.6	264.1	341.3	348.1	353.4	332.0	346.0
1100	39	56.1	293.4	61.9	56.2	70.1	60.7	61.0	342.9	105.6	337.1	342.8	328.9	338.3	338.0
1104	338	348.4	202.1	353.3	358.7	354.8	8.3	355.5	349.6	135.9	344.7	339.3	343.2	329.7	342.5
1106	300	331.3	50.6	326.1	320.7	347.3	328.5	325.3	328.7	249.4	333.9	339.3	312.7	331.5	334.7
1112	87	14.6	299.8	39.5	38.4	40.9	29.3	32.9	78.9	147.2	51.5	57.0	57.6	57.7	54.1
1124	219	224.6	120.0	222.2	226.4	231.4	235.4	225.5	0.9	99.0	356.8	352.6	347.6	343.6	353.5
1132	106	108.0	4.4	106.9	114.2	112.4	107.5	110.9	358.0	101.6	359.1	351.8	353.6	358.5	355.1
1136	145	150.3	4.4	152.5	154.9	150.7	158.3	153.1	1.2	140.6	352.5	350.1	354.3	346.7	351.9
1138	128	131.9	239.6	130.3	133.5	133.5	146.3	126.5	356.1	248.4	1.7	2.9	354.5	341.7	1.5
1140	129	128.5	32.3	134.4	129.9	130.1	143.2	131.9	7.0	96.7	354.6	359.1	358.9	345.8	357.1
1144	217	220.6	82.3	229.3	230.9	230.1	245.3	229.9	356.4	134.7	347.7	346.1	346.9	331.7	347.1
1146	74	88.9	187.8	88.7	86.8	90.8	95.2	88.0	345.1	246.2	345.3	347.2	343.2	338.8	346.0
1152	178	183.9	48.7	190.7	192.9	188.9	188.0	191.1	0.6	129.3	347.3	345.1	349.1	350.0	346.9

Table S1: ...continued

relative depth (cm)	D _{AMS0}	D _{AMS1}	D _{AMS2}	D _{AMS3}	D _{AMS4}	D _{AMS5}	D _{AMS6}	D _{AMS7}	D _{VRM}	25-50°C	50-100°C	100-150°C	150-200°C	200-300°C	50-200°C
1154	171	187.3	328.7	188.3	181.8	193.2	192.7	185.9	343.7	202.3	342.7	349.2	337.8	338.3	345.1
1156	252	258.4	155.7	266.6	260.8	269.8	255.7	265.0	353.6	96.3	345.4	351.2	342.2	356.3	347.0
1160	90	90.6	314.2	92.6	102.2	99.8	96.4	96.8	5.9	135.8	357.4	357.8	350.2	353.6	353.2
1162	24	27.7	293.1	26.2	34.0	36.6	38.7	30.0	356.3	90.9	1.8	350.0	347.4	345.3	354.0
1164	357	17.3	254.4	23.2	26.4	17.1	15.7	17.1	346.2	102.6	337.7	339.0	351.4	341.3	339.9
1168	192	197.7	61.4	196.6	211.4	206.2	208.4	203.4	0.8	130.6	355.4	340.6	345.8	343.6	348.6
1170	13	19.7	319.6	25.5	20.1	34.8	27.0	23.5	353.3	53.4	347.5	352.9	338.2	346.0	349.5
1180	104	105.3	345.8	105.6	105.8	113.7	113.1	107.0	358.7	118.2	358.4	358.2	350.3	350.9	357.0
1184	233	223.1	104.9	231.7	234.0	242.5	237.0	230.9	16.4	128.1	5.3	359.0	2.0	356.0	2.1
1186	23	35.8	105.6	352.1	37.9	57.4	32.2	28.2	347.2	277.4	30.9	347.2	325.6	350.8	354.8
1188	155	153.3	31.4	134.3	157.7	160.0	159.2	147.6	8.2	123.6	24.7	357.3	355.0	355.8	7.4
1192	188	193.2	26.9	190.0	197.3	197.0	196.7	194.3	354.8	161.1	358.0	350.7	351.0	351.3	353.7
1194	115	128.4	284.5	115.2	129.8	130.5	132.7	125.5	346.6	190.5	359.8	345.2	344.5	342.3	349.5
1196	321	327.8	147.8	323.8	332.1	330.4	330.2	326.4	353.2	173.2	1.2	348.9	350.6	350.8	354.6
1200	164	165.2	22.1	164.3	174.6	175.9	178.0	170.8	358.8	141.9	359.7	349.4	348.1	346.0	353.2
1202	290	283.0	62.4	274.0	281.2	295.4	268.5	273.4	13.5	227.6	20.0	17.2	6.1	21.5	16.6
1204	311	304.4	41.9	279.6	312.3	318.3	300.9	292.2	13.1	269.1	35.4	7.1	4.2	10.1	18.8
1208	334	336.9	187.5	326.6	358.9	352.3	348.8	342.0	3.6	146.5	11.4	335.1	341.7	345.2	352.0
1210	311	315.1	146.3	305.0	312.1	318.7	310.6	309.5	2.4	164.7	10.0	358.9	352.3	0.4	1.5
1212	115	116.5	279.9	101.8	118.5	115.3	112.2	108.8	5.0	195.1	17.2	356.5	359.7	2.8	6.2
1216	339	328.7	211.0	334.1	343.5	339.5	337.7	337.6	16.8	128.0	8.8	355.5	359.5	1.3	1.4
1218	327	328.7	54.9	317.1	334.7	332.8	330.2	327.1	358.3	272.1	13.9	352.3	354.2	356.8	359.9
1220	338	340.7	250.7	346.8	339.9	344.9	330.4	343.9	3.8	87.3	351.2	358.1	353.1	7.6	354.1
1224	122	105.3	346.4	115.3	123.5	126.8	121.1	118.6	23.2	135.6	10.7	358.5	355.2	0.9	3.4
1228	114	116.1	14.0	114.4	122.8	124.8	117.2	117.2	4.4	100.0	359.6	351.2	0.6	356.8	356.8
1244	175	173.5	349.4	162.3	179.8	178.4	177.6	165.6	8.0	185.6	16.7	355.2	8.1	357.4	9.4
1250	162	159.0	297.7	138.8	162.4	165.3	150.1	151.5	9.5	224.3	27.2	359.6	8.2	11.9	10.5
1264	72	82.7	285.8	90.0	94.8	91.4	87.9	92.0	349.3	146.2	342.0	337.2	340.6	344.1	340.0
1312	151	149.6	16.7	154.1	165.1	156.5	157.5	157.6	7.9	134.3	0.9	345.9	354.5	353.5	353.4
1384	1	19.4	192.4	16.0	17.7	15.1	21.8	16.5	341.6	168.6	345.0	343.3	345.9	339.2	344.5
1400	157	145.5	20.7	157.1	157.8	159.0	155.8	154.7	18.0	136.3	359.9	7.6	358.0	1.2	2.3
1412	268	273.8	81.3	260.6	281.8	273.6	262.0	267.3	0.7	186.7	11.4	346.2	354.4	6.0	0.7
1416	71	64.0	287.6	72.4	75.3	74.7	65.7	70.7	13.5	143.4	358.6	4.1	356.3	5.3	0.3
1424	199	189.5	69.7	200.4	201.4	207.9	187.3	202.0	16.0	129.3	358.6	357.6	351.1	11.7	357.0
1426	11	356.5	100.6	344.4	13.2	339.6	355.5	354.4	14.5	270.4	26.6	6.2	31.4	15.5	16.6
1434	156	157.7	85.4	156.5	163.0	159.5	161.7	153.1	4.8	70.6	3.5	1.4	8.0	354.3	2.9
1442	111	112.3	32.3	101.4	121.0	74.1	131.2	110.3	5.2	78.7	13.6	350.0	48.4	339.8	0.7
1444	38	29.4	295.0	12.9	45.2	45.4	40.7	29.1	15.1	103.0	29.1	352.8	4.0	357.3	8.9
1448	119	123.4	330.7	130.5	121.1	131.6	123.8	127.4	355.6	148.3	348.5	357.9	347.4	355.2	351.6
1452	117	123.1	323.3	104.7	142.5	132.8	113.4	124.3	353.9	153.7	16.3	334.5	344.2	3.6	352.7

Table S1: ...continued

relative depth (cm)	D _{AMS0}	D _{AMS1}	D _{AMS2}	D _{AMS3}	D _{AMS4}	D _{AMS5}	D _{AMS6}	D _{AMS7}	D _{VRM}	25-50°C D _{VRM}	50-100°C D _{VRM}	100-150°C D _{VRM}	150-200°C D _{VRM}	200-300°C D _{VRM}	50-200°C D _{VRM}
1456	49	48.9	278.7	65.2	51.2	62.9	55.3	59.6	6.6	130.3	343.8	357.8	346.1	353.7	349.4
1460	154	158.4	45.4	124.3	168.8	158.5	159.9	151.8	2.1	108.6	33.7	345.2	6.9	354.1	2.2
1468	185	189.1	127.5	234.6	178.5	224.6	184.0	195.9	355.9	57.5	310.4	14.9	320.4	1.0	349.1
1472	127	131.7	343.8	136.8	133.7	141.0	134.6	136.2	1.8	143.2	350.2	353.3	346.0	352.4	350.8
1476	151	151.5	37.4	142.5	160.8	155.4	161.8	153.1	359.5	113.6	12.5	350.2	355.6	349.2	357.9
1484	188	189.6	84.4	188.8	207.0	189.6	197.7	197.3	358.4	103.6	359.2	341.0	358.4	350.3	350.7
1500	289	270.7	107.5	252.9	288.7	281.9	272.9	264.1	24.8	181.5	40.1	8.7	18.6	16.1	24.9