

The distribution of sediments on and around the Manihiki Plateaus, Central Pacific Ocean.

-Sedimentological description of the seven core samples obtained by R/V KAIREI KR99-12 Cruise-.

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Seven long-length piston cores were penetrated into the latest Cenozoic strata on and around the Manihiki Plateaus for biostratigraphic, magnetostratigraphic and paleoceanographic studies in the central Pacific Ocean. This paper describes the lithologies and sedimentary structures in these core samples. The sediments are divided into three lithofacies (planktic foraminiferal ooze, nannofossil chalk and reddish clay) and their depth distributions are delineated. The sea floor at depths shallower than 3,000 m is covered by planktic foraminiferal ooze, and the sediments on sea floor deeper than 4,500 m are composed of reddish clay. Chalky sediments may be distributed on the slope in the depth interval from 3,000 m to 4,500 m. The CCD depth, which exists about 4,500 m deep in the Manihiki Plateaus at present, was evidently shallower than 4,500 m during the late Cenozoic time, based on the lithofacies in core PC 3 and PC-7. The late Cenozoic strata in PC-2, PC-4 and PC-5 on the Manihiki Eastern Plateaus, which are composed of massive planktic foraminiferal ooze, was continuously deposited during the late Pliocene to recent times.

Keywords : Manihiki Plateaus, Cenozoic, Lithology, Sedimentology, Pacific Ocean.

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1. Introduction

The Manihiki Plateaus, located in the central Pacific Ocean, range from 160° W to 170° W longitude and from 6° S to 15° S latitude, and are situated on the Mid-Pacific Plate. The Manihiki Plateaus are geographically subdivided into the Eastern, Western and North Plateaus (Fig. 1).

Detailed submarine topography, and geophysical, geological and micropaleontological investigations were summarized by two previous research groups. One is the research under the Deep Sea Drilling Project in 1973 that examined site 317 at the top of the Eastern Plateaus (e.g. Jenkyns, 1973, Schlanger, Jackson, et al., 1976). The other is the research by the Geological Survey of Japan in 1980 that studied many sites on the northern and eastern slopes of this plateau (e.g. Nakao and Mizuno, 1982). The former research made clear that thick sediments consisting of nanno-foraminiferal, foraminiferal-nanno oozes and cherts, lie on the Eastern Plateaus. The geological age of these sediments was assigned as latest Late Cretaceous to Quaternary (e.g. Jenkyns, 1973). The latter research revealed that the core sediments in the Manihiki area, except from the top of the plateau, reach Early Pliocene including many hiatuses at various horizons (Takayanagi et al., 1982; Ujiie and Mishima, 1982). Based on the preservation status of planktic foraminifers and their proportion to the total population, Takayanagi et al. (1982) evaluated that the present lysocline existed at depths shallower than 3,900 m, and that the carbonate compensation depth (CCD) was set at 5,100 m. Nakao and Mizuno (1982) reported that the cores from the eastern slope of the Eastern Plateaus are characterized by the Pliocene to Holocene calcareous turbiditic sequence.

During the KR99-12 Cruise of R/V KAIREI, piston coring at seven sites (PC-1, PC-2, PC-3, PC-4, PC-5, PC-7 and PC-8) penetrated Late Cenozoic sediments in the Manihiki area (Fig. 1) to estimate the water depth of Recent lysocline and CCD, to investigate the distribution of the hiatuses and vertical fluctuation of the CCD in Late Cenozoic time and to refine the paleoenvironments of the surface, intermediate, deep and bottom waters. This paper describes the lithology and sedimentary structures in the seven piston cores.

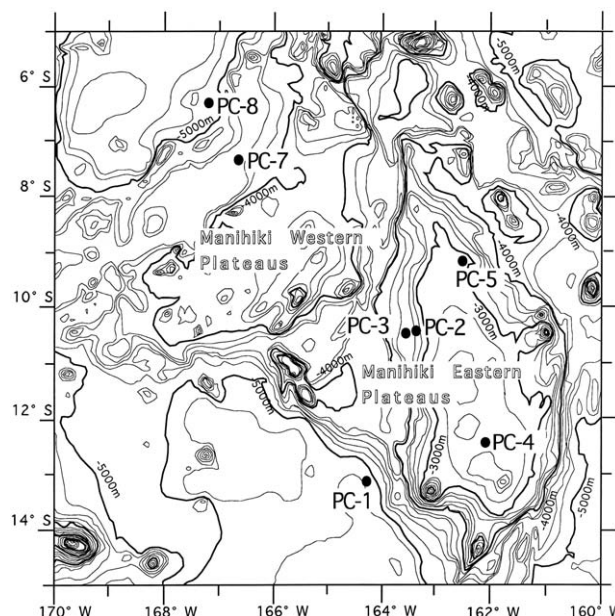


Fig. 1 Regional bathymetry (in meters) of the Manihiki Plateaus, showing location of PC 1-8.

2. Sampling methods and treatments

A 15 or 20 meter long piston corer, joined to a five meter long aluminum pipe, with 600 kilograms of weight, and an 80 centimeter long multiple-type corer with acrylic pipe, as a pilot of a piston core, were used to collect sediment cores. Each piston core sample (PC) was cut into each one meter long pipe and stored temporarily in the laboratory on-board. Then, each 1 m long pipe was cut vertically into half core samples. One half-cut core sample was utilized in describing the core and sampling for micropaleontological study, and the other was preserved after sampling for paleomagnetic study. In the same manner, each pilot core was also cut vertically and subsequently observed and sampled.

3. Localities of seven piston cores

The localities of seven piston cores are listed in Table 1 and their geographic positions are shown in Figure 1.

Two piston cores (PC-1 and PC-8) were located in the sea floor around the Manihiki Plateaus. PC-1, being 13.50 m in length, was obtained from the southwestern sea floor of the Manihiki Plateaus (Lat. 13°07.5653'S, Long. 164°30.0053'W, 5,496 m depth). PC-8, 19.649 m in core length, was situated on the northwestern sea floor of the Manihiki Western Plateaus (Lat.

Table 1 KR 99-12 piston core summary

Area	Date	Core	Latitude (S)	Longitude (W)	Water Depth(m)	Core length(cm)	Location	Remarks
B	09-Jan-2000	PC01	13°07.5653	164°30.0053	5,496m	1,350cm	Southwestern abyssal planes of the Manihiki Plateaus	This core is characterized by dark brown reddish clay with bioturbation. Basement of core consists of calcareous ooze with trough cross lamination. Lower part consists of reddish clay with calcareous turbidites.
B	10-Jan-2000	PC02	10°44.9955	163°29.3030	3,383m	1,442cm	Southwestern slope of the manihiki Eastern Plateaus	This core is characterized by calcareous sediments. Lower, middle part consists of light gray calcareous ooze. Upper part consists of dull yellow orange calcareous ooze.
B	10-Jan-2000	PC03	10°46.9876	163°55.9489	4,467m	1,911.5cm	Southwestern slope of the Manihiki Eastern Plateaus	This core is characterized by dull yellow orange chalky ooze and dark brown reddish clay with calcareous turbidites. Lower part consists of repeated dull yellow orange chalky clay with calcareous turbidites. Upper part consists of dark brown reddish clay with calcareous turbidites.
B	11-Jan-2000	PC04	12°48.0842	162°10.1309	2,326m	1,415cm	Southern top of Manihiki Eastern Plateaus	This core is characterized by light gray planktic foraminiferal ooze.
B	12-Jan-2000	PC05	09°21.0092	162°50.0258	2,933m	1,733.3cm	Southern top of the Manihiki Eastern Plateaus	This core is characterized by light gray planktic foraminiferal ooze.
B	13-Jan-2000	PC06	07°31.0016	166°39.9649	4,539m	471cm	Northwestern slope of the Manihiki Western Plateaus	This core site closely locates on PC-7 site. Pistone corer will probably fail samplig.
B	13-Jan-2000	PC07	07°31.0218	166°40.0041	4,542m	2,015.4cm	Northwestern slope of the Manihiki Western Plateaus	This core is characterized by brownish black, dull yellow orange pelagic clay with bioturbation. Sediments consists of brownish black reddish clay with light gray calcareous turbidites.
B	14-Jan-2000	PC08	06°37.0053	167°13.5956	5,098m	1,964.9cm	Northwestern abyssal planes of the Manihiki Plateaus	This core is characterized by brownish black reddish clay with bioturbation. Uppermost part, lower part consists of reddish clay with calcareous turbidites.

06°37.0053'S, Long. 167°13.5956'W, 5,098 m depth).

The locations of PC-2 (Lat. 10°44.9955'S, Long. 163°29.3030'W, 3,383 m depth) and PC-3 (Lat. 10°46.9876'S, Long. 163°55.9489'W, 4,467 m depth) were at the southwestern slope of the Manihiki Eastern Plateaus and that of PC-7 (Lat. 07°31.0218'S, Long. 166°40.0041'W, 4,542 m depth) was at the northwestern slope of the Manihiki Western Plateaus. The core lengths of PC-2, PC-3 and PC-7 are 14.42 m, 19.115 m and 20.154 m, respectively.

PC-4 and PC-5 were located at the top of the Manihiki Eastern Plateaus. The location of PC-4 was at the south area of the eastern plateaus (Lat. 12°48.0842'S, Long. 162°10.1309'W, 2,326 m depth), and that of PC-5 was at the north top of the plateaus (Lat. 09°21.0092'S, Long. 162°50.0258'W, 2,933 m depth). The core lengths of PC-4 and PC-5 are 14.15 m and 17.333 m, respectively.

4. Lithology of seven piston cores

4.1. Piston cores on the sea floor (PC-1 and PC-8)

Piston core PC-1 (Figs. 2 and 3) is characterized by massive dark brown reddish clay. The pilot core also consists of dark reddish brown colored homogeneous pelagic clay (Fig. 4). The top 7 centimeters of this core show a soupy nature. In PC-1, turbidite beds, which consist of light gray planktic foraminiferal ooze with grading structure (Fig. 5), exist in the intervals from 0.47 to 0.48 mbsf (meters below sea floor), 1.52 and 1.80 mbsf, 2.15 and 2.27 mbsf, 9.40 and 9.43 mbsf, and below 12.75 mbsf. The turbiditic layers at the bottom of this core yield many manganese micro-nodules, and are accompanied by trough cross lamination and parallel lamination (Fig. 6). Bioturbations are restricted to the depth interval from 9.20 to 9.38 mbsf, at horizons of 12.50 mbsf and 12.85 mbsf (Fig. 7).

Piston core PC-8 (Figs. 8 and 9) consists mainly of brownish-black reddish clay, except for several tur-

biditic layers in the intervals from 0 to 0.54 mbsf, 12.55 to 12.82 mbsf, 12.97 to 13.605 mbsf, 15.10 to 15.77 mbsf, and 16.51 to 17.15 mbsf. In PC-8, turbiditic layers are composed of three layers of calcareous materials. The lower part of a turbiditic layer is light gray planktic foraminiferal ooze, the middle part is dull yellow-orange or light yellow-orange clayey chalk, and the upper part is brown chalky clay. Manganese micro-nodules occur in the parts between 0.24 and 0.535 mbsf, 12.12 and 12.57 mbsf, 13.06 and 13.09 mbsf, 13.32 and 13.505 mbsf, and 16.73 and 17.15 mbsf. The pilot core consists of two lithologic units, as follows: The upper part is characterized by clayey sediments with gradual color change from reddish brown to dull yellow in descending order (Fig.4). In contrast, the lower part shows the dull yellow colored layer of planktic foraminiferal ooze. Manganese micro-nodules occur in the parts between 0.30 and 0.41 mbsf. Bioturbations are found in the interval from 0 to 0.18 mbsf.

4.2. Piston core on the slope of the Manihiki Eastern Plateaus (PC-2, PC-3)

Piston core PC-2 (Figs. 10 and 11) is composed mainly of dull yellow-orange planktic foraminiferal ooze with chalky matrix. The pilot core shows one lithologic unit composed of homogeneous foraminiferal ooze (Fig. 4). Two bioturbated layers exist in the intervals from 2.64 to 2.74 mbsf, and from 11.03 to 11.08 mbsf.

Piston core PC-3 (Figs. 12 and 13) is composed mainly of calcareous substrates which are characterized by components of dull yellow-orange colored chalky ooze with cross laminations changing gradually to light-gray colored chalky ooze in ascending order. The occurrences of manganese micro-nodules are observed throughout the core. An upward graded sequence is recognized in the chalky ooze in the lower part. Bouma sequences are found in the intervals from 2.18 to 3.23 mbsf and 16.03 to 16.44 mbsf. Five dark brown colored layers of pelagic clay are inserted in the intervals from 1.84 to 2.18 mbsf, from 3.23 to 4.00 mbsf, 6.74 to 6.96 mbsf, 18.195 to 18.395 mbsf, and 18.945 to 19.045 mbsf. In two parts of the core ranging from 11.945 to 13.12 mbsf and 16.44 to 17.19 mbsf, angular fragments of dark brownish sandy silt are scattered. Bioturbated layers are found in the intervals from 1.84 to 4.86 mbsf, 6.84 to 8.06 mbsf, and 17.195 to 18.895 mbsf.

Sediments ranging from 0 to 0.23 mbsf and 0.52 to 1.84 mbsf are disturbed due to flow-in. The pilot core consists of dark pelagic clay with color change (Fig.4).

4.3. Piston core on the slope of the Manihiki Western Plateaus (PC-7)

Piston core PC-7 (Figs. 14 and 15) consists of brownish black reddish clay (0.02 to 3.115 mbsf), brownish black reddish clay with interbedded brownish black reddish sand (1.35 to 1.51 mbsf and 2.51 to 2.58 mbsf), brownish black reddish sand (6.365 to 6.565 mbsf, 7.025 to 7.185 mbsf and 8.37 to 8.50 mbsf), brownish sand (11.637 to 11.667 mbsf, 14.049 to 14.599 mbsf, 15.204 to 15.434 mbsf and 19.139 to 19.579 mbsf), and dull yellow-orange chalky ooze (3.225 to 3.455 mbsf, 3.875 to 4.105 mbsf, 4.215 to 4.565 mbsf, 4.665 to 5.535 mbsf, 6.095 to 6.365 mbsf, 6.565 to 7.025 mbsf, 7.185 to 7.365 mbsf). In addition, their boundaries are obscured by bioturbations (Fig. 16). Many manganese micro-nodules occur in the intervals from 1.44 to 1.505 mbsf, 1.90 to 1.97 mbsf, 2.51 to 2.58 mbsf, 3.875 to 3.965 mbsf, 5.315 to 5.535 mbsf, 6.665 to 6.765 mbsf, 14.019 to 14.599 mbsf and 16.534 to 16.674 mbsf. The pilot core is composed of brown colored pelagic clay with slight color change (Fig. 4).

4.4. Piston core on the Manihiki Eastern Plateaus (PC-4 and PC-5)

Piston core PC-4 (Figs. 17 and 18) and PC-5 (Figs. 19 and 20) from one lithostratigraphic unit are composed mainly of dull yellow-orange planktic foraminiferal ooze with chalky matrix. Manganese micro-nodules occur in the interval from 9.835 to 9.915 mbsf, and at horizons of 13.04 mbsf in PC-4, and at horizons of 11.373 and 15.493 mbsf in PC-5. None of the stratigraphic gap in these two cores is recognized by the observations on board. Both pilot cores also consist of homogeneous foraminiferal ooze (Fig. 4).

5. Concluding remarks

Preliminary results on lithology of cores obtained during the KR99-12 cruise in the Manihiki area of the central South Pacific Ocean, are summarized as follows: (1) Core sediments from the abyssal depths (deeper than 5,000 m) southwest (core-site of PC-1) and northwest (core-site of PC-8) of the Western Plateaus are com-

posed mainly of pelagic clay with several turbiditic layers of planktic foraminiferal ooze, but biogenic disturbance is recognized in the southwestern core (PC-1); (2) Cored sediments from different water depths on the slope of the Eastern Plateaus (PC-2: 3,383 m; PC-3: 4,467 m depth) are composed chiefly of planktic foraminiferal ooze. However, the core from the deeper depth (PC-3) intercalates several thin layers of pelagic clay and contains parts with bioturbation, in contrast to the mostly homogeneous nature in the shallower core (PC-2); (3) Pelagic clay is the main component of core PC-7 collected from the slope of the Western Plateaus. Intense biogenic disturbance is constantly observed in this core, except the upper part of the core; (4) Core sediments from the intermediate depths on the southern top (core-site of PC-4) and northern top (core-site of PC-5) of the Eastern Plateaus show the sequences of homogeneous foraminiferal ooze with chalky matrix; (5) These core sediments can be delineated into three types, such as homogeneous foraminiferal ooze at the top of the plateau, foraminiferal ooze with calcareous chalky matrix at the slope of the plateau, and pelagic clay in the abyssal plane, as a whole.

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Legend

	Reddish sand		Planktic foraminiferal ooze
	Reddish clay		Planktic foraminiferal ooze with chalk
	Chalky clay with planktic foraminifera		Calcareous ooze
	Chalky clay		Chalky ooze
	Chalk		Alternation of brownish sand and chalky ooze
	Clayey chalk		Chalky brownish sand
	Calcareous chalk		Chalky brownish clay
	Sandy chalk		Alternation of brownish sand and ooze
	Alternation of calcareous ooze and brownish sand		
	Alternation of chalky ooze and purely chalk		
	Grading		Coarsening-upward sequence
	Bioturbation		Cross lamination
	Chalk upward sequence		Parallel lamination

mc: manganese micro-nodules

Fig. 2 Legend; Key to symbols used in the lithology and sedimentary structure on the core description in Figs.2, 8, 10, 12, 14, 17, and 19.

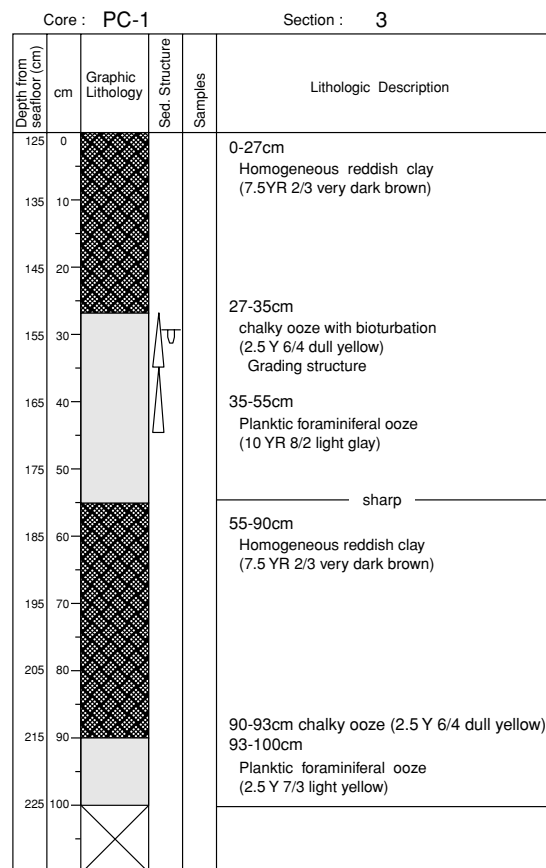
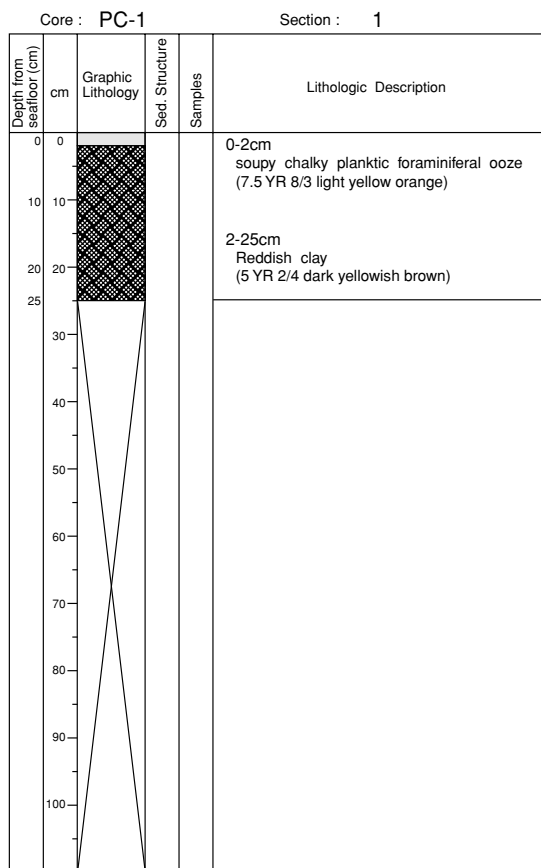
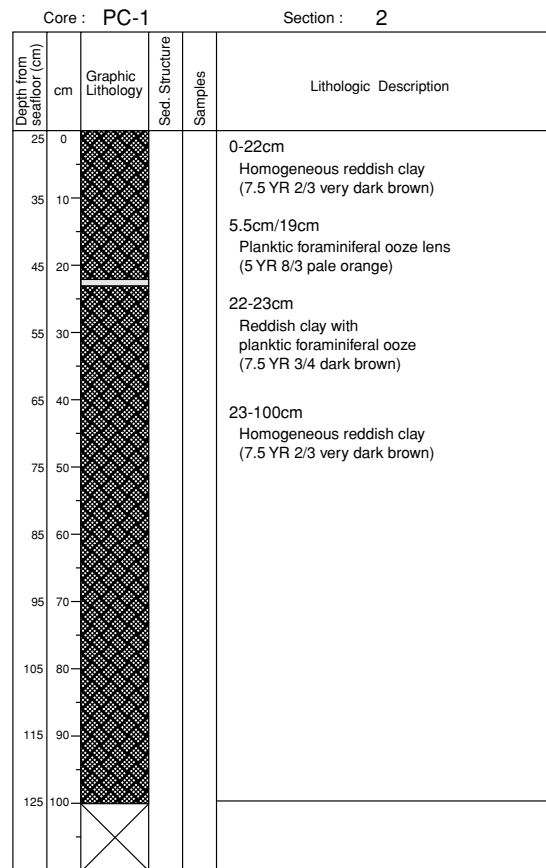
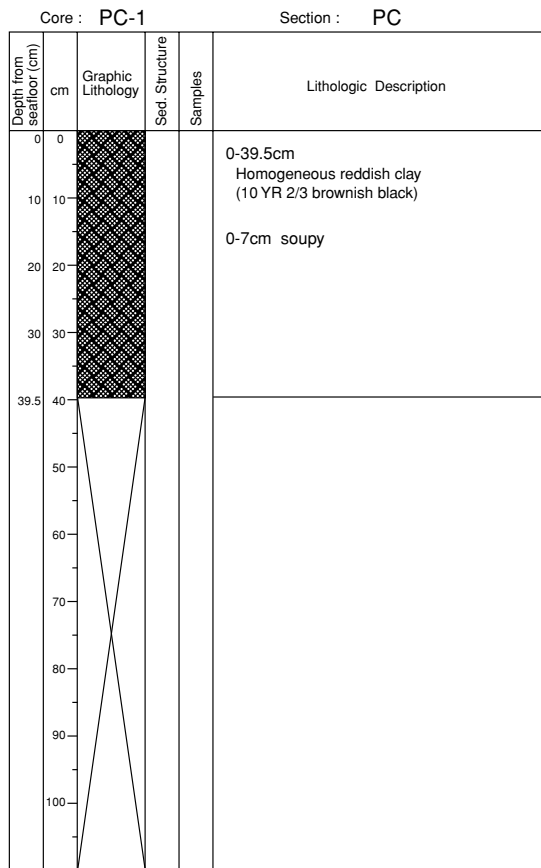


Fig. 2 Generalized summary of the lithology, structure of PC-1.

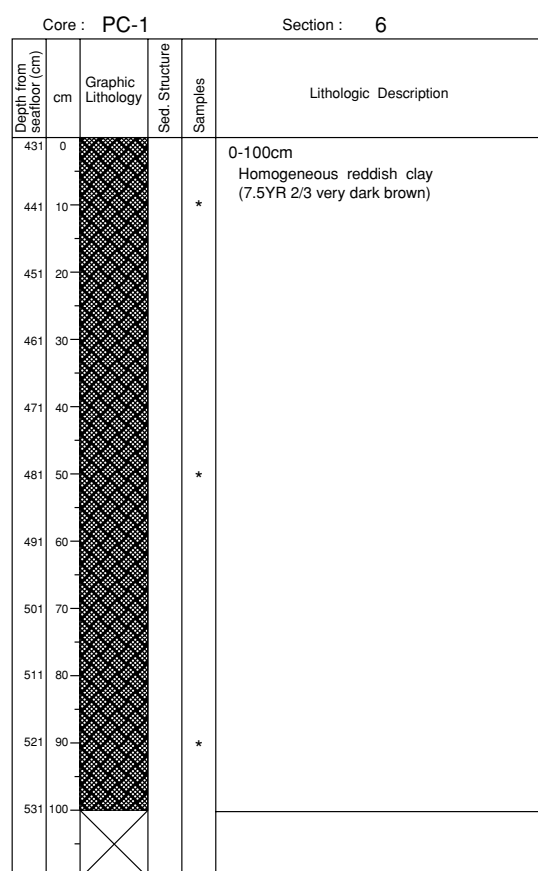
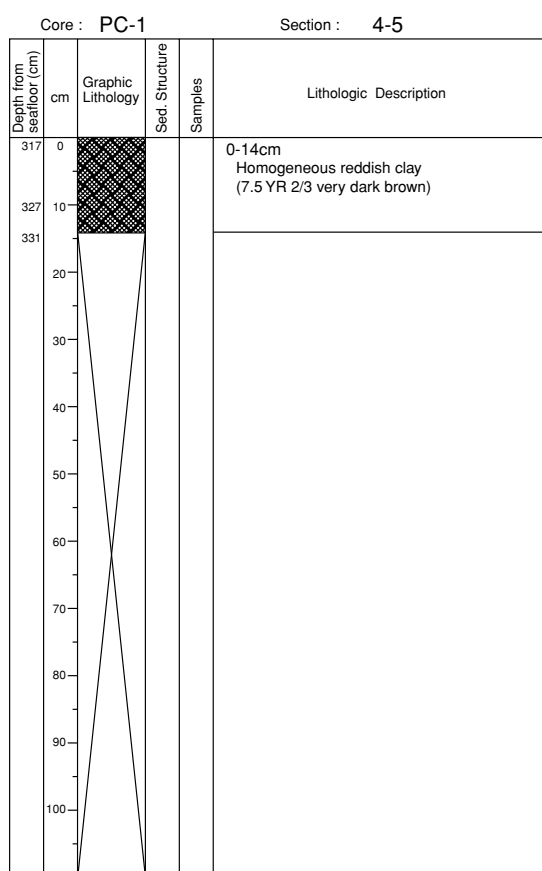
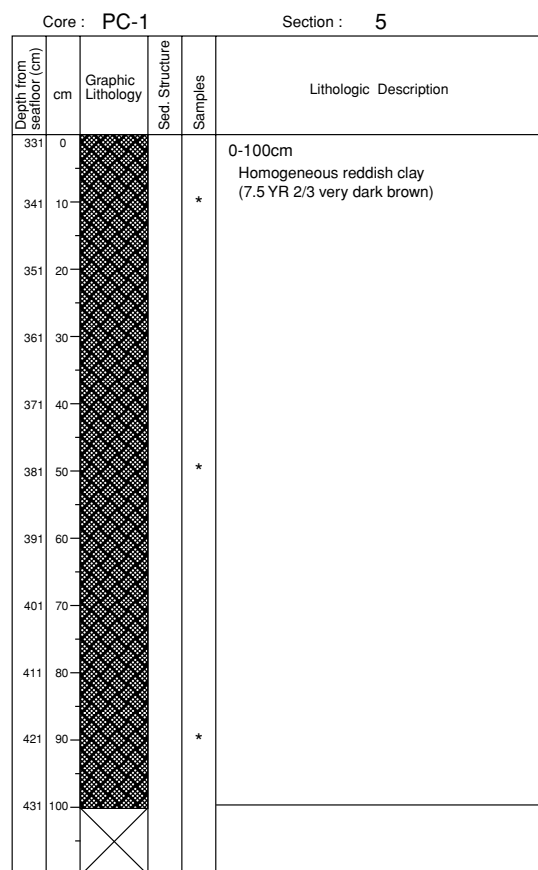
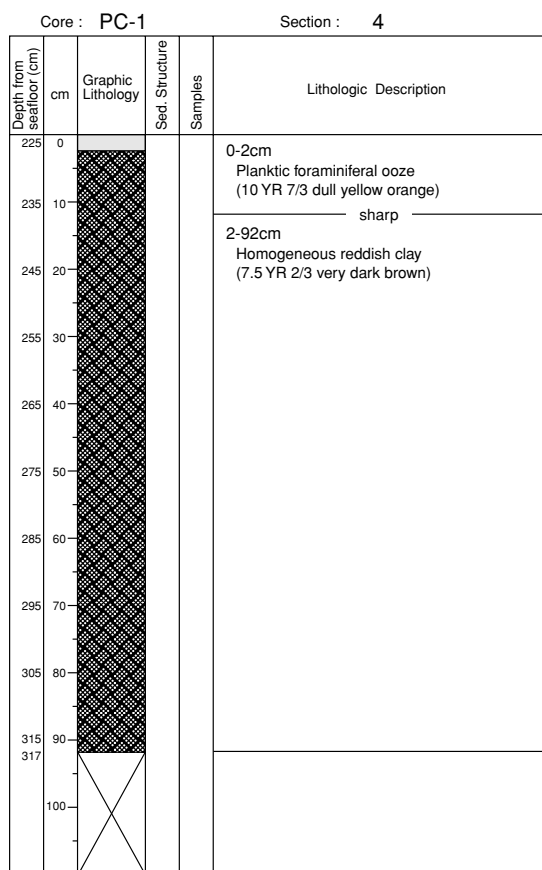


Fig. 2 (continued).

Core : PC-1		Section : 7			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
531	0			*	0-100cm Homogeneous reddish clay (7.5 YR 2/3 very dark brown)
541	10				
551	20				
561	30				
571	40				
581	50				
591	60				
601	70				
611	80				
621	90				
631	100				

Core : PC-1		Section : 9			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
731	0			*	0-98cm Homogeneous reddish clay (7.5 YR 2/3 very dark brown)
741	10				
751	20				
761	30				
771	40				
781	50				
791	60				
801	70				
811	80				
821	90				
829	100				

Core : PC-1		Section : 8			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
631	0			*	0-100cm Homogeneous reddish clay (7.5 YR 2/3 very dark brown)
641	10				
651	20				
661	30				
671	40				
681	50				
691	60				
701	70				
711	80				
721	90				
731	100				

Core : PC-1		Section : 10			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
829	0			*	0-91cm Homogeneous reddish clay (7.5YR 2/2 brownish black)
839	10				
849	20				
859	30				
869	40				
879	50				
889	60				
899	70				
909	80				
919	90				
929	100		U	*	91-100cm gradual Reddish clay (7.5YR 2/2 brownish black) with bioturbation (10YR 3/4 dark brown)

Fig. 2 (continued).

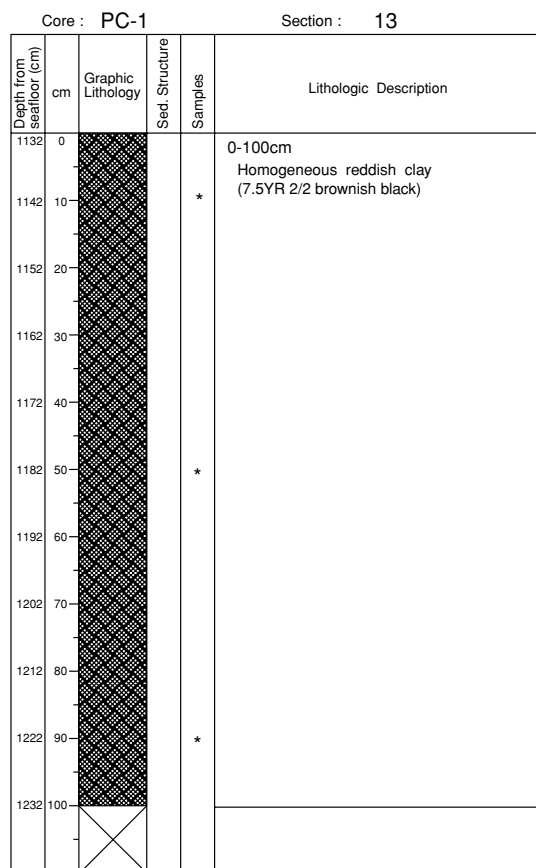
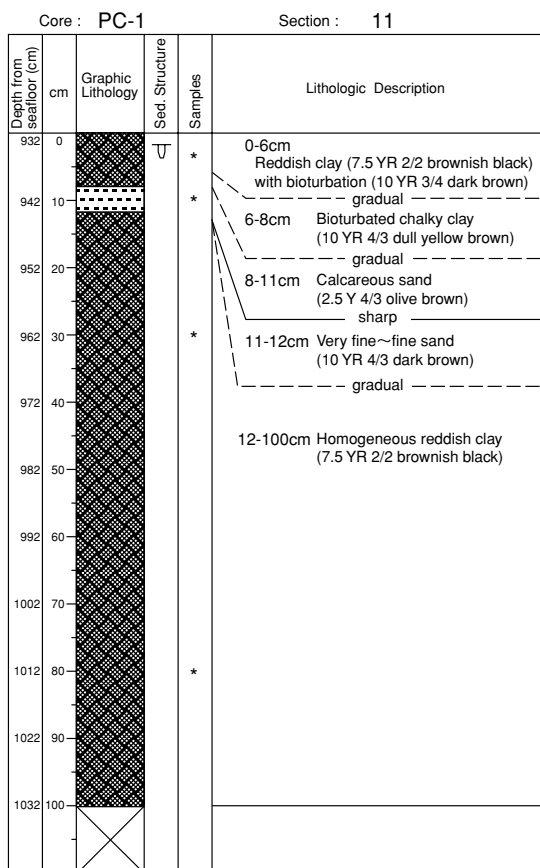
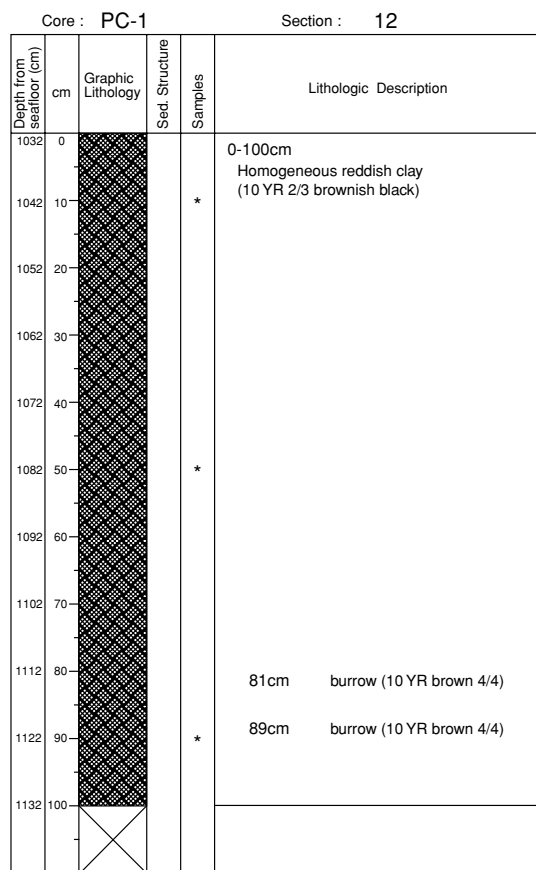
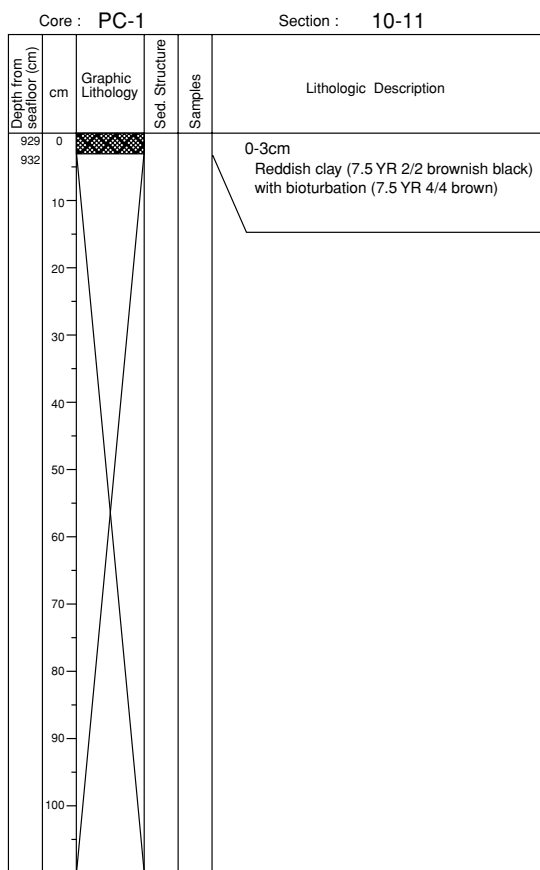


Fig. 2 (continued).

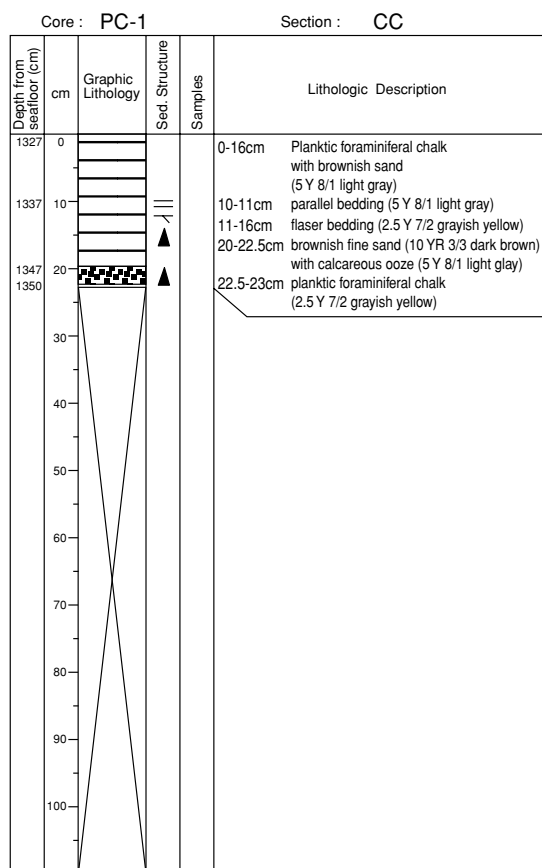
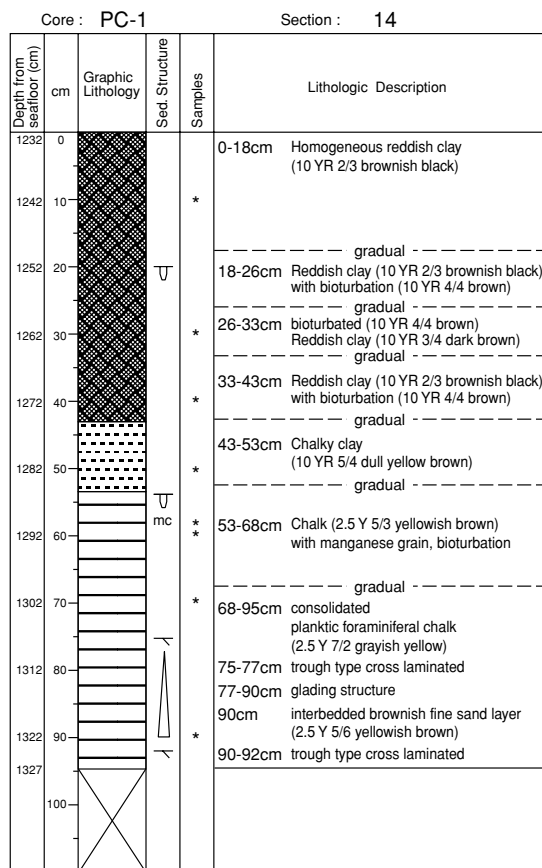


Fig. 2 (continued).

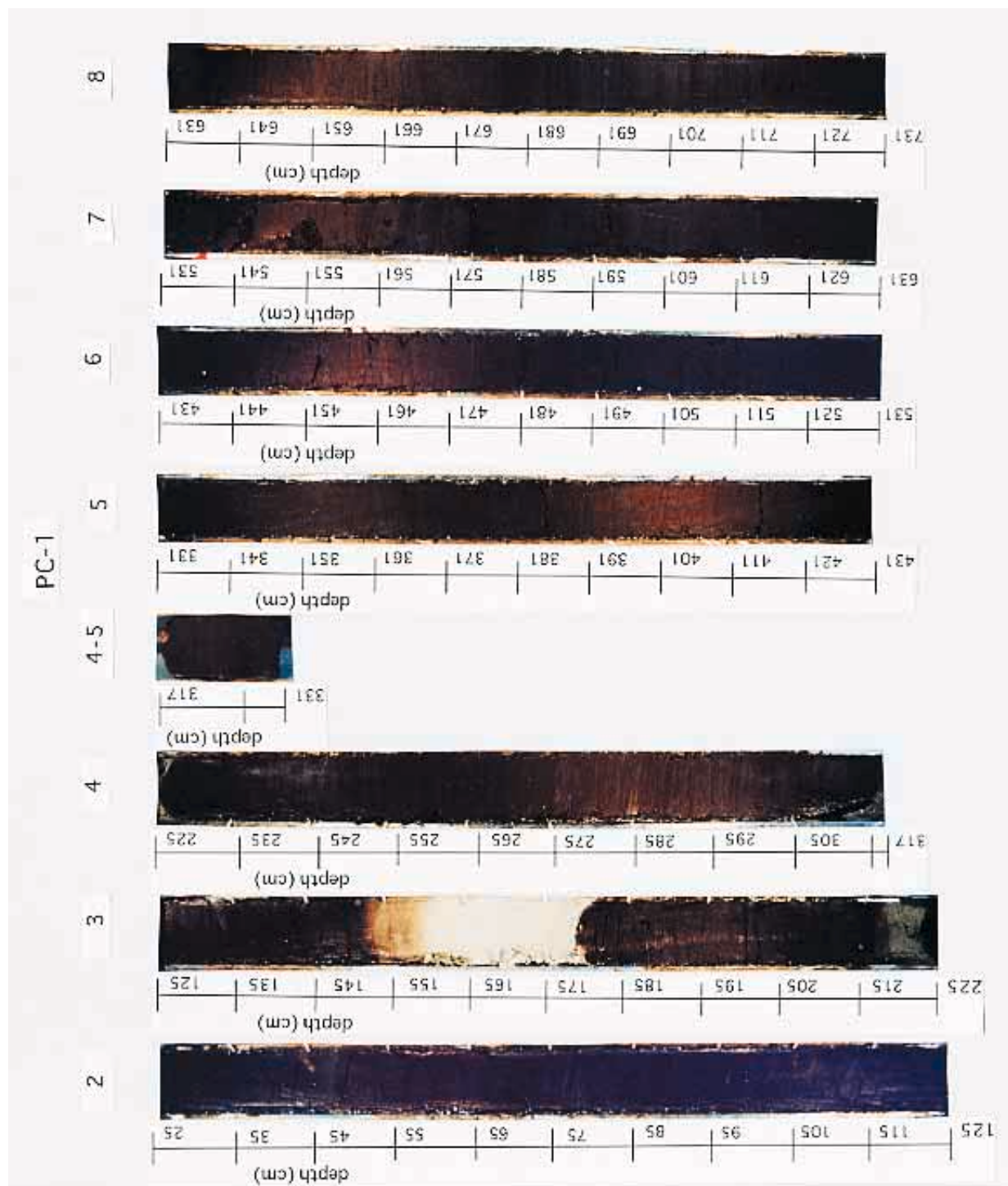


Fig. 3 Photograph of interval PC-1 Section 2-8, 25cm-731cm. Photograph of interval PC-1 Section 1 was lost.

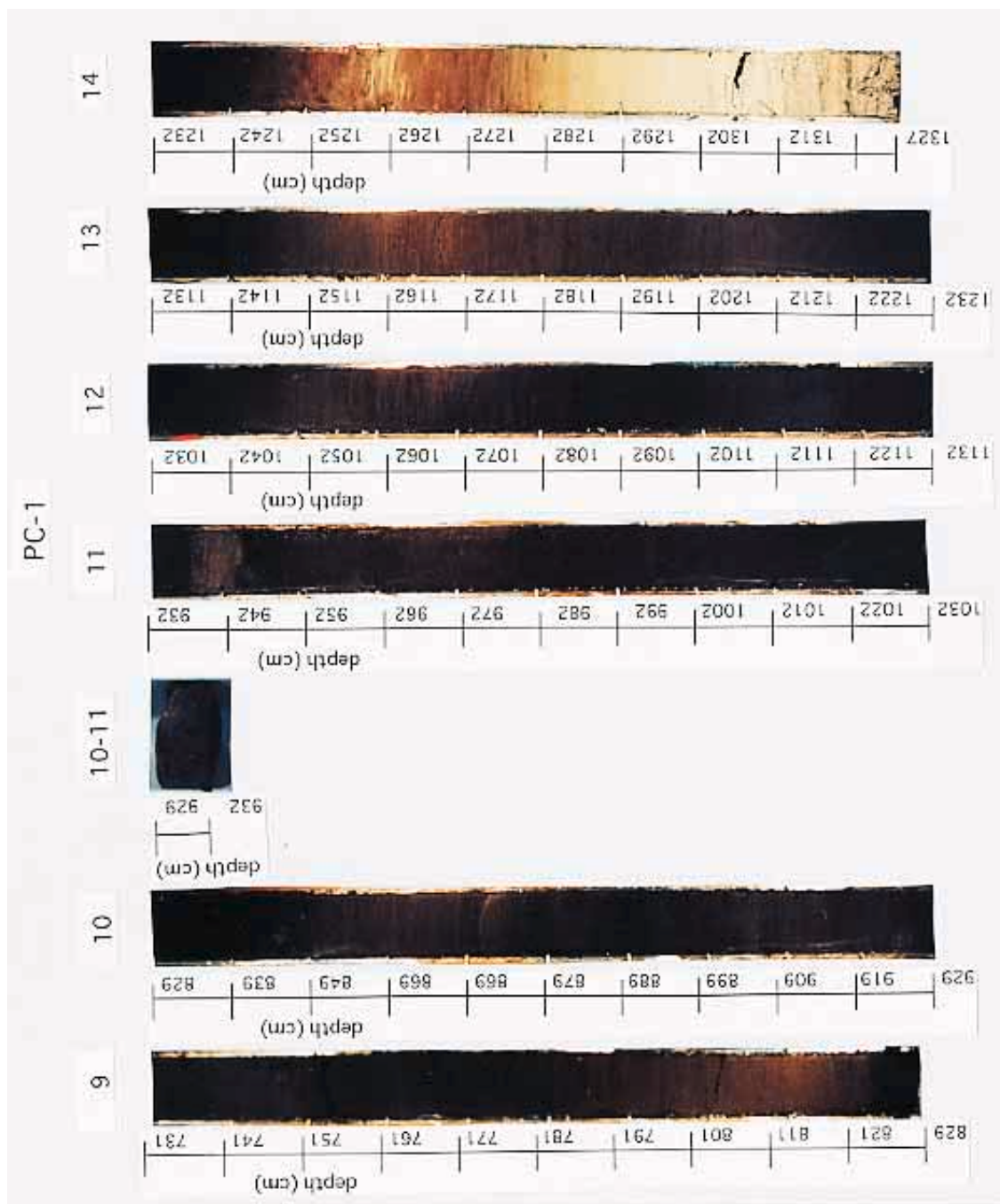


Fig. 3 (continued). Photograph of interval PC-1 Section 9-14, 731cm-1327cm.

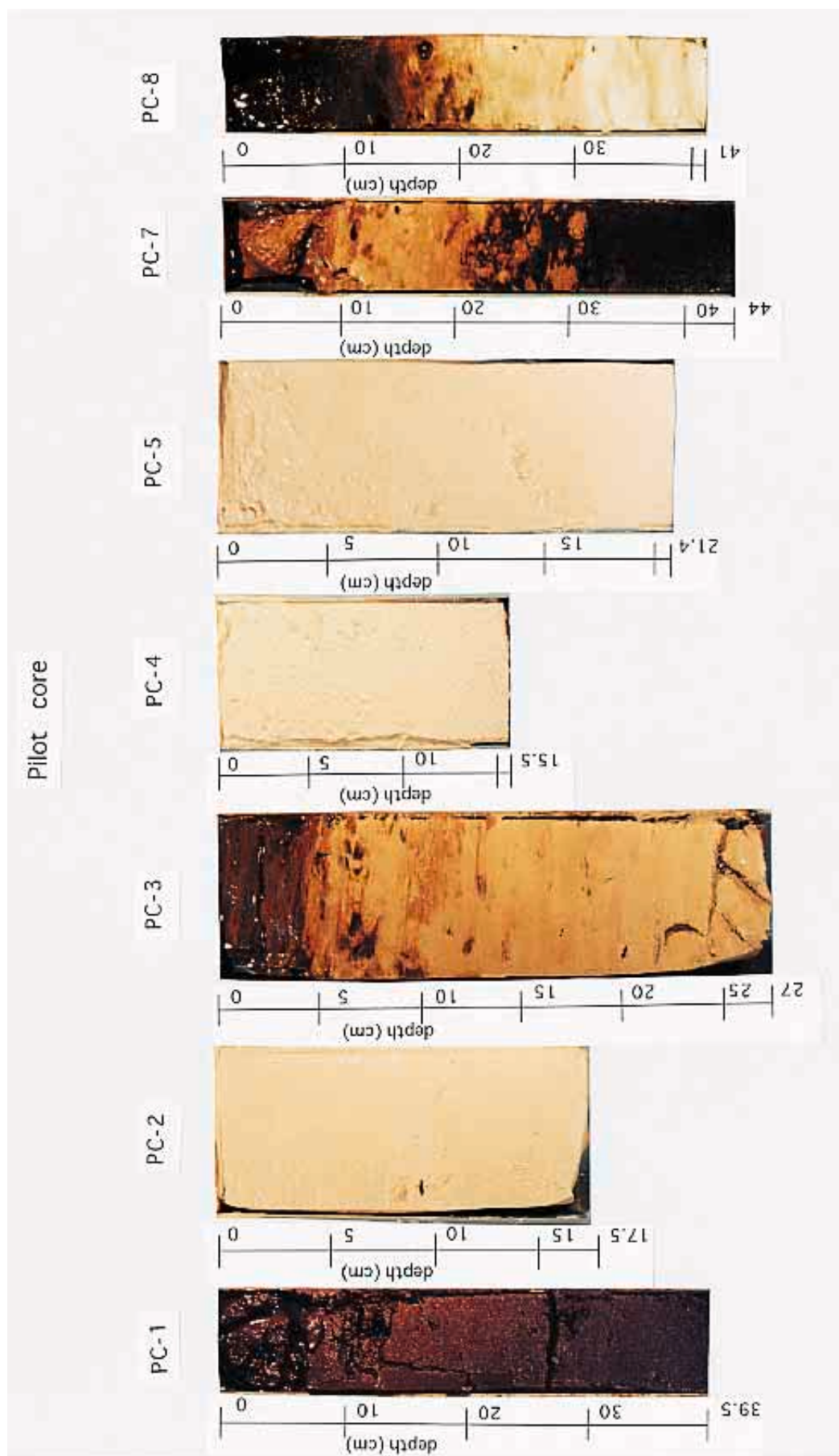


Fig. 4 Photograph of interval PC-1 (0cm-39.5cm), 2 (0cm-17.5cm), 3 (0cm-27cm), 4 (0cm-15.5cm), 5 (0cm-21.4cm), 7 (0cm-44cm) and 8 (0cm-41cm) Section PC (piston core).

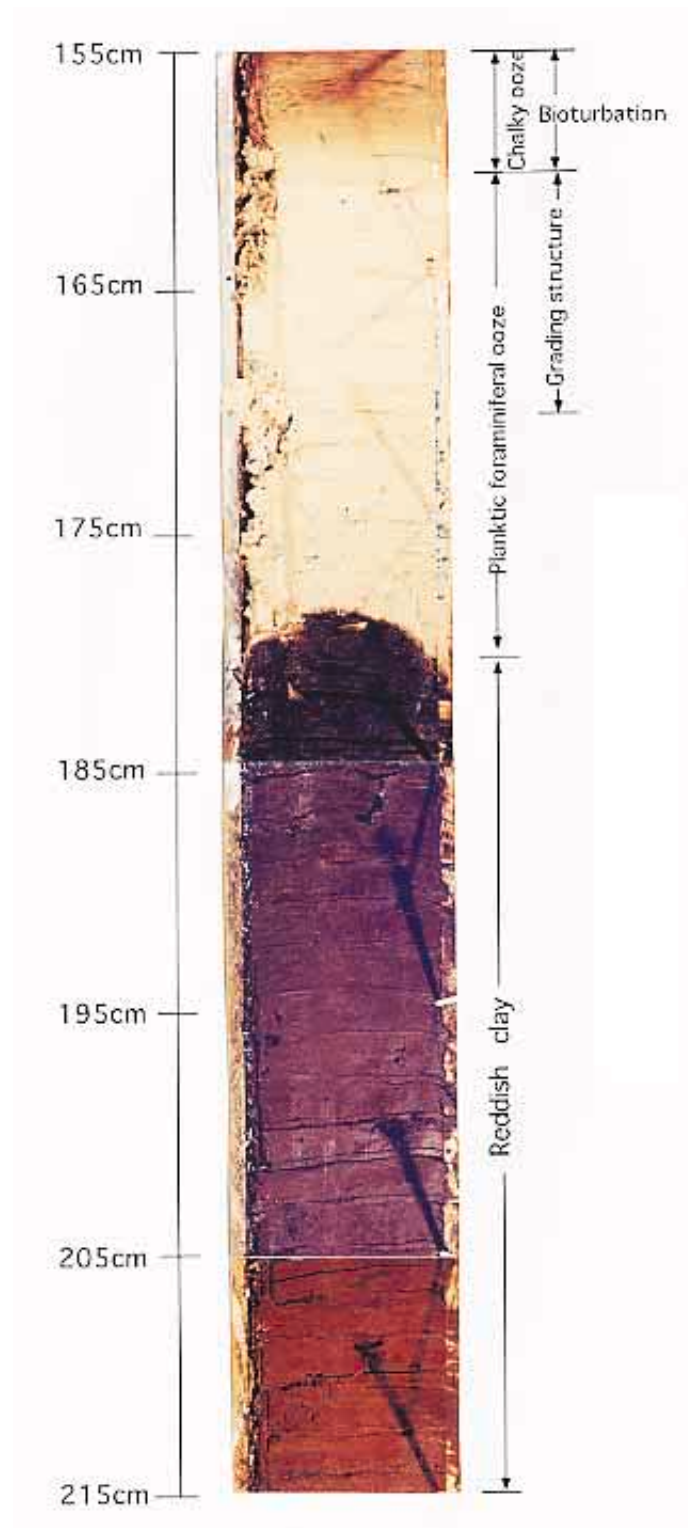


Fig. 5 Photograph of interval PC-1 Section 3, 155cm-215cm, showing turbiditic layer.

Core catcher

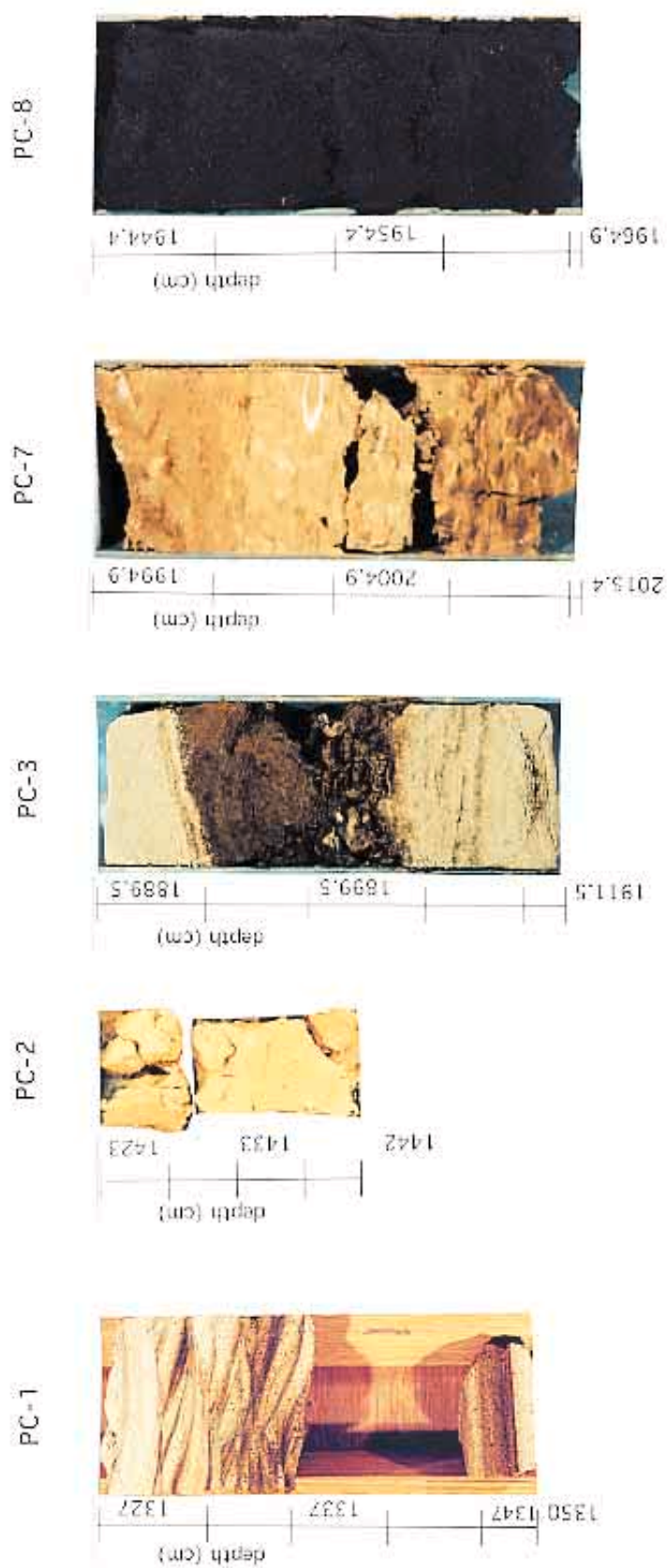


Fig. 6 Photograph of interval PC-1 (1327cm-1350cm), 2 (1423cm-1442cm), 3 (1889.5cm-1911.5cm), 7 (1994.9cm-2015.4cm) and 8 (1944.4cm-1964.9cm) Section CC (core catcher).

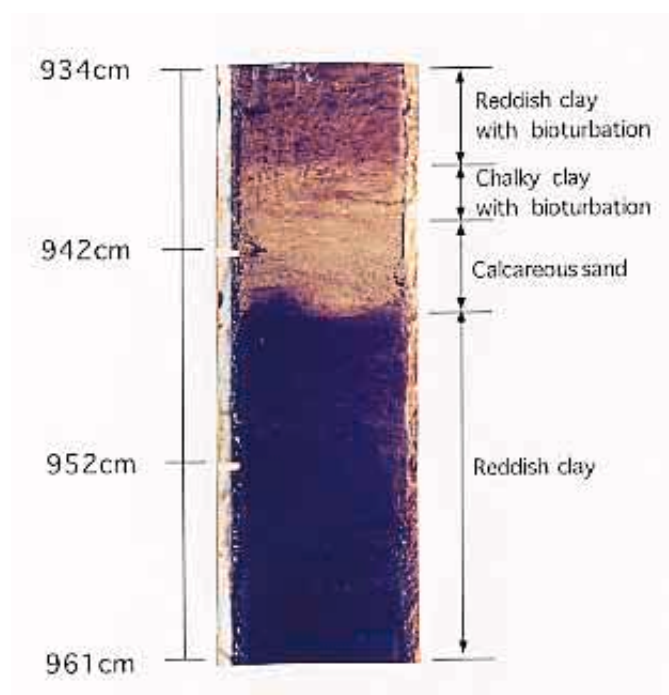


Fig. 7 Photograph of interval PC-1 Section 10, 934cm-961cm, showing bioturbation.

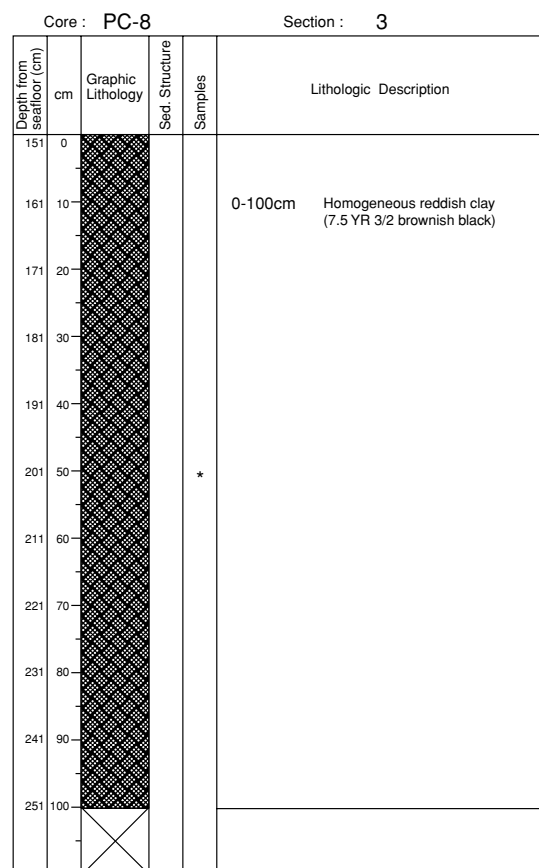
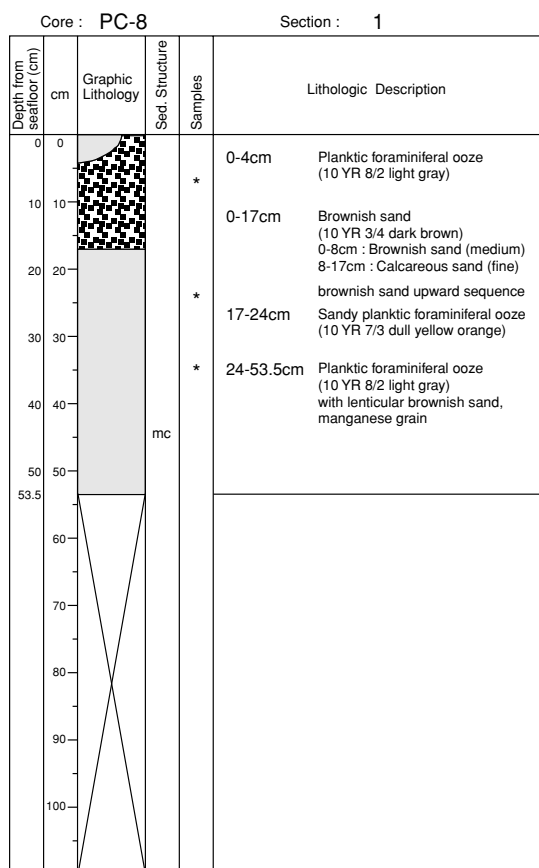
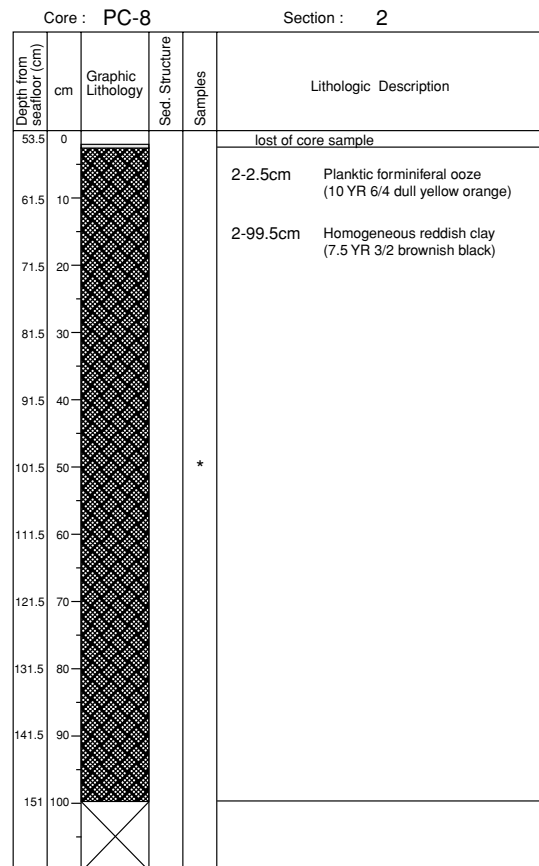
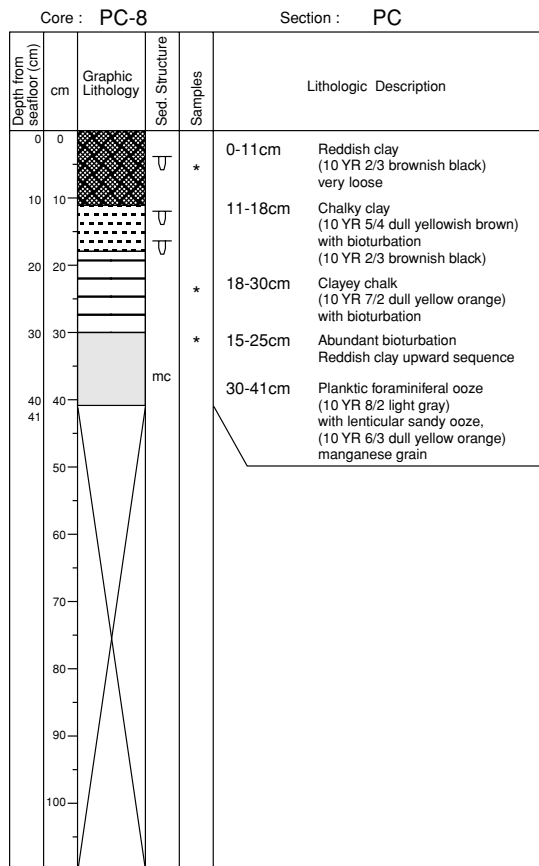


Fig. 8 Generalized summary of the lithology, structure of PC-8.

Core : PC-8		Section : 4			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
251	0		U	*	0-100cm Homogeneous reddish clay (7.5 YR 3/2 brownish black)
261	10				
271	20				19-20cm Bioturbation
281	30				
291	40				37-43cm abundant bioturbation (10 YR 5/4 dull yellowish brown)
301	50				
311	60				
321	70				
331	80				
341	90				94-96cm bioturbation
351	100				

Core : PC-8		Section : 6			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
450.5	0		U	*	0-99.5cm Homogeneous reddish clay (7.5 YR 3/2 brownish black)
460.5	10				
470.5	20				
480.5	30				
490.5	40				
500.5	50				
510.5	60				
520.5	70				66-70cm trace fossil filled clayey chalk (10 YR 5/4 dull yellowish brown)
530.5	80				
540.5	90				
550	100				

Core : PC-8		Section : 5			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
351	0		U	*	0-99.5cm Homogeneous reddish clay (7.5 YR 3/2 brownish black)
361	10				
371	20				16cm dark brownish clay thin layer (10 YR 2/3 brownish black)
381	30				
391	40				
401	50				
411	60				
421	70				
431	80				
441	90				
450.5	100				

Core : PC-8		Section : 7			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
550	0		U	*	0-100cm Homogeneous reddish clay (7.5 YR 3/2 brownish black)
560	10				
570	20				
580	30				
590	40				38-48cm bioturbation
600	50				
610	60				
620	70				
630	80				
640	90				
650	100				

Fig. 8 (continued).

Core : PC-8		Section : 8			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
650	0			*	0-100cm Homogeneous reddish clay (7.5YR 3/2 brownish black)
660	10				
670	20				
680	30				
690	40				
700	50				
710	60				
720	70				
730	80				
740	90				
750	100				

Core : PC-8		Section : 10			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
850	0			*	0-100cm Homogeneous reddish clay (7.5YR 3/2 brownish black)
860	10				
870	20				
880	30				
890	40				
900	50				
910	60				
920	70				
930	80				
940	90				
950	100				

Core : PC-8		Section : 9			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
750	0			*	0-100cm Homogeneous reddish clay (10YR 3/2 brownish black)
760	10				
770	20				
780	30				26-27cm mottles filled brownish clay (10YR 4/4 brown)
790	40				
800	50				
810	60				
820	70				
830	80				
840	90				
850	100				

Core : PC-8		Section : 11			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
950	0			*	0-100cm Homogeneous reddish clay (7.5YR 3/2 brownish black)
960	10				
970	20				
980	30				29-31cm trace fossil filled brownish clay (10YR 4/4 brown)
990	40				
1000	50				
1010	60				
1020	70				69-72cm trace fossil filled brownish clay (10YR 4/4 brown)
1030	80				
1040	90				
1050	100				98-100cm trace fossil filled brownish clay (10YR 4/4 brown)

Fig. 8 (continued).

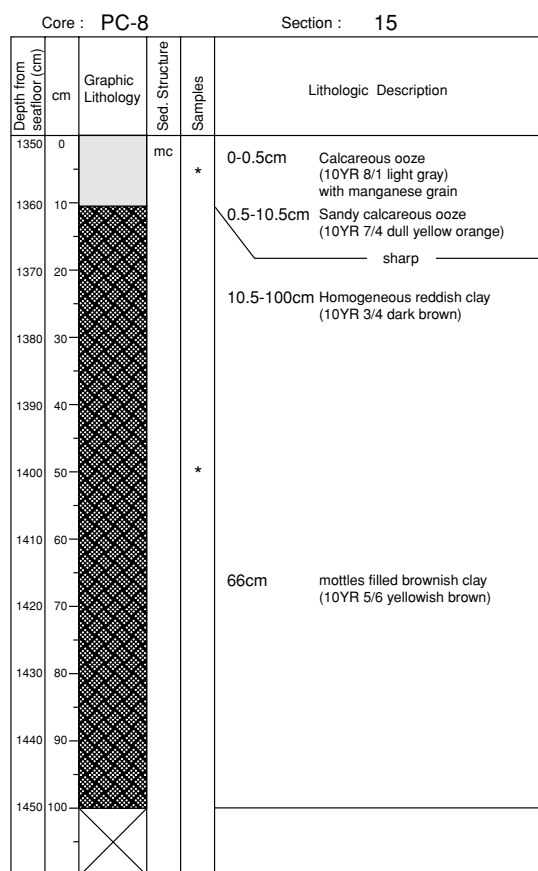
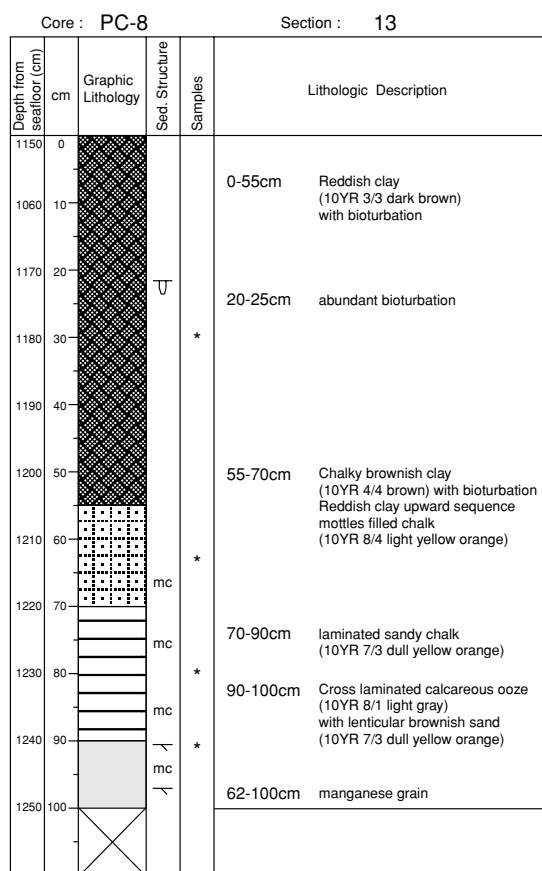
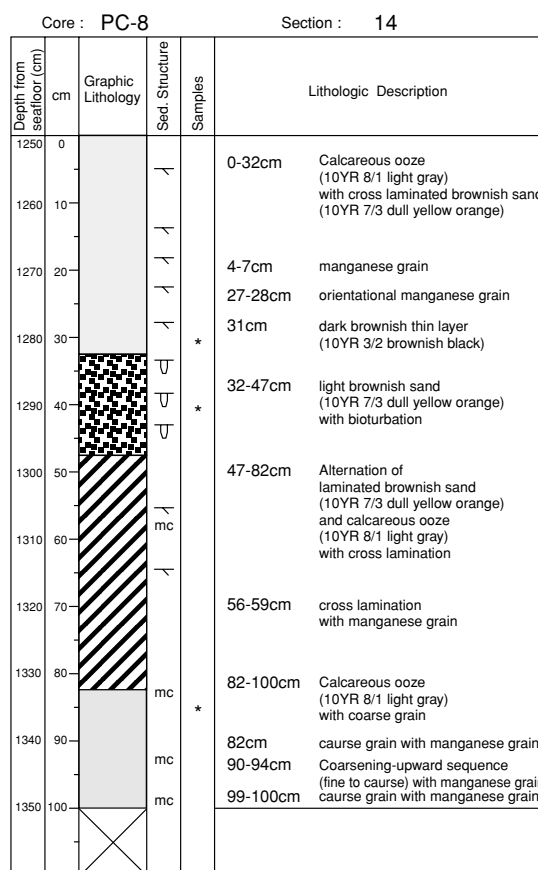
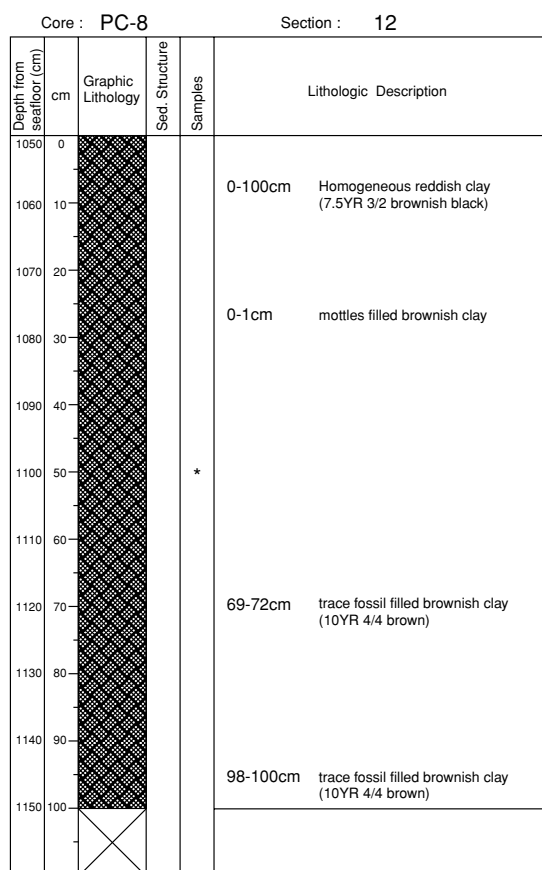


Fig. 8 (continued).

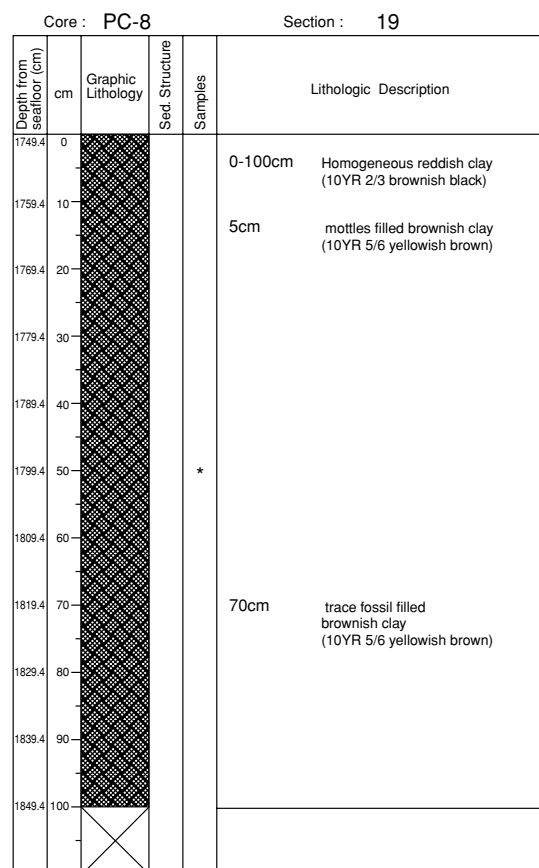
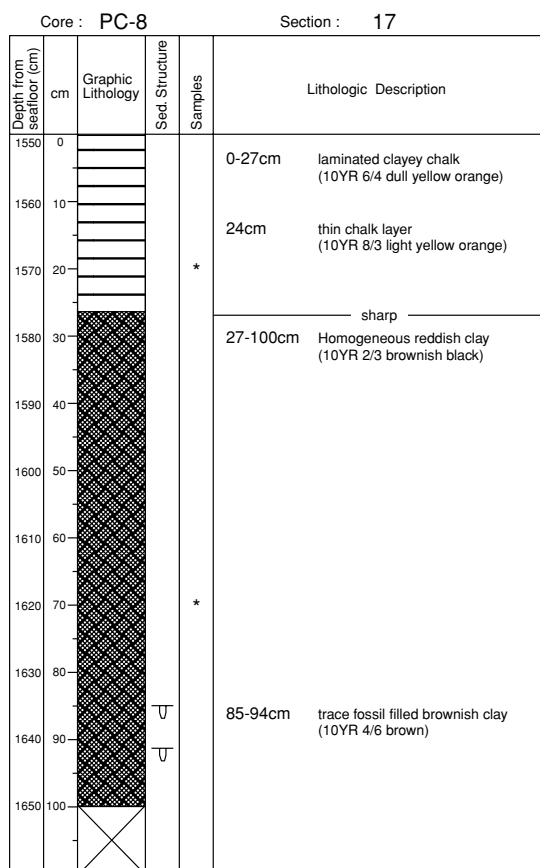
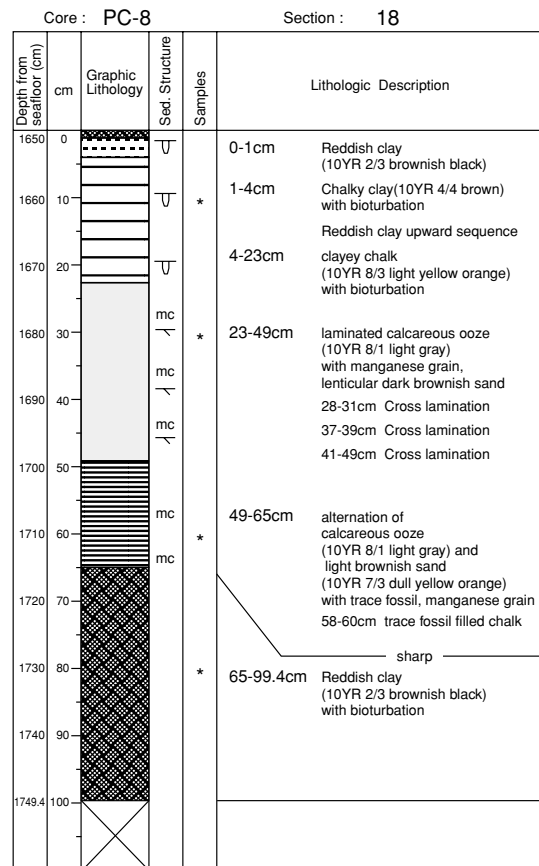
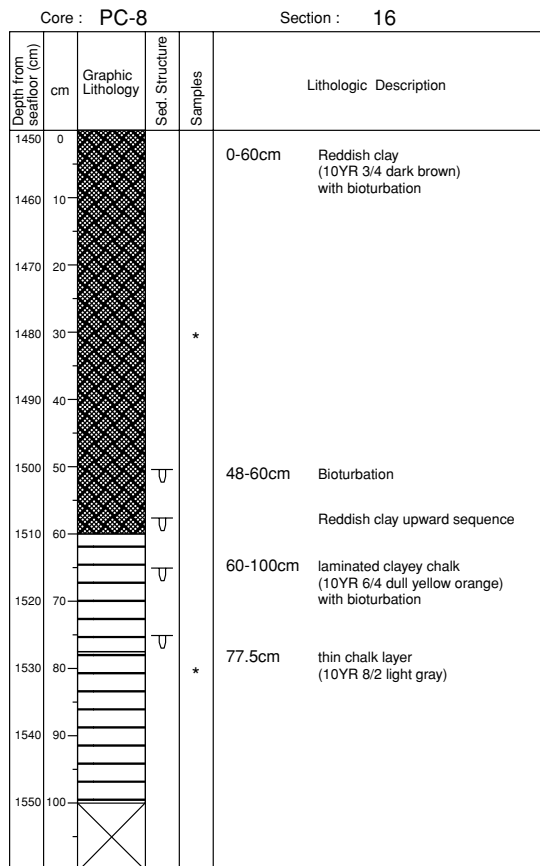


Fig. 8 (continued).

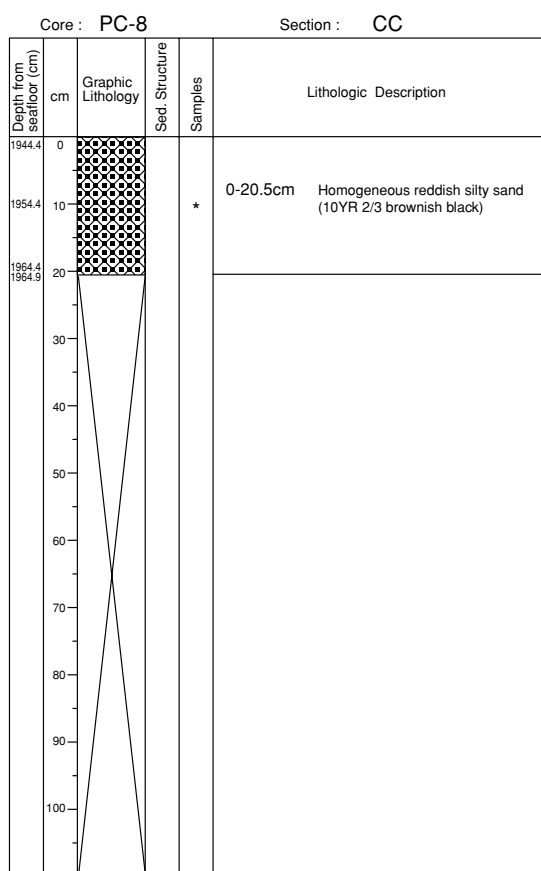
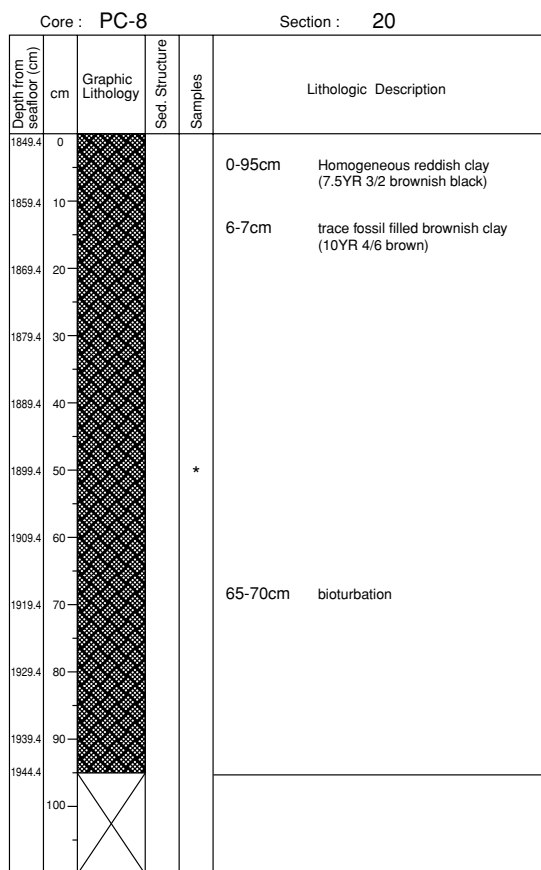


Fig. 8 (continued).

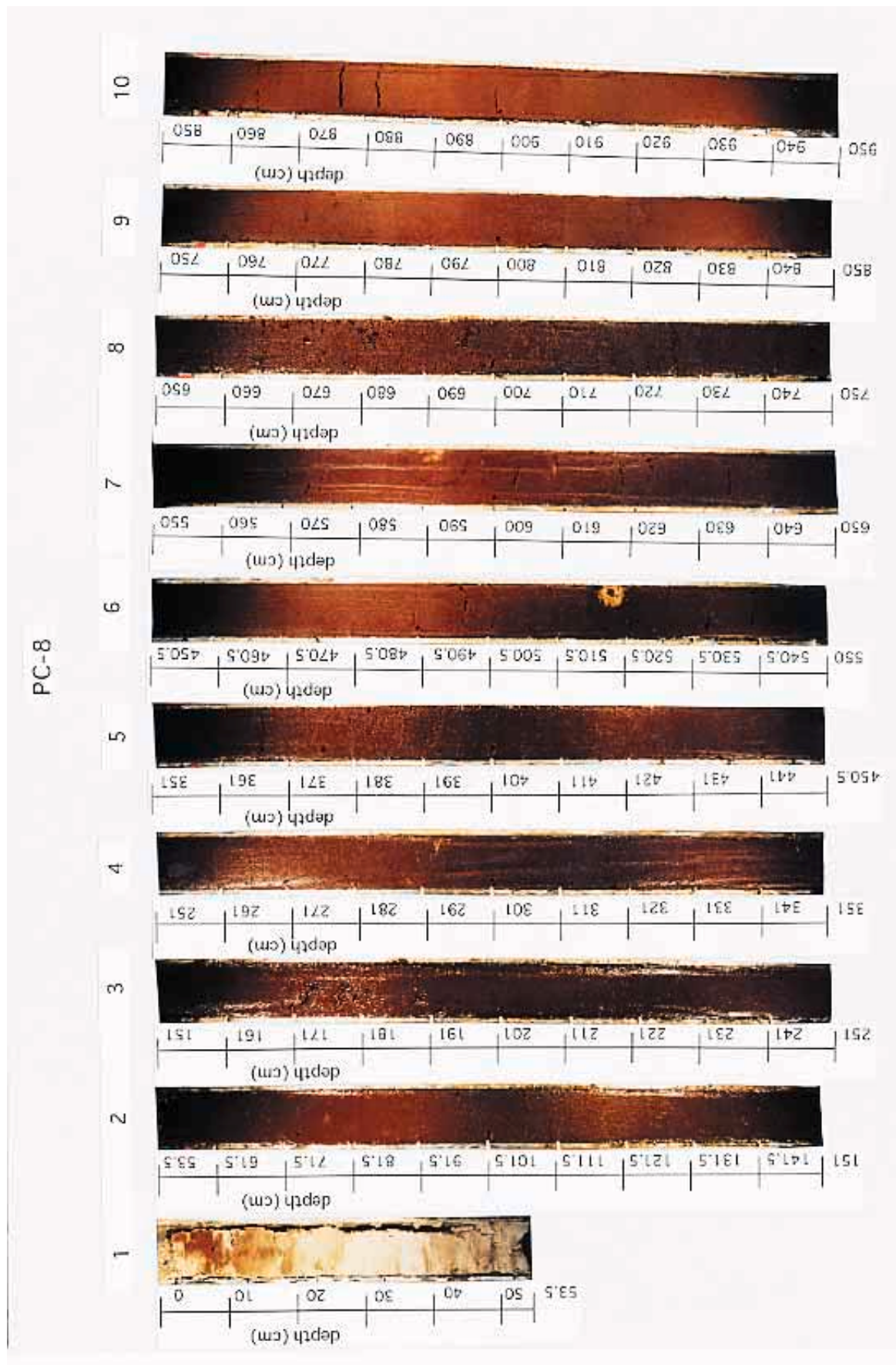


Fig. 9 Photograph of interval PC-8 Section 1-10, 0cm-950cm.

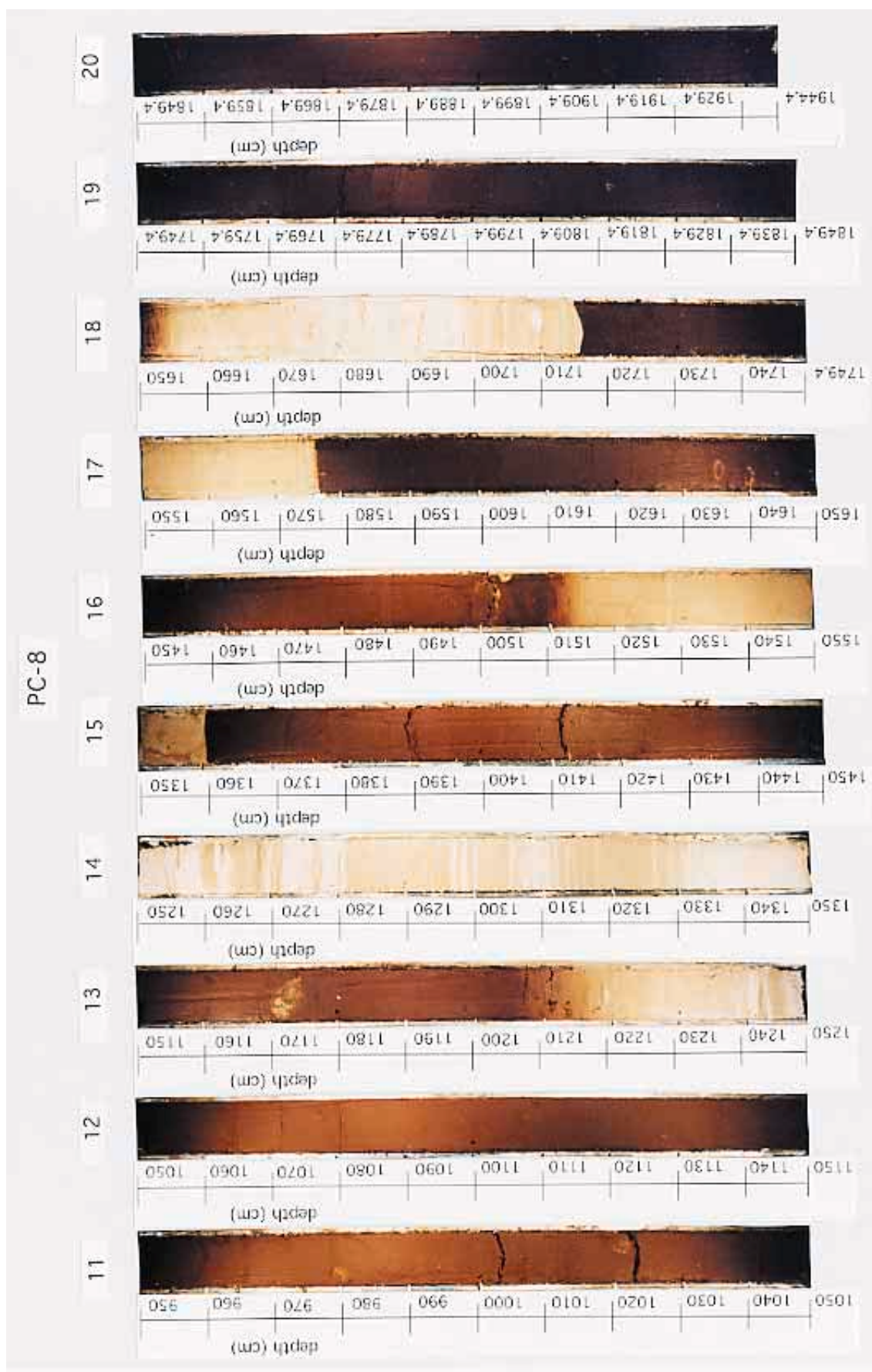


Fig. 9 (continued). Photograph of interval PC-8 Section 11-20, 950cm-1944.4cm.

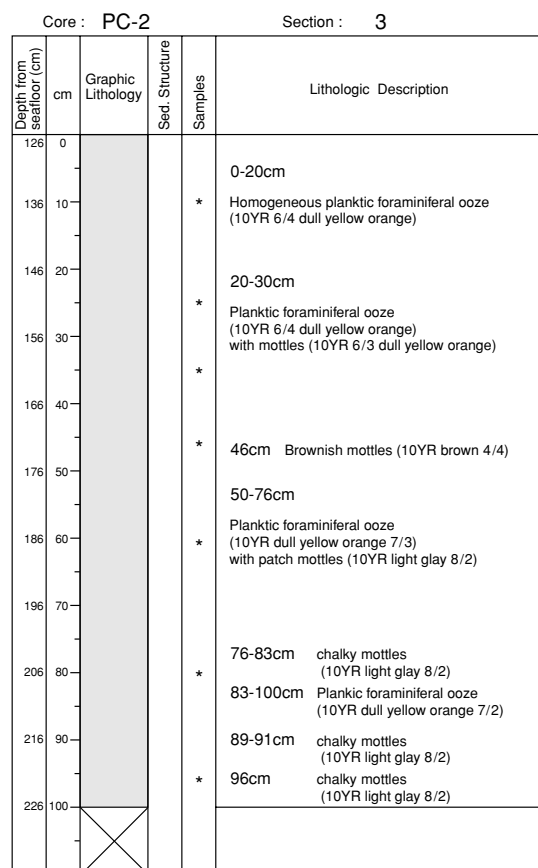
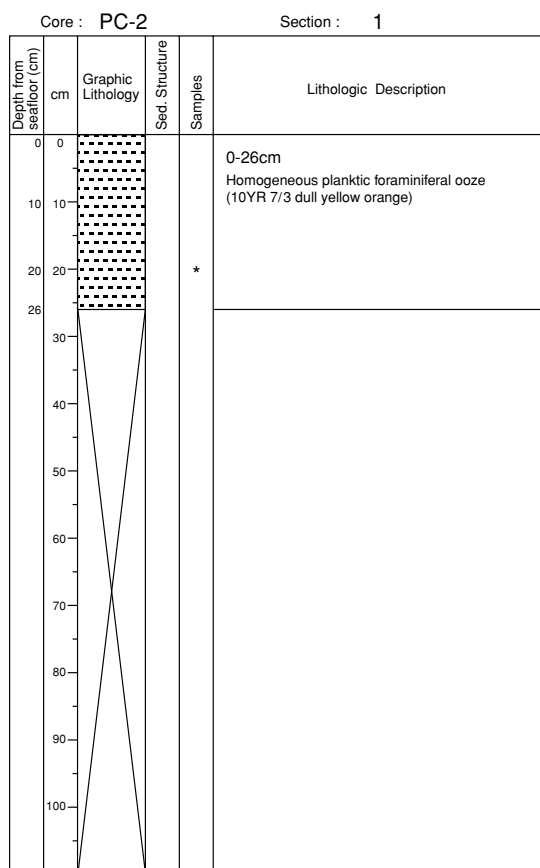
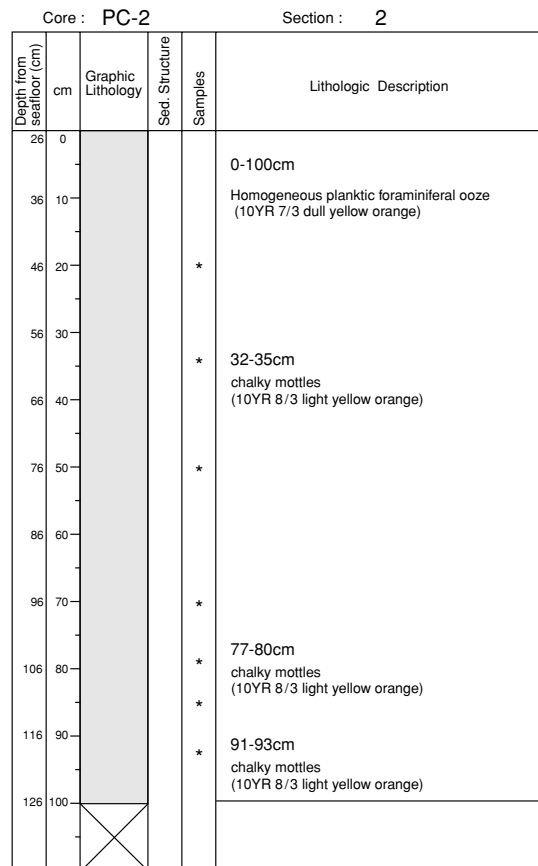
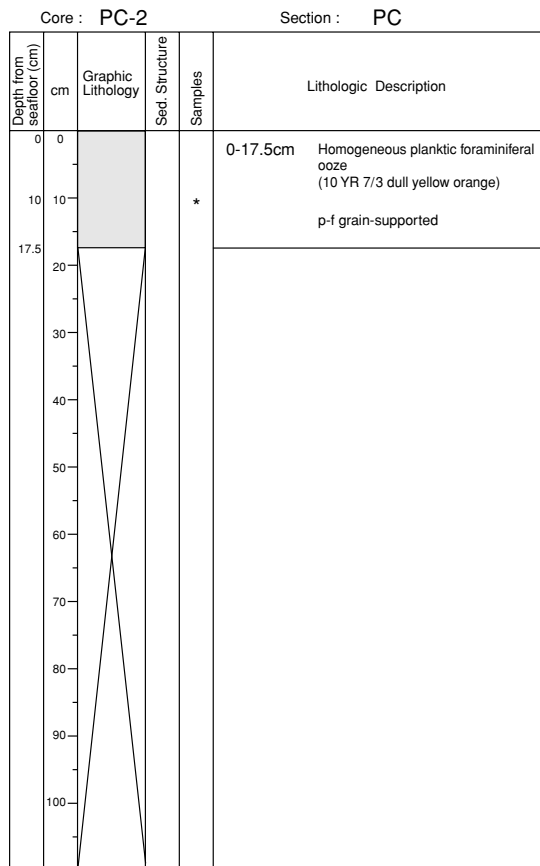


Fig.10 Generalized summary of the lithology, structure of PC-2.

Core : PC-2		Section : 4			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
226	0		U		0-38cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange)
236	10			*	
246	20				20cm Brownish mottles (10YR 6/4 dull yellow brown)
256	30				
266	40			*	38-70cm Planktic foraminiferal ooze (10YR 6/3 dull yellow orange)
276	50			*	38-48cm Bioturbation (10YR 8/3 light yellow orange)
286	60				58cm chalky mottles (10YR 8/3 light yellow orange)
296	70				60cm chalky lens (10YR 8/3 light yellow orange)
306	80			*	70-83cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange)
316	90			*	83-100cm Planktic foraminiferal ooze (10YR 6/4 dull yellow orange)
326	100				88-90cm chalky mottles (10YR 8/3 light yellow orange)

Core : PC-2		Section : 6			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
426	0				1-100cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange)
436	10			*	
446	20				
456	30				
466	40				46cm chalky mottles (10YR 8/2 light gray)
476	50			*	
486	60				
496	70				
506	80				
516	90			*	
526	100				

Core : PC-2		Section : 5			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
326	0				0-100cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange) with chalky mottles patch (10YR 8/2 light gray)
336	10			*	
346	20				
356	30				
366	40				
376	50			*	47cm chalky mottles
386	60				60cm chalky mottles
396	70				70-72cm chalky mottles
406	80				78-80cm chalky mottles
416	90			*	
426	100				

Core : PC-2		Section : 7			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
526	0				1-37cm Planktic foraminiferal ooze (10YR 6/3 dull yellow orange) with chalky matrix
536	10			*	
546	20				
556	30				
566	40			*	37-100cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange) p-f grain-supported
576	50				
586	60				
596	70				
606	80			*	Planktic foraminiferal ooze (10YR 8/3 light yellow orange)
616	90				
626	100				

Fig.10 (continued).

Core : PC-2		Section : 8			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
624	0				lost of core sample
633	10			*	1-41cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange) with chalky matrix
643	20			*	11-15cm Chalky mottles (10YR 8/2 light gray)
653	30				26-28cm Chalky mottles
663	40				41-60cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange) with chalky matrix
673	50			*	45cm Chalky mottles
683	60				60-100cm Planktic foraminiferal ooze (10YR 8/3 dull yellow orange) with chalky matrix
693	70				70cm Chalky mottles
703	80				
713	90			*	
723	100				

Core : PC-2		Section : 10			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
823	0				0-30cm Planktic foraminiferal ooze with chalky matrix (10YR 7/3 dull yellow orange)
833	10			*	
843	20				24-26cm mottles filled chalk (10YR 8/2 light gray)
853	30				29-30cm mottles filled chalk (10YR 8/2 light gray)
863	40				30-100cm Planktic foraminiferal ooze (30-50cm:10YR 7/3 dull yellow orange 50-100cm:10YR 8/2 light gray)
873	50			*	45cm mottles filled chalk (10YR 8/2 light gray)
883	60				49cm mottles filled chalk (10YR 8/2 light gray)
893	70				73cm mottles filled chalk (10YR 8/2 light gray)
903	80				76cm mottles filled chalk (10YR 8/2 light gray)
913	90			*	93cm mottles filled chalk (10YR 8/2 light gray)
923	100				98cm mottles filled chalk (10YR 8/2 light gray)

Core : PC-2		Section : 9			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
723	0				0-45cm Planktic foraminiferal ooze with chalky matrix (0-24cm:10YR 7/3 dull yellow orange 24-30cm:10YR 6/3 dull yellow orange 30-45cm:10YR 7/3 dull yellow orange)
733	10			*	
743	20			*	
753	30			*	34.5cm Chalky mottles (10YR 8/3 light yellow orange)
763	40				44cm mottles (10YR 8/3 light yellow orange)
773	50				45-100cm Planktic foraminiferal ooze (10YR 8/3 light yellow orange)
783	60				
793	70			*	
803	80				77cm mottles
813	90				
823	100				

Core : PC-2		Section : 11			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
923	0				0-62cm Planktic foraminiferal ooze with chalky matrix (10YR 7/3 dull yellow orange)
933	10			*	
943	20				
953	30				
963	40				
973	50			*	59cm mottles (10YR 8/2 light gray)
983	60				62-100cm Planktic foraminiferal ooze with chalky matrix (10YR 8/2 light gray)
993	70				64cm mottles (10YR 7/2 dull yellow orange)
1003	80				
1013	90			*	
1023	100				

Fig.10 (continued).

Core : PC-2		Section : 12			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1023	0				0-100cm Planktic foraminiferal ooze with chalky matrix (0-78cm:10YR 7/3 dull yellow orange 78-84cm:10YR 8/2 light gray 84-100cm:10YR 7/2 dull yellow orange)
1033	10			*	
1043	20				
1053	30				
1063	40				33cm mottles filled chalk (10YR 8/2 light gray)
1073	50			*	43-48cm mottles filled chalk (10YR 8/2 light gray)
1083	60				
1093	70				73cm mottles filled chalk (10YR 8/2 light gray)
1103	80			*	80-85cm Bioturbation (10YR 7/3 dull yellow orange)
1113	90			*	
1123	100				94-97cm mottles filled chalk (10YR 8/2 light gray)

Core : PC-2		Section : 14			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1223	0				0-100cm Planktic foraminiferal ooze with chalky matrix (0-20cm:10YR 7/3 dull yellow orange 20-26cm:10YR 8/3 light yellow orange 26-100cm:10YR 7/3 dull yellow orange)
1233	10			*	
1243	20			*	
1253	30				
1263	40				
1273	50			*	53cm mottles
1283	60				
1293	70				
1303	80				
1313	90			*	
1323	100				

Core : PC-2		Section : 13			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1123	0			*	0-80cm Planktic foraminiferal ooze with chalky matrix (0-8cm:10YR 7/2 dull yellow orange 8-15cm:10YR 7/3 dull yellow orange 15-30cm:10YR 8/2 light gray 30-40cm:10YR 7/3 dull yellow orange 40-80cm:10YR 8/3 light yellow orange)
1133	10			*	
1143	20			*	
1153	30			*	
1163	40				
1173	50				
1183	60			*	
1193	70				
1203	80				80-100cm Chalky clay with Planktic foraminifera (10YR 7/2 dull yellow orange)
1213	90			*	93cm mottles filled chalk
1223	100				

Core : PC-2		Section : 15			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1323	0				0-100cm Planktic foraminiferal ooze with chalky matrix (0-27cm:10YR 7/3 dull yellow orange 27-54cm:10YR 5/4 dull yellowish brown 54-100cm:10YR 6/4 dull yellow orange)
1333	10			*	
1343	20				
1353	30				
1363	40				38cm mottles (10YR 4/4 brown)
1373	50			*	
1383	60				58cm mottles (10YR 8/2 light gray)
1393	70				74cm mottles (10YR 8/2 light gray)
1403	80				80cm mottles (10YR 8/2 light gray)
1413	90			*	90cm mottles (10YR 8/2 light gray)
1423	100				

Fig.10 (continued).

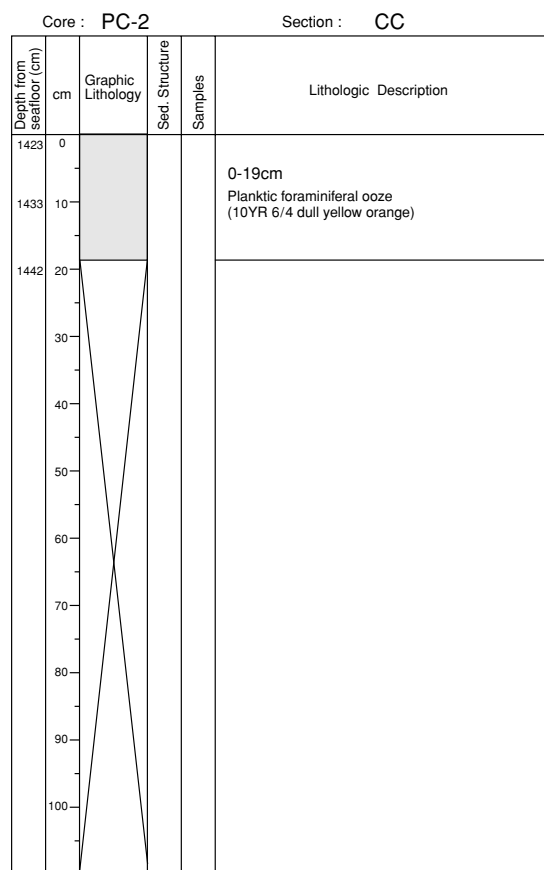


Fig.10 (continued).

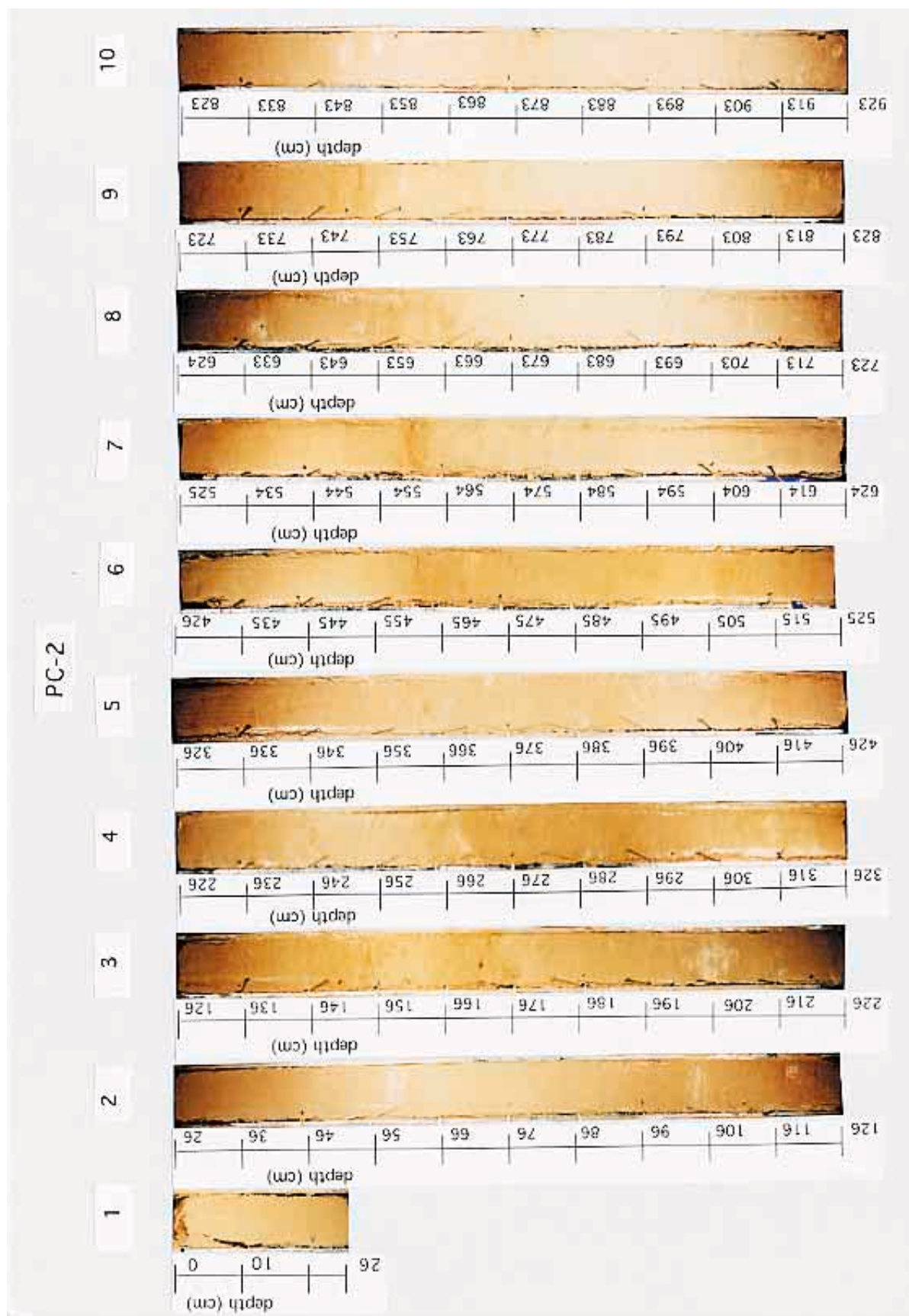


Fig.11 Photograph of interval PC-2 Section 1-10, 0cm-923cm.

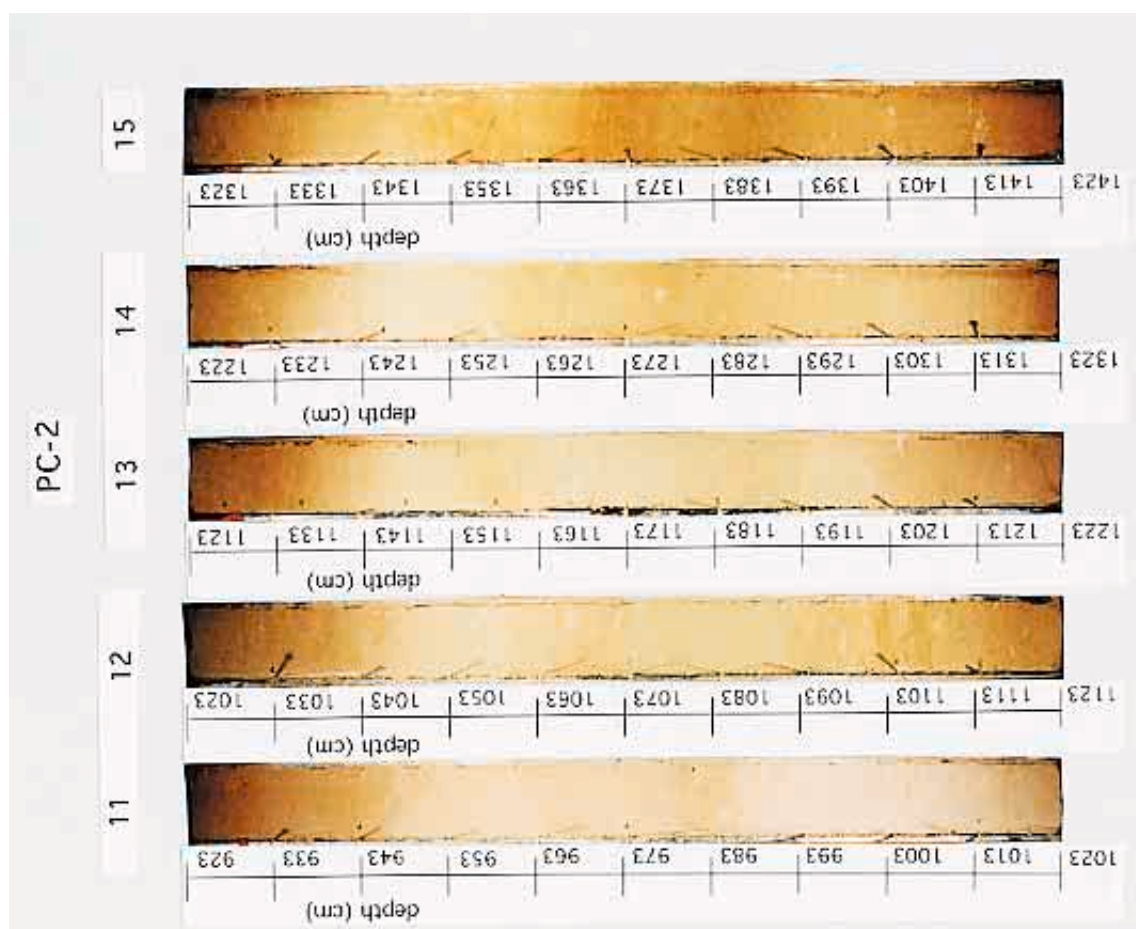


Fig.11 (continued). Photograph of interval PC-2 Section 11-15, 923cm-1423cm.

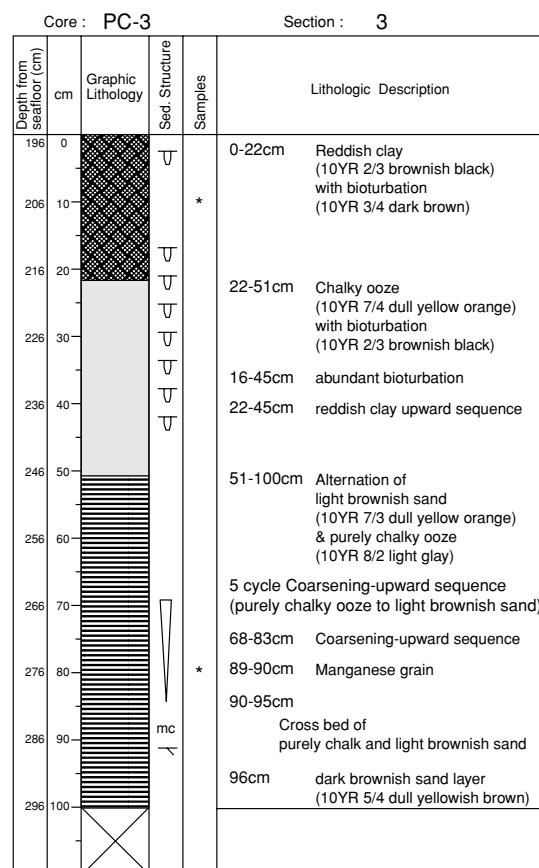
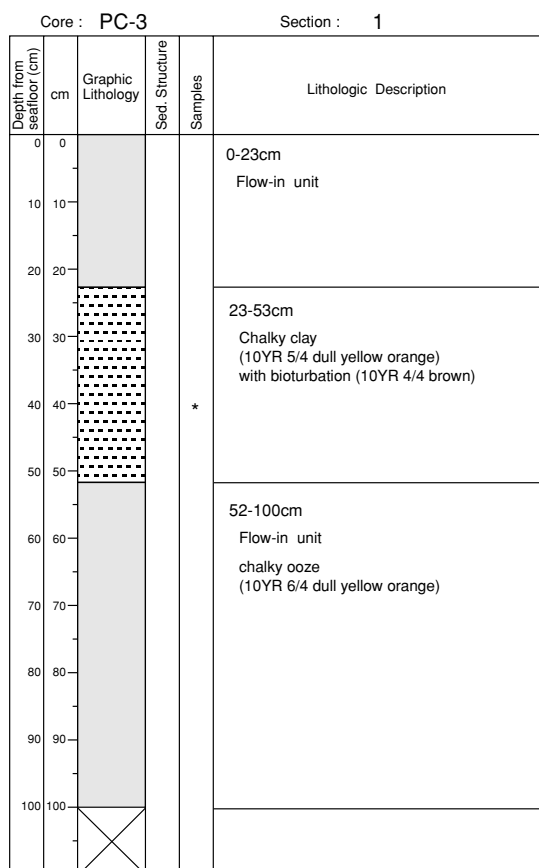
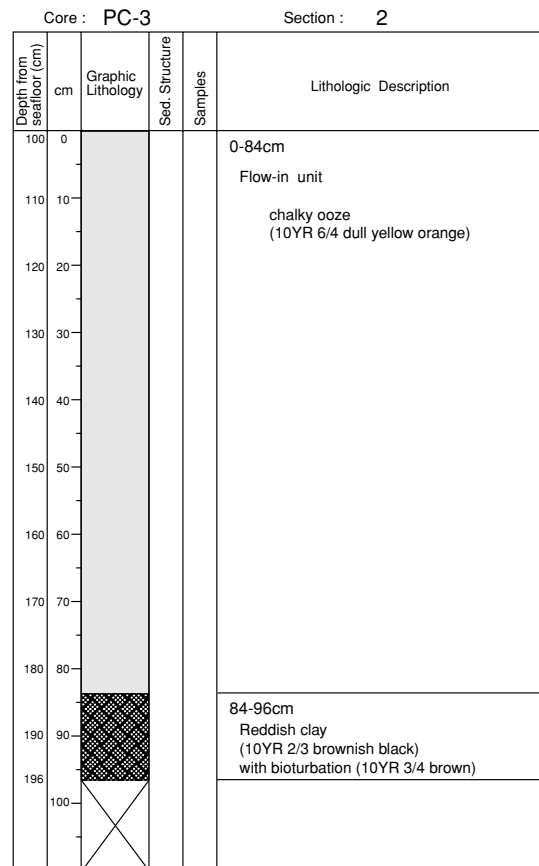
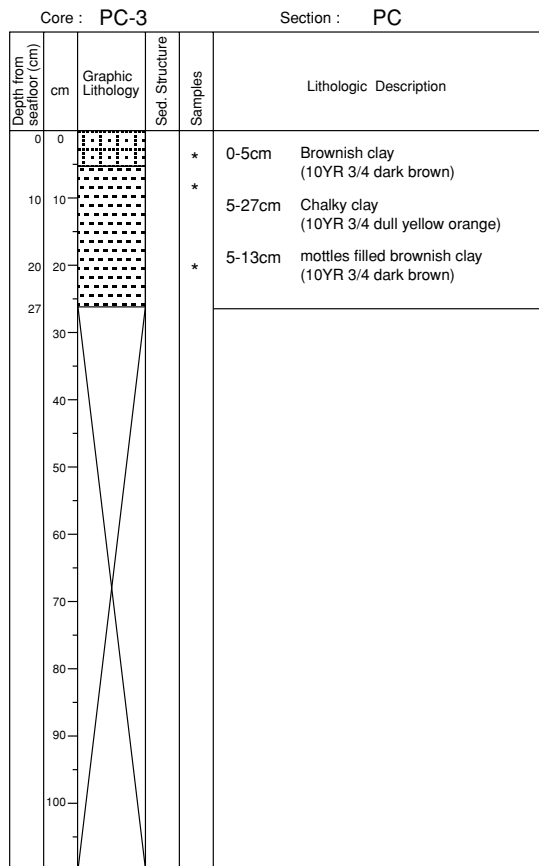


Fig.12 Generalized summary of the lithology, structure of PC-3.

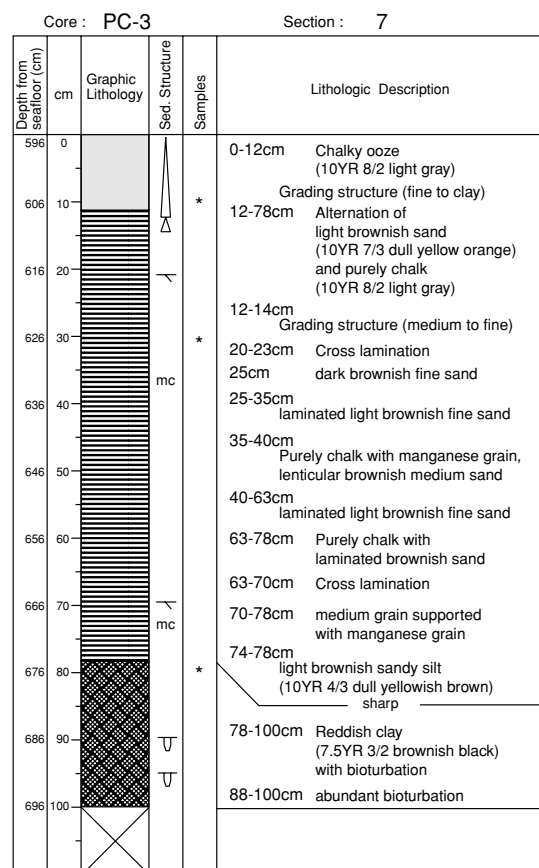
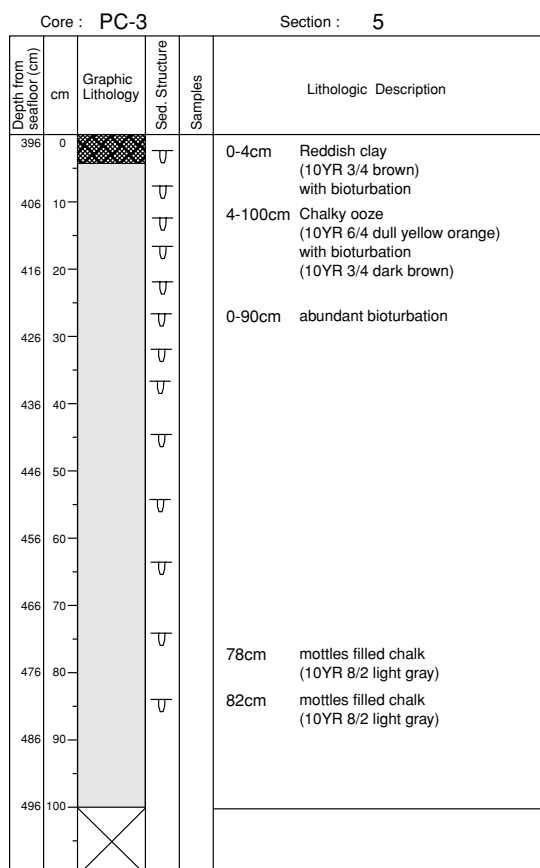
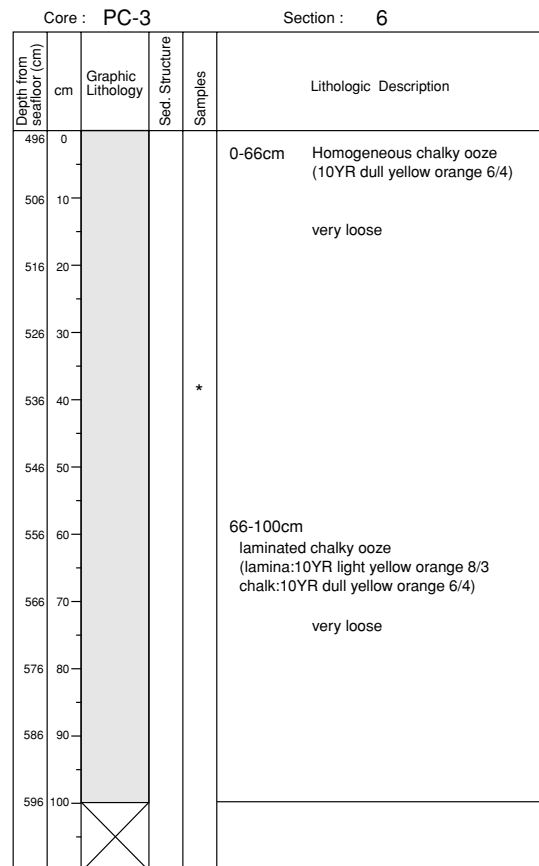
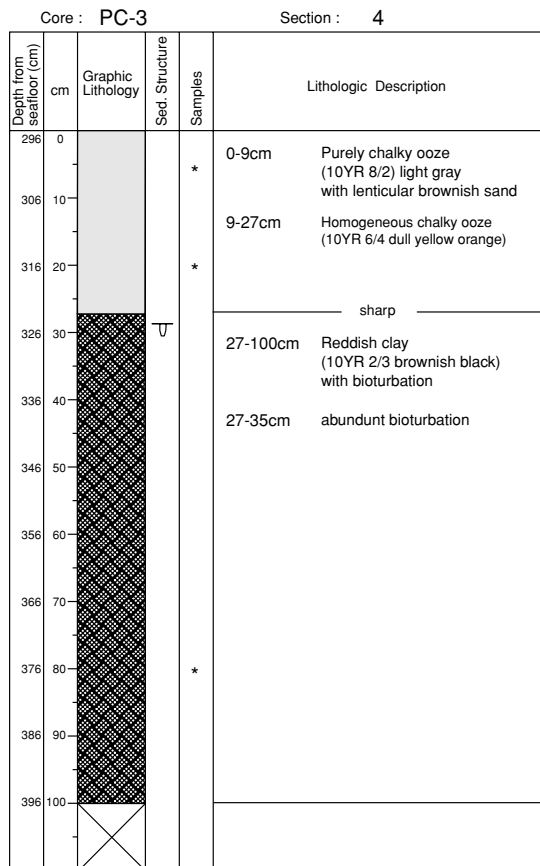


Fig.12 (continued).

Core : PC-3		Section : 8			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
696	0				0-100cm Chalky ooze (10YR 6/4 dull yellow orange) with bioturbation
706	10				0-16cm abundant bioturbation bioturbation filled light brownish clay (10YR 5/4 dull yellowish brown)
716	20				
726	30				16-100cm bioturbation filled dark brownish clay (10YR 3/4 dark brown)
736	40				
746	50				*
756	60				
766	70				
776	80				
786	90				
796	100				

Core : PC-3		Section : 10			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
896	0				0-99cm Homogeneous chalky ooze (10YR 6/4 dull yellow orange)
906	10				
916	20				
926	30				
936	40				
946	50				
956	60				
966	70				
976	80				
986	90				
996	100				

Core : PC-3		Section : 9			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
796	0				0-100cm Homogeneous chalky ooze (10YR 6/4 dull yellow orange) with bioturbation
806	10				3-9cm mottles filled brownish clay (10YR 3/4 dark brown)
816	20				23cm mottles filled brownish clay (10YR 3/4 dark brown)
826	30				
836	40				
846	50				
856	60				
866	70				
876	80				
886	90				
896	100				

Core : PC-3		Section : 11			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
996	0				0-64cm Homogeneous chalky ooze (10YR 6/4 dull yellow orange) very loose
1006	10				
1016	20				
1026	30				
1036	40				
1046	50				
1056	60				
1066	70				64-73cm laminated chalky ooze (lamina:10YR 7/4 dull yellow orange chalk:10YR 6/4 dull yellow orange) very loose
1076	80				
1086	90				73-100cm Homogeneous chalky ooze (10YR 6/4 dull yellow orange) very loose
1096	100				

Fig.12 (continued).

Core : PC-3		Section : 12		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
1095	0		*	0-5.5cm Homogeneous chalky ooze (10YR 6/3 dull yellow orange)
1105	10			5.5-24cm Purely chalky ooze (10YR 8/3 light yellow orange) with lenticular brownish clay (10YR 6/4 dull yellow orange)
1115	20			24-98cm laminated chalky ooze (10YR 6/4 dull yellow orange) with dark brownish clay
1125	30			
1135	40			
1145	50			
1155	60			
1165	70			
1175	80			
1185	90			95-98cm Purely chalky ooze (10YR 7/3 dull yellow orange)
1193	100			

Core : PC-3		Section : 14		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
1293	0		*	0-17cm laminated chalky light brownish sand (10YR 6/3 dull yellow orange) with dark brownish clay clast
1303	10			14-16cm lenticular planktic foraminiferal ooze
1313	20			17-19cm Planktic foraminiferal ooze (10YR 8/2 light gray) with manganese grain, dark brownish clay clast
1323	30			19-100cm Homogeneous chalky ooze (10YR 6/4 dull yellow orange)
1333	40			
1343	50			
1353	60			
1363	70			
1373	80			86-87cm Planktic foraminiferal ooze (10YR 8/2 light gray)
1383	90			93.5-94.5cm Planktic foraminiferal ooze (10YR 8/2 light gray)
1393	100			80-100cm laminated chalky light yellowish sand with planktic foraminifera (10YR 8/3 light yellow orange)

Core : PC-3		Section : 13		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
1193	0		*	0-1.5cm Purely chalk (10YR 8/3 dull yellow orange)
1203	10			1.5-49cm laminated chalky ooze (10YR 6/4 light yellow orange) with brownish silt clastic grain
1213	20			
1223	30			
1233	40			
1243	50			49-54.5cm Planktic foraminiferal ooze (10YR 8/1 light gray) p-f grain-supported
1253	60			54.5-100cm laminated chalky light brownish sand (10YR 6/3 dull yellow orange) with brownish silt clastic grain
1263	70			86-87cm Planktic foraminiferal ooze (10YR 8/2 light gray)
1273	80			93.5-94.5cm Planktic foraminiferal ooze (10YR 8/2 light gray)
1283	90			80-100cm laminated chalky light yellowish sand with planktic foraminifera (10YR 8/3 light yellow orange)
1293	100			

Core : PC-3		Section : 15		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
1393	0		*	0-100cm Homogeneous chalky ooze (10YR 6/4 dull yellow orange)
1403	10			
1413	20			
1423	30			
1433	40			
1443	50			
1453	60			
1463	70			
1473	80			
1483	90			
1493	100			

Fig.12 (continued).

Core : PC-3		Section : 16			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1493	0				0-100cm Homogeneous chalky ooze (10YR 6/4 dull yellow orange)
1503	10				
1513	20				
1523	30				
1533	40				
1543	50				
1553	60				
1563	70				
1573	80				
1583	90				
1593	100				78-80cm laminated chalky ooze (10YR 7/3 dull yellow orange)
1793					

Core : PC-3		Section : 18			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1693	0				0-26.5cm light brownish sand (10YR 6/4 dull yellow orange) with interbedded planktic foraminiferal ooze (10YR 8/3 light yellow orange) dark brownish clay (10YR 2/3 brownish black)
1703	10				
1713	20				
1723	30				
1723	30				4 cycle of Coarsening-upward sequence sharp
1733	40				
1743	50				
1753	60				
1763	70				26.5-36cm Chalky clay (10YR 4/4 brown) with bioturbation (10YR 3/4 dark brown)
1773	80				
1783	90				
1793	100				
1793	100				36-68cm Brownish clay (10YR 3/4 dark brown) with bioturbation
1793.5					
1793	100				68-100.5cm Chalky ooze (10YR 7/3 dull yellow orange) with bioturbation (10YR 3/4 dark brown)
1793.5					

Core : PC-3		Section : 17			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1593	0				0-12cm Homogeneous chalky ooze (10YR 6/4 dull yellow orange)
1603	10				
1613	20				12-51cm Alternation of chalky ooze (10YR 6/4 dull yellow orange) and laminated purely chalk (10YR 8/3 light yellow orange)
1623	30				
1633	40				
1643	50				
1653	60				6 cycle of gliding structure (chalky ooze to laminated purely chalk)
1663	70				
1673	80				
1683	90				
1693	100				51-56cm Cross bedded of Purely chalk (10YR 8/3 light yellow orange) and brownish sandy silt (10YR 4/4 brown)
1793					
1693	100				56-100cm light brownish sand (10YR 5/3 dull yellowish brown) with dark brownish clay clast, planktic foraminifera ill-sorted
1793					

Core : PC-3		Section : 19			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1793.5	0				0-26cm chalky ooze (10YR 7/4 dull yellow orange) with bioturbation (10YR 3/4 dark brown)
1803.5	10				
1813.5	20				22cm mottle filled reddish clay (10YR 3/4 dark brown)
1823.5	30				
1833.5	40				26-46cm Reddish clay (10YR 4/4 dark brown) with bioturbation abundant bioturbation
1843.5	50				
1853.5	60				
1863.5	70				
1873.5	80				46-96cm Chalky ooze (10YR 7/4 dull yellowish orange) with bioturbation (10YR 3/4 dark brown)
1883.5	90				
1893.5	100				
1899.5					
1893.5	100				63cm mottle filled reddish clay
1899.5					

Fig.12 (continued).

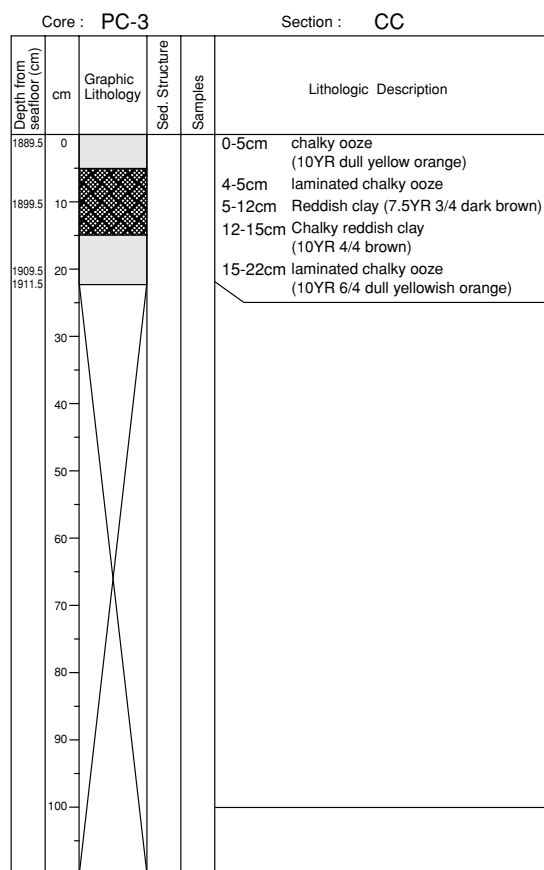


Fig.12 (continued).

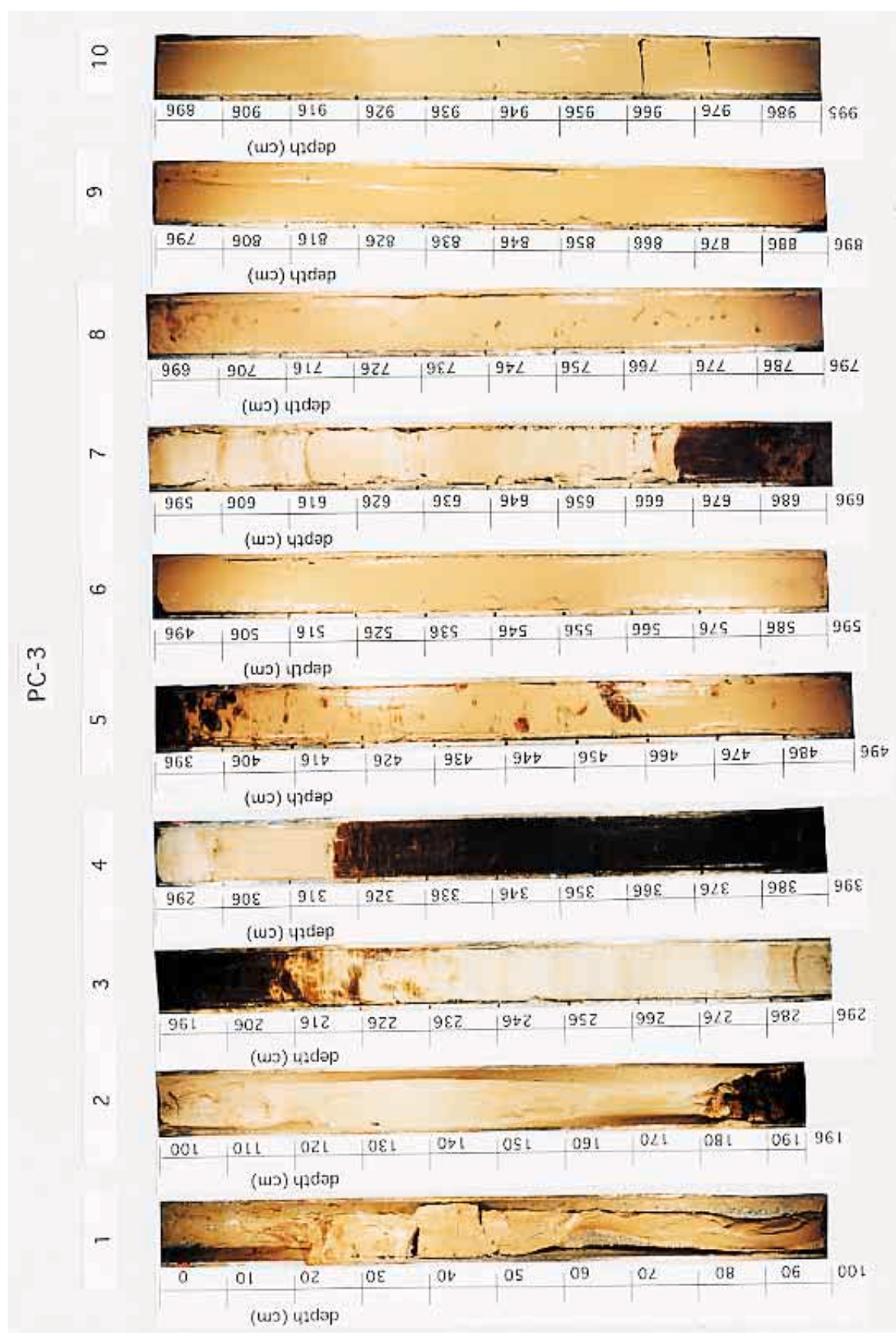


Fig.13 Photograph of interval PC-3 Section 1-10, 0cm-995cm.

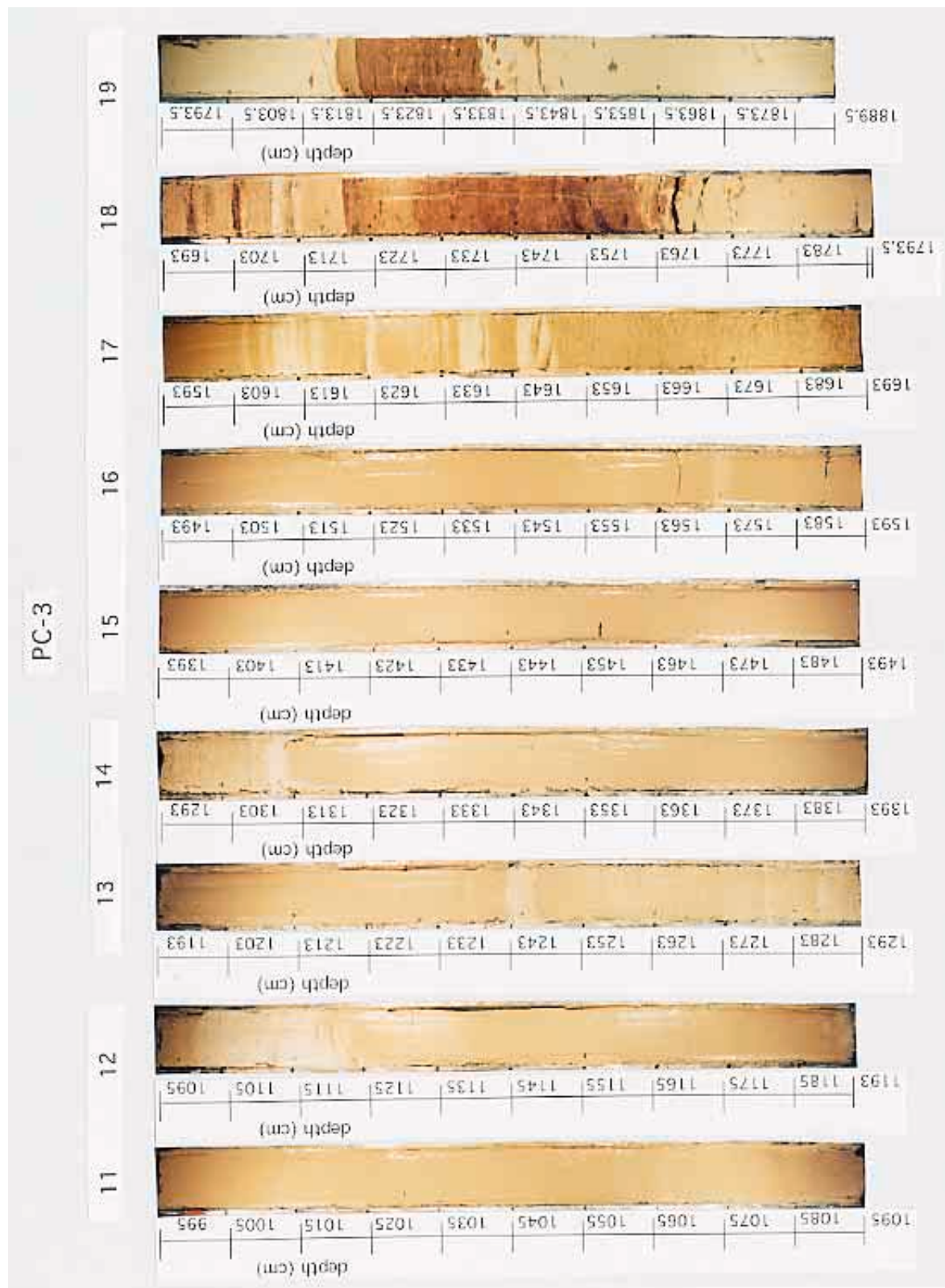


Fig.13 (continued). Photograph of interval PC-3 Section 11-19, 995cm-1889.5cm.

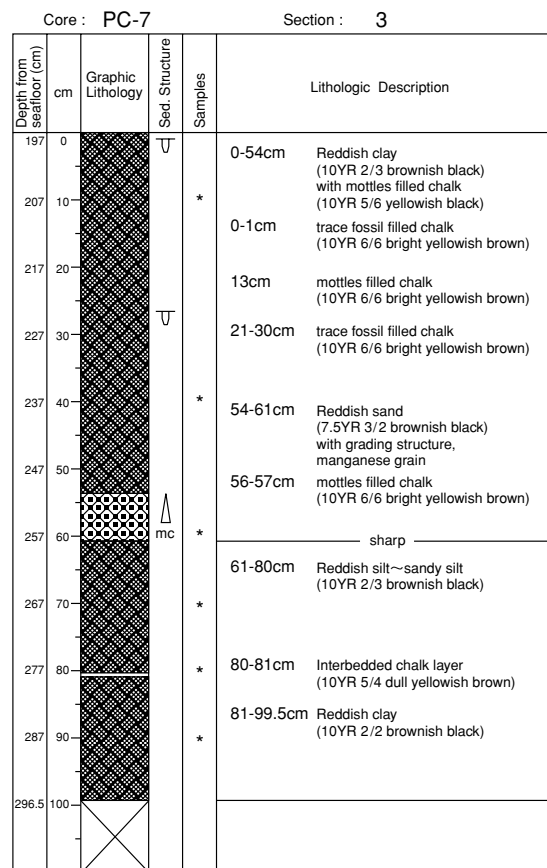
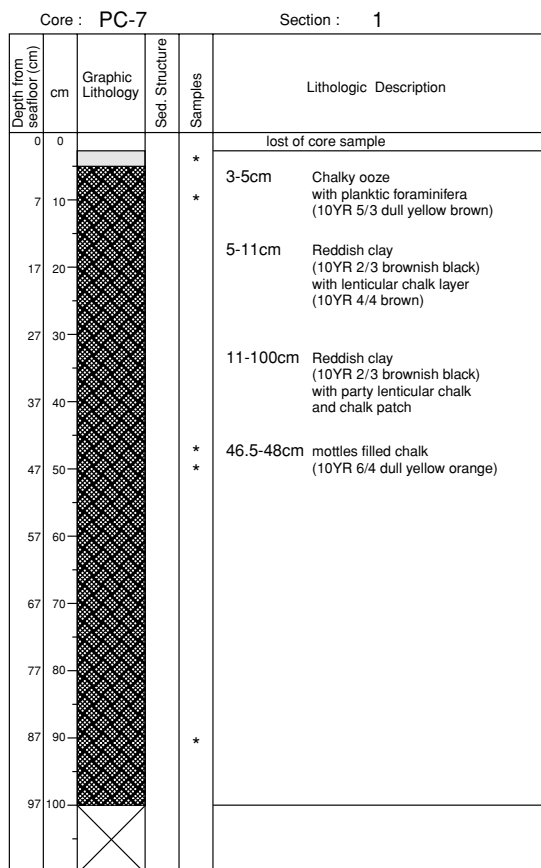
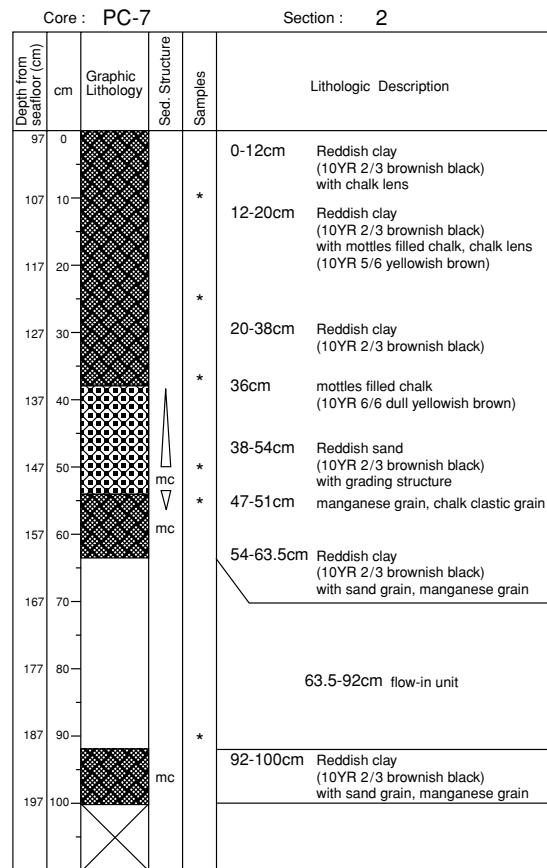
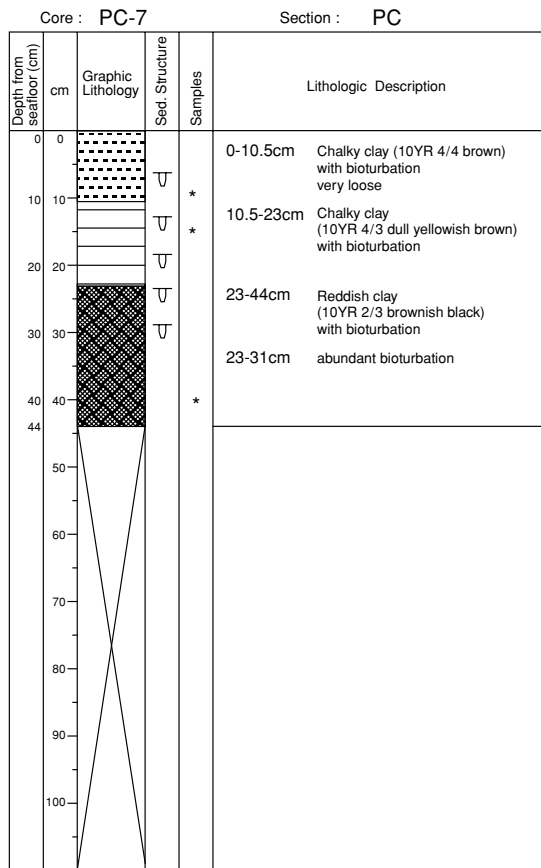


Fig.14 Generalized summary of the lithology, structure of PC-7.

Core : PC-7		Section : 4			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
296.5	0				0-15cm Reddish clay (10YR 2/2 brownish black)
306.5	10			*	15-26cm Chalky clay (10YR 2/3 brownish black) with bioturbation
316.5	20		U		26-49cm Chalky ooze (10YR 2/3 dark brown) with bioturbation (10YR 2/3 brownish black)
326.5	30		U		39-41cm Chalky clay (10YR 6/4 dull yellow orange)
336.5	40			*	37-38cm trace fossil filled chalk (10YR 2/3 brownish black)
346.5	50				43-46cm trace fossil filled chalk (10YR 2/3 brownish black)
356.5	60			*	49-54cm Reddish clay (10YR 2/2 brownish black) with mottles filled chalky clay (10YR 3/3 dark brown)
366.5	70			*	54-74cm Chalky clay (10YR 3/4 brownish black) with mottles filled chalky clay (10YR 3/4 dark brown)
376.5	80			*	74-91cm Reddish clay (10YR 2/2 brownish black) with mottles filled chalky clay (10YR 3/4 dark brown)
386.5	90			*	91-100cm Chalky ooze (10YR 6/4 dull yellow orange) with bioturbation, manganese grain interbedded reddish clay (10YR 2/2 brownish black)
396.5	100		mc		

Core : PC-7		Section : 6			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
496.5	0		U	*	0-25cm Purely chalky ooze (0-5cm:10YR 6/3 dull yellow orange 5-25cm:10YR 7/3 dull yellow orange)
506.5	10			*	0-6cm mottles filled chalk (10YR 8/1 light gray)
516.5	20				5-10cm laminated chalky ooze loose
526.5	30		U	*	25-57cm laminated planktic foraminiferal -chalky ooze (10YR 8/2 light gray) with grading structure (very coarse to fine)
536.5	40		mc		35-57cm manganese grain
546.5	50		mc	*	49-57cm Planktic foraminiferal ooze (10YR 8/2 light gray) with manganese grain
556.5	60				sharp
566.5	70		U	*	57-96cm Chalky clay (10YR 3/4 dark brown) with bioturbation (10YR 2/3 brownish black)
576.5	80		U		60-64cm abundant planktic foraminifera patch (10YR 7/3 dull yellow orange)
586.5	90		U		74-79cm Purely chalk patch (10YR 7/3 dull yellow orange)
596.5	100			*	96-100cm Clayey chalk (10YR 5/4 dull yellow brown)

Core : PC-7		Section : 5			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
396.5	0		U	*	0-14cm Chalky ooze (10YR 3/4 dark brown) with interbedded reddish clay, bioturbation (10YR 2/3 brownish black)
406.5	10		U		14-25cm Reddish clay (10YR 3/4 dark brown) with bioturbation (10YR 6/4 dull yellow orange)
416.5	20			*	25-60cm Chalky ooze (10YR 3/4 dark brown) with interbedded reddish clay, bioturbation (10YR 2/3 brownish black)
426.5	30		U		
436.5	40		U	*	
446.5	50		U		
456.5	60			*	60-70cm Reddish clay (10YR 2/3 brownish black) with bioturbation (10YR 5/4 dull yellow brown)
466.5	70		U		70-80cm Chalky ooze (10YR 5/4 dull yellow brown) with bioturbation (10YR 2/3 brownish black)
476.5	80		U		
486.5	90		U	*	80-100cm Purely chalky ooze (10YR 7/3 dull yellow orange) with interbedded chalky clay (10YR 5/4 dull yellow brown)
496.5	100		mc		

Core : PC-7		Section : 7			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
596.5	0		U		0-13cm Clayey chalk (10YR 5/4 dull yellowish brown) with bioturbation (10YR 3/4 dark brown)
606.5	10		U	*	13-40cm chalky ooze (10YR 7/4 dull yellow orange) with bioturbation (10YR 5/4 dull yellow brown)
616.5	20		U		
626.5	30		U	*	
636.5	40				40-60cm Reddish silty sand (10YR 3/4 dark brown) with bioturbation (10YR 6/4 dull yellow orange), grading structure (medium to fine)
646.5	50			*	
656.5	60		U		60-100cm Chalky ooze (60-70cm:10YR 6/4 dull yellow orange 79-100cm:10YR 6/4 dull yellow orange) with bioturbation (10YR 3/4 dark brown)
666.5	70		U	*	
676.5	80		mc		70-80cm manganese grain
686.5	90			*	
696.5	100				

Fig.14 (continued).

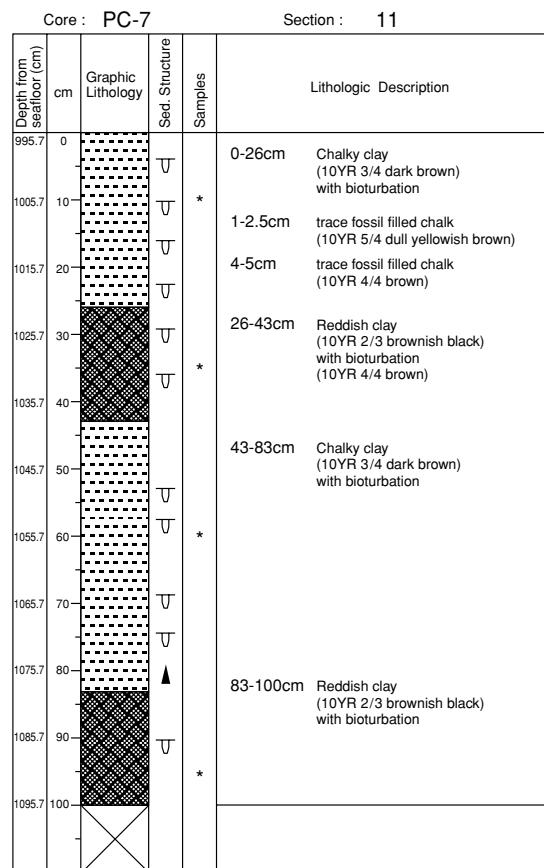
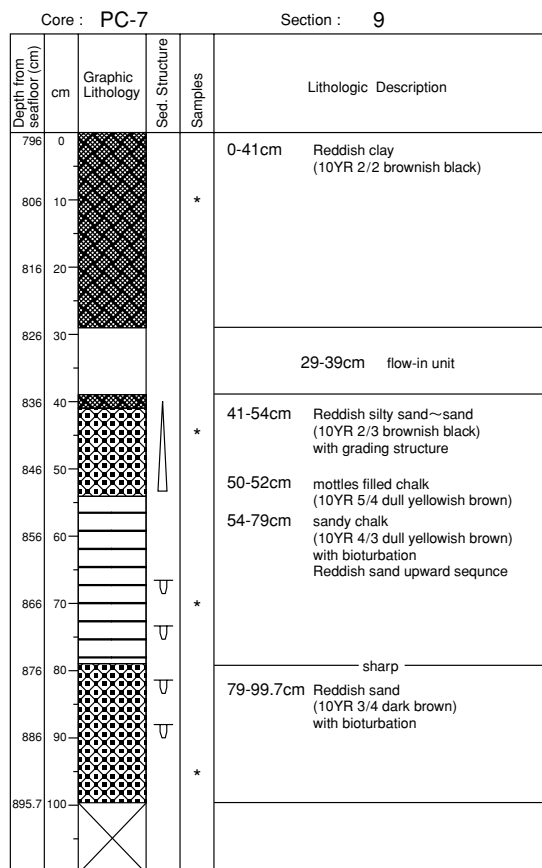
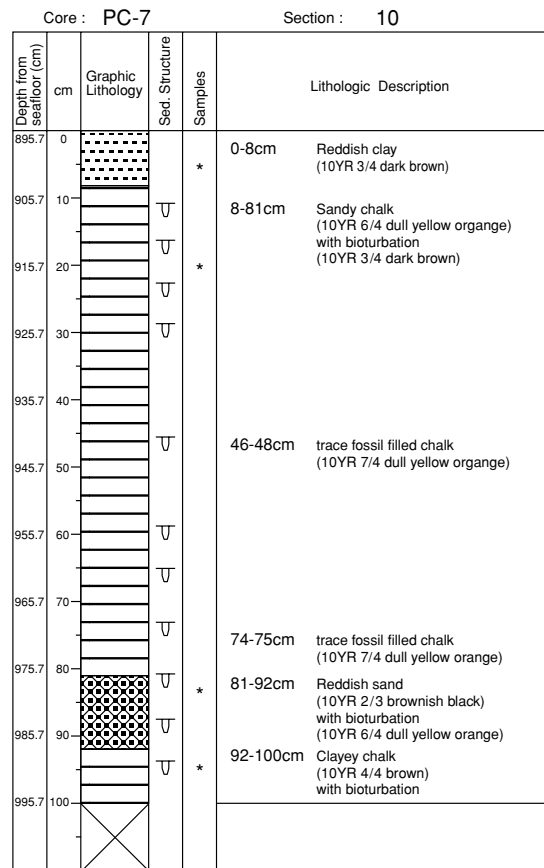
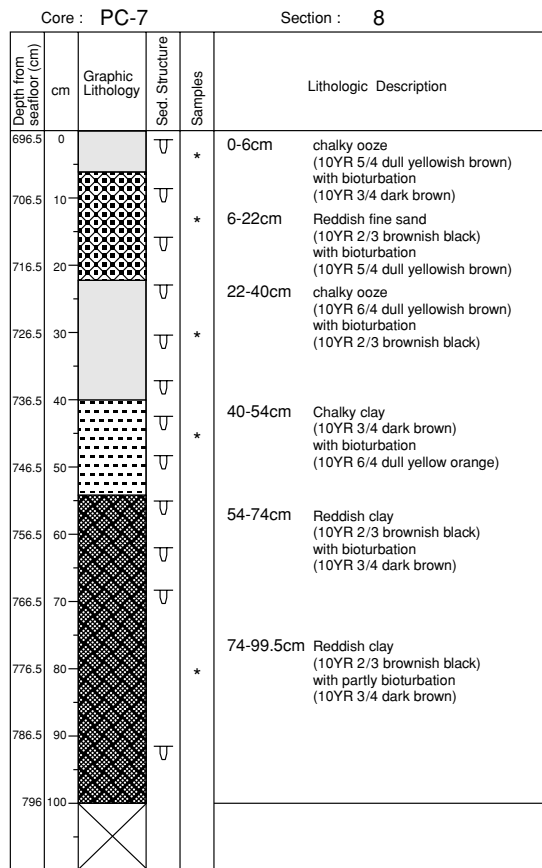


Fig.14 (continued).

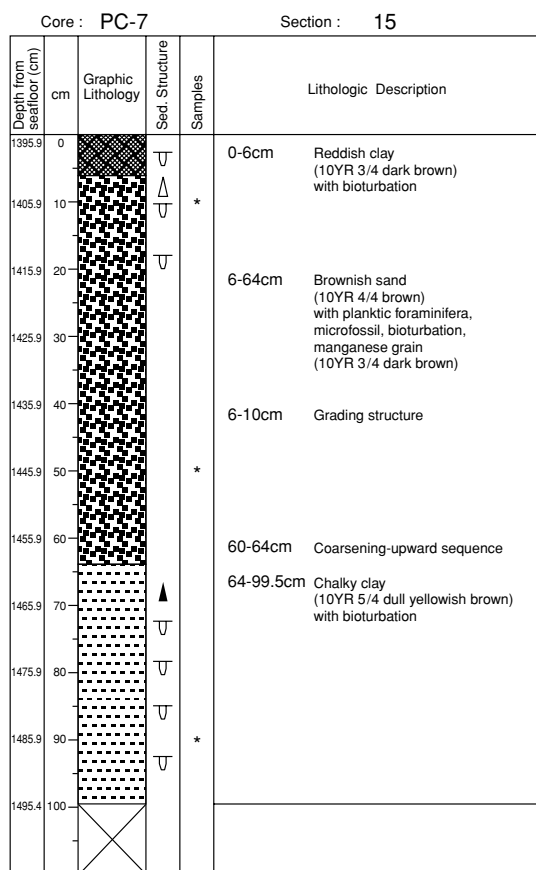
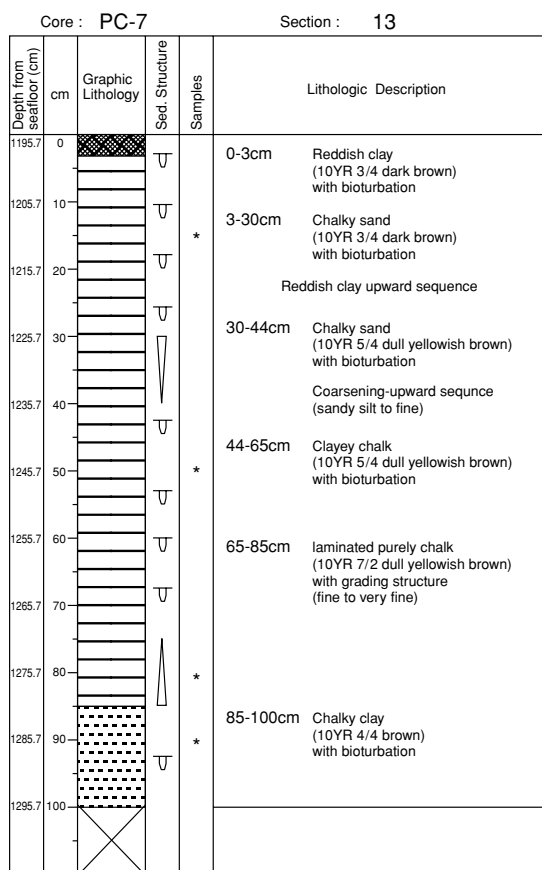
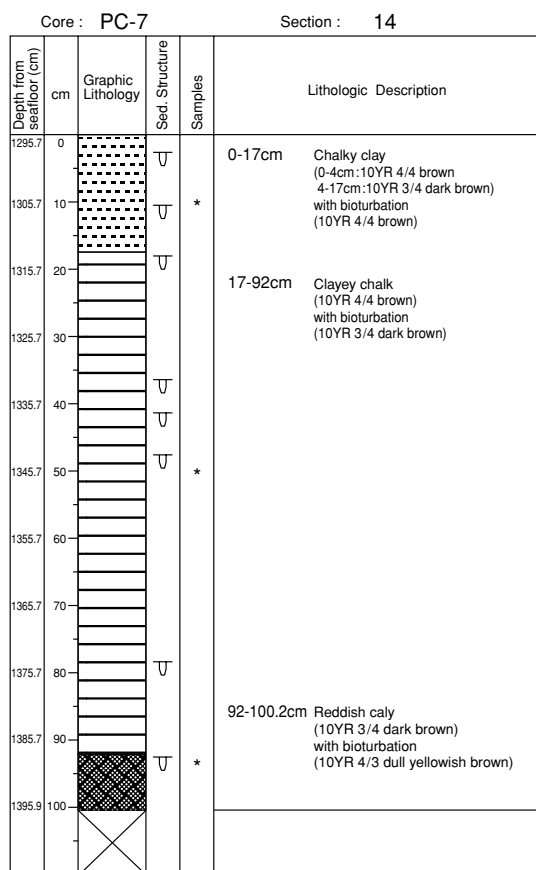
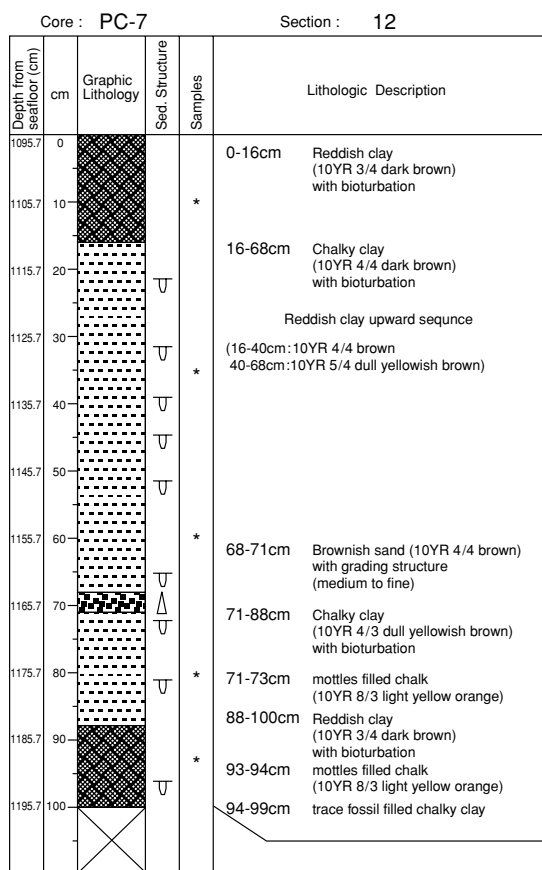


Fig.14 (continued).

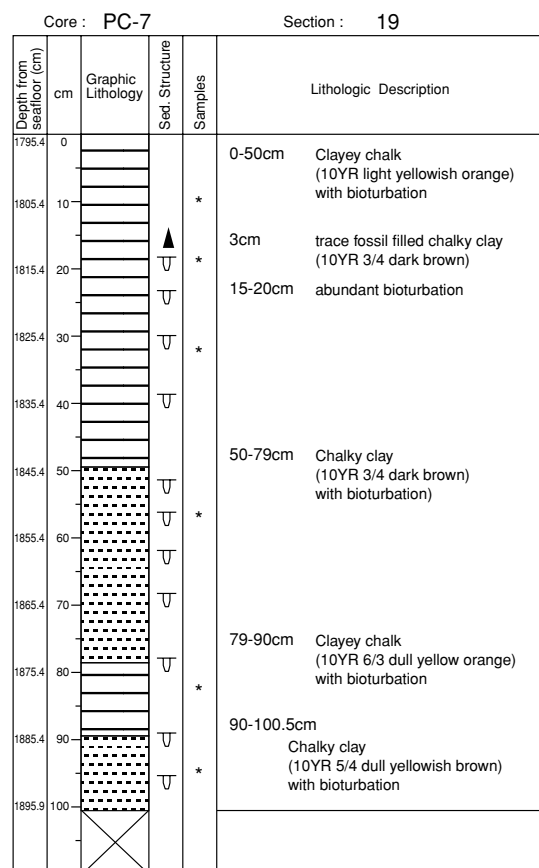
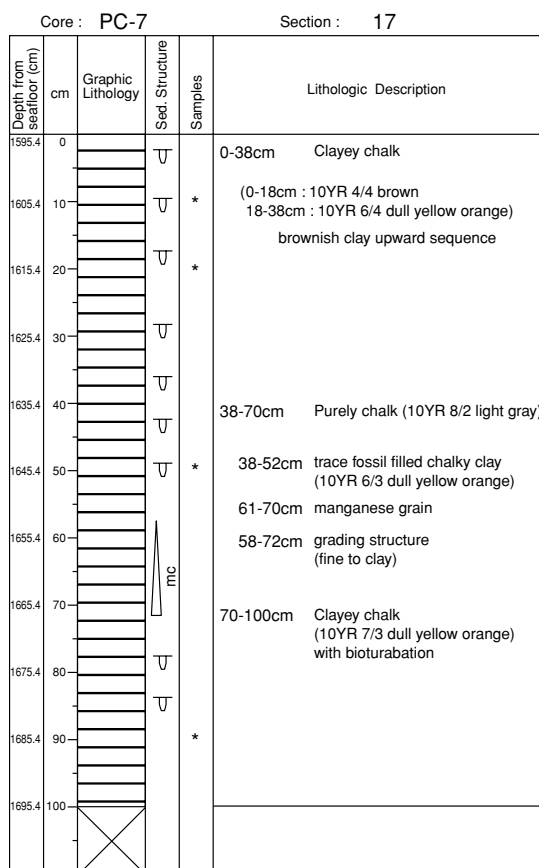
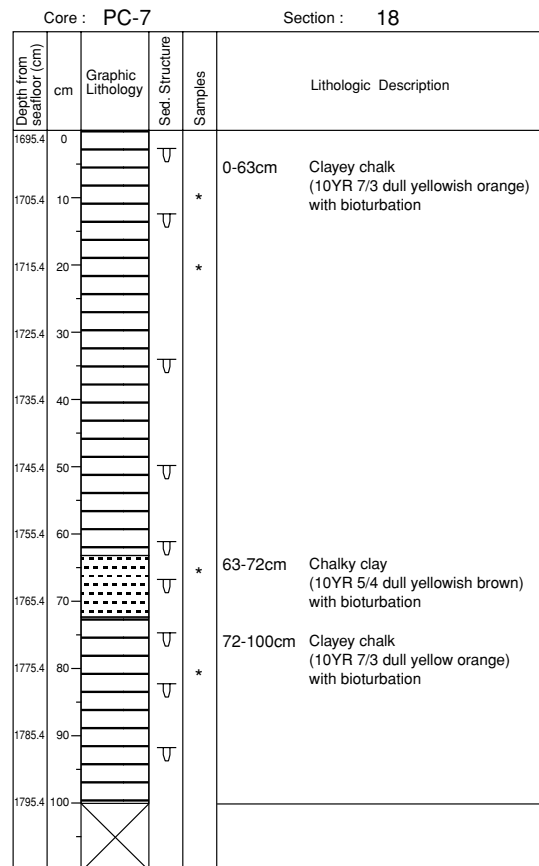
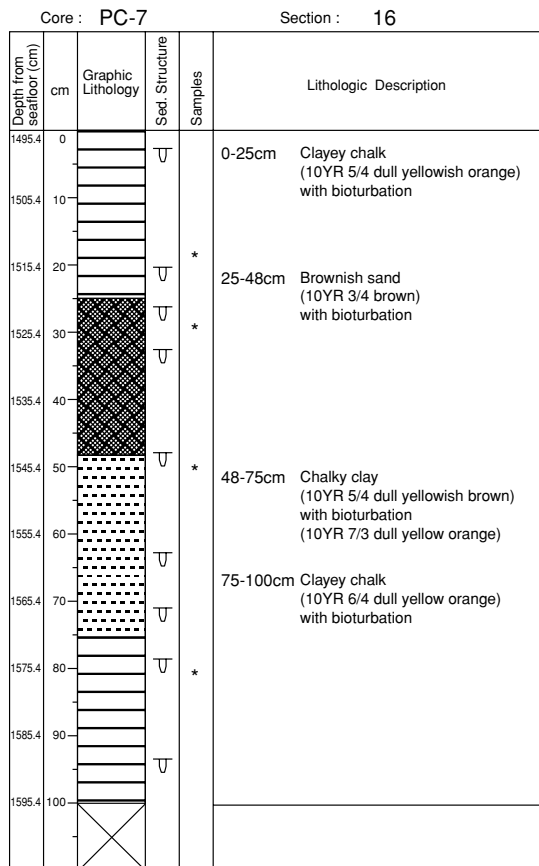


Fig.14 (continued).

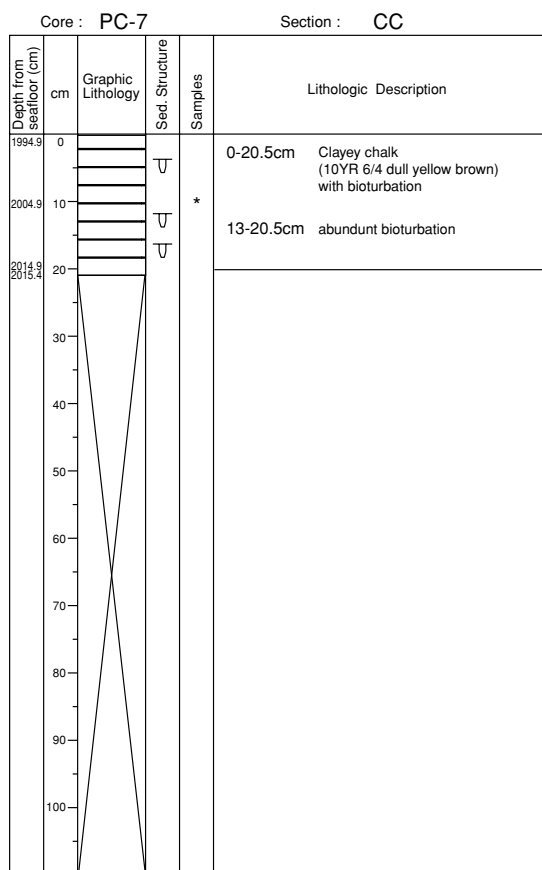
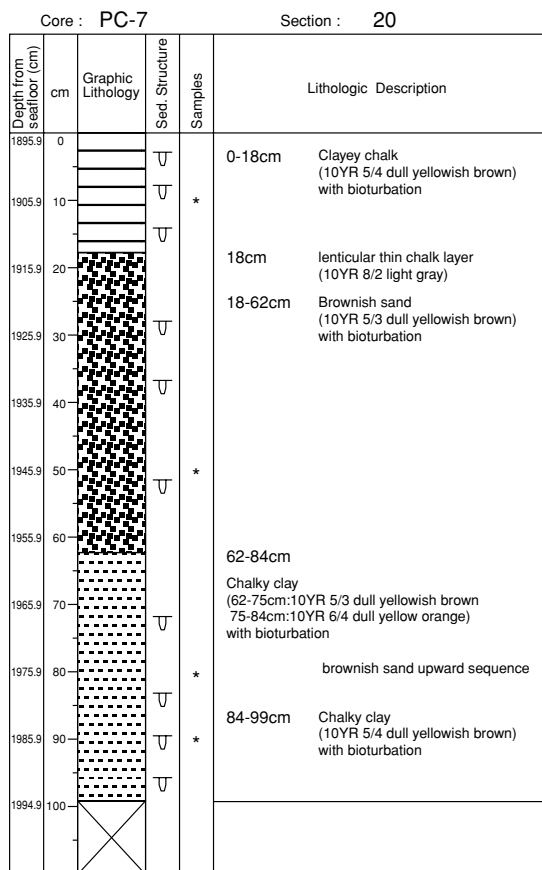


Fig.14 (continued).

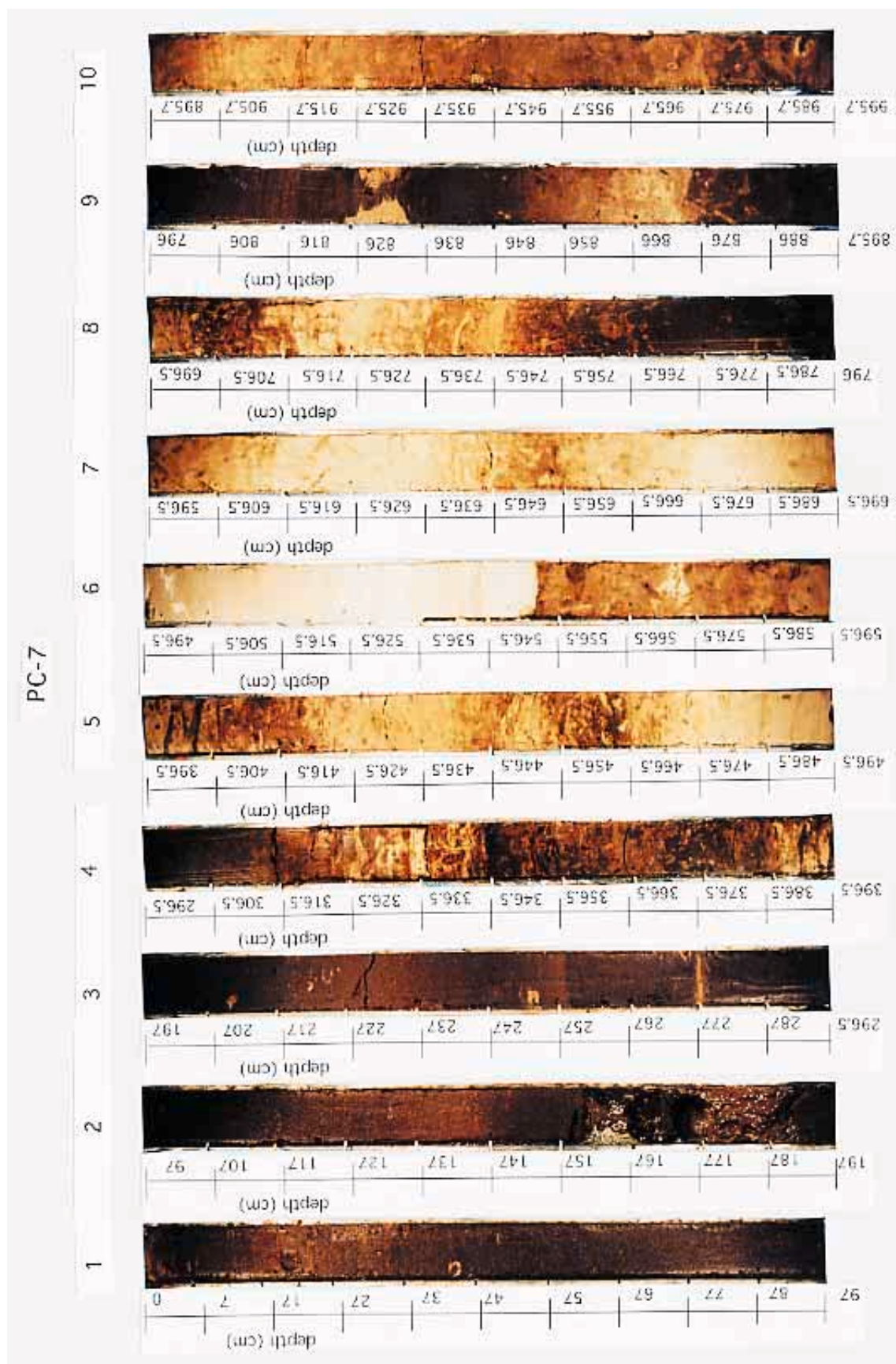


Fig.15 Photograph of interval PC-7 Section 1-10, 0cm-995.7cm.

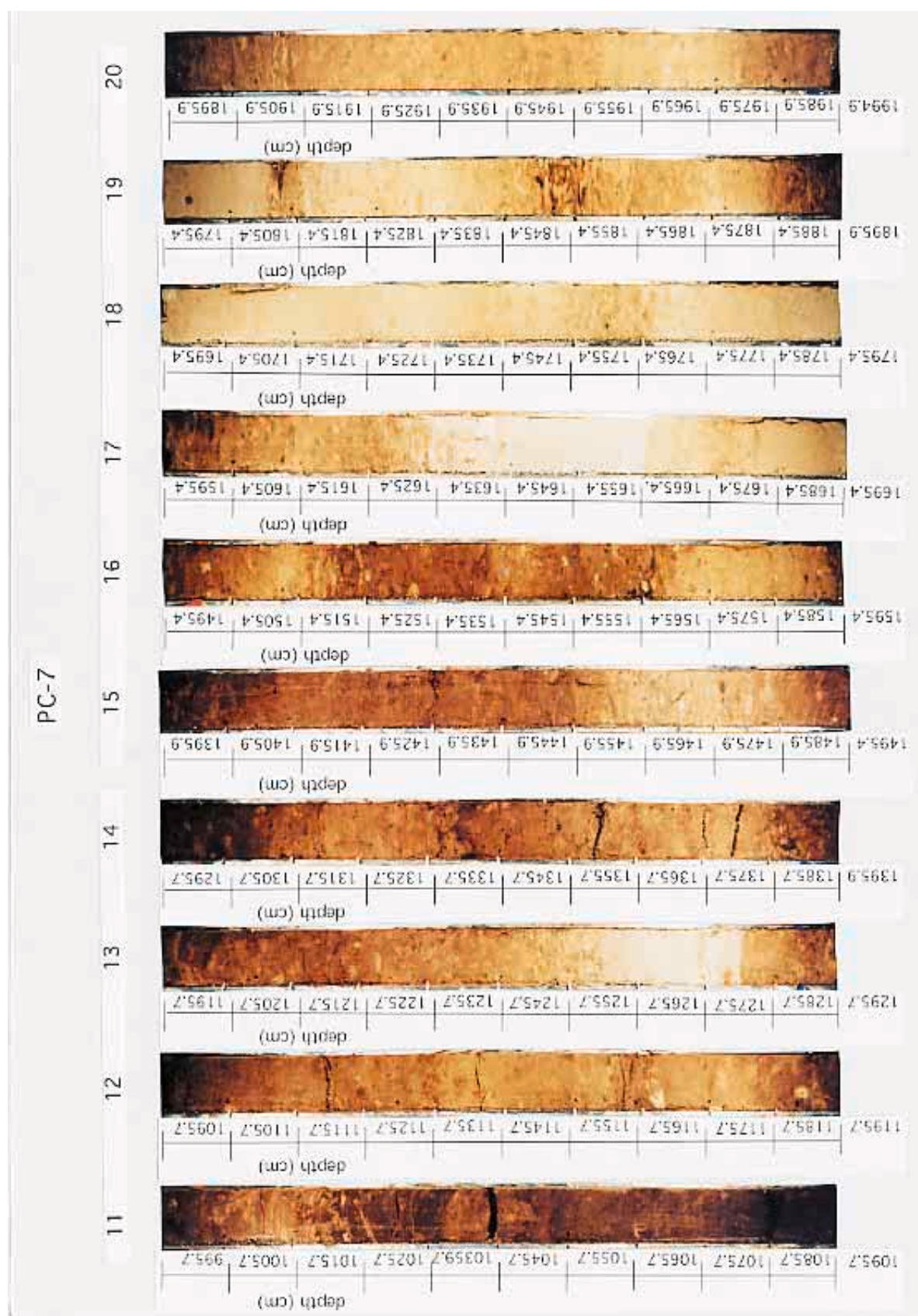


Fig.15 (continued). Photograph of interval PC-7 Section 11-20, 995.7cm-1994.9cm.

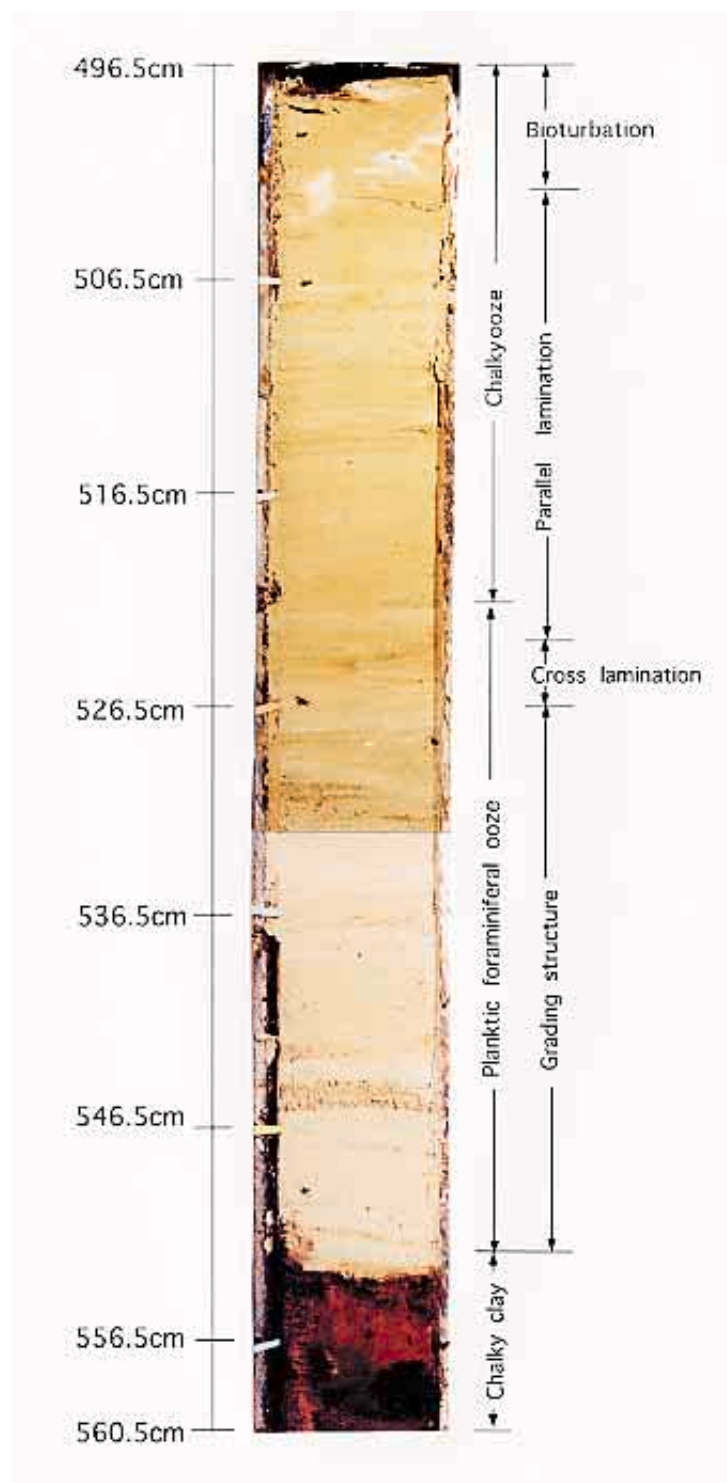


Fig.16 Photograph of interval PC-7 Section 6, 496.5cm-560.5cm, showing turbidite bed.

Core : PC-4		Section : PC			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
0	0			*	0-15.5cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange) p-f grain-supported
10	10				
15.5	15.5				
20	20				
30	30				
40	40				
50	50				
60	60				
70	70				
80	80				
90	90				
100	100				

Core : PC-4		Section : 2			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
24	0			*	0-100cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange) p-f grain-supported
34	10				
44	20				
54	30				
64	40				
74	50				
84	60				
94	70				
104	80				
114	90				
124	100				

Core : PC-4		Section : 1			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
0	0			*	0-24cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange) p-f grain-supported
10	10				
20	20				
24	24				
30	30				
40	40				
50	50				
60	60				
70	70				
80	80				
90	90				
100	100				

Core : PC-4		Section : 3			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
124	0			*	0-100cm Homogeneous planktic foraminiferal ooze (10YR 7/3 dull yellow orange) p-f grain-supported
134	10				
144	20				
154	30				
164	40				38-100cm very loose
174	50				
184	60				
194	70				
204	80				
214	90				
224	100				

Fig.17 Generalized summary of the lithology, structure of PC-4.

Core : PC-4		Section : 4		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
224	0			lost of core sample
233	10			1-100cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange) p-f grain-supported
243	20			
253	30			
263	40			
273	50			
283	60			
293	70			
303	80			
313	90			
323	100			

Core : PC-4		Section : 6		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
423	0			0-100cm Planktic foraminiferal ooze
433	10			(0-80cm : 10YR 7/3 dull yellow orange 80-100cm : 10YR 7/2 dull yellow orange)
443	20			p-f grain-supported
453	30			
463	40			
473	50			
483	60			
493	70			
503	80			
513	90			
523	100			

Core : PC-4		Section : 5		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
323	0			0-100cm Planktic foraminiferal ooze (10YR 7/3 dull yellow orange) p-f grain-supported
333	10			
343	20			
353	30			
363	40			
373	50			
383	60			
393	70			
403	80			
413	90			
423	100			

Core : PC-4		Section : 7		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
523	0			0-100cm Planktic foraminiferal ooze
533	10			(0-70cm : 10YR 7/3 dull yellow orange 70-100cm : 10YR 7/2 dull yellow orange)
543	20			p-f grain-supported
553	30			
563	40			
573	50			
583	60			
593	70			
603	80			
613	90			
623	100			

Fig.17 (continued).

Core : PC-4		Section : 8		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
623	0			0-100cm Planktic foraminiferal ooze
633	10			(0-80cm : 10YR dull yellow orange 7/3 80-100cm : 10YR dull yellow orange 7/2)
643	20			p-f grain-supported
653	30			
663	40			
673	50			
683	60			
693	70			
703	80			
713	90			
723	100			

Core : PC-4		Section : 10		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
821.5	0			lost of core sample
829.5	10			2-100cm Planktic foraminiferal ooze
839.5	20			(10YR 8/2 light gray)
849.5	30			p-f grain-supported
859.5	40			
869.5	50			
879.5	60			
889.5	70			
899.5	80			
909.5	90			
919.5	100			

Core : PC-4		Section : 9		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
723	0			0.5-99cm Planktic foraminiferal ooze
732.5	10			(0-34cm : 10YR 8/3 light yellow orange 34-99cm : 10YR 8/2 light gray)
742.5	20			p-f grain-supported
752.5	30			
762.5	40			
772.5	50			
782.5	60			
792.5	70			
802.5	80			
812.5	90			
821.5	100			

Core : PC-4		Section : 11		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
919.5	0			0-100cm Planktic foraminiferal ooze
929.5	10			(0-40cm 10YR 8/2 light gray)
939.5	20			p-f grain-supported
949.5	30			
959.5	40			(40-64cm : 10YR 7/2 dull yellow orange)
969.5	50			
979.5	60			
989.5	70			64-72cm : manganese clast grains (10YR 6/1 brownish gray)
999.5	80			(72-100cm : 10YR 8/2 light gray)
1009.5	90			
1019.5	100			

Fig. 17 (continued).

Core : PC-4		Section : 12			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1019.5	0			*	0-100cm Planktic foraminiferal ooze (10YR 8/2 light gray)
1029.5	10				p-f grain-supported
1039.5	20				
1049.5	30				
1059.5	40				
1069.5	50				
1079.5	60				
1089.5	70				
1099.5	80				
1109.5	90				
1119.5	100				

Core : PC-4		Section : 14			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1219.5	0			*	1.5-99cm Planktic foraminiferal ooze (10YR 8/2 light gray)
1228	10				p-f grain-supported
1238	20				
1248	30				
1258	40				
1268	50				
1278	60				
1288	70				
1298	80				
1308	90				
1317	100				

Core : PC-4		Section : 13			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1119.5	0			*	0-100cm Planktic foraminiferal ooze (10YR 8/2 light gray)
1129.5	10				p-f grain-supported
1139.5	20				
1149.5	30				
1159.5	40				
1169.5	50				
1179.5	60				
1189.5	70				
1199.5	80				
1209.5	90				
1219.5	100				

Core : PC-4		Section : 15			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1317	0			*	2-100cm Planktic foraminiferal ooze
1325	10				(2-30cm : 10YR 8/1 light gray 30-100cm 10YR 8/2 light gray)
1335	20				p-f grain-supported
1345	30				
1355	40				
1365	50				
1375	60				
1385	70				
1395	80				
1405	90				
1415	100				

Fig. 17 (continued).

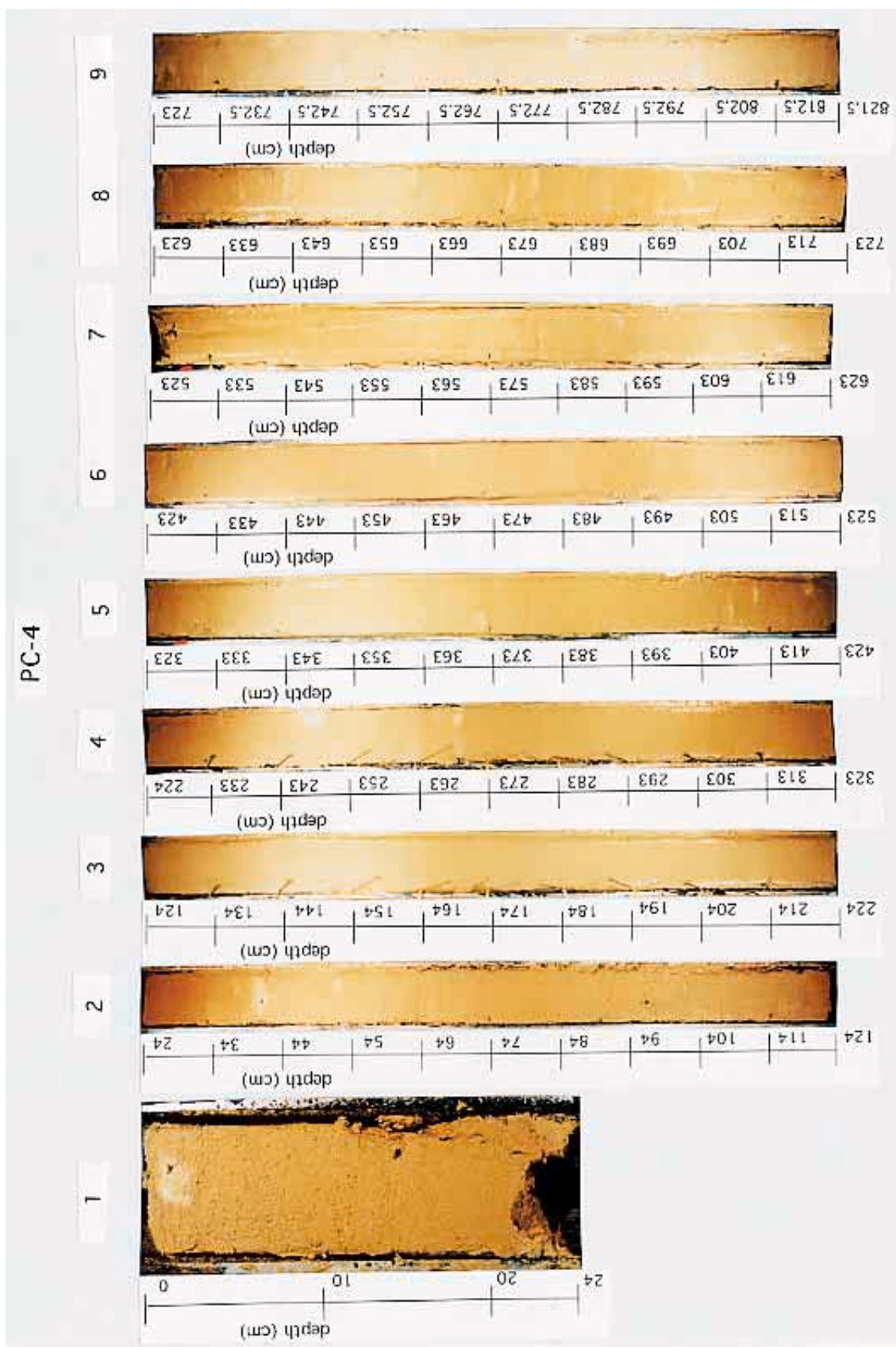


Fig.18 Photograph of interval PC-4 Section 1-9, 0cm-821.5cm.

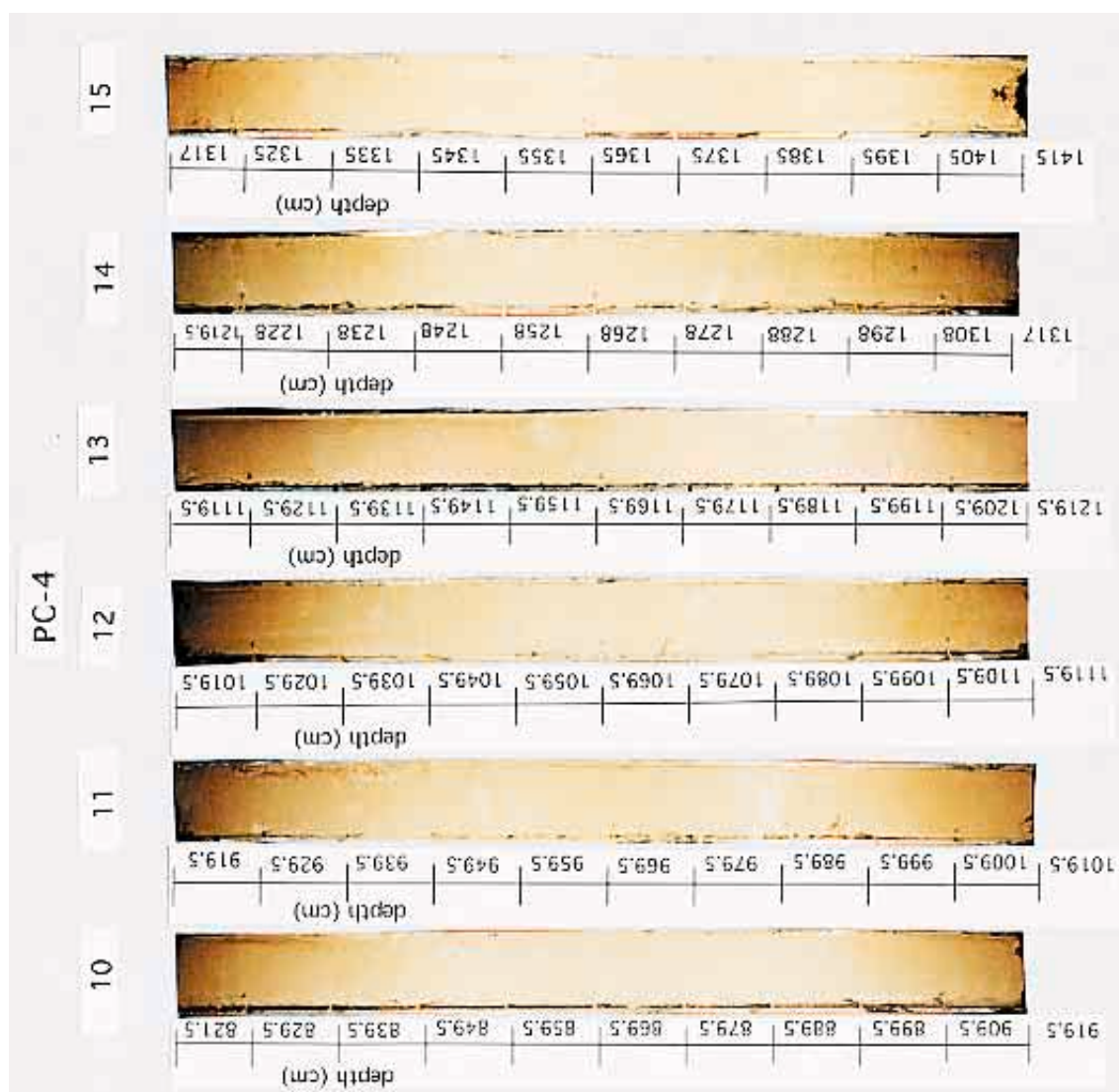


Fig.18 (continued). Photograph of interval PC-4 Section 10-15, 821.5cm-1415cm.

Core : PC-5		Section : PC			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
0	0			*	0-21.4cm Homogeneous planktic foraminiferal ooze (10YR 7/3 dull yellow orange)
10	10				
20	21.4				
30					
40					
50					
60					
70					
80					
90					
100					

Core : PC-5		Section : 2			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
20	0			*	0-100cm Planktic foraminiferal ooze (10YR 8/3 light yellow orange)
30	10				grain-supported
40	20				
50	30				
60	40				
70	50			*	
80	60				
90	70				
100	80				
110	90			*	
120	100				

Core : PC-5		Section : 1			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
0	0			*	0-20cm Homogeneous planktic foraminiferal ooze (10YR 7/3 dull yellow orange)
10	10				grain-supported
20	20				
30					
40					
50					
60					
70					
80					
90					
100					

Core : PC-5		Section : 3			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
120	0			*	0-98cm Planktic foraminiferal ooze (10YR 8/3 light yellow orange)
130	10				grain-supported
140	20				
150	30				
160	40				
170	50			*	
180	60				
190	70				
200	80				
210	90			*	
218	100				

Fig.19 Generalized summary of the lithology, structure of PC-5.

Core : PC-5		Section : 3-4			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
218	0			*	0-18.8cm Homogeneous planktic foraminiferal ooze (10YR 8/3 light yellow orange) grain-supported
228	10				
236.8	20				
	30				
	40				
	50				
	60				
	70				
	80				
	90				
	100				

Core : PC-5		Section : 5			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
336.8	0			*	0-100cm Homogeneous planktic foraminiferal ooze (10YR 8/3 light yellow orange) grain-supported
346.8	10				
356.8	20				
366.8	30				
376.8	40				
386.8	50				
396.8	60				
406.8	70				
416.8	80				
426.8	90				
436.8	100			*	

Core : PC-5		Section : 4			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
236.8	0			*	0-100cm Homogeneous planktic foraminiferal ooze (10YR 8/3 light yellow orange) grain-supported
246.8	10				
256.8	20				
266.8	30				
276.8	40				
286.8	50				
296.8	60				
306.8	70				
316.8	80				
326.8	90				
336.8	100			*	

Core : PC-5		Section : 6			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
436.8	0			*	0-101cm Planktic foraminiferal ooze grain-supported (0-4cm : 10YR 8/3 light yellow orange 4-46cm : 10YR 7/3 dull yellow orange 46-101cm : 10YR 8/3 light yellow orange)
446.8	10				
456.8	20				
466.8	30				
476.8	40				
486.8	50				
496.8	60				
506.8	70				
516.8	80				
526.8	90				
537.8	100			*	

Fig. 19 (continued).

Core : PC-5		Section : 7		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
537.8	0			0-99cm Homogeneous planktic foraminiferal ooze
547.8	10			p-f grain-supported
557.8	20			(10YR 8/3 light yellow orange)
567.8	30			
577.8	40			
587.8	50			
597.8	60			
607.8	70			
617.8	80			
627.8	90			
636.8	100			

Core : PC-5		Section : 9		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
736.8	0			0-100cm Homogeneous planktic foraminiferal ooze
746.8	10			p-f grain-supported
756.8	20			(10YR 8/3 light yellow orange)
766.8	30			
776.8	40			
786.8	50			
796.8	60			
806.8	70			
816.8	80			
826.8	90			
836.8	100			

Core : PC-5		Section : 8		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
636.8	0			0-100cm Planktic foraminiferal ooze
646.8	10			p-f grain-supported
656.8	20			(0-45cm : 10YR 8/3 light yellow orange
666.8	30			45-100cm 10YR 7/2 light gray)
676.8	40			
686.8	50			
696.8	60			
706.8	70			
716.8	80			
726.8	90			
736.8	100			

Core : PC-5		Section : 10		
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Lithologic Description
836.8	0			lost of core sample
845.8	10			1-100cm Planktic foraminiferal ooze
855.8	20			p-f grain-supported
865.8	30			(10YR 8/3 light yellow orange)
875.8	40			
885.8	50			
895.8	60			
905.8	70			
915.8	80			
925.8	90			
935.8	100			

Fig.19 (continued).

Core : PC-5		Section : 11			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
935.8	0			*	0-99.5cm Planktic foraminiferal ooze
945.8	10				p-f grain-supported
955.8	20				(10YR 8/3 light yellow orange)
965.8	30				
975.8	40				
985.8	50				
995.8	60				
1005.8	70				
1015.8	80				
1025.8	90				
1035.3	100				

Core : PC-5		Section : 13			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1135.3	0		mc	*	0-100cm Planktic foraminiferal ooze
1145.3	10				p-f grain-supported
1155.3	20				(0-47cm : 10YR 7/2 dull yellow orange
1165.3	30				47-55cm : 10YR 8/3 light yellow orange
1175.3	40				55-93cm : 10YR 8/2 light gray
1185.3	50				93-100cm : 10YR 8/3 light yellow orange)
1195.3	60				
1205.3	70				2cm manganese grain
1215.3	80				(10YR 7/1 light gray)
1225.3	90				
1235.3	100				

Core : PC-5		Section : 12			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1035.3	0			*	0-100cm Planktic foraminiferal ooze
1045.3	10				0-25cm p-f grain-supported
1055.3	20				(0-5cm : 10YR 8/3 light yellow orange
1065.3	30				5-25cm : 10YR 7/3 dull yellow orange)
1075.3	40				25-47cm chalky matrix-supported
1085.3	50				(10YR 8/2 light gray)
1095.3	60				
1105.3	70				48-55cm p-f grain-supported
1115.3	80				(10YR 8/3 light yellow orange)
1125.3	90				
1135.3	100				55-100cm chalky matrix-supported
					(10YR 8/2 light gray)
			mc		99cm manganese grain
					(10YR 7/1 light gray)

Core : PC-5		Section : 14			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1235.3	0			*	0-100cm Planktic foraminiferal ooze
1245.3	10				p-f grain-supported
1255.3	20				(10YR 8/3 light yellow orange)
1265.3	30				
1275.3	40				
1285.3	50				
1295.3	60				
1305.3	70				
1315.3	80				
1325.3	90				
1335.3	100				

Fig.19 (continued).

Core : PC-5		Section : 15			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1335.3	0			*	0-99.5cm Homogeneous planktic foraminiferal ooze
1345.3	10				p-f grain-supported
1355.3	20				(0-45cm : 10YR 8/3 light yellow orange 45-99.5cm 10YR 8/2 light gray)
1365.3	30				
1375.3	40				
1385.3	50				
1395.3	60				
1405.3	70				
1415.3	80				
1425.3	90				
1434.8	100				

Core : PC-5		Section : 17			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1534.3	0		mc	*	0-99.5cm Planktic foraminiferal ooze
1544.3	10				p-f grain-supported (10YR 8/2 light gray)
1554.3	20				15cm manganese grain (10YR 7/1 light gray)
1564.3	30				
1574.3	40				
1584.3	50				
1594.3	60				
1604.3	70				
1614.3	80				
1624.3	90				
1633.8	100				

Core : PC-5		Section : 16			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1434.8	0			*	0-99.5cm Homogeneous planktic foraminiferal ooze
1444.8	10				
1454.8	20				(0-40cm : 10YR 8/3 light yellow orange 45-99.5cm : 10YR 8/2 light gray)
1464.8	30				0-40cm p-f grain-supported
1474.8	40				40-99.5cm chalky matrix-supported
1484.8	50				
1494.8	60				
1504.8	70				
1514.8	80				
1524.8	90				
1534.3	100				

Core : PC-5		Section : 18			
Depth from seafloor (cm)	cm	Graphic Lithology	Sed. Structure	Samples	Lithologic Description
1633.8	0			*	0-99.5cm Planktic foraminiferal ooze
1643.8	10				p-f grain-supported (10YR 8/2 light gray)
1653.8	20				
1663.8	30				
1673.8	40				
1683.8	50				
1693.8	60				
1703.8	70				
1713.8	80				
1723.8	90				
1733.3	100				

Fig.19 (continued).

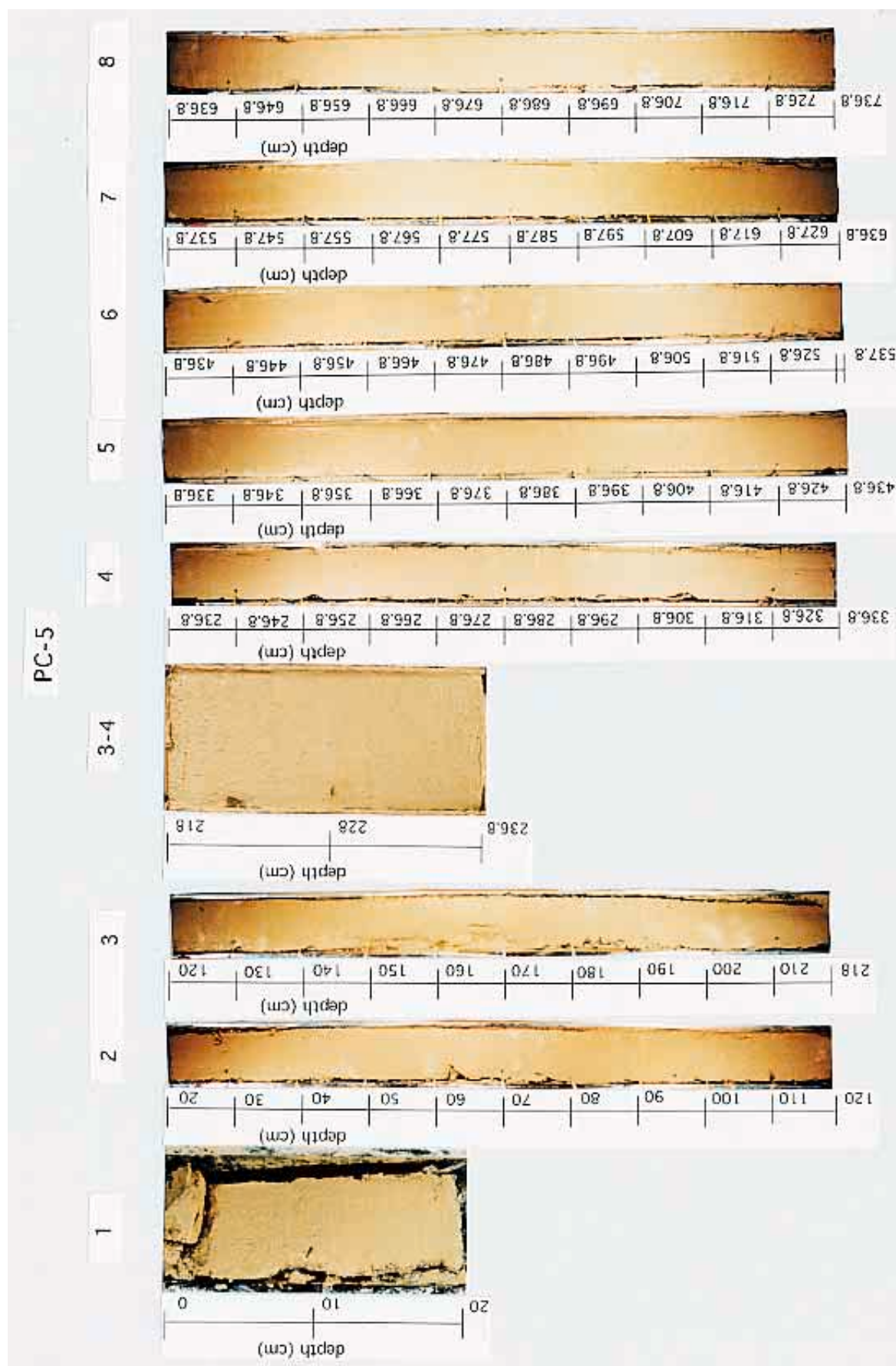


Fig.20 Photograph of interval PC-5 Section 1-8, 0cm-736.8cm.

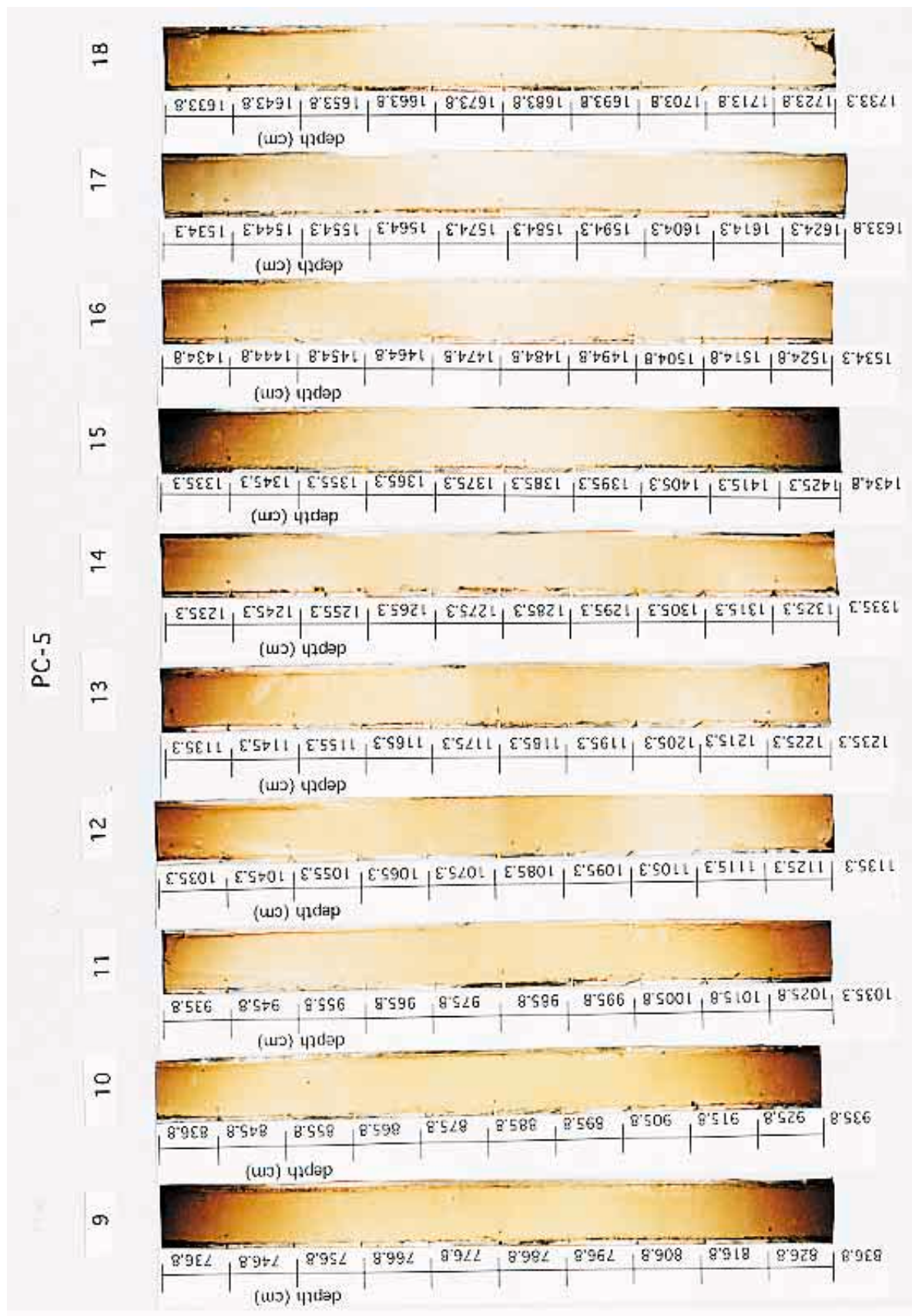


Fig.20 (continued). Photograph of interval PC-5 Section 9-18, 736.8cm-1733.3cm.