Preliminary results of on going sedimentation on fine grained sediments of the Northern portuguese shelf.

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Introduction

This first study concerns the data obtained by University of Bordeaux 1 on samples collected by the Instituto Hidrografico on the northern portuguese shelf during the CORVET cruise (Figure 1).
According to the different tasks in connection with our partners we have measured the grainsize of SPM (task III.1.1) from hydrological stations, the POC content and the carbonate content in sediment samples (task II.2.2 & III.2.2.). Moreover we have splited the samples with partners in charge of geochemical analysis.
For the main task in our charge (task III.1.3) presented here, we have worked on 57 sediment samples collected in the 2 mud patches located respectively off the Douro river in the south and Minho river in the north.
The proposed study aims to understand the first steps of sedimentation by the means of detailled studies of surficial sediments collected with box-corers. It will be focused on the sea-bed interface to establish, on a sedimentological point of view, the on going sedimentological processes induced by the hydrodynamic conditions. This will enable us to establish the budget of the current sedimentation on the shelf and the upper part of the margin. Therefore special attention is done to the fine grained deposits which are the best records for the on going processes.

Methods

44 samples were taken with a Smith & Mc Intyre sediment grab and 13 surfical cores with a multicorer MARK I (4 cores each time). These cores were studied each centimeter (Grain-size, Carbonate content, Water content, POC, Spectrometry gamma HR). Parallely X Ray analysis of the sister cores was conducted.
The grain-size analysis was realised using a MALVERN 3600 E microgranulometric diffractometer laser. The POC amounts in sediment and water samples were determined using the STRICKLAND and PARSONS' method (1972) as adapted by ETCHEBER (1981). Its content was measured with a LECO CS-125 equipment. The $CaCO_3$ content was determined by a gasometric method showing a fairly low $CaCO_3$ relative variation (<2%) in duplicate measurements.
For spectrometry gamma HR, 210Pb (46.5 Kev) measurements were done on dried bulk sediment samples, using a high resolution gamma-spectrometer with a semi-planar detector (Intertechnique EGSP 2200-25-R). 210Pb excess have been calculated from : 210Pb total - 226Ra (226Ra is counted from its daughters ; 214Bi and 214Pb) The sample (6 to 10 g) is counted during 10 to 20 hours.
Radiography of surficial cores were performed with SCOPIX made up of a classical X-ray equipment coupled with a new equipment of radioscopy developed by the CEGELEC Company (France) and connected to a computer for data acquisition and processing using two specific softwares (Acquisition and Analysis).

Results

The physical structures (laminae, ripples, erosive contact …) in the cores (Figure 2) reveal in some case the recording of dynamical events often observed in the top layer (2 or 3 cm thick). It seems that the effect of dynamics is higher in the Minho mud patch than in the Douro one. These observations are in accordance with the mean sediment grain-size which is coarser in the Douro area that could been

explain by higher energetic processes in this zone. Moreover the biological structures were everywhere very numerous that correspond to an intense activity of the infauna.
From these observations and taking in account the previously established relationships between 210Pb activity and grain-size, we have plotted all the radionuclides results versus mean grain-size (Figure 3). If we consider the 2 first centimeters, this relationship is clearly established for grain-size ranging between 20 and 80 µm. The other 210Pb data with a grain-size between 20 and 40 µm show no relation and present a normal decay of the activity with the sedimentation recording. These values have been used for determining the sedimentation and mixing rates. The choices of the segment of the 210Pb excess profile in the sedimentary column for this calculation have been made according to the sedimentary structures observed with X-ray and grain-size distribution. That means that we have considered on one hand, for mixing rate, the sediment layer where bioturbation was maximum and on an other hand, for sedimentation rate, the layer less disturbed without erosive contacts corresponding to a single sedimentary sequence.

The results of 210Pb excess always show a mixing surficial layer with a thickness ranging from 7 to more than 9 cm. Under this layer, sedimentation rate for some cores are measured. According to the previous studies of Drago et al. (1998) and Carvalho and Ramos (1989), the sedimentation rates (Table 1) vary from 0.06 to 0.21 cm/year. The mixing rates (corrected or not with sedimentation rate value) vary from 0.94 to 11.10 -6 cm2/s. The comparison of theses data with sedimentological results and principally with X Ray imagery can easily explain the distribution of 210Pb excess in the cores. The mixing zone obtained with 210Pb excess profiles could correspond either to a biological effect with burrows and mottled sediment or to a physical process with sedimentary structures such as laminae and erosive contacts.

Conclusions

The estimates of sedimentation and mixing rates on the northern portuguese shelf reveals that there are no marked differences in the two fine-grained deposits areas. The on-going processes affect everywhere the ten first centimeters marked by a general mixing. Nevertheless this apparent homogeneity is due to 2 main processes : i. bioturbation with evidence of burrows and living macrofauna ; ii. dynamical effect such as storm events that contribute to the building of sedimentary bedforms. These results complicate the evaluation of the sedimentation rates that would need longer cores up to 50 cm. The next cruise in July 1998 will collect these records.

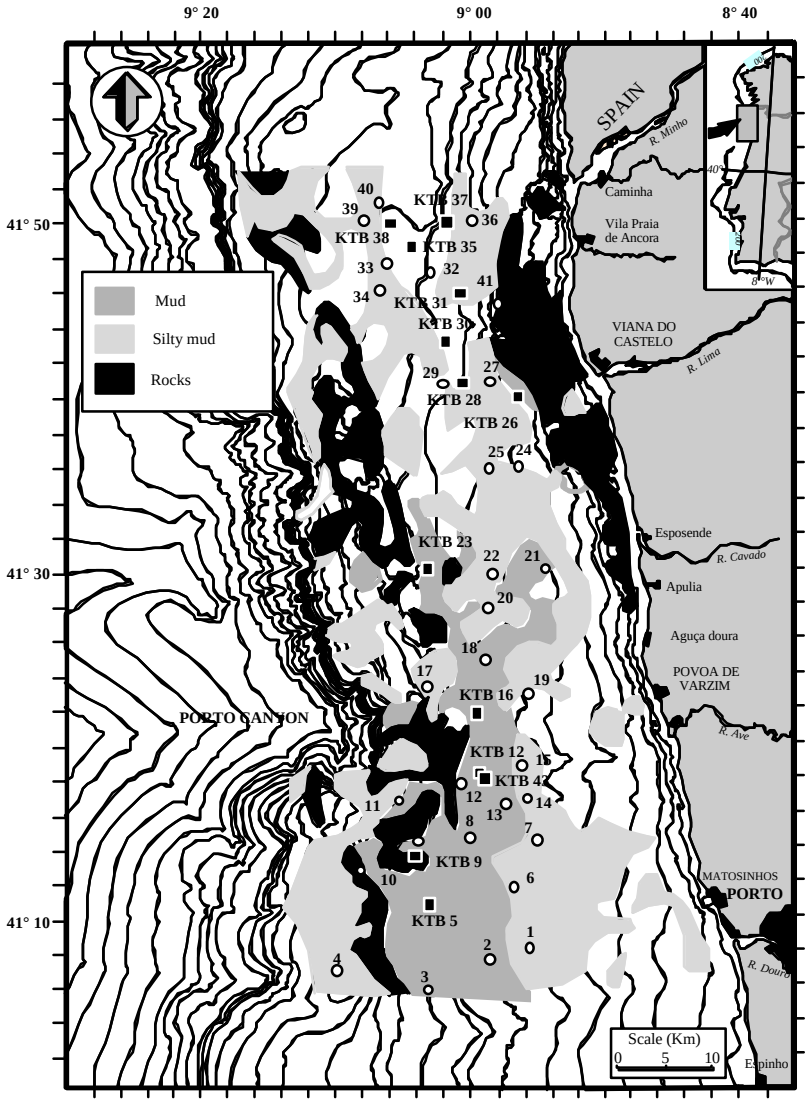

Figure 1 : Sampling location map of the northern portuguese shelf during CORVET cruise. In grey mud and silty mud areas ; in black rocky outcrops. Circles for grab sediment samples ; Squares for multicorer samples.

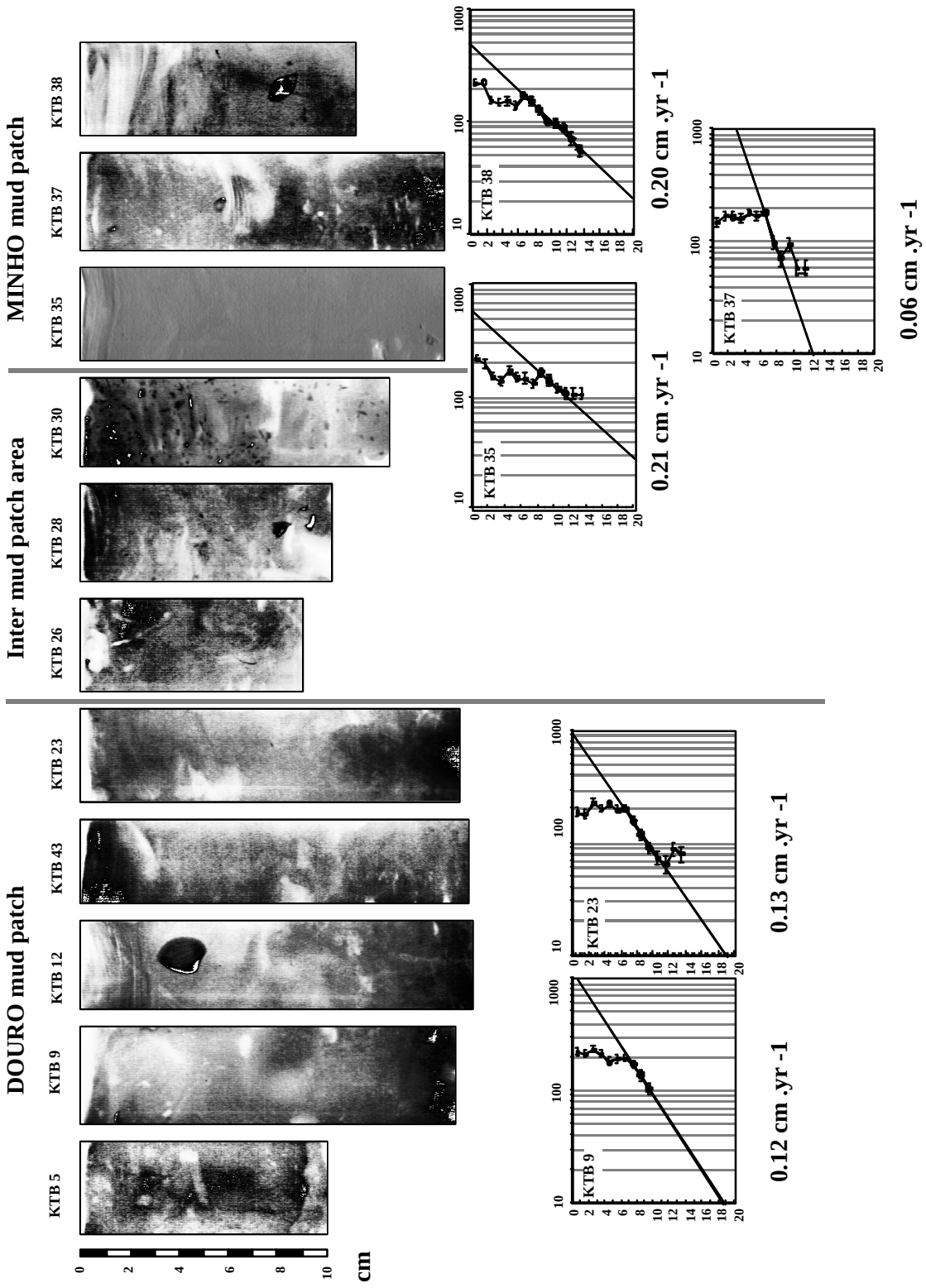

Figure 2 : X-ray images and 210 Pb excess profiles of some selected cores collected on the northern portuguese shelf.

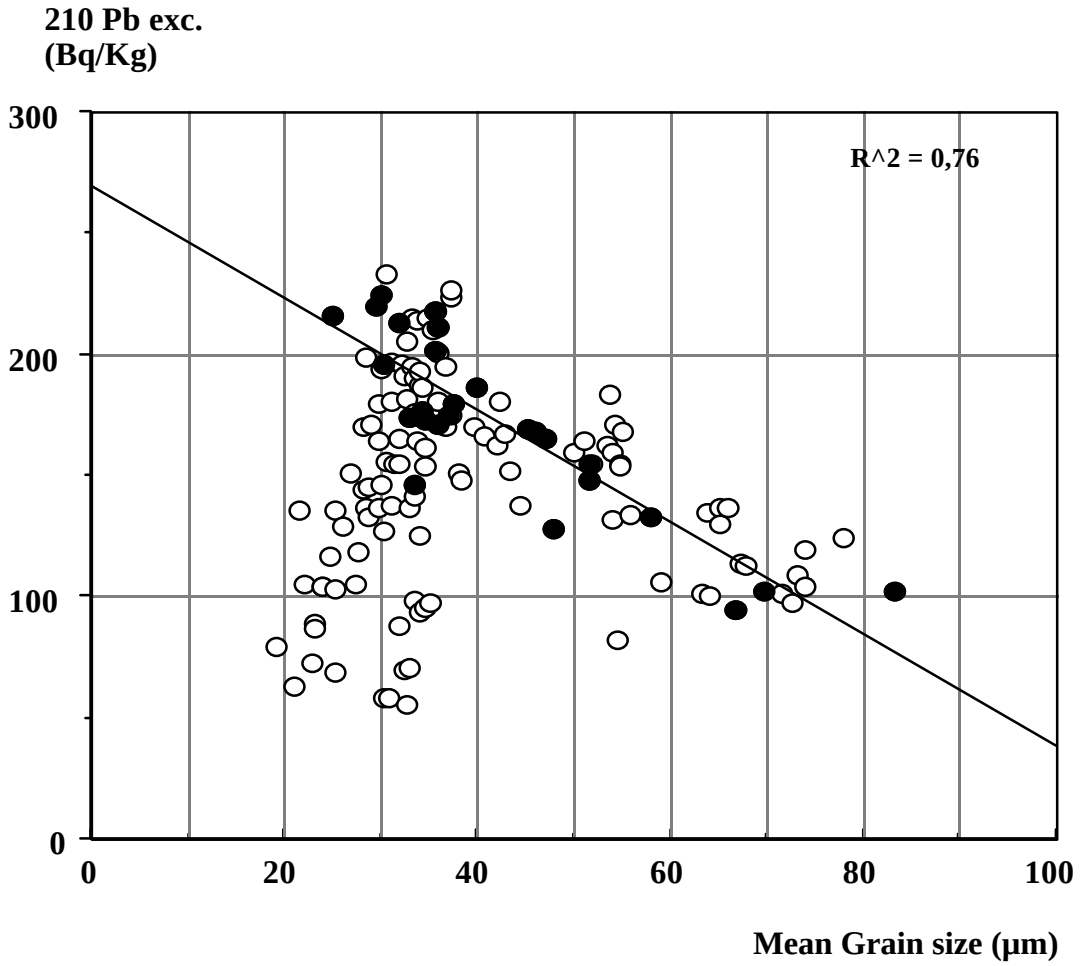

Figure 3 : 210 Pb excess versus mean grain-size (µm). Black dots corresponds to the two first centimetres of the cores.

Cores	Depth	R=Sedimentation rate	D=Mixing rate	D=Mixing rate (R=0)	POC	CaCO3	Mean
n°	m	cm / year	cm2 / s	cm2 / s	%	%	µm
KTB 5	104			6.551 E-06	1.42	4.78	34.43
KTB 9	107	0.12	2.845 E-06	3.061 E-06	2.11	6.79	31.94
KTB 12	86			1.281 E-06	1.29	5.35	31.15
KTB 16	87			5.205 E-06	1.15	4.66	34.67
KTB 23	95	0.13	9.519 E-06	9.124 E-06	1.62	8.08	35.53
KTB 26	69			9.099 E-07	0.55	6.05	63.59
KTB 28	94			1.098 E-05	1.16	8.46	51.78
KTB 31	96			9.400 E-07	0.64	5.55	67.22
KTB 35	112	0.21			1.30	6.33	27.64
KTB 37	104	0.06	1.093 E-06	1.028 E-06	1.38	4.25	41.69
KTB 38	118	0.20	8.032 E-07	1.033 E-06	1.13	8.40	35.50

Table 1 : Sedimentation rates, mixing rates, and average values of POC content, carbonate content and mean grainsize measured in selected cores sampled on the northern portuguese shelf.

		Grain-size parameters													Depth	W	CaCO3	POC	210 Pb exc.	±	137 Cs	±
Sample	cm	Mean	Dév.St.	Skew.	90	50	5	Mode	%	125	125-63	63-30	30-15	15	m	%	%	%	Bq / Kg		Bq / Kg	
St 1	1	73.1	1.28	2.13	24.8	90.3	198.2	82.7 -	14.8	20.5	54.8	12.6	5.0	7.0	67.5	30.50	2.14	0.38				
41°08'10"N	2	66.1	1.42	1.84	15.8	87.6	198.5	82.7 -	13.3	20.2	50.3	13.2	6.8	9.5	67.5	31.30	2.56	0.30				
8°56'10"W	3	65.6	1.45	1.77	15.3	87.8	203.2	82.7 -	12.6	21.1	49.1	12.7	7.3	9.8	67.5	31.98	1.68	0.33				
	4	69.1	1.37	1.87	18.9	88.1	208.7	82.7 -	13.6	20.9	50.7	13.8	6.3	8.3	67.5	32.37	2.52	0.40				
	5	65.2	1.44	1.84	15.7	86.2	198.1	82.7 -	12.9	19.6	50.2	13.9	6.6	9.6	67.5	33.29	2.11	0.36				
St2	1	58.0	1.37	1.65	17.3	69.5	182.1	61.6 -	11.8	14.3	43.6	25.1	8.0	9.0	80.0	37.16	4.27	0.40				
41°07'46"N	2	59.8	1.32	1.70	20.4	70.2	177.6	61.6 -	11.7	14.2	44.3	26.5	7.2	7.8	80.0	34.79	4.28	0.38				
8°58'55"W	3	57.9	1.32	1.71	19.5	68.6	172.0	61.6 -	12.3	13.0	44.0	27.2	7.6	8.2	80.0	34.01	4.27	1.30				
	4	62.7	1.23	1.81	25.6	70.5	186.8	61.6 -	12.7	14.1	45.6	28.0	6.2	6.0	80.0	24.77	4.28	0.30				
	5	57.2	1.34	1.79	19.3	68.2	171.8	61.6 -	12.0	13.0	43.5	28.4	7.1	8.1	80.0	33.33	4.29	0.35				
St3	1	79.2	1.79	1.17	14.2	118.0	360.6	173.0 -	10.4	48.3	15.3	16.5	9.6	10.5	100.0	33.50	6.82	0.47				
41°06'02"N	2	83.5	1.75	1.36	15.1	130.7	298.8	173.0 -	9.8	51.6	14.8	14.9	8.8	9.9	100.0	32.47	5.96	0.58				
9°03'08"W	3	89.5	1.73	1.44	16.3	142.4	302.1	201.0 -	10.7	55.1	13.8	13.5	8.3	9.3	100.0	30.86	6.37	0.45				
	4	72.3	1.85	1.16	11.6	108.2	296.9	201.0 -	8.9	46.3	14.5	16.3	10.5	12.4	100.0	31.14	5.10	0.53				
	5	74.6	1.85	1.13	12.3	113.0	355.0	173.0 -	10.2	47.1	14.7	16.2	10.2	11.8	100.0	33.85	8.50	0.55				
KTB5	1	35.7	1.51	1.03	9.1	41.2	156.2	39.5 -	8.3	8.2	19.8	37.4	18.3	16.3	104.0	82.0	5.53	1.30	202	9	2	1
41°10'58"N	2	35.9	1.60	0.97	8.3	42.4	173.0	45.8 -	7.6	9.7	20.4	34.6	18.1	17.2	104.0	62.4	5.11	1.35	211	9	3	1
9°03'39"W	3	36.8	1.44	1.28	9.9	43.8	133.1	45.8 -	8.8	6.0	23.1	39.0	17.5	14.4	104.0	61.4	4.68	1.25	195	13		
	4	34.9	1.54	1.15	8.4	41.7	143.8	39.5 -	8.5	7.1	20.9	37.7	17.8	16.5	104.0	65.5	4.67	1.35	215	13	5	1
	5	31.1	1.60	1.08	7.2	38.2	136.4	39.5 -	7.8	6.3	18.9	35.7	19.1	20.0	104.0	60.4	4.68	1.40	197	13		
	6	35.5	1.57	0.97	8.6	40.8	166.6	39.5 -	7.9	9.0	19.8	36.1	17.9	17.2	104.0	59.0	4.68	1.45	210	13	5	1
	7	33.7	1.64	0.95	7.5	40.2	166.3	39.5 -	7.5	9.4	18.9	34.1	18.5	19.0	104.0	52.2	4.69	1.50	214	14	7	1
	8	33.5	1.68	0.86	7.4	39.5	178.2	39.5 -	7.7	9.7	18.2	33.9	18.8	19.4	104.0	62.5	4.68	1.60	190	13	5	1
	9	32.8	1.62	0.97	7.5	38.8	148.2	34.1 -	7.3	7.7	20.4	33.8	18.2	20.0	104.0	67.5	4.26	1.60	182	12	5	1
St6	1	76.5	1.08	2.42	36.1	86.9	186.8	82.7 -	15.7	17.6	58.8	15.6	3.7	4.3	68.0	40.29	1.70	0.20				
41°11'57"N	2	76.3	1.12	2.38	35.3	87.4	192.1	82.7 -	15.9	18.0	58.8	14.9	3.5	4.9	68.0	33.10	2.12	0.23				
8°56'53"W	3	75.0	1.24	2.17	29.2	88.5	211.9	82.7 -	14.6	20.8	54.8	14.1	4.1	6.1	68.0	31.97	2.11	0.27				
	4	75.6	1.20	2.20	31.3	87.9	208.9	82.7 -	14.7	20.4	55.3	14.8	3.9	5.6	68.0	31.56	2.54	0.26				
	5	77.0	1.18	2.18	32.1	88.4	212.3	82.7 -	14.4	21.2	54.9	14.6	4.0	5.3	68.0	32.41	2.11	0.28				
St7	1	62.0	1.41	1.80	16.2	81.4	190.0	82.7 -	12.8	16.9	49.1	17.3	7.4	9.3	67.0	30.62	3.42	0.43				
41°14'48"N	2	61.5	1.39	1.83	16.3	81.1	181.4	82.7 -	13.6	15.6	50.3	17.1	7.6	9.4	67.0	30.58	3.42	0.50				
8°55'07"W	3	60.7	1.42	1.79	15.3	80.3	184.3	82.7 -	13.1	15.6	49.8	17.1	7.6	9.8	67.0	30.72	3.86	0.46				
	4	59.1	1.44	1.67	14.5	78.3	189.0	82.7 -	12.2	16.0	47.2	18.0	8.5	10.3	67.0	30.22	3.85	0.50				

		Grain-size parameters												Depth	W	CaCO3	POC	210 Pb exc.	±	137 Cs	±
Sample	cm	Mean	Dév.St.	Skew.	90	50	5	Mode %	125	125-63	63-30	30-15	15	m	%	%	%	Bq / Kg		Bq / Kg	
	5	61.9	1.38	1.79	16.8	80.7	186.8	82.7 - 12.9	16.2	49.4	17.6	7.6	9.1	67.0	29.55	4.28	0.51				
St8	1	47.6	1.32	1.74	15.5	57.0	142.7	61.6 - 10.9	7.6	35.1	38.0	9.7	9.7	87.0	38.93	3.42	0.44				
41°14'55"N	2	49.1	1.36	1.60	15.2	58.1	157.8	61.6 - 10.5	9.5	34.8	36.5	9.4	9.9	87.0	37.52	3.42	0.50				
9°00'20"W	3	50.2	1.33	1.77	17.7	58.5	154.7	61.6 - 11.0	8.8	35.6	38.8	8.4	8.3	87.0	37.97	3.00	0.45				
	4	46.1	1.45	1.59	14.5	55.2	157.5	61.6 - 9.9	9.2	32.1	38.4	9.9	10.4	87.0	36.92	3.86	0.49				
	5	46.8	1.43	1.57	14.1	56.0	162.8	61.6 - 10.3	9.3	32.6	38.0	9.4	10.7	87.0	38.81	3.85	0.52				
St9	1	37.0	1.65	0.94	8.2	42.4	185.9	34.1 - 6.9	11.2	21.7	32.6	16.8	17.7	106.0	64.09	5.96	1.42				
41°14'33"N	2	32.6	1.67	0.87	7.4	37.6	164.3	34.1 - 6.8	8.7	19.6	31.9	18.9	20.9	106.0	58.88	6.32	1.34				
9°04'26"W	3	36.5	1.66	0.89	8.1	41.8	189.3	34.1 - 6.5	10.9	21.5	31.9	17.5	18.3	106.0	57.14	6.76	1.34				
	4	33.0	1.67	0.86	7.4	37.9	171.2	34.1 - 7.0	9.3	19.5	31.9	18.8	20.5	106.0	59.42	6.40	1.39				
KTB9	1	35.6	1.73	0.67	7.7	39.2	222.7	34.1 - 6.2	11.9	19.5	29.7	19.2	19.7	107.0	99.3	6.79	1.80	218	13	4	1
41°13'50"N	2	31.8	1.64	0.88	7.4	36.6	155.4	34.1 - 6.9	8.3	19.3	31.2	20.1	21.0	107.0	108.2	6.37	2.10	213	13	3	1
9°04'22"W	3	30.6	1.66	0.91	7.1	35.8	151.0	34.1 - 7.2	7.8	18.2	32.1	20.2	21.7	107.0	82.5	6.79	2.15	233	13	2	1
	4	33.2	1.72	0.79	7.2	36.9	181.6	34.1 - 6.8	12.6	17.8	29.0	19.3	21.3	107.0	90.5	7.23	2.10	215	14	4	1
	5	29.8	1.69	0.88	6.9	34.4	147.8	29.4 - 7.1	7.4	20.0	29.1	20.2	23.3	107.0	80.2	6.78	2.10	180	13	3	1
	6	32.5	1.81	0.66	6.8	36.6	222.8	34.1 - 6.8	11.5	17.7	29.4	19.4	22.0	107.0	79.2	6.80	2.40	191	13	4	1
	7	30.0	1.72	0.79	6.8	34.8	166.9	34.1 - 6.7	8.8	17.7	30.0	20.3	23.2	107.0	82.4	6.77	2.10	194	13	4	1
	8	29.1	1.72	0.82	6.7	34.0	156.9	34.1 - 6.8	8.1	17.4	30.0	20.7	23.8	107.0	79.2	6.78	2.10	171	13	4	1
	9	25.3	1.75	1.06	< 5.8	32.2	123.3	34.1 - 8.0	4.7	17.3	31.5	22.0	24.6	107.0	71.1	6.76	1.95	136	12	2	1
	10	25.2	1.75	0.88	6.0	31.3	130.7	34.1 - 7.5	5.6	15.3	30.9	21.9	26.3	107.0	69.8	6.78	2.00	103	11	4	1
St10	1	45.2	2.11	0.64	6.8	53.6	344.0	129.0 - 4.2	29.1	17.3	17.1	14.5	21.9	143.0	49.77	37.57	1.09				
41°13'55"N	2	36.4	2.10	0.56	6.2	41.0	336.3	29.4 - 4.6	19.9	18.9	20.6	15.6	25.0	143.0	51.07	34.49	1.17				
9°09'10"W	3	32.1	2.03	0.52	6.2	34.6	261.8	25.4 - 4.7	17.1	17.7	19.7	18.4	27.2	143.0	54.57	24.64	1.41				
	4	29.6	2.01	0.53	6.0	32.3	234.2	25.4 - 4.9	15.2	16.8	20.4	19.0	28.6	143.0	54.41	27.98	1.26				
	5	29.0	2.02	0.49	5.9	30.9	237.3	25.4 - 5.0	15.3	15.9	19.8	19.9	29.2	143.0	53.46	23.79	1.37				
St11	1	26.4	1.84	0.60	6.1	30.3	169.8	25.4 - 5.6	8.3	16.0	26.2	21.0	28.6	122.0	65.84	14.52	1.54				
41°17'22"N	2	27.0	1.88	0.46	6.2	29.8	210.7	25.4 - 5.5	9.9	15.1	24.8	21.2	29.1	122.0	65.36	14.13	1.71				
9°05'53"W	3	28.8	1.90	0.48	6.3	31.9	241.3	25.4 - 5.4	11.1	15.5	25.5	20.4	27.4	122.0	66.94	13.70	1.61				
	4	23.7	1.82	0.62	5.9	27.6	142.4	25.4 - 5.9	6.3	14.5	25.9	22.6	30.8	122.0	64.35	12.41	1.72				
	5	24.8	1.94	0.41	< 5.8	27.7	230.8	25.4 - 6.1	8.7	13.7	24.3	22.5	30.8	122.0	58.90	11.97	1.74				
KTB12	1	34.4	1.46	1.25	9.3	40.6	131.2	39.5 - 9.1	5.7	19.7	40.7	18.3	15.5	86.0	90.5	5.52	1.25	177	12	4	1
41°18'29"N	2	37.1	1.46	1.08	10.2	43.2	150.8	45.8 - 8.5	7.5	21.5	37.8	18.8	14.5	86.0	73.2	5.09	1.10	175	12	4	1
8°59'30"W	3	40.7	1.40	1.35	11.8	48.1	143.9	45.8 - 9.7	7.4	25.2	40.3	14.9	12.3	86.0	67.4	5.09	1.00	166	13	6	1

		Grain-size parameters												Depth	W	CaCO3	POC	210 Pb exc.	±	137 Cs	±
Sample	cm	Mean	Dév.St.	Skew.	90	50	5	Mode %	125	125-63	63-30	30-15	15	m	%	%	%	Bq / Kg		Bq / Kg	
	4	31.8	1.50	1.16	8.0	39.0	125.9	39.5 - 8.5	5.1	18.7	37.8	20.0	18.4	86.0	67.4	5.08	1.25	165	9	3	1
	5	30.7	1.55	1.09	7.5	38.0	127.8	39.5 - 8.2	5.3	17.9	36.7	20.4	19.8	86.0	66.4	5.55	1.20	#N/A	6	6	1
	6	31.3	1.58	0.99	7.5	38.5	135.0	45.8 - 8.2	5.9	18.2	35.7	20.3	19.8	86.0	66.4	5.09	1.30	155	12		
	7	28.7	1.55	1.21	7.1	36.6	110.5	39.5 - 8.6	3.5	17.3	37.7	20.6	20.9	86.0	64.9	5.07	1.35	133	12		
	8	31.1	1.55	1.07	7.7	38.2	125.6	45.8 - 7.7	5.1	19.7	34.6	20.8	19.9	86.0	69.5	5.09	1.30	138	12	4	1
	9	24.0	1.64	0.96	6.3	29.3	104.8	39.5 - 7.0	3.0	14.5	31.6	23.2	27.6	86.0	75.1	5.52	1.45	104	11	5	1
	10	21.6	1.68	0.85	6.0	25.0	102.2	39.5 - 6.0	2.6	13.7	27.4	24.6	31.7	86.0	92.1	6.37	1.70	136	12		
St13	1	42.0	1.43	1.29	11.4	50.3	147.3	53.1 - 8.8	8.0	28.9	36.1	14.0	13.1	79.0	46.18	3.42	0.75				
41°16'46"N	2	41.9	1.42	1.25	11.6	49.7	148.3	53.1 - 8.7	8.1	28.3	36.1	14.5	13.0	79.0	46.75	3.40	0.74				
8°57'35"W	3	37.8	1.48	1.19	9.8	45.1	141.6	53.1 - 8.1	7.0	25.4	35.8	16.4	15.4	79.0	45.44	3.40	0.81				
	4	38.0	1.48	1.28	9.5	46.5	139.0	53.1 - 8.5	6.8	26.5	35.6	15.6	15.5	79.0	43.21	3.41	0.78				
	5	41.4	1.53	1.04	10.4	48.9	174.3	53.1 - 8.0	10.0	26.7	33.8	15.1	14.5	79.0	44.62	2.13	0.86				
	6	38.4	1.51	1.17	9.5	46.5	147.9	53.1 - 8.3	7.8	25.9	34.8	15.9	15.6	79.0	46.68	3.40	0.95				
St14	1	59.7	1.47	1.55	14.4	81.1	197.8	82.7 - 11.7	18.2	45.6	16.0	9.8	10.4	75.0	33.16	2.14	0.37				
41°17'05"N	2	55.1	1.59	1.47	11.3	79.6	194.6	82.7 - 11.8	17.2	45.0	14.7	9.7	13.5	75.0	34.49	2.97	0.51				
8°56'22"W	3	57.9	1.56	1.50	12.2	81.8	205.5	82.7 - 11.8	18.6	45.1	14.6	9.3	12.4	75.0	36.01	4.24	0.56				
	4	54.8	1.60	1.46	11.1	79.6	197.3	82.7 - 11.7	17.4	44.6	14.7	9.7	13.6	75.0	36.35	3.81	0.52				
	5	50.1	1.65	1.35	9.8	74.9	187.1	82.7 - 11.3	15.4	42.5	15.5	10.9	15.5	75.0	34.73	4.24	0.63				
St15	1	82.9	1.65	1.16	19.7	93.6	396.3	82.7 - 6.6	38.6	28.9	17.3	7.2	8.0	76.0	31.03	5.54	0.37				
41°19'44"N	2	87.8	1.79	1.17	15.6	106.7	433.8	173.0 - 5.7	44.6	24.6	14.0	7.1	9.7	76.0	30.45	4.71	0.40				
8°56'31"W	3	81.7	1.73	1.19	16.0	98.1	382.1	173.0 - 6.0	41.7	25.4	15.9	7.6	9.4	76.0	29.69	5.14	0.37				
	4	75.8	1.75	1.14	14.3	90.6	355.5	71.4 - 6.1	38.7	26.1	16.4	8.4	10.4	76.0	28.98	5.14	0.42				
	5	84.7	1.75	1.19	16.1	103.8	392.7	173.0 - 6.3	43.9	24.1	15.0	7.6	9.4	76.0	28.29	5.13	0.60				
KTB16	1	36.0	1.50	1.01	9.4	40.5	151.6	34.1 - 7.5	7.8	21.3	35.6	19.3	16.0	87.0	72.5	4.65	0.88	171	12	4	1
41°22'20"N	2	34.5	1.49	1.18	8.8	41.2	139.1	39.5 - 8.7	6.5	19.8	38.9	19.1	15.8	87.0	65.3	4.67	1.15	173	13	6	1
9°00'01"W	3	33.6	1.49	1.17	8.6	39.1	133.7	34.1 - 8.3	6.0	19.9	38.2	19.0	17.0	87.0	61.2	4.68	1.20	176	13	5	1
	4	34.3	1.50	1.08	8.7	40.7	139.5	45.8 - 8.1	6.4	20.3	36.5	20.1	16.7	87.0	62.6	4.66	1.25	186	14	3	1
	5	35.8	1.41	1.27	10.2	42.5	125.3	45.8 - 8.5	5.0	22.7	38.1	19.5	14.7	87.0	58.6	4.65	1.15	181	14	6	1
	6	34.5	1.47	1.21	8.9	41.4	129.6	45.8 - 8.2	5.6	21.6	37.4	19.1	16.3	87.0	60.4	4.67	1.20	161	11	3	1
	7	34.0	1.49	1.14	8.7	40.4	127.5	53.1 - 7.8	5.4	22.4	35.0	19.9	17.3	87.0	64.4	4.66	1.25	187	16		
St17	1	150.7	1.48	2.64	33.3	213.8	305.8	201.0 - 22.6	81.7	5.8	3.1	3.7	5.7	104.0	20.04	5.12	0.37				
41°23'40"N	2	153.6	1.45	2.66	35.4	214.4	307.5	201.0 - 22.5	82.2	5.6	3.2	3.6	5.4	104.0	22.21	5.13	0.49				
9°03'48"W	3	131.7	1.70	2.13	19.5	210.4	311.0	201.0 - 20.6	76.9	5.5	4.4	5.2	8.0	104.0	25.09	5.11	0.22				

		Grain-size parameters												Depth	W	CaCO3	POC	210 Pb exc.	±	137 Cs	±
Sample	cm	Mean	Dév.St.	Skew.	90	50	5	Mode %	125	125-63	63-30	30-15	15	m	%	%	%	Bq / Kg		Bq / Kg	
St18	1	45.7	1.60	1.23	9.7	59.8	182.5	61.6 - 8.7	13.0	34.2	25.8	11.9	15.1	83.0	47.64	4.26	0.78				
41°25'20"N	2	44.1	1.62	1.20	9.1	57.8	176.0	61.6 - 8.7	12.1	33.2	26.8	12.2	15.7	83.0	38.84	3.80	0.71				
8°59'14"W	3	55.1	1.45	1.38	15.2	65.9	204.7	61.6 - 9.7	15.5	37.4	27.8	9.4	9.9	83.0	43.82	5.09	0.60				
	4	43.9	1.61	1.21	9.2	57.3	178.6	61.6 - 8.6	12.3	32.6	27.2	12.1	15.8	83.0	43.24	5.08	0.59				
	5	48.2	1.62	1.18	10.2	60.9	207.9	61.6 - 8.5	15.3	32.9	26.4	11.4	14.1	83.0	45.66	4.24	0.68				
St19	1	64.6	1.50	1.83	14.0	89.6	197.3	95.9 - 13.6	20.9	49.2	13.1	6.2	10.6	72.0	34.31	3.42	0.36				
41°23'45"N	2	65.2	1.49	1.81	14.5	89.2	203.3	95.9 - 13.1	21.4	48.8	13.1	6.4	10.3	72.0	33.91	3.41	0.44				
8°56'21"W	3	58.5	1.57	1.62	12.0	84.2	195.6	95.9 - 12.2	19.0	46.0	14.8	7.8	12.3	72.0	34.32	3.40	0.48				
	4	59.2	1.56	1.63	12.2	85.1	194.2	95.9 - 12.2	19.7	45.8	14.5	7.9	12.2	72.0	34.11	3.41	0.46				
	5	60.9	1.55	1.67	12.7	86.1	199.0	95.9 - 12.3	20.3	46.2	14.4	7.4	11.7	72.0	32.82	2.98	0.46				
	6	62.9	1.53	1.73	13.3	87.7	202.9	95.9 - 12.7	20.9	47.4	14.0	6.7	11.1	72.0	36.78	2.98	0.45				
S20	1	66.4	1.39	1.84	18.5	84.3	207.6	82.7 - 12.9	19.3	50.5	14.4	6.9	8.8	80.0	36.88	5.13	0.46				
41°28'13"N	2	64.9	1.40	1.83	17.6	82.8	202.1	82.7 - 13.5	17.9	51.0	15.0	7.1	9.1	80.0	34.81	5.57	0.37				
8°59'25"W	3	58.3	1.54	1.61	12.5	78.7	204.7	82.7 - 12.0	17.2	46.7	16.3	8.1	11.6	80.0	35.97	5.15	0.48				
	4	58.0	1.53	1.62	12.5	78.7	198.7	82.7 - 12.1	16.8	47.4	15.8	8.2	11.7	80.0	35.15	5.58	0.50				
	5	53.8	1.62	1.50	10.3	76.6	193.1	82.7 - 11.5	16.2	45.2	15.9	8.7	14.0	80.0	37.37	6.00	0.41				
St21	1	57.2	1.44	1.65	14.4	73.4	186.5	82.7 - 11.3	14.4	45.8	21.6	7.8	10.4	68.0	48.51	4.26	0.36				
41°30'18"N	2	63.1	1.44	1.71	16.0	80.0	211.0	82.7 - 12.0	18.1	47.8	17.8	6.8	9.5	68.0	37.66	4.23	0.63				
8°55'54"W	3	58.2	1.48	1.60	13.7	76.2	200.3	82.7 - 11.5	16.2	45.8	19.3	7.9	10.8	68.0	37.93	4.24	0.50				
	4	58.1	1.44	1.74	14.2	75.6	184.5	82.7 - 12.2	14.5	48.2	19.3	7.5	10.5	68.0	35.96	3.39	0.46				
	5	61.4	1.42	1.77	15.8	78.3	196.9	82.7 - 12.2	16.5	48.7	18.4	6.8	9.6	68.0	36.31	3.39	0.45				
St22	1	70.7	1.39	2.02	19.0	91.1	206.1	82.7 - 14.9	21.1	54.1	10.3	5.7	8.7	77.0	33.99	3.85	0.42				
41°30'33"N	2	69.6	1.39	1.97	18.3	90.2	205.3	82.7 - 15.2	19.9	54.2	11.3	5.7	9.0	77.0	36.64	3.82	0.45				
8°5903"W	3	68.6	1.41	1.97	17.3	89.8	200.6	82.7 - 15.0	19.6	54.0	11.4	5.8	9.2	77.0	35.63	5.09	0.52				
	4	64.9	1.45	1.82	14.6	87.0	200.2	82.7 - 14.1	19.2	51.6	12.0	7.1	10.2	77.0	35.20	5.09	0.50				
	5	65.7	1.46	1.88	14.7	88.4	199.0	82.7 - 14.4	19.4	52.4	11.5	6.6	10.1	77.0	35.27	6.79	0.44				
KTB23	1	40.0	1.51	1.17	10.2	46.1	163.1	53.1 - 7.5	9.5	25.0	35.7	15.8	14.1	95.0	62.2	8.90	1.00	186	14		
41°30'23"N	2	37.5	1.56	1.11	8.9	43.3	161.6	34.1 - 7.2	9.4	23.3	34.4	17.0	15.9	95.0	64.5	8.08	1.35	180	12		
9°03'45"W	3	37.2	1.66	0.90	8.1	42.3	193.1	34.1 - 6.9	11.5	21.4	32.4	17.3	17.4	95.0	72.4	7.67	1.65	226	14	4	1
	4	36.0	1.61	1.04	8.1	41.7	146.5	34.1 - 6.7	9.2	24.4	30.8	17.5	18.1	95.0	65.7	8.08	1.75	201	13		
	5	37.1	1.64	0.88	8.4	42.2	188.3	53.1 - 6.3	11.2	22.1	30.9	18.3	17.6	95.0	92.1	8.08	1.90	224	14		
	6	32.3	1.64	1.08	7.2	38.6	148.3	34.1 - 7.6	7.9	19.6	34.5	18.9	19.1	95.0	76.6	7.64	1.80	196	12	5	1
	7	28.6	1.59	1.04	7.0	35.0	132.7	53.1 - 8.3	5.6	14.7	35.8	21.8	22.1	95.0	76.7	8.11	1.90	199	12	5	1

		Grain-size parameters												Depth	W	CaCO3	POC	210 Pb exc.	±	137 Cs	±
Sample	cm	Mean	Dév.St.	Skew.	90	50	5	Mode %	125	125-63	63-30	30-15	15	m	%	%	%	Bq / Kg		Bq / Kg	
	8	30.7	1.67	0.99	6.9	36.8	150.4	34.1 - 7.3	7.8	18.8	32.7	19.7	21.1	95.0	73.3	8.08	1.65	156	13		
	9	24.8	1.73	0.85	6.1	30.2	130.6	34.1 - 6.9	5.7	15.1	29.5	22.1	27.7	95.0	67.8	7.22	1.85	117	11	3	1
	10	23.1	1.73	0.86	5.9	28.4	120.6	34.1 - 7.1	4.5	13.8	29.6	23.0	29.1	95.0	66.0	6.39	1.85	89	11		
	11	22.9	1.72	0.81	6.0	27.2	124.5	34.1 - 7.0	5.0	12.8	28.4	24.7	29.2	95.0	67.4	6.39	1.90	73	10	4	1
	12	21.1	1.74	0.86	< 5.8	25.5	111.8	34.1 - 7.0	3.6	13.2	27.7	24.2	31.4	95.0	69.5	7.23	1.95	63	11	4	1
	13	23.2	1.73	0.82	6.0	27.7	126.4	34.1 - 6.9	5.1	13.4	28.4	24.1	29.0	95.0	72.4	7.22	1.90	87	10		
	14	19.2	1.70	0.75	< 5.8	23.0	105.5	29.4 - 6.9	2.9	10.5	25.9	24.8	35.9	95.0	76.5	7.24	1.90	79	12		
St24	1	69.8	1.47	1.87	16.8	92.7	197.7	95.9 - 12.3	26.2	45.0	13.7	5.8	9.3	73.0	38.40	5.11	0.40				
41°36'30"N	2	68.2	1.56	1.68	14.3	93.1	211.7	95.9 - 11.6	27.8	41.8	13.2	6.8	10.4	73.0	37.52	6.30	0.49				
8°57'18"W	3	62.6	1.58	1.70	12.5	87.8	193.6	95.9 - 11.3	24.0	42.9	14.3	7.2	11.6	73.0	36.53	5.60	0.56				
	4	64.5	1.59	1.64	12.7	89.9	203.1	95.9 - 10.6	26.9	40.4	13.9	7.3	11.4	73.0	35.61	5.49	0.52				
	5	61.2	1.62	1.57	11.5	87.5	197.9	95.9 - 10.7	25.1	40.2	14.3	8.0	12.4	73.0	34.76	5.53	0.50				
St25	1	79.4	1.60	1.66	16.2	104.9	264.7	111.0 - 9.9	38.5	35.3	11.0	5.8	9.5	81.0	39.48	12.40	0.50				
41°36'34"N	2	47.2	1.95	0.94	7.3	71.6	230.5	95.9 - 7.2	25.7	27.9	13.4	12.4	20.6	81.0	43.34	12.84	0.70				
8°59'21"W	3	91.0	1.61	1.64	18.7	118.5	357.1	111.0 - 9.6	46.5	30.3	9.2	5.4	8.5	81.0	41.18	13.68	0.45				
	4	93.6	1.61	1.73	19.8	120.7	361.2	111.0 - 10.1	47.6	31.0	8.5	4.7	8.3	81.0	37.93	14.15	0.66				
KTB26	1	69.7	1.50	1.58	15.4	90.6	225.5	95.9 - 11.2	26.7	43.5	13.0	7.0	9.8	69.0	41.6	5.51	0.40	102	13		
41°40'28"N	2	66.7	1.64	1.44	12.2	91.8	241.0	95.9 - 11.1	28.1	40.6	11.7	7.6	12.0	69.0	41.3	5.51	0.46	95	15		
8°56'53"W	3	63.8	1.67	1.48	11.0	90.8	222.4	95.9 - 10.7	27.6	40.2	11.6	7.5	13.1	69.0	45.7	5.50	0.52	135	14	4	1
	4	55.9	1.76	1.32	9.0	83.4	213.1	95.9 - 9.6	24.7	37.4	13.6	8.9	15.5	69.0	44.4	5.93	0.54	134	14	5	1
	5	67.4	1.55	1.62	13.6	92.2	212.8	95.9 - 11.4	27.4	42.1	12.5	7.2	10.9	69.0	57.2	6.33	0.55	114	12		
	6	53.9	1.77	1.34	9.2	82.0	225.4	95.9 - 10.1	22.7	37.2	15.4	9.8	14.9	69.0	41.9	5.91	0.58	132	13		
	7	65.2	1.66	1.36	12.3	89.7	255.2	95.9 - 10.1	28.2	38.1	13.7	7.9	12.1	69.0	42.1	5.94	0.54	130	15	6	1
	8	65.9	1.64	1.45	12.2	92.4	229.0	95.9 - 10.6	29.0	38.9	12.2	7.8	12.1	69.0	40.8	6.37	0.57	137	15	4	1
	9	73.1	1.60	1.54	14.4	97.8	260.6	95.9 - 11.0	32.2	39.6	11.2	6.6	10.4	69.0	51.7	6.35	0.58	109	13		
St27	1	76.3	1.80	1.45	11.3	121.2	267.1	149.0 - 11.2	48.3	21.0	10.6	7.5	12.5	86.0	37.48	9.80	0.34				
41°41'00"N	2	88.5	1.69	1.68	14.5	134.4	274.7	149.0 - 13.0	55.3	19.5	8.5	6.4	10.3	86.0	34.25	11.93	0.43				
8°59'40"W	3	91.3	1.67	1.74	15.4	136.6	280.2	149.0 - 13.4	56.8	19.3	8.0	6.1	9.8	86.0	32.63	12.26	0.42				
	4	94.7	1.64	1.79	16.8	138.4	291.6	149.0 - 13.8	58.3	18.9	7.8	5.8	9.2	86.0	31.82	10.83	0.59				
	5	96.0	1.61	1.86	17.5	139.3	273.0	149.0 - 14.2	59.1	18.8	7.6	5.6	8.9	86.0	32.58	12.30	0.50				
KTB28	1	46.0	1.82	0.88	8.3	60.6	232.7	82.7 - 6.5	21.1	27.5	19.3	13.9	18.2	94.0	86.4	6.78	1.15	168	12	4	1
41°41'05"N	2	47.1	1.80	0.90	8.7	59.2	257.5	82.7 - 6.3	20.9	26.7	21.7	13.8	16.9	94.0	67.8	8.00	1.35	165	13	4	1
9°01'23"W	3	51.0	1.75	0.96	9.8	63.7	265.8	82.7 - 6.7	22.0	28.5	22.0	12.5	15.0	94.0	63.8	9.73	1.05	164	12	2	1

		Grain-size parameters												Depth	W	CaCO3	POC	210 Pb exc.	±	137 Cs	±
Sample	cm	Mean	Dév.St.	Skew.	90	50	5	Mode %	125	125-63	63-30	30-15	15	m	%	%	%	Bq / Kg		Bq / Kg	
	4	54.8	1.82	0.91	9.6	68.9	309.2	82.7 - 6.2	26.9	26.7	18.9	12.1	15.3	94.0	58.8	8.87	0.90	154	12		
	5	54.9	1.82	0.96	9.6	69.4	289.4	82.7 - 6.2	27.2	26.6	19.4	11.7	15.0	94.0	58.0	8.93	1.25	168	12	4	1
	6	53.4	1.84	0.93	9.1	67.3	300.9	82.7 - 6.3	25.7	27.0	20.0	11.7	15.6	94.0	54.6	9.31	1.50	162	13	4	1
	7	54.1	1.79	0.93	9.8	68.1	292.0	82.7 - 6.6	25.1	28.2	19.4	12.2	15.0	94.0	52.5	8.89	1.20	160	12	4	1
	8	50.0	1.80	0.90	8.9	63.4	280.5	82.7 - 6.6	22.1	28.2	20.8	12.5	16.4	94.0	49.5	7.64	1.05	160	9	2	1
	9	54.7	1.78	0.97	9.7	68.7	290.9	82.7 - 6.6	25.3	28.4	19.9	11.3	15.0	94.0	50.8	8.01	0.95	155	9	2	1
KTB30	1	47.9	1.89	0.70	8.4	55.8	310.1	61.6 - 5.3	24.9	20.8	21.6	14.6	18.0	99.0	67.1	12.75	0.85	128	12	4	1
41°43'07"N	2	51.7	1.86	0.75	9.1	59.8	324.6	61.6 - 5.6	26.3	21.8	22.3	13.6	16.1	99.0	49.4	12.78	0.95	155	11		
9°02'36"W	3	65.1	1.82	0.88	11.6	74.9	339.2	201.0 - 5.8	35.4	20.6	19.3	11.9	12.7	99.0	51.7	10.62	0.80	137	12		
	4	73.9	1.87	1.05	11.9	92.6	358.8	201.0 - 7.0	42.2	19.8	16.2	9.8	12.1	99.0	45.0	12.32	0.65	104	11		
	5	74.0	1.87	1.10	11.7	96.2	334.4	201.0 - 7.9	44.0	18.3	15.2	10.2	12.3	99.0	51.5	16.16	0.75	119	11		
	6	53.7	1.90	0.69	9.3	61.0	344.2	53.1 - 4.9	29.5	19.4	20.2	14.5	16.3	99.0	58.8	9.75	1.10	183	14	3	1
	7	54.3	1.98	0.63	8.8	61.0	396.8	61.6 - 4.8	30.5	18.5	19.6	14.5	16.9	99.0	51.8	10.61	1.40	171	11	4	1
KTB31	1	57.9	1.87	0.99	9.2	82.5	269.2	149.0 - 6.5	32.9	25.4	13.6	11.8	16.4	96.0	78.4	5.52	0.70	133	13	3	1
41°46'48"N	2	83.3	1.48	1.64	22.9	102.4	267.5	111.0 - 8.7	38.5	34.9	13.7	5.5	7.3	96.0	44.3	5.51	0.50	102	12	3	1
9°01'29"W	3	78.0	1.63	1.46	14.9	105.1	261.3	173.0 - 8.8	41.3	29.5	11.4	7.7	10.0	96.0	46.5	5.09	0.65	124	12	4	1
	4	59.1	1.91	0.98	8.9	85.7	290.5	173.0 - 7.1	35.3	23.5	12.7	11.9	16.5	96.0	45.8	5.50	0.80	106	12	3	1
	5	63.3	1.85	1.09	9.9	90.6	284.1	173.0 - 7.3	36.9	24.9	12.5	10.9	14.9	96.0	49.8	5.09	0.75	101	12	5	1
	6	67.9	1.82	1.17	10.7	96.8	290.8	173.0 - 8.0	39.1	25.7	11.5	10.0	13.7	96.0	42.3	5.08	0.68	113	13	4	1
	7	64.0	1.87	1.09	9.8	91.8	305.6	149.0 - 7.2	37.2	25.1	12.2	10.6	14.9	96.0	42.2	5.51	0.60	100	12	3	1
	8	72.6	1.78	1.36	11.2	103.0	283.3	173.0 - 8.4	40.9	27.1	11.8	7.9	12.4	96.0	40.3	5.51	0.55	97	12		
	9	71.5	1.78	1.29	11.5	102.3	283.3	173.0 - 8.4	40.8	26.2	11.6	8.9	12.5	96.0	41.2	7.20	0.55	101	11	3	1
	10	54.6	1.94	0.90	8.3	77.8	294.1	149.0 - 6.2	32.5	23.5	13.3	12.5	18.1	96.0	41.7	5.50	0.65	82	13	4	1
St32	1	47.7	1.91	0.81	7.9	59.0	282.3	61.6 - 5.9	24.9	22.6	21.2	13.0	18.3	103.0	46.51	5.55	0.78				
41°47'14"N	2	53.1	1.86	0.81	9.1	63.6	327.6	61.6 - 6.0	27.5	22.9	21.0	12.3	16.2	103.0	42.91	5.10	0.74				
9°03'02"W	3	53.0	1.90	0.85	8.7	64.6	290.7	173.0 - 6.4	30.3	20.6	19.5	12.8	16.8	103.0	43.51	5.96	0.78				
	4	66.6	1.83	1.03	11.4	80.2	338.8	173.0 - 8.1	38.1	21.0	17.8	10.2	12.9	103.0	41.62	5.51	0.78				
	5	52.3	1.92	0.78	8.5	62.8	328.6	61.6 - 5.6	28.4	21.6	20.2	12.5	17.3	103.0	44.49	5.51	0.90				
St33	1	63.8	1.94	1.12	8.9	107.9	262.5	149.0 - 10.1	45.1	13.8	15.0	10.9	15.2	115.0	38.85	8.54	0.53				
41°47'11"N	2	70.8	1.88	1.24	10.4	122.7	266.1	149.0 - 11.0	49.3	13.2	14.2	9.9	13.4	115.0	40.09	8.91	0.62				
9°06'01"W	3	73.0	1.87	1.28	10.5	128.7	266.6	149.0 - 11.6	51.2	12.7	13.4	9.6	13.1	115.0	41.31	8.89	0.70				
	4	59.2	1.99	1.02	8.1	95.0	262.8	173.0 - 9.5	42.2	13.8	15.6	11.7	16.7	115.0	38.25	8.47	0.68				
	5	61.6	1.99	1.12	8.1	105.3	258.3	173.0 - 10.1	44.8	13.3	15.0	11.0	16.0	115.0	37.22	8.47	0.61				

		Grain-size parameters												Depth	W	CaCO3	POC	210 Pb exc.	±	137 Cs	±
Sample	cm	Mean	Dév.St.	Skew.	90	50	5	Mode %	125	125-63	63-30	30-15	15	m	%	%	%	Bq / Kg		Bq / Kg	
St34	1	100.9	1.55	1.98	20.0	145.5	258.5	149.0 - 16.6	65.2	13.0	8.2	6.0	7.7	115.0	32.69	8.55	0.32				
41°46'53"N	2	72.0	1.95	1.30	9.2	131.8	266.6	149.0 - 12.5	53.1	12.9	9.9	9.1	14.9	115.0	32.93	8.55	0.33				
9°07'07"W	3	91.3	1.74	1.76	14.1	143.6	266.3	149.0 - 15.3	62.3	13.0	7.8	6.3	10.5	115.0	31.42	9.01	0.50				
	4	80.3	1.86	1.43	11.3	138.2	275.0	149.0 - 13.3	57.0	12.2	9.5	8.6	12.7	115.0	31.90	8.55	0.72				
	5	83.0	1.83	1.53	11.6	139.5	268.2	149.0 - 14.0	58.4	12.8	8.8	7.8	12.2	115.0	34.24	8.54	0.40				
KTB35	1	24.9	1.39	0.44	6.1	27.9	100.5	49.8 - 6.4	3.2	13.0	30.8	25.3	27.8	112.0	132.5	5.52	1.80	216	9	4	1
41°48'32"N	2	30.2	1.36	0.58	7.7	34.6	114.9	49.8 - 6.6	3.7	20.2	31.7	22.6	21.8	112.0	97.4	6.39	1.55	196	13	4	1
9°04'47"W	3	26.9	1.42	0.52	6.3	31.1	105.3	49.8 - 6.3	2.6	19.0	29.8	21.7	27.0	112.0	66.4	6.40	1.15	151	12		
	4	33.1	1.47	0.63	7.2	39.8	138.7	57.7 - 6.6	7.1	23.2	29.5	18.4	21.8	112.0	60.2	6.39	1.15	137	11	3	1
	5	28.3	1.43	0.54	6.5	34.2	116.6	42.9 - 7.5	4.0	17.8	32.8	20.3	25.1	112.0	53.0	6.38	1.15	170	12	2	1
	6	30.0	1.45	0.56	6.8	36.3	127.1	42.9 - 7.1	5.3	19.8	31.3	19.8	23.8	112.0	58.6	6.38	1.20	146	11	5	1
	7	28.3	1.42	0.51	6.7	33.4	119.0	42.9 - 7.0	4.3	17.6	32.1	20.7	25.4	112.0	57.7	6.39	1.15	144	13		
	8	26.2	1.46	0.48	6.0	31.3	118.8	42.9 - 7.1	4.4	14.6	32.5	20.6	27.8	112.0	56.5	6.40	1.20	129	11	3	1
	9	29.8	1.47	0.53	6.6	35.5	129.9	42.9 - 6.6	5.6	20.1	29.6	20.2	24.5	112.0	54.6	6.38	1.30	164	12	3	1
	10	28.4	1.48	0.50	6.3	32.8	121.6	57.7 - 6.2	4.6	20.3	28.0	20.9	26.1	112.0	57.4	6.39	1.30	137	13		
	11	27.6	1.52	0.47	5.9	31.4	124.2	57.7 - 6.0	4.9	20.2	26.5	20.7	27.7	112.0	57.9	6.38	1.30	118	10		
	12	27.3	1.54	0.49	5.8	31.3	126.1	57.7 - 5.8	5.1	19.8	26.6	20.4	28.1	112.0	57.2	6.39	1.30	105	11		
	13	22.0	1.45	0.26	5.4	23.9	104.5	27.6 - 6.0	3.5	11.7	26.0	24.5	34.3	112.0	62.0	6.40	1.30	105	10		
	14	24.0	1.51	0.33	5.4	26.3	122.3	57.7 - 5.8	4.8	14.4	26.2	22.9	31.8	112.0	61.2	6.39	1.40	104	12		
St36	1	58.1	1.61	1.51	11.0	79.5	220.4	82.7 - 11.0	19.6	43.6	15.9	8.0	12.8	95.0	50.49	2.98	0.50				
41°50'22"N	2	57.8	1.65	1.53	10.4	81.1	219.1	82.7 - 11.1	20.4	43.9	14.5	7.8	13.4	95.0	46.18	3.42	0.77				
9°00'01"W	3	57.8	1.62	1.55	10.9	80.5	214.6	82.7 - 11.1	19.9	43.9	15.2	8.0	13.0	95.0	45.14	3.00	1.37				
	4	55.8	1.65	1.49	10.1	79.0	214.4	82.7 - 11.1	19.1	43.3	15.5	8.3	13.9	95.0	42.49	2.99	0.68				
	5	59.2	1.64	1.46	10.9	81.3	234.5	82.7 - 11.2	20.7	43.5	15.0	8.0	12.9	95.0	49.42	3.85	0.82				
St37	1	42.5	1.74	1.14	7.7	59.2	190.1	61.6 - 8.0	14.1	32.9	22.1	12.7	18.2	102.0	55.61	4.68	1.37				
41°50'23"N	2	44.5	1.71	1.16	8.3	61.6	194.1	82.7 - 8.6	13.5	35.3	22.1	12.1	17.0	102.0	53.03	3.39	1.22				
9°02'16"W	3	39.9	1.73	1.13	7.5	56.5	172.3	71.4 - 8.3	11.3	33.6	22.7	13.3	19.2	102.0	48.83	4.24	1.36				
	4	43.6	1.72	1.15	8.0	61.2	191.7	71.4 - 8.7	13.2	35.3	21.7	12.2	17.6	102.0	52.70	4.24	1.41				
KTB37	1	51.7	1.49	1.30	11.6	66.3	181.9	82.7 - 10.4	13.6	39.7	23.7	10.6	12.5	104.0	58.8	4.25	0.90	148	12	5	1
41°50'11"N	2	45.2	1.61	1.10	9.5	59.1	189.9	61.6 - 8.2	13.6	33.2	24.0	13.8	15.4	104.0	60.6	4.24	1.10	169	12		
9°02'26"W	3	42.9	1.75	1.10	7.7	56.8	208.8	61.6 - 7.5	14.3	30.9	25.7	11.9	17.2	104.0	46.4	4.24	1.60	167	13		
	4	42.0	1.73	1.11	7.8	56.5	190.1	61.6 - 8.3	12.3	32.1	25.4	13.2	17.1	104.0	55.9	4.24	1.70	162	13		
	5	31.0	1.79	0.96	6.4	42.7	143.2	61.6 - 7.5	7.3	26.5	25.0	16.6	24.5	104.0	56.1	4.25	1.25	181	9	4	1

		Grain-size parameters												Depth	W	CaCO3	POC	210 Pb exc.	±	137 Cs	±
Sample	cm	Mean	Dév.St.	Skew.	90	50	5	Mode %	125	125-63	63-30	30-15	15	m	%	%	%	Bq / Kg		Bq / Kg	
	6	36.8	1.79	1.00	7.0	50.9	174.8	61.6 - 7.7	11.1	29.1	24.0	15.0	20.8	104.0	59.2	4.25	1.65	170	12	7	1
	7	42.2	1.83	0.89	7.5	55.8	267.1	61.6 - 7.4	14.2	30.3	23.4	13.7	18.4	104.0	54.9	4.26	1.45	181	12	3	1
	8	35.1	1.80	0.95	6.8	48.1	171.4	61.6 - 7.4	10.6	27.7	24.1	15.4	22.2	104.0	47.7	4.26	1.30	97	12	4	1
	9	33.1	1.82	0.99	6.5	46.6	160.8	61.6 - 7.4	9.6	27.4	24.5	15.0	23.5	104.0	47.2	4.26	1.60	71	11	4	1
	10	34.1	1.82	0.95	6.6	46.6	171.4	61.6 - 7.2	10.3	26.6	25.2	15.4	22.4	104.0	49.4	4.26	1.50	94	11	5	1
	11	30.7	1.86	0.89	6.2	42.8	157.6	61.6 - 6.6	9.3	25.1	24.1	15.7	25.8	104.0	49.8	4.24	1.60	58	8	4	1
	12	30.4	1.85	0.93	6.2	42.3	154.5	61.6 - 6.9	8.8	25.4	24.5	15.6	25.6	104.0	50.3	4.24	2.05	58	8		
KTB38	1	29.4	1.66	0.79	7.1	34.2	157.8	34.1 - 7.5	7.9	15.8	32.2	20.9	23.2	118.0	105.1	7.18	1.50	220	12	4	1
41°50'05"N	2	30.0	1.70	0.84	6.8	36.2	162.8	39.5 - 7.1	8.9	16.7	31.2	20.5	22.7	118.0	86.4	7.65	1.25	225	12		
9°06'31"W	3	34.6	1.93	0.67	6.6	39.2	212.6	39.5 - 5.8	20.0	14.6	24.1	17.6	23.7	118.0	68.8	8.10	1.15	154	10		
	4	38.2	1.92	0.70	7.0	42.9	217.9	39.5 - 5.4	22.6	16.1	22.0	17.4	22.0	118.0	56.7	8.83	1.00	148	10	4	1
	5	38.1	1.95	0.63	7.0	42.8	230.2	149.0 - 4.8	23.1	15.5	20.5	18.0	22.9	118.0	52.0	9.37	1.00	151	10		
	6	44.4	1.92	0.81	7.6	52.6	223.6	129.0 - 6.7	28.4	17.3	18.1	16.1	20.1	118.0	59.7		1.00	138	10		
	7	39.7	1.92	0.75	7.1	44.6	215.9	149.0 - 5.9	25.1	15.0	22.0	16.7	21.3	118.0	53.7	8.95	1.05	170	11		
	8	43.3	1.93	0.80	7.4	50.7	223.0	129.0 - 6.5	27.4	17.1	19.3	15.9	20.4	118.0	51.8	7.69	1.00	152	11		
	9	34.1	1.91	0.66	6.6	39.4	204.1	39.5 - 5.5	18.8	15.7	22.6	18.8	24.1	118.0	43.5	8.49	1.15	125	9		
	10	33.5	1.95	0.62	6.5	37.9	210.1	39.5 - 5.2	19.6	14.9	21.6	18.9	25.0	118.0	52.0	8.09	1.25	98	8		
	11	34.5	1.97	0.68	6.4	40.1	203.6	129.0 - 5.6	21.5	14.9	21.0	17.7	24.9	118.0	48.8	8.08	1.25	96	8		
	12	31.8	1.99	0.60	6.2	36.1	207.0	39.5 - 5.0	19.2	14.5	20.9	18.8	26.7	118.0	49.7	8.54	1.05	88	8	5	1
	13	32.5	2.01	0.61	6.2	37.3	211.6	39.5 - 5.2	21.1	13.1	21.2	18.2	26.4	118.0	50.7	8.49	1.03	70	8	3	1
	14	32.6	2.01	0.58	6.3	36.4	213.1	129.0 - 4.9	20.7	14.4	19.2	18.7	27.0	118.0	51.2	9.78	1.20	55	6	4	1
St39	1	72.3	1.87	1.45	10.1	128.8	243.6	129.0 - 15.6	52.0	16.4	9.2	8.6	13.8	121.0	43.03	12.81	0.54				
41°50'16"N	2	85.0	1.70	1.75	13.8	135.2	239.6	129.0 - 17.2	57.6	17.0	7.6	7.1	10.7	121.0	41.05	13.21	0.50				
9°08'10"W	3	78.7	1.77	1.68	11.9	132.1	228.7	129.0 - 17.1	55.0	17.5	8.0	7.4	12.0	121.0	41.41	14.05	0.47				
	4	37.4	2.12	0.75	6.1	45.7	201.7	129.0 - 9.5	30.0	15.0	12.8	15.7	26.5	121.0	43.05	12.80	0.58				
	5	66.8	1.91	1.33	9.0	122.2	232.4	129.0 - 14.0	48.6	16.9	9.5	9.8	15.2	121.0	41.45	13.21	0.63				
ST40	1	71.3	1.88	1.40	9.5	126.1	246.3	129.0 - 13.5	50.5	16.9	9.7	8.7	14.2	121.0	48.07	9.83	0.55				
41°51'37"N	2	75.0	1.78	1.52	11.3	130.7	228.9	129.0 - 15.3	53.3	15.7	9.2	9.0	12.7	121.0	43.18	10.20	0.50				
9°07'45"W	3	57.5	1.98	1.15	7.7	111.3	225.9	129.0 - 12.6	43.9	15.6	11.4	11.3	17.9	121.0	40.99	11.02	0.44				
	4	66.9	1.90	1.35	9.3	121.8	232.8	129.0 - 13.3	48.5	16.4	10.7	9.6	14.8	121.0	39.91	10.18	0.45				
	5	65.5	1.89	1.33	9.0	121.0	226.6	129.0 - 14.1	48.0	15.8	11.0	10.1	15.0	121.0	40.35	10.17	0.51				
St41	1	55.8	1.71	1.47	9.1	85.0	207.3	95.9 - 11.7	20.8	44.7	10.9	8.1	15.5	72.0	71.94	3.84	0.53				
41°45'16"N	2	56.7	1.69	1.56	9.3	85.8	199.4	95.9 - 12.0	20.6	45.6	11.3	7.6	14.8	72.0	54.43	4.28	0.60				

		Grain-size parameters												Depth	W	CaCO3	POC	210 Pb exc.	±	137 Cs	±
Sample	**cm**	**Mean**	**Dév.St.**	**Skew.**	**90**	**50**	**5**	**Mode %**	**125**	**125-63**	**63-30**	**30-15**	**15**	**m**	**%**	**%**	**%**	**Bq / Kg**		**Bq / Kg**	
8°58'24"W	3	60.9	1.64	1.56	10.8	88.0	217.7	95.9 - 11.9	22.8	45.0	11.1	7.8	13.3	72.0	45.72	4.28	0.50				
	4	62.7	1.60	1.71	11.3	89.2	211.2	95.9 - 12.5	22.6	47.5	10.7	6.7	12.4	72.0	41.17	4.29	0.57				
	5	63.7	1.56	1.73	12.4	89.4	207.1	95.9 - 12.8	22.2	48.0	11.0	7.0	11.7	72.0	38.87	4.29	0.50				
	6	60.5	1.63	1.66	11.0	87.5	208.9	95.9 - 12.3	21.6	46.5	11.9	7.0	13.0	72.0	34.56	4.29	0.47				
St42	1	64.7	1.33	1.83	20.4	82.2	191.0	82.7 - 12.4	17.7	48.2	19.6	7.1	7.4	61.0	44.82	3.41	0.39				
41°23'55"N	2	65.6	1.43	1.86	17.2	86.3	203.1	82.7 - 12.3	20.5	47.9	16.6	6.2	8.9	61.0	38.49	3.43	0.59				
8°53'43"W	3	64.6	1.44	1.78	16.4	85.5	205.4	82.7 - 12.1	20.3	47.0	16.8	6.7	9.2	61.0	35.62	3.42	0.40				
	4	59.8	1.49	1.66	14.2	81.2	195.7	82.7 - 11.6	18.3	45.5	17.7	7.9	10.6	61.0	33.93	3.86	0.52				
	5	60.1	1.51	1.65	13.8	82.0	200.8	82.7 - 11.6	19.0	45.4	16.8	7.9	10.8	61.0	32.83	3.43	0.50				
KTB43	1	33.6	1.42	1.29	9.7	39.5	124.7	39.5 - 9.5	5.0	18.8	41.1	19.8	15.3	84.0	75.5	4.68	0.88	146	13	5	1
41°18'39"N	2	33.0	1.46	1.20	8.6	40.2	122.5	45.8 - 8.6	4.7	20.0	38.4	19.8	17.1	84.0	79.0	4.68	1.25	174	13	5	1
8°59'18"W	3	32.7	1.53	1.07	8.1	39.3	132.5	39.5 - 7.7	5.9	20.5	35.4	19.5	18.8	84.0	86.8	4.66	1.40	205	14		
	4	33.3	1.47	1.19	8.7	40.3	125.1	39.5 - 8.8	5.0	19.5	39.2	19.7	16.6	84.0	81.7	4.26	1.65	195	13	5	1
	5	34.0	1.58	0.96	8.2	39.2	158.2	34.1 - 7.3	8.6	20.1	33.7	18.8	18.8	84.0	72.0	3.82	1.40	193	13		
	6	33.8	1.49	1.15	8.7	40.4	133.6	39.5 - 9.1	5.8	19.1	39.7	19.0	16.3	84.0	59.0	3.82	1.00	164	13	6	1
	7	32.0	1.47	1.26	8.2	39.2	119.1	39.5 - 9.0	4.3	18.9	39.7	19.6	17.4	84.0	57.4	3.83	1.10	155	12		
	8	33.6	1.47	1.27	8.8	40.5	125.6	39.5 - 9.2	5.1	19.4	40.8	18.7	16.0	84.0	55.6	3.83	1.15	141	14		
	9	29.9	1.56	1.14	7.3	36.9	124.1	39.5 - 8.6	4.9	17.0	38.2	20.0	19.9	84.0	53.7	3.83	1.20	137	13		
	10	28.7	1.56	1.17	7.1	35.8	115.5	39.5 - 8.7	4.0	16.7	38.0	20.5	20.8	84.0	55.5	3.83	1.15	145	12		
	11	30.3	1.56	1.10	7.4	37.1	130.0	39.5 - 8.4	5.5	16.8	37.6	20.5	19.6	84.0	52.7	4.26	1.20	127	12		
	12	25.3	1.59	1.06	6.5	31.6	106.5	39.5 - 8.1	3.2	13.8	35.1	23.3	24.6	84.0	55.0	3.82	1.30	69	11		
St44	1	70.2	1.26	1.71	25.9	83.5	220.1	82.7 - 12.4	19.8	48.4	19.2	6.8	5.8	40.0	46.50	3.41	0.40				
41°10'36"N	2	87.5	1.39	1.22	29.5	93.2	392.8	82.7 - 12.9	31.6	43.3	14.8	5.2	5.0	40.0	35.16	3.00	0.47				
8°47'23"W	3	81.8	1.21	1.57	32.2	89.6	266.7	82.7 - 12.1	25.8	48.2	17.1	4.9	4.1	40.0	28.03	3.43	0.39				
	4	81.2	1.27	1.70	31.8	91.0	273.3	82.7 - 13.0	25.5	49.5	16.0	4.2	4.8	40.0	25.94	3.42	0.22				
	5	124.0	1.37	1.12	45.4	119.7	481.3	82.7 - 9.2	48.0	35.4	10.7	3.0	2.9	40.0	24.83	3.00	0.21				