

GOBEX-III

Fahrtbericht/Cruise Report  
FS POSEIDON  
Gotland Becken  
Rostock-Kiel  
04.03. - 13.03. 1996

Institut für Ostseeforschung an der Universität Rostock

Sektion Marine Geologie

## Abstract

Cruise GOBEX-III was the second expedition mounted by the IOW Marine Geology Group under Project GOBEX to investigate the geochemical and sedimentological environment in the Gotland Basin of the Central Baltic Sea. The cruise concentrated on improving the coverage with shallow seismic profiles (GEOCHIRP sonar), shallow sediment cores (Multicorer) and long gravity and Kasten cores of various depths in the Gotland Deep and adjacent basins. Using acoustic methods, we mapped the local accumulations of mud (Schlick) in basin-normal and along-strike profiles. The accumulations of mud and underlying lacustrine clays were sampled by shallow multi-coring and gravity coring (to 12 m, maximum of 10.5 m recovery). Cores were subsampled onboard ship for porewater, sedimentological, and magnetic analyses in shorebased laboratories. A first exploratory survey of sediments was carried out in the Gdansk Basin by seismic soundings, surface sediment sampling, and gravity coring. Two gravity cores were taken in the Arkona Basin.

## Danksagung/Acknowledgements

We thank Kapitän Bülow and his crew for the excellent working conditions and good atmosphere during the cruise. The Institute für Meereskunde Kiel is acknowledged for providing shiptime on POSEIDON. Thanks to the GPI Kiel (Prof. Stoffers, Dr. Kögler) and GEOMAR (Dr. Kassens) and their equipment, we were able to take some excellent cores.

## Einführung und Ziele/Background and Objectives:

GOBEX (Gotland Basin Experiment) was initiated in 1993 as a multidisciplinary experiment to investigate the oceanographic, chemical, biological and sedimentological situation in the Gotland Basin of the Central Baltic Sea. It is a direct result of scientific conferences sponsored by ECOPS on the future of Baltic Sea research; scientific goals formulated for GOBEX thus closely reflect its primary purpose: To mount an interdisciplinary and international pilot study of processes in the deep Baltic Sea which may serve as nucleus for future cooperation among Baltic geoscientists.

The "benthic and geological processes" task force of GOBEX defined its contribution as follows: It set out to study the the Gotland Basin as an end-member in the dynamic depositional environment of the Baltic Sea. The pilot study with cruise GOBEX II (F/S A. v. HUMBOLDT; August, 1994) as an initial sampling campaign aimed to clarify



pathways of materials, their modifications and post-depositional and biological processes in the final depositional sink. This included the initial identification of mass fluxes of natural and anthropogenic substances, evaluation of transport processes, biological and geochemical processes, and sampling short (<200 years) and long (>1000 years) sedimentary records to hindcast historical and geological environments. The cores taken during that cruise proved to be very interesting in their potential to hindcast saltwater inflows by characteristic manganese carbonate beds which appear to coincide with historical ingressions of saline waters (Neumann et al., in press). Emeis et al. (submitted) found indications of considerable sediment dynamics in the surficial layer of antropogenically influenced sediments and in trace metal profiles and accumulation rates.

Based on these preliminary results and on acoustic profiles of excellent quality, we decided to enlarge the areal coverage<sup>α</sup> of acoustic profiles and to concentrate them in areas of mud accumulation and structural features in the Holocene or Pleistocene sub-surface. In several areas, the different reflectors were potentially within reach of the long sediment cores (12 m) that can be taken with the F/S POSEIDON. These long cores will be used to identify seismic reflectors and to compile basinal sediment sections that reach back to the Baltic Ice Lake stage of Baltic Sea evolution. Once optimal sediment sections for each stage (emphasis is on the Littorina Stage) have been compiled, we intend to date them and analyse them for a series of paleoclimatic and paleoenvironmental indicators in the sediments. The final goal is to establish a high-resolution history of the Central Baltic Sea evolution over the last 7600 years. Additional tasks during the POEIDON cruise were to take pore water samples for shorebased analyses of the sulfur system in the sediments, and paleomagnetic samples to study the variations in the geomagnetic field.

## Participants and Participating Institutions

Table 1: Scientific crew of cruise POSEIDON 215B (4.3.-13.3.96)

Name	Task	Institute
Dr. Blanz, Thomas	Geologie	IOW
Dr. Böttcher, Michael	Porenwasser	Univ. Oldenburg
Prof. Emeis, Kay-Christian	Fahrtleiter	IOW
Dr. Endler, Rudolf	Geophysik	IOW
Frahm, Andreas	Technik Geologie	IOW
Klutentreter, Heidi	Geologie	IOW
Nickel, Gerald	Technik Akustik	IOW
Schoster, Frank	Porenwasser	Univ. Oldenburg
Dr. Struck, Uli	Geologie	IOW
Reich, Mike	Geologie	IOW
Dr. Roberts, Andrew	Magnetik	Univ. Davis, U.S.A.
Prof. Winsemann, Jutta	Sedimente	Univ. Hannover

## Instrumentation and Methods

### **Navigation**

All coordinates given are geographical coordinates obtained from GPS navigation. The geoid used is WGS 84. For seismic profiling, a separate GPS system was employed and the positions were automatically stored on the tracks and on paper printout.

### **Acoustic Work/ IOW (Endler)**

We employed a GeoChirp Subbottom Profiler System for the acoustic surveys. The Chirp profiler (transmitted signal 2 to 8 kHz or 1.5 to 11.5 kHz, depending on operating mode) consisted of a deck unit and a tow fish. The penetration depth of the unit was up to 40 m below seafloor and typically had high resolution (0.3-0.5 m). Some examples are give in the Appendix. The shooring rate was 4 per second. Signal processing was performed with a Sonar Enhancement System and data were digitally stored on 8 mm DAT tapes in SEG Y format. Navigation data were obtained from a separate GPS and stored.

Based on results of the acoustic surveys, we targeted sediment and water-column stations to areas where echograms indicated high sediment accumulation and where the acoustic stratigraphy promised recent sediment cover. This approach was very successful and yielded generally good results in sediment cores recovered.

## **Equipment used for Geological Work and Sediment sampling**

Four different tools were used to obtain sediment samples.

The Niemistö-Lot, a short gravity corer with a plastic tube of 8 cm diameter and 50 cm length, which is used to log physical properties of surface sediments.

A multicorer, which provides up to eight sediment cores from an area of 1.5 m<sup>2</sup> to a depth of 45 cm and ideally recovers bottom water. Several of these sub-cores were sliced in 1 cm thick discs on board and either stored frozen for shorebased analyses, or centrifuged to obtain porewater samples. Other subcores were left intact for future subsampling.

A gravity corer (Schwerelot) with an inner plastic liner and a top weight of initially 1200 kg, later of 850 kg. A maximum length of 10 m sediment was recovered with this weight, which was found to be sufficient for penetrating the soft sediment of the Gotland Basin. The liners were cut into sections of 1 m length, capped, and stored for shorebased logging.

A Kastenlot of 15x15 cm diameter and variable length, weighted by 1200 to 2200 kg of lead. The longest core recovered was 970 cm. These cores were opened on board, slabs and u-channels were taken over the entire length for x-ray photography and magnetic measurements, and the cores were described after visual examination. In addition, discrete samples were taken for porewater and sediment analyses.

## **Cruise Narrative**

R/V POSEIDON left Rostock-Warnemünde on March 4, 1996 at 12:00z and headed for the Gotland Basin. The southern Baltic Sea was covered with sea ice of considerable thickness (<30 cm) to approximately 14°E after the severe winter. Eastward of the Kadettrinne, the water was open and the sea was calm, so that all instrumentation was set up and checked. During the transit the wind increased to 6 Bft from the N and several of the scientific crew paid their dues to Poseidon. Fortunately, the weather improved considerably on the day of arrival to the area of operation. Figure 1 is a map giving all stations and survey tracks in the Gotland Basin area.

The first station was occupied at HELCOM station 271 on March 6 at 08:00z (Station 201300/Poseidon 204; station list is in Table 2). Here, a sediment trap mooring was deployed with two traps (Type....) and an Aanderra current meter, as well as with 5 temperature loggers (Fig. 2). Our program consisted of several futile and finally successful runs with water sampling bottles (4L) to depths of 150 m in order to obtain deep water to fill the cups. At 10:14 GMT (=z-1 hour), the trap was finally deployed and the ship relocated to our first sediment sampling station 201301. This station is located in an area where the Littorina mud is relatively thin and underlying layers were in reach of the corer. Fig. 3 depicts a section of acoustic profile and the position of station

201301 (57°20.16'N/19°57.41'E). After two runs with the Niemistölot, a multicorer was run which overpenetrated and was discarded. A second multicorer was successfully deployed and recovered 8 subcores. All core descriptions are given in the Appendix. Following this, we obtained a Kastenlot with 1070 cm sediment. The thick varved clay at the base (brownish-pink with light, cream-colored interlayers) was intensely fractured and disrupted by syndimentary features.

Following the sampling program, the first of a series of GEOCHIRP-profiles were run during the night. Start, turning, and end points of these profiles are given in Table 3. Conditions were excellent and the digitally recorded soundings are of very good quality.

On March 7, operations continued at 08:23 GMT at Station 201302 (57°15.05'N/20°11.95'E) with a Kastenlot that was discarded because it was only partly filled. Figure 4 depicts the location on an acoustic profile. The station was selected to obtain an expanded interval of Littorina mud from what appears to be a contour deposit at the foot of the eastern basin slope. Here, acoustic reflectors thought to be Littorina mud were exceptionally thick. After three Niemistölots, which also overpenetrated, a Kastenlot recovered 687 cm of plastic, water-rich Littorina mud that was intensely laminated and stained with black iron monosulfide. As a last tool, we ran the Multicorer in several runs. One of these yielded sediment, but may have overpenetrated in spite of wooden support beams which were attached to the frame to prevent it from sinking into the mud. Several other attempts were unsuccessful and the operation was aborted.

We then occupied station 201303 (57°11.09'N/19°55.68'E) from 15:13 GMT and obtained a fine multicorer from this southerly position. Figure 5 shows the site on an acoustic profile. The bottom water in the cores was devoid of oxygen and gave an Eh reading of -80 mV. The sediment surface was covered with brownish, gelatinous debris and white remains of bacterial mats (?) overlying a black, grainy sediment with flocs. Until 15:50 GMT, two Niemistölots were also taken at Station 201303, and the ship resumed the seismic survey of lines 6 to 9. Again, sea conditions were very favorable and the data are of good quality.

On March 8, long gravity cores were taken at positions previously sampled by kastens and multicores. Station 201304 is at 57°11.14'N/19°55.69'E and yielded 1010 cm of core (Ice lake brownish clay at the base. Station 201305 is at 57°15.41'N/20°11.81'E and, after two futile attempts and a reduction of head weight from 1.2 to 0.85 t, yielded 900 cm of Littorina mud. Station 201306 at 57°22.66'N/20°17.84'E yielded 900 cm of sediment and ended brown clay at the base. We then relocated the ship to a small basin SW of Klints

Bank (station 201307; 57°00'N, 019°26.99'E in water 182 m deep). A gravity core brought 995 cm of sediment which was brownish clay at the base, and two Niemistö-Lote were taken. At 22:13 z the ship resumed the survey of acoustic profil 10 and then transited to the Gdansk Basin.

After a transit of 100 nm, the GEOCHIRP was deployed at 05:55 GMT on March 9 for an initial survey across the intended sediment sampling station #201308 (54°49.9'N/019°18.4'E, 117 m water depth). The soundings show a gradually thickening wedge of mud overlying acoustically banded layers presumed to be lacustrine clays. Having finished the survey, we took a gravity corer at 11:09 GMT. The corer overpenetrated about 2 m and yielded 10.7 m of sediment with grey clay at the base. In addition, we sampled a multicorer and two Niemistö-lote. The multicorer provided 45 cm of sediment with bottom water. The Eh of the bottom water was +180 mV and the silty to slightly sandy sediment was covered with a dense, brownish bacterial mat of *Beggiatoa*. After coring, four additional seismic profiles were collected in roughly N-S and E-W directions. Some shallow gas caused acoustic turbidity at several depressions, but the subsurface was very uniform and lacked structure.

On March 10, the program was to collect a 12 m Kastencore at the location of station #201309. An initial attempt with a head weight of 850 kg of lead yielded only 3 m of sediment and it was decided to try again with a full set of weights (2.2 t). Unfortunately, this was excessive and the second attempt resulted in two severely damaged kastens. Operations were aborted and the ship set out to transit to the coring locations in the Arkona Basin at 09:00 GMT.

The next day (March 11) saw increased winds from the E (6 Bft) and cold temperatures with ice on deck. At 08:00z we decided to try taking the Schwerelote at the two positions in the Arkona Basin and we reduced the head weight of the corer to approximately 1.6 t. At the first position (station # 201310) we recovered 985 cm of sediment with the 11 m long corer; at the base we found brown "Rosa" clay of the ice lake stage. At the second position (station # 201311) we cored only 785 cm, again bottoming out in brown clay. Upon pulling the corer out of the seafloor, the winch registered a pull-out weight of >5t, which may indicate a stiff, harder layer which was not penetrated. At 09:50z operations finished and the ship headed towards Warnemünde. We arrived in Rostock on 11. 3. 96 at 18:00z. The ship was unloaded on 12.3. and departed to Kiel at 16:00 z. The expedition ended in Kiel on 13.3. after the transit and unloading of all equipment.

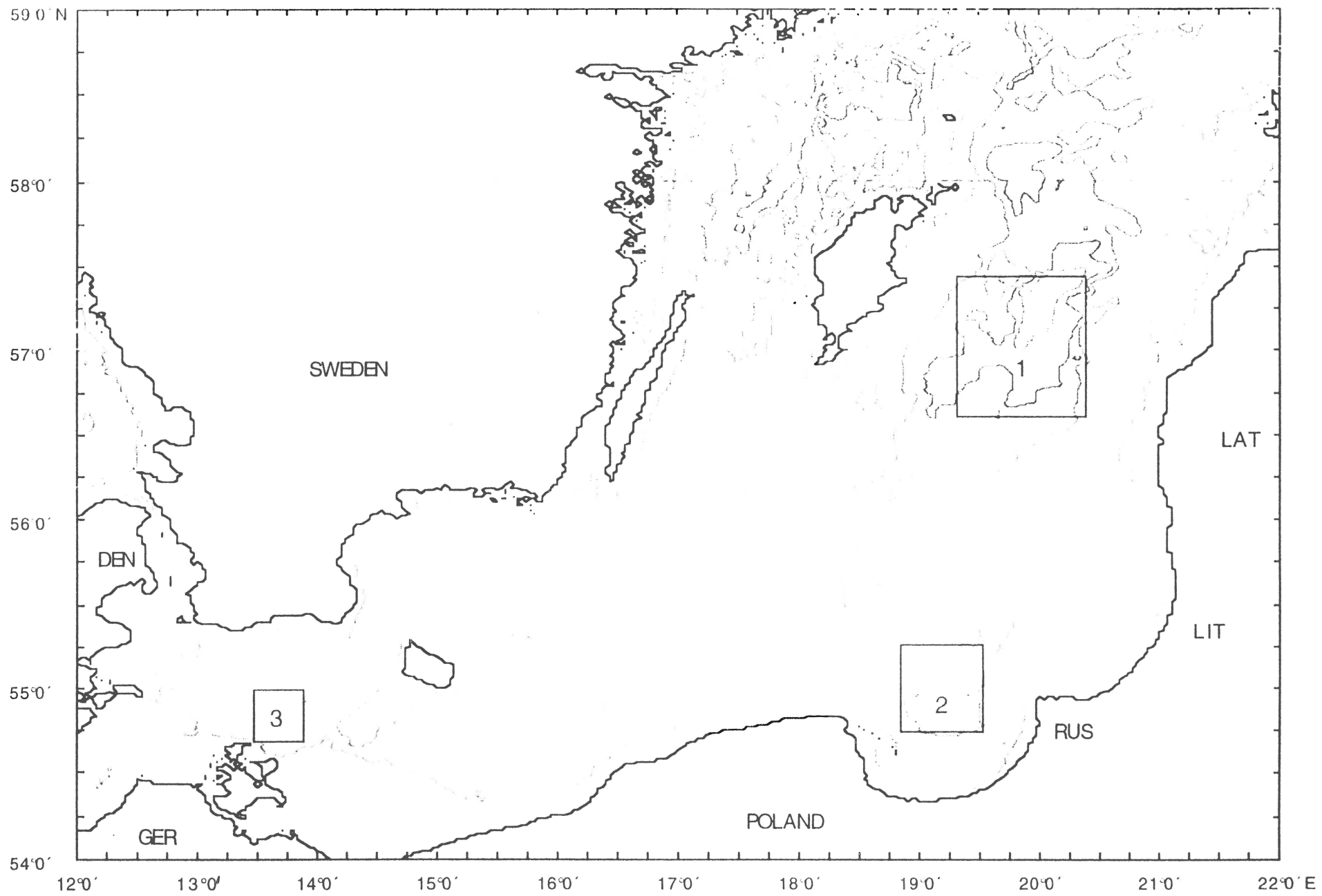
Figure 1: Map of the operational areas occupied during cruise Gobex III

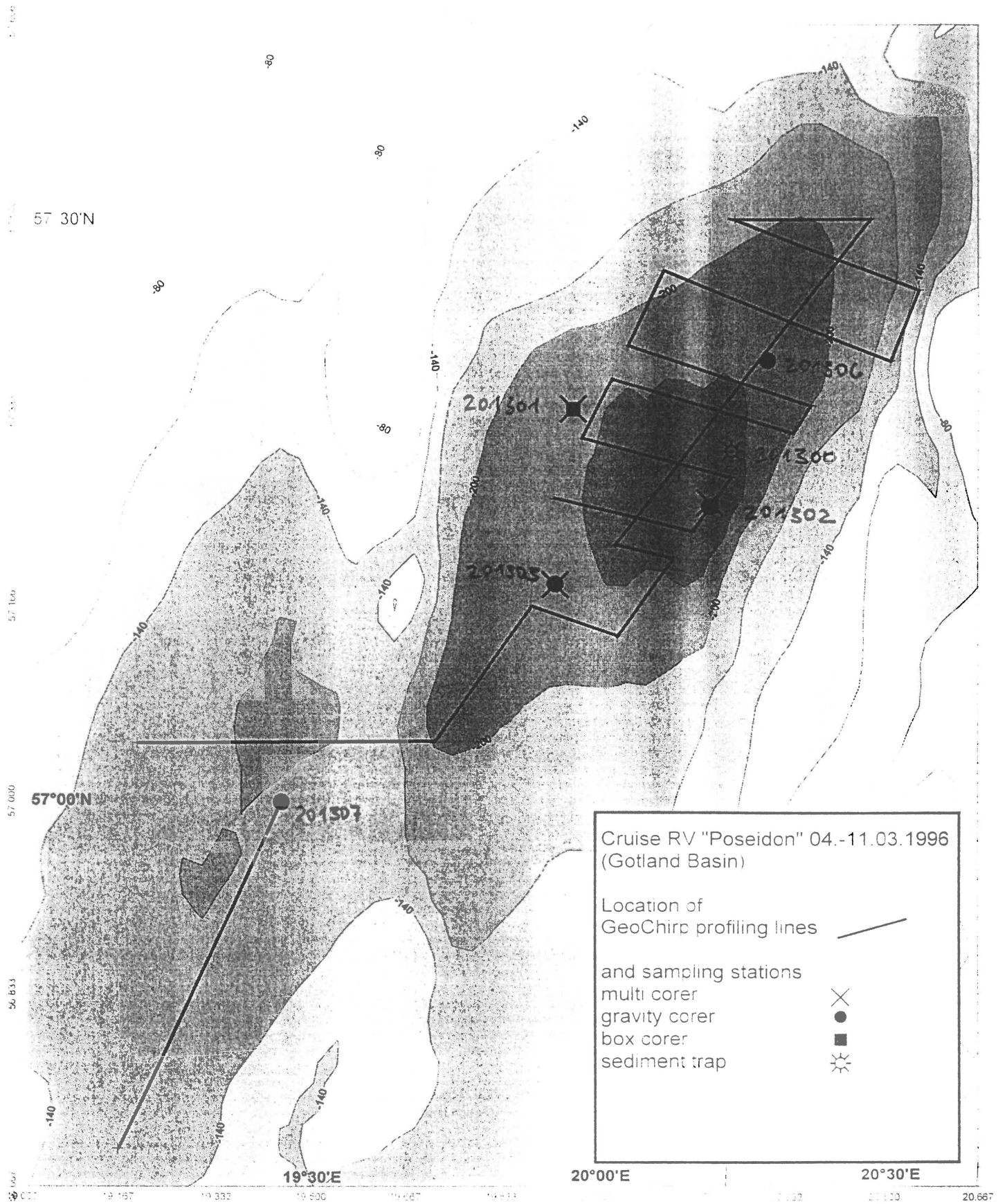
Figure 2: Bar chart of activities during the cruise

Table 2: Stations occupied during the expedition POSEIDON 215B

Table 3: Start and end of acoustic profiles

Appendix : Station records, Core Descriptions





Cruise RV "Poseidon" 04.-11.03.1996  
(Gotland Basin)

Location of  
GeoChirp profiling lines

and sampling stations

multi corer ●

gravity corer ○

box corer ■

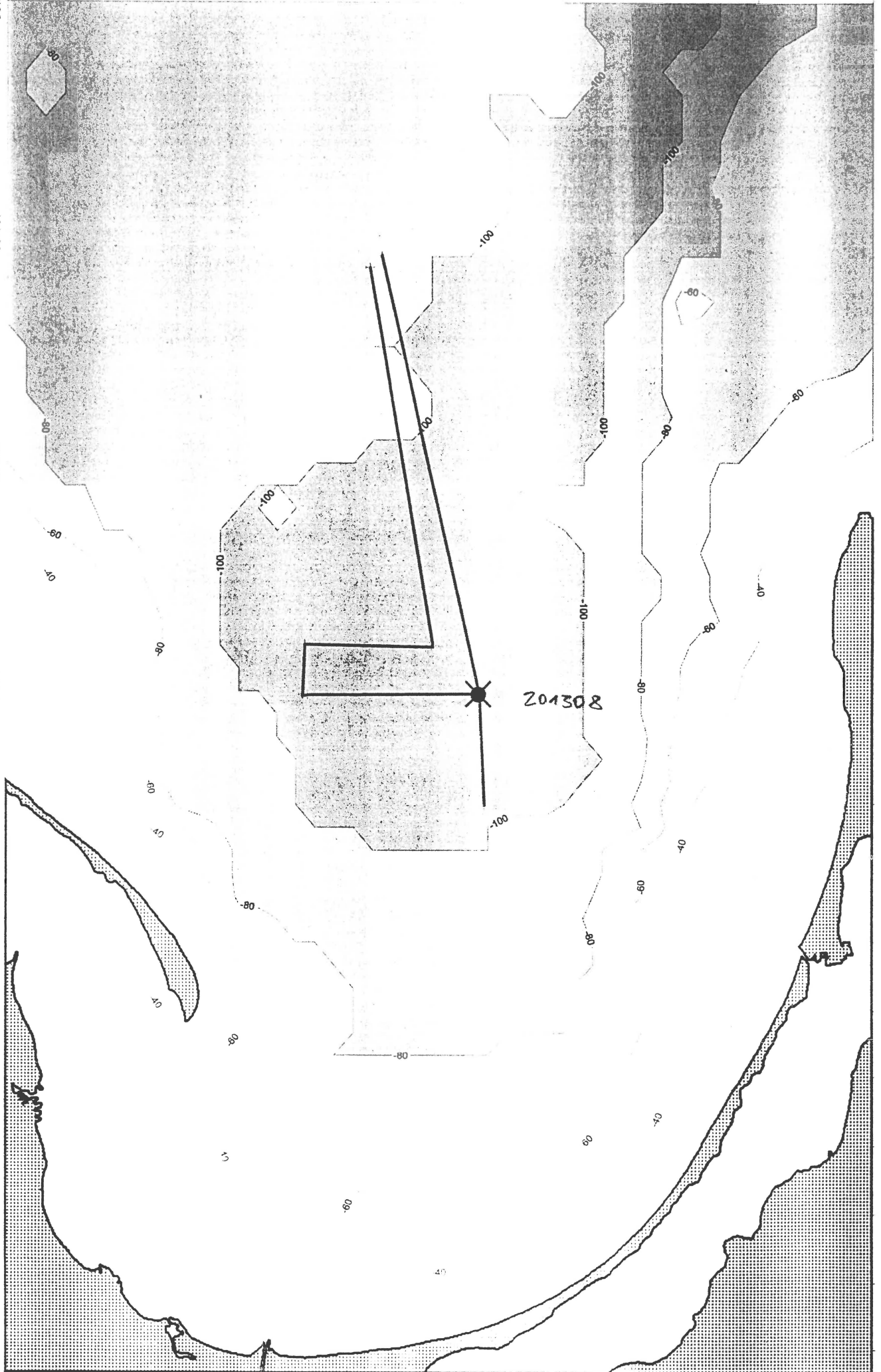
sediment trap ☼

19°00'E 19°15'E 19°30'E 19°45'E 20°00'E 20°15'E 20°30'E 20°45'E 20°60'E 20°75'E 20°90'E 21°00'E

56°45'N 56°55'N 57°05'N 57°15'N 57°25'N 57°35'N



54 333 54 500 54 667 54 833 55 000 55 167 55 333



18 667 18 833 19 000 19 167 19 333 19 500 19 667 19 833 20 000



Table 2: Sediment Stations

Station	Date	Time z	Lat	minutes	Lon	minutes	WD	Tool	Penetration	Yield
201300	07. 03 00	8:00	57 °	17.950 'N	20 °	14.100 'E		Falle		
201301-4	07. 03 00	11:48	57 °	20.100 'N	19 °	57.500 'E	237.0	MUC	0.6	0.60
201301-5	07. 03 00	13:42	57 °	20.100 'N	19 °	57.500 'E	237.0	KL	12.0	10.70
201302-5	08. 03 00	10:07	57 °	15.140 'N	20 °	11.990 'E	249.0	KL	12.0	7.00
201302-6	08. 03 00	12:11	57 °	15.280 'N	20 °	11.830 'E		MUC	0.7	0.70
201303-1	08. 03 00	15:13	57 °	11.090 'N	19 °	55.680 'E	237.0	MUC	0.6	0.60
201304-1	09. 03 00	7:18	57 °	11.140 'N	19 °	55.690 'E	241.0	SL	12.0	10.10
201305-3	09. 03 00	11:24	57 °	15.080 'N	20 °	11.840 'E	248.0	SL	12.0	9.00
201306-1	09. 03 00	13:32	57 °	22.660 'N	20 °	17.850 'E	235.0	SL	12.0	8.95
201307-1	09. 03 00	17:21	57 °	0.000 'N	19 °	26.990 'E	182.0	SL	12.0	9.95
201308-1	10. 03 00	11:09	54 °	49.870 'N	19 °	18.940 'E	117.0	SL	12.0	10.70
201308-2	10. 03 00	11:30	54 °	49.870 'N	19 °	18.940 'E	117.0	MUC	0.5	0.50
201310-1	12. 03 00	7:17	54 °	57.940 'N	13 °	40.000 'E	55.0	SL	12.0	9.85
201311-1	12. 03 00	8:17	54 °	59.260 'N	13 °	39.840 'E	55.0	SL	12.0	7.85

Table 3: Acoustic Profiles

line	time	date	lat	lon	length
	utc		[d] [min]	[d] [min]	[nm]
<i>Gotland Basin</i>					
960306-A2	16:28	06. 03 96	57 ° 15.500 N	19 ° 55.500 E	
			57 ° 13.800 N	20 ° 10.000 E	7.5
	18:04		57 ° 16.600 N	20 ° 14.000 E	3.5
960306-B1	18:06	06. 03 96	57 ° 16.600 N	20 ° 14.000 E	
			57 ° 18.600 N	19 ° 58.400 E	8.0
	19:53		57 ° 21.700 N	20 ° 1.600 E	3.7
960306-C1	19:58	06. 03 96	57 ° 21.700 N	20 ° 1.600 E	
	21:36		57 ° 18.900 N	20 ° 20.500 E	10.0
960306-D1	21:39	06. 03 96	57 ° 18.900 N	20 ° 20.500 E	
	21:51		57 ° 20.300 N	20 ° 22.400 E	1.7
960306-E1	21:53	06. 03 96	57 ° 20.300 N	20 ° 22.400 E	
			57 ° 23.400 N	20 ° 3.200 E	10.0
	00:11	07. 03 96	57 ° 27.300 N	20 ° 6.900 E	4.3
960307-A1	00:14	07. 03 96	57 ° 27.300 N	20 ° 6.900 E	
			57 ° 22.600 N	20 ° 30.600 E	13.0
	02:55		57 ° 26.300 N	20 ° 33.600 E	4.0
960307-B1	02:58	07. 03 96	57 ° 26.300 N	20 ° 33.600 E	
			57 ° 30.000 N	20 ° 14.400 E	10.2
	05:46		57 ° 30.000 N	20 ° 28.500 E	7.0
960307-C1	05:49	07. 03 96	57 ° 30.000 N	20 ° 28.500 E	
			57 ° 22.700 N	20 ° 17.800 E	9.0
	07:34		57 ° 19.149 N	20 ° 12.101 E	13.0
960307-E1	17:36	07. 03 96	57 ° 19.466 N	20 ° 12.426 E	
	18:55		57 ° 13.100 N	20 ° 2.000 E	9.0
960307-F1	18:58	07. 03 96	57 ° 13.100 N	20 ° 2.000 E	
			57 ° 12.500 N	20 ° 8.000 E	3.0
			57 ° 8.400 N	20 ° 2.200 E	5.0
	21:05		57 ° 10.000 N	19 ° 53.000 E	5.0
960307-G1	21:09	07. 03 96	57 ° 10.000 N	19 ° 53.000 E	
			57 ° 3.000 N	19 ° 43.000 E	9.5
	01:12	08. 03 96	57 ° 3.000 N	19 ° 12.000 E	15.5
960308-B1	18:07	08. 03 96	57 ° 0.000 N	19 ° 27.000 E	
			56 ° 42.000 N	19 ° 10.000 E	19.0
<i>Gdansk Basin</i>					
960309-A1	05:59	09. 03 96	55 ° 8.511 N	19 ° 7.568 E	
	09:02		54 ° 49.746 N	19 ° 18.905 E	19.0
	09:43		54 ° 44.929 N	19 ° 19.577 E	5.0
960309-C1	12:38	09. 03 96	54 ° 49.862 N	19 ° 18.987 E	
	14:20		54 ° 49.849 N	19 ° 1.209 E	11.0
960309-D1	14:23	09. 03 96	54 ° 49.856 N	19 ° 0.690 E	
	14:44		54 ° 52.000 N	19 ° 0.907 E	2.0
	15:54		54 ° 51.956 N	19 ° 14.036 E	8.0
960309-D1	15:56	09. 03 96	54 ° 52.082 N	19 ° 14.118 E	
	17:24		55 ° 9.030 N	19 ° 8.741 E	18.0

**Appendix 1:**  
**Station Records**

#201300.stat

Bordbezeichnung <b>POS 215B/204</b>	Schiff: <b>Poseidon</b>	Seegebiet: <b>Gotland</b>	Jahr 1996	Monat 3	Tag 6	Beginn 08:00	IOW Stations-Nummer <b>201300</b>
Breite: 57°17.95' N Länge: 020°14.1' E	Wassertiefe Start 244	<b>Stationsbeschreibung</b>					
Echogramm:		Position nach dGPS mit Geoid WGS 84					
<b>Geräteinsatz:</b>		Sedimentfallenstation bei BY271/Zentralstation					
		Fallenplan laut Anlage Fahrtbericht					
	Am Boden	Tiefe/Koordinaten	Gerät	Eindring	Gewinn	Entnehmer	Kurzbeschreibung
-1			Wasserschöpfer			Struck	Mehrere Einsätze bei 150 m zum Füllen der Cups
-2	10:15 z		Sedimentfallen			Struck	Sedimentfallen mit Aanderraa-Strömungsmesser
-3							Temperaturrecorder C521 Auftrieb 1
-4							C523 Auftrieb 2
-5							C525 Falle 1
-6							C529 Auftrieb 3
-7							C527 Falle 2

Folgekarte

Ja.....

Nein.....

Probenliste bei

Temperaturlogger# C521

2x  
60 kg Auftrieb



C523

Meteorleine (10m)



C525

Sinkstofffalle (SMT 236)



Kette (1-2m)



Meteorleine (20m)



C529

60 kg Auftrieb



Meteorleine (50m)



C527

Sinkstofffalle (SMT 236)



Kette (1-2m)



Meteorleine (5m)



20 kg Auftrieb (mit ca. 5m Meteorleine)



Anderaa Strömungsmesser



Meteorleine (5m)



akustischer Auslöser (Benthos)



Drahtseil (ca. 10m)

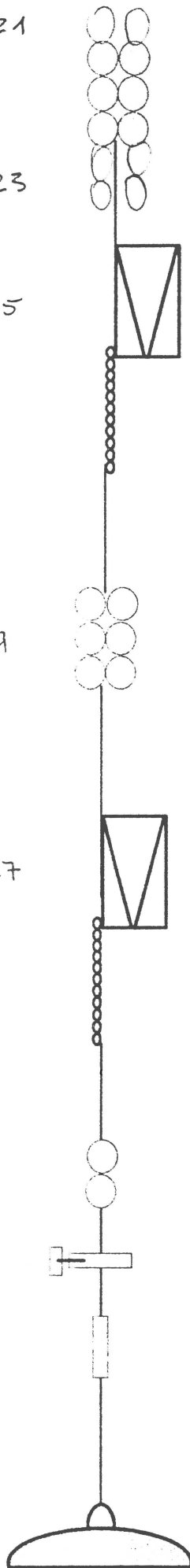
22 Schäkel (verzinkt)

9 Eisenringe

4 Schäkel (Niro)

2 Ringe (Niro)

2 Drehwirbel (Niro)



Grundgewicht (ca. 300kg)

GOTLAND II (Gesamtlänge ca. 115m)

FS FS Poseidon

Betr.: ~~Strommess-~~ <sup>Sinkstoffallen-</sup> Verankerung Nr. 1 Zeitmeridian: UTC + 01 h

Die Verankerung wurde am 06.03.1996 ausgelegt.

Folgende Angaben zur Auslegung:

Wetter: Wind 5 kn aus 325 Grad

Wellenhöhe 1 m aus 360 Grad 4 sec

Stations-Nr. 204

Lottiefe 247 m Wassertiefe 247 m (beschickt)

Stationsbeginn 0950 Stationsende 1025

Zeit: 0950 <sup>Auftriebs-</sup> ~~Bojen mit~~ Sender — zu Wasser

Zeit: 1004 Releaser zu Wasser

Zeit: 1015 Ankerstein zu Wasser

Zeit: — Sender nach — Stunden — Minuten erloschen

<sup>GPS</sup>  
(SAT - FIX) während der Verankerungsauslegung

Zeit: <u>0950</u>	Breite: <u>57° 17,3' N</u>	Länge: <u>020° 15,0' E</u>	(1. Auftriebspak.)
Zeit: <u>0953</u>	Breite: <u>57° 17,4' N</u>	Länge: <u>020° 15,0' E</u>	(1. Sinkstoffalle)
Zeit: <u>0957</u>	Breite: <u>57° 17,5' N</u>	Länge: <u>020° 14,8' E</u>	(2. Auftriebspak.)
Zeit: <u>1002</u>	Breite: <u>57° 17,6' N</u>	Länge: <u>020° 14,6' E</u>	(2. Sinkstoffalle)
Zeit: <u>1004</u>	Breite: <u>57° 17,7' N</u>	Länge: <u>020° 14,5' E</u>	(Auslöser)
Zeit: <u>1015</u>	Breite: <u>57° 18,0' N</u>	Länge: <u>020° 14,0' E</u>	(Ankerstein)

Die Verankerung kann mit der Position:

Breite: 57° 17,95' N Länge: 020° 14,1' E

als richtig angenommen werden.

Magnetische Mißweisung: 4° E Grad

Akustischer Anruf nach dem Auslegen

nein

o.k.

Zeit: 1022

Bemerkungen:

DIE VERANKERUNG WURDE ÜBER DAS HECK AUSGELEGT.

Jilbers  
Kapitän



#201301.stat

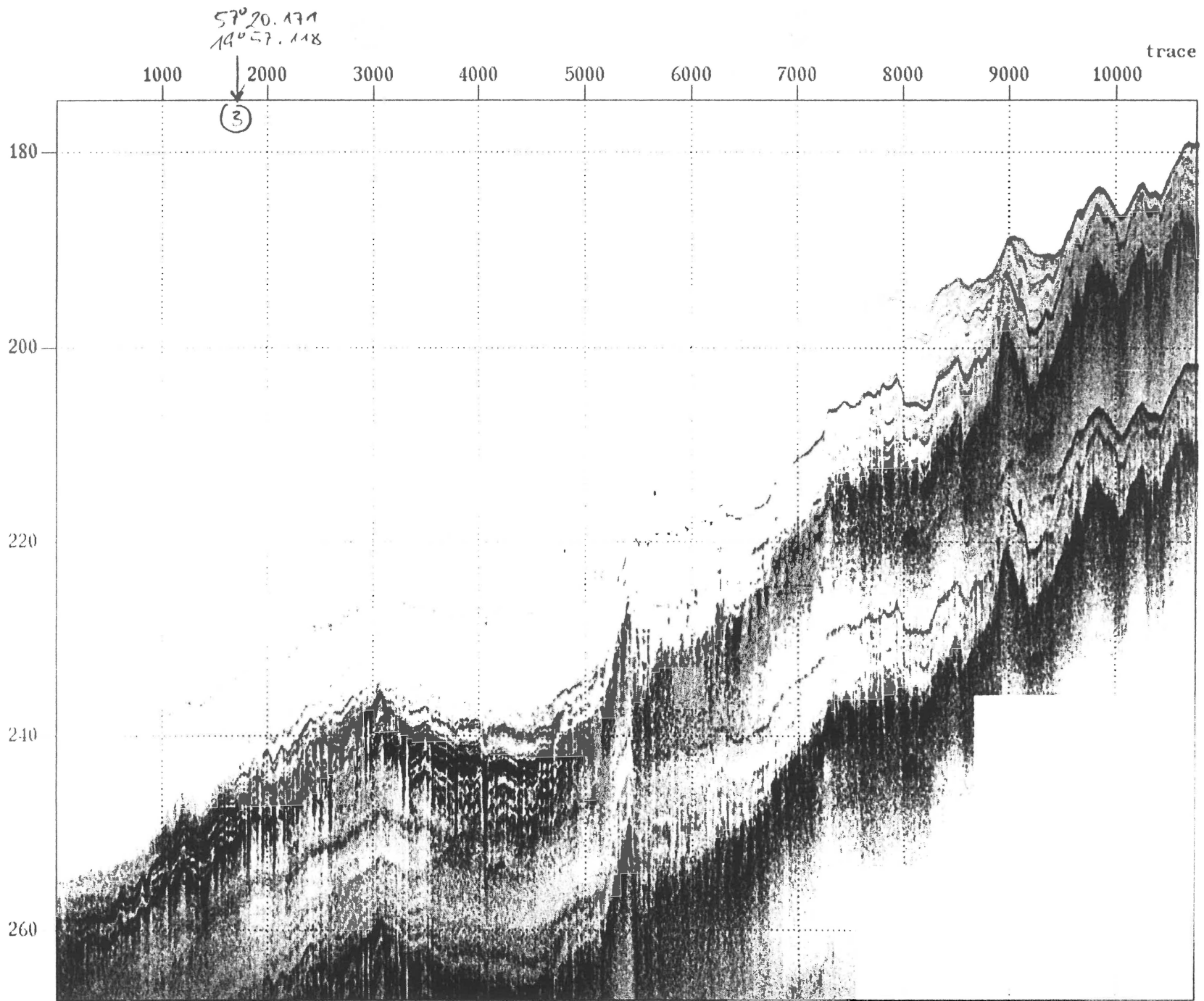
Bordbezeichnung	Schiff:	Seegebiet:	Jahr	Monat	Tag	Beginn	IOW Stations-Nummer
POS 215B/205	Poseidon	Gotland	1996		3	6 11:48	201301
Breite: 57°20.1' N	Wassertiefe Start	<b>Stationsbeschreibung</b> Position nach dGPS mit Geoid WGS 84 Sedimentstation am W-Hang des Beckens; Abfolge des Littorinstadiums dünn; Seestadien dick					
Länge: 019°57.5' E	237						
Echogramm:							
<b>Geräteinsatz:</b>							
	Am Boden	Tiefe/Koordinaten	Gerät	Eindring	Gewinn	Entnehmer	Kurzbeschreibung
-1	10:56 GMT		Niemistö-Lot			Endler	
-2	11:22 GMT		Niemistö-Lot			Endler	
-3	11:48:00 GMT		MUC	60	60	Emeis	Übervoll, Wiederholen
-4	12:37 GMT		MUC	55	55	Emeis	8 Rohre mit Schlick, s. Kernbeschreibung
-5	13:42 GMT	57°20.22' / 19°57.34'	Kastenlot	12 m	1070	Struck	Basis Warventon, gestört. Röntgenpräparate, u-channels, Porenwasser, Proben Reich Paläontologie
-6	15:40 GMT		Sonde Leitfähigkeit			Endler	
-7							

Folgekarte

Ja.....

Nein.....

Probenliste bei



depth in m

File: 82304sh2; ampl.range: 5-98%; stacked:9;

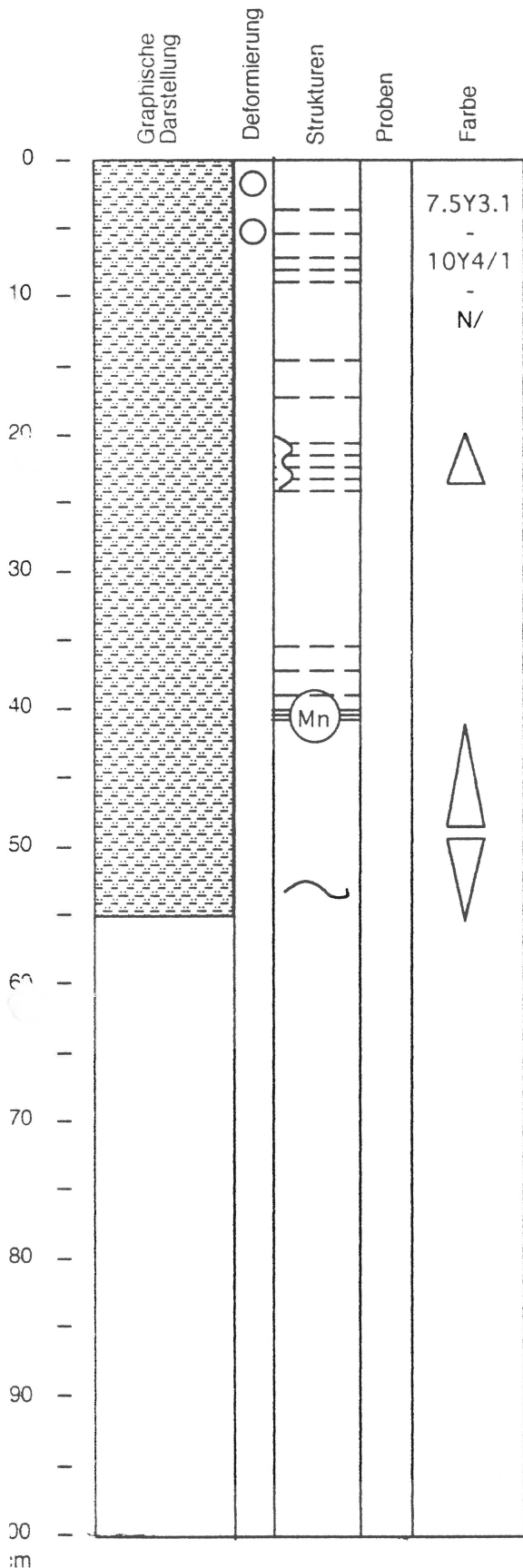
Datum	Bearbeiter
6 / 3 / 1996	Emeis

Kern #	Sektion	Intervall	Typ
201301	3	0-55	MUC

Position: 57°20.1'N/ 019°57.5'E

237 m Wassertiefe

## Multicorerbeschreibung

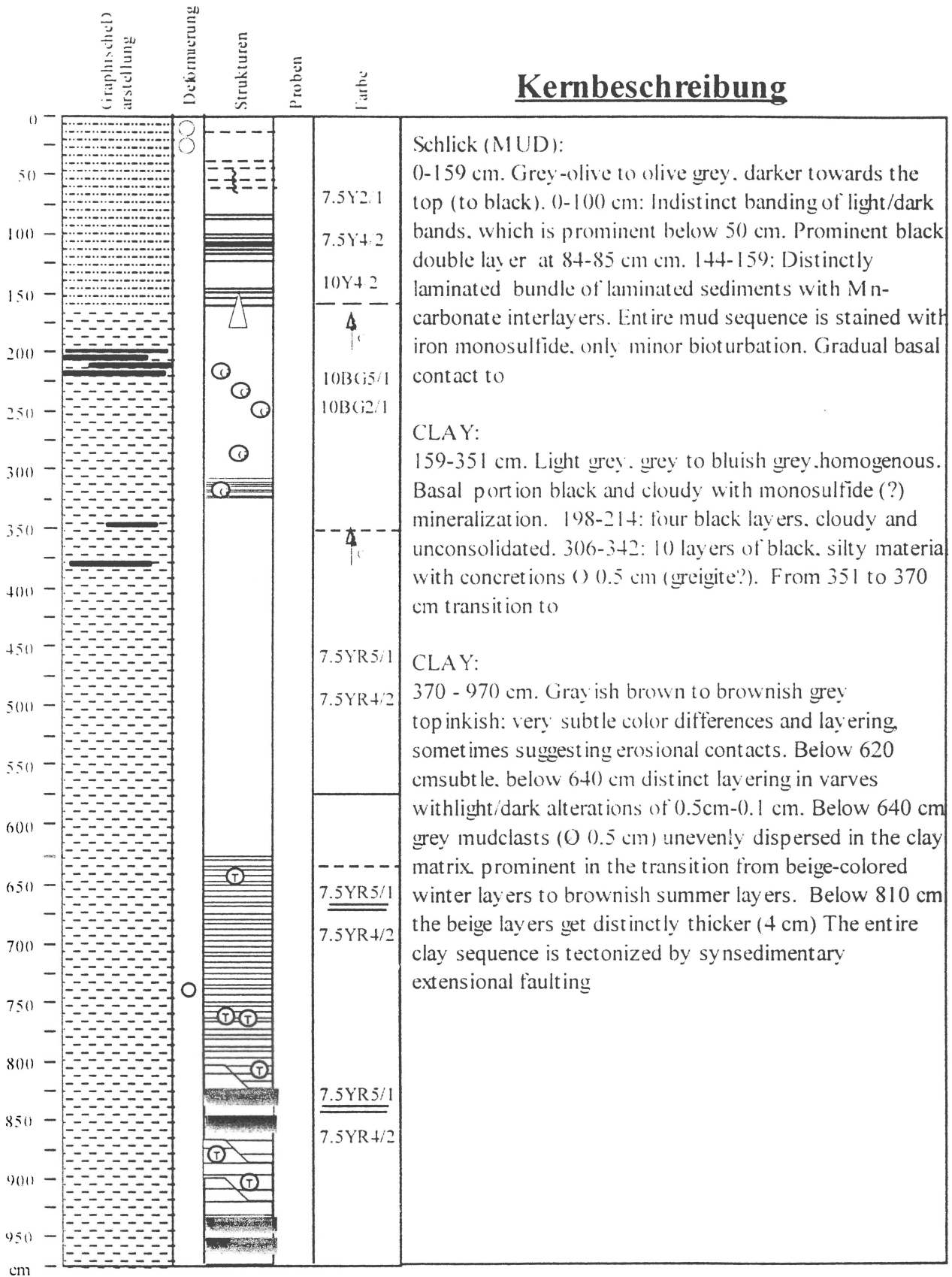


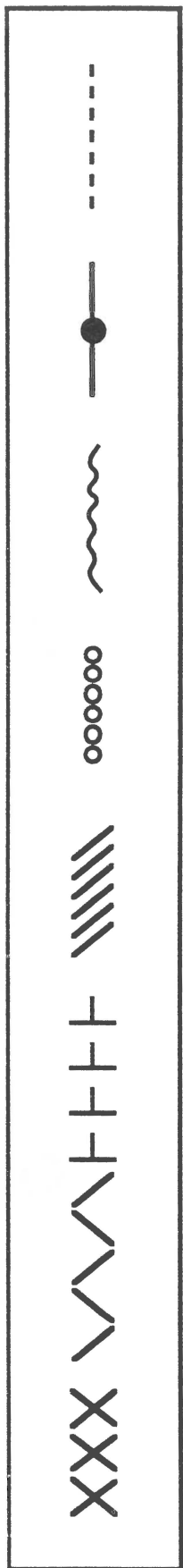
SCHLICK, schwarzgrauoliv bis schwarz, grau, mit Monosulfid imprägniert und mit einzelnen Mn-Carbonatlagen ( 40-41 cm). Teilweise undeutlich gebändert und bioturbiert. Einige Intervalle mit Farbgradierung von hell bis dunkel oder umgekehrt. Die ersten 4 cm sehr wasserreich und suppig.

Datum	Bearbeiter
06 / 03 / 1996	Struck

Leg	Station	Kern #	Typ
POS215B	201301	5	KL 12m

## Kernbeschreibung





Wenig gestört

Mäßig gestört

Sehr gestört

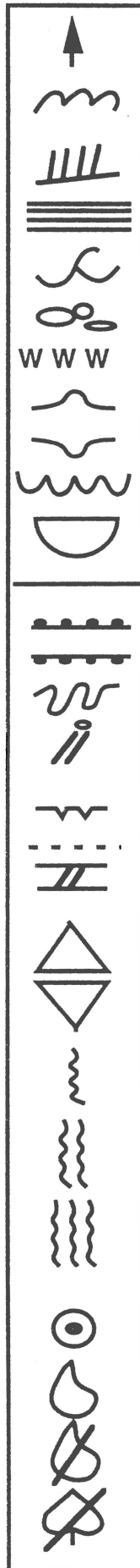
Suppig

Leicht gebrochen

Mäßig zerbrochen

Stark zerbrochen

Brekziös



Intervallkennzeichnung

Strömungsrippeln

Mikro-Kreuzschichtung

Parallele Laminierung

Flaserschichtung

Linsenförmige Schichtung

Wellenartige Schichtung

Slumps

Load casts

Erosiver Kontakt

Kolkmarken

Scharfer Kontakt

Normale Gradierung

Inverse Gradierung

Verwürgte Schichtung

Entwässerungsspuren

Mudcracks

Gradierter Kontakt

Kreuzschichtung

Feiner nach oben

Feiner nach unten

Bioturbation:  
gering (<30% Oberfläche)

mäßig (30%-60% Oberfläche)

stark (> 60% Oberfläche)

Konkretionen

Schalen komplett

Schalenfragmente

Holzreste

## Deformations- und Struktursymbole

#201302.stat

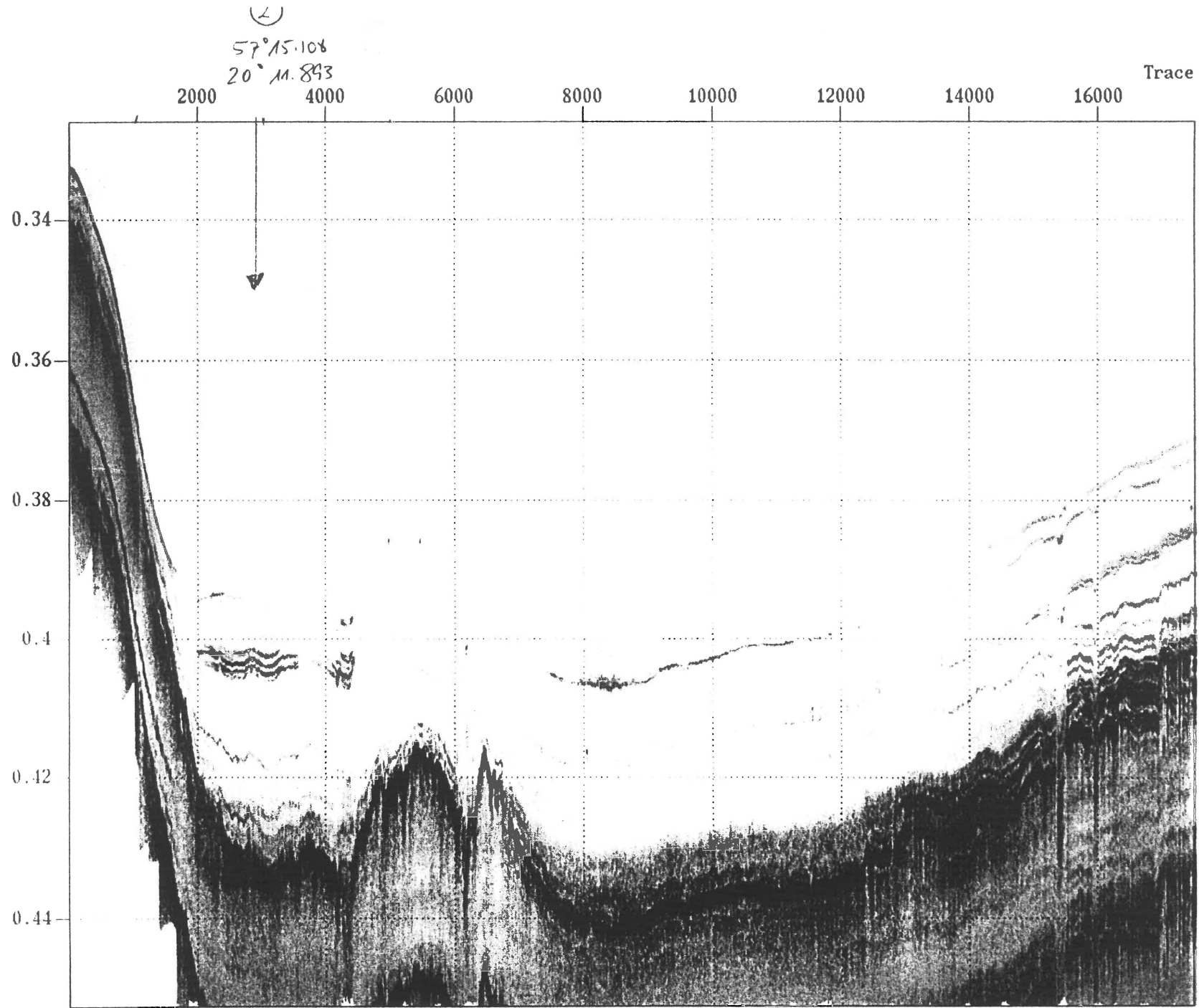
Bordbezeichnung <b>POS 215B/206</b>	Schiff: <b>Poseidon</b>	Seegebiet: <b>Gotland</b>	Jahr 1996	Monat 3	Tag 7	Beginn 09:13	IOW Stations-Nummer <b>201302</b>
Breite: 57°15.0'N Länge: 020°12.0'E	Wassertiefe Start 249	<b>Stationsbeschreibung</b>					
Echogramm:	CHIRP	Position nach dGPS mit Geoid WGS 84					
<b>Geräteinsatz:</b>		Sedimentstation am E-Rand des Beckens, Sedimente Littorina sehr dick ausgeprägt					
	Am Boden	Tiefe/Koordinaten	Gerät	Eindring	Gewinn	Entnehmer	Kurzbeschreibung
-1	08:23 GMT	57°15.054'N/ 020°11.95'E	Kastenlot	10 m	400	Emeis	Halbvoll, verworfen
-2	09:11 GMT	57°15.1'N/ 020°11.8'E	Niemistö-Lot			Endler	zu voll, verworfen
-3	09:29 GMT	57°15.1'N/ 020°12.1'E	Niemistö-Lot			Endler	ok, Oberfläche nicht erwischt
-4	09:52 GMT	57°15.12'N/ 020°11.92'E	Niemistö-Lot			Endler	zu voll, verworfen
-5	10:07 GMT	57°15.14' / 20°11.99'	Kastenlot	12 m	700	Struck	Littorinaschlick, gebändert; s. Kernbeschreibung
-6	12:11-13:45	57°15.28' / 20°11.83'	MUC (5x)	70	70	Emeis	Oberfläche fraglich; 1 slice, 1 Risö
-7							

Folgekarte

Ja.....

Nein.....

Probenliste bei



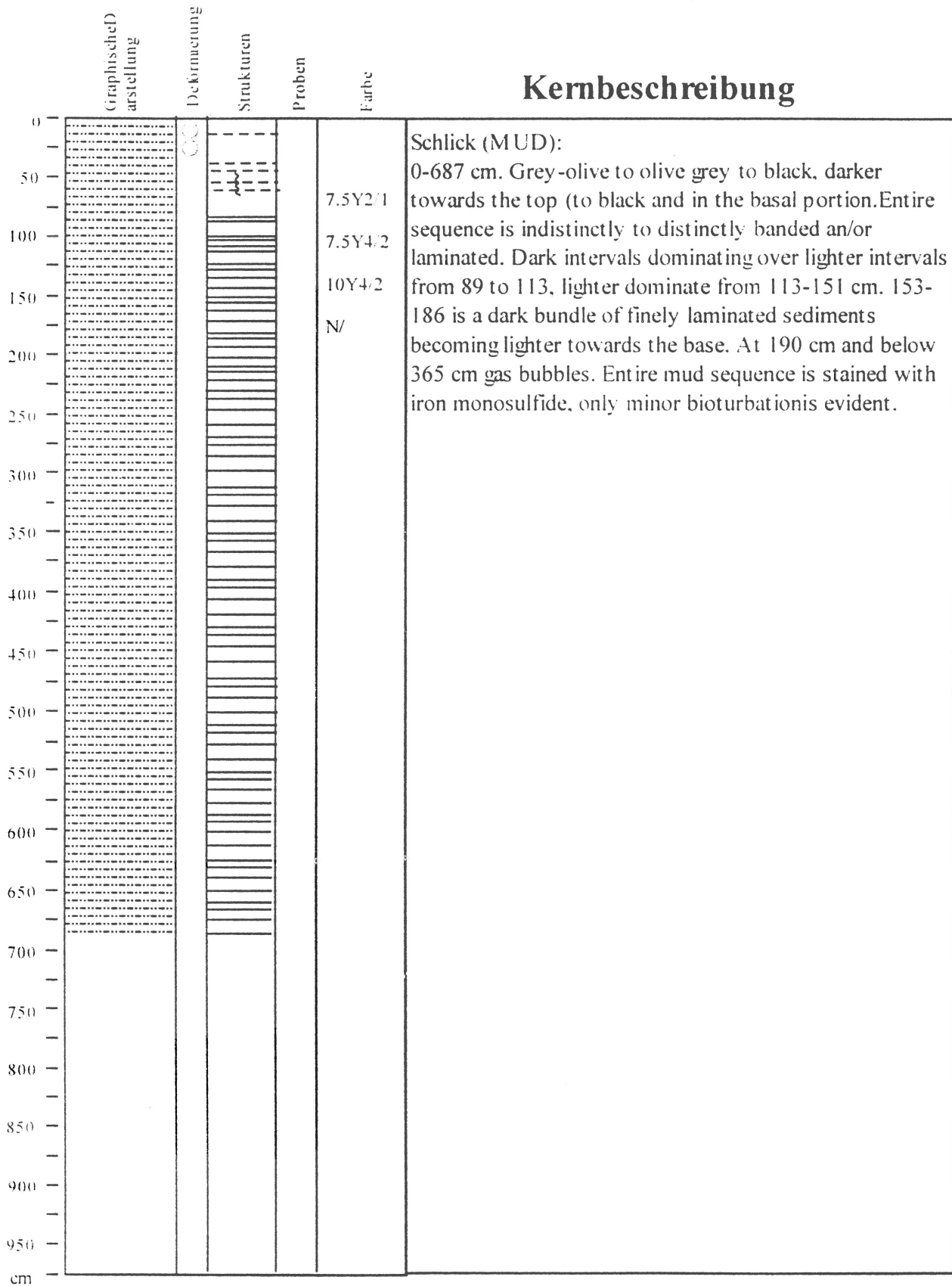
Zeit in sec

82705sh1\_swf\_bartlett\_800

Datum	Bearbeiter
06 / 03 / 1996	Struck

Leg	Station	Kern #	Typ
POS215B	201302	5	KL 12m

## Kernbeschreibung



Schlick (MUD):  
 0-687 cm. Grey-olive to olive grey to black, darker towards the top (to black and in the basal portion. Entire sequence is indistinctly to distinctly banded and/or laminated. Dark intervals dominating over lighter intervals from 89 to 113, lighter dominate from 113-151 cm. 153-186 is a dark bundle of finely laminated sediments becoming lighter towards the base. At 190 cm and below 365 cm gas bubbles. Entire mud sequence is stained with iron monosulfide, only minor bioturbation is evident.

687 cm EOC



#201303.stat

Bordbezeichnung	Schiff:	Seegebiet:	Jahr	Monat	Tag	Beginn	IOW Stations-Nummer
POS 215B/207	Poseidon	Gotland	1996		3	7 16:06	201303
Breite: 57°11.1'N	Wassertiefe Start	<b>Stationsbeschreibung</b>					
Länge: 019°55.60'E	237	Position nach dGPS mit Geoid WGS 84					
Echogramm:	CHIRP	Sedimentstation am S-Rand des Beckens,					
<b>Geräteinsatz:</b>		Sedimente flach gelagert					
	Am Boden	Tiefe/Koordinaten	Gerät	Eindring	Gewinn	Entnehmer	Kurzbeschreibung
-1	15:13 GMT	57°11.09'N/ 019°55.68'E	MUC	60	60	Emeis	8 Rohre, Emeis, Blanz, N.N. Risö; 0-10 schwarz, Bodenwasser -80 mV
-2	15:41 GMT	57°11.15'N/ 019°56.06'E	Niemistö-Lot			Endler	ok
-3	15:50 GMT	57°11.06'N/ 019°56.05'E	Niemistö-Lot			Endler	ok
-4							
-5							
-6							
-7							

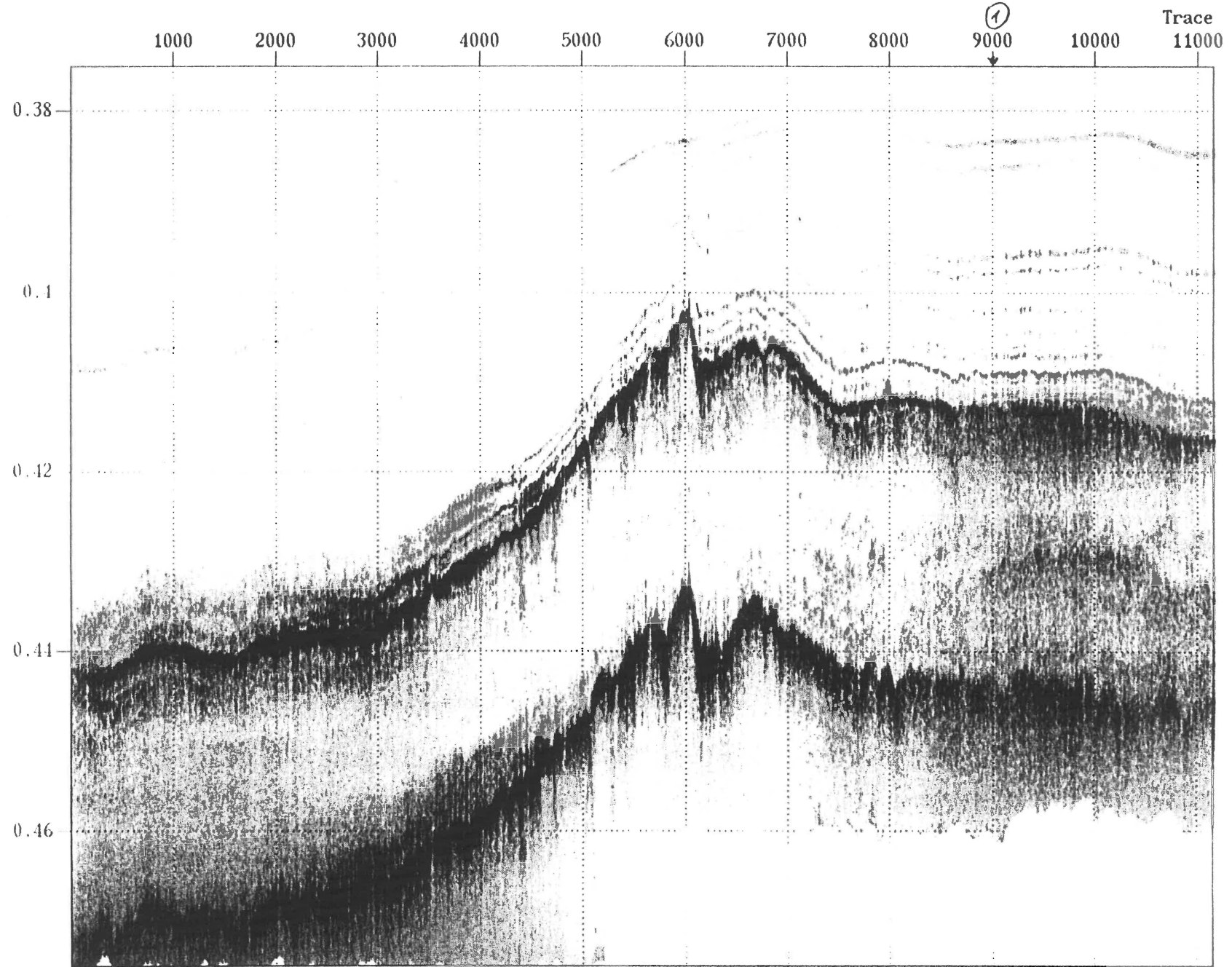
Folgekarte

Ja.....

Nein.....

Probenliste bei

57° 11,093' N  
14° 55 622' E



Zeit in sec

83003sh1\_swf\_bartlett\_900

#201304.stat

Bordbezeichnung <b>POS 215B/208</b>	Schiff: <b>Poseidon</b>	Seegebiet: <b>Gotland</b>	Jahr 1996	Monat 3	Tag 8	Beginn 08:56	IOW Stations-Nummer <b>201304</b>
Breite: 57°11.16´N	Wassertiefe Start 241	<b>Stationsbeschreibung</b>					
Länge: 019°55.68´E		Position nach dGPS mit Geoid WGS 84					
Echogramm:	CHIRP	Schwerelotstation zu 201303					
<b>Geräteinsatz:</b>							
	Am Boden	Tiefe/Koordinaten	Gerät	Eindring	Gewinn	Entnehmer	Kurzbeschreibung
-1	07:18 GMT	57°11.14´N/ 019°55.69´E	SL 12 m	12 m	1010	Emeis	Basis brauner Ton
-2							
-3							
-4							
-5							
-6							
-7							

Folgekarte

Ja.....

Nein.....

Probenliste bei

#201305.stat

Bordbezeichnung	Schiff:	Seegebiet:	Jahr	Monat	Tag	Beginn	IOW Stations-Nummer
POS 215B/209	Poseidon	Gotland	1996		3	8 10:23	201305
Breite: 57°15.21´N	Wassertiefe Start	Stationsbeschreibung					
Länge: 020°11.88´E	248	Position nach dGPS mit Geoid WGS 84					
Echogramm:	CHIRP	Schwerelotstation zu 201302					
Geräteinsatz:		Zuerst mit 1,2 t gewicht, dann 850 kg					
	Am Boden	Tiefe/Koordinaten	Gerät	Eindring	Gewinn	Entnehmer	Kurzbeschreibung
-1	09:09 GMT	57°15.41´N/ 020°11.805´E	SL 12 m	>12 m	>1200	Emeis	Basis brauner Ton; Wiederholen
-2	09:23 GMT	57°15.20´N/ 020°11.93´E	SL12 m	>12 m		0 Emeis	
-3	11:24 GMT	57°15.08´N/ 020°11.84´E	SL12 m	>12 m	900	Emeis	Basis Littorina-Schlick, laminiert
-4							
-5							
-6							
-7							

Folgekarte

Ja.....

Nein.....

Probenliste bei

#201306.stat

Bordbezeichnung	Schiff:	Seegebiet:	Jahr	Monat	Tag	Beginn	IOW Stations-Nummer
POS 215B/210	Poseidon	Gotland	1996		3	8 10:23	201306
Breite: 57°22.67' N	Wassertiefe Start	Stationsbeschreibung Position nach dGPS mit Geoid WGS 84					
Länge: 020°17.85' E	235						
Echogramm:	CHIRP						
Geräteinsatz:							
	Am Boden	Tiefe/Koordinaten	Gerät	Eindring	Gewinn	Entnehmer	Kurzbeschreibung
-1	13:32 GMT	57°22.66' N/ 020°17.84' E	SL 12 m	>12 m	895	Emeis	Basis brauner Ton
-2							
-3							
-4							
-5							
-6							
-7							

Folgekarte

Ja.....

Nein.....

Probenliste bei

#201307.stat

Bordbezeichnung	Schiff:	Seegebiet:	Jahr	Monat	Tag	Beginn	IOW Stations-Nummer
POS 215B/211	Poseidon	Gotland	1996		3	8 18:16	201307
Breite: 57°00' N	Wassertiefe Start	Stationsbeschreibung					
Länge: 019°26.99' E	182	Position nach dGPS mit Geoid WGS 84					
Echogramm:	CHIRP	Kleines Becken W' Klints Bank					
Geräteinsatz:							
	Am Boden	Tiefe/Koordinaten	Gerät	Eindring	Gewinn	Entnehmer	Kurzbeschreibung
-1	17:21 GMT	57°00.01' N/ 019°26.93' E	SL 12 m	>12 m	995	Emeis	Basis brauner Ton (Liner falsch beschriftet (10 cm))
-2	17:32 GMT	57°00.04' N/ 019°26.88' E	Niemistölot			Endler	
-3	17:32 GMT	57°00.04' N/ 019°26.88' E	Niemistölot			Endler	
-4							
-5							
-6							
-7							

Folgekarte

Ja.....

Nein.....

Probenliste bei

#201308.stat

Bordbezeichnung	Schiff:	Seegebiet:	Jahr	Monat	Tag	Beginn	IOW Stations-Nummer
POS 215B/212	Poseidon	Gdansk	1996		3	9 12:09	201308
Breite: 54°49.9´N	Wassertiefe Start	Stationsbeschreibung					
Länge: 019°18.4´E	117 m	Position nach dGPS mit Geoid WGS 84					
Echogramm:	CHIRP	Zentralstation Gdanker Bucht					
Geräteinsatz:							
	Am Boden	Tiefe/Koordinaten	Gerät	Eindring	Gewinn	Entnehmer	Kurzbeschreibung
-1	11:09 GMT	54°49.87´N/ 019°18.94´E	SL 12 m	>12 m	1070	Emeis	Überteuft (ca 200 cm); Basis grauer Ton
-2	11:30 GMT	54°49.87´N/ 019°18.94´E	MUC	50 cm	50 cm	Emeis	8 MUC-Rohre mit Bodenwasser. Deutliche Beggia-toa-Matten, Bodenwasser +180 mV
-3	11:50 GMT	54°49.87´N/ 019°18.94´E	Niemistölot			Endler	
-4	11:55 GMT	54°49.87´N/ 019°18.94´E	Niemistölot			Endler	
-5							
-6							
-7							

Folgekarte

Ja.....

Nein.....

Probenliste bei

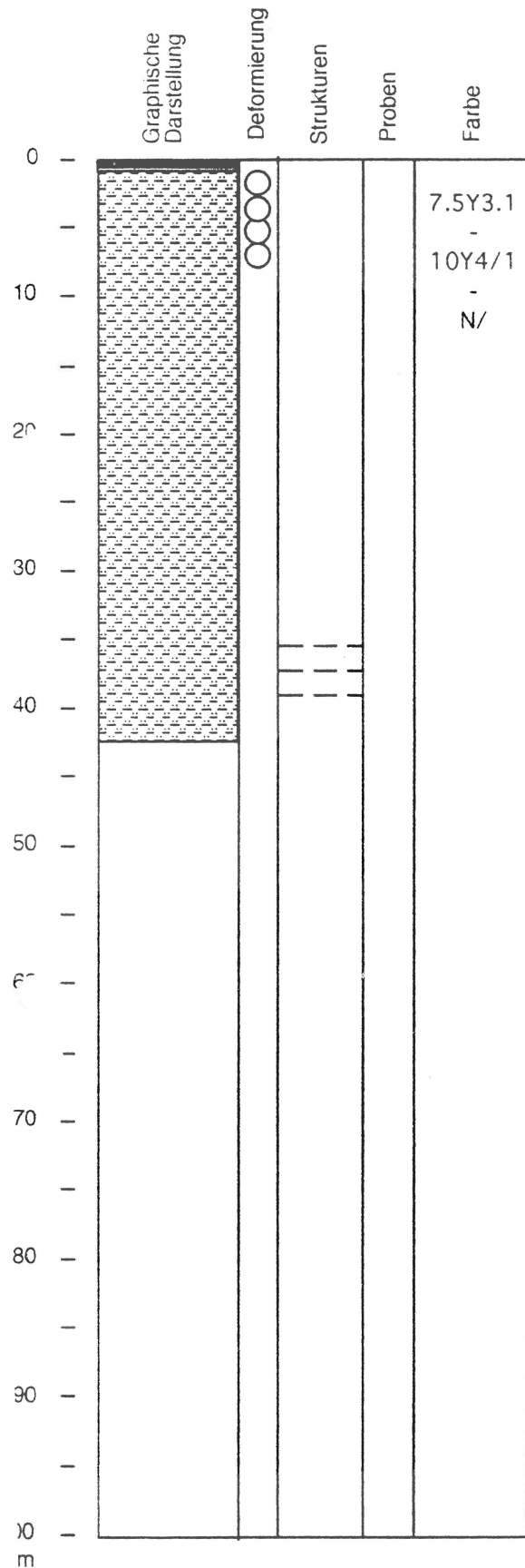
Datum	Bearbeiter
6 / 3 / 1996	Emeis

Kern #	Sektion	Intervall	Typ
201308	2	0-42	MUC

Position: 54°49.9'N/ 019°18.9'E

117 m Wassertiefe

## Multicorerbeschreibung



SCHLICK, leicht sandig,  
 grauschwarz bis schwarz,  
 mit Monosulfid imprägniert.  
 Unten undeutlich gebändert und  
 ansonsten homogen.  
 0-0.2 cm: Bakterienmatte (Beggiatoa),  
 bräunlich und filzig mit Detritusauflage.  
 0.2-0.7 cm: Schwarze, flockige Schicht  
 Sehr wasserreich bis 6 cm.  
 Sulfidgeruch im gesamten Tiefenintervall



#201309.stat

Bordbezeichnung	Schiff:	Seegebiet:	Jahr	Monat	Tag	Beginn	IOW Stations-Nummer
POS 215B/213	Poseidon	Gdansk	1996		3	10 08:08	201309
Breite: 54°49.9'N	Wassertiefe Start	Stationsbeschreibung					
Länge: 019°18.95'E	119 m	Position nach dGPS mit Geoid WGS 84					
Echogramm:	CHIRP	Zentralstation Gdanker Bucht					
Geräteeinsatz:							
	Am Boden	Tiefe/Koordinaten	Gerät	Eindring	Gewinn	Entnehmer	Kurzbeschreibung
-1	07:08 GMT	54°49.9'N/ 019°18.95'E	KL	>12 m	300	Emeis	verworfen
-2	07:57 GMT	54°49.84'N/ 019°19.13'E	KL	>12 m	0	Emeis	Banane
-3							
-4							
-5							
-6							
-7							

Folgekarte

Ja.....

Nein.....

Probenliste bei

#201310.stat

Bordbezeichnung		Schiff:		Seegebiet:		Jahr		Monat		Tag		Beginn		IOW Stations-Nummer	
POS 215B/214		Poseidon		Arkona		1996		3		11		08:17		201310	
Breite: 54°57.94´N		Wassertiefe Start		Stationsbeschreibung											
Länge: 013°40.0´E		55 m		Position nach dGPS mit Geoid WGS 84											
Echogramm:		CHIRP		Station Arkona R. Endler											
Geräteinsatz:															
	Am Boden	Tiefe/Koordinaten		Gerät	Eindring	Gewinn	Entnehmer		Kurzbeschreibung						
-1	07:17 GMT	54°57.94´N/ 013°40.0´E		SL 11m	>12 m	985	Emeis		Basis rosa/brauner Ton						
-2															
-3															
-4															
-5															
-6															
-7															

Folgekarte

Ja.....

Nein.....

Probenliste bei

#201311.stat

Bordbezeichnung	Schiff:	Seegebiet:	Jahr	Monat	Tag	Beginn	IOW Stations-Nummer
POS 215B/215	Poseidon	Arkona	1996		3	11 09:12	201311
Breite: 54°59.26´N	Wassertiefe Start	Stationsbeschreibung					
Länge: 013°39.84´E	55 m	Position nach dGPS mit Geoid WGS 84					
Echogramm:	CHIRP	Station Arkona R. Endler					
Geräteinsatz:							
	Am Boden	Tiefe/Koordinaten	Gerät	Eindring	Gewinn	Entnehmer	Kurzbeschreibung
-1	07:17 GMT	54°59.26´N/ 013°39.84´E	SL 11m	>12 m	785	Emeis	Basis rosa/brauner Ton
-2							
-3							
-4							
-5							
-6							
-7							

Folgekarte

Ja.....

Nein.....

Probenliste bei