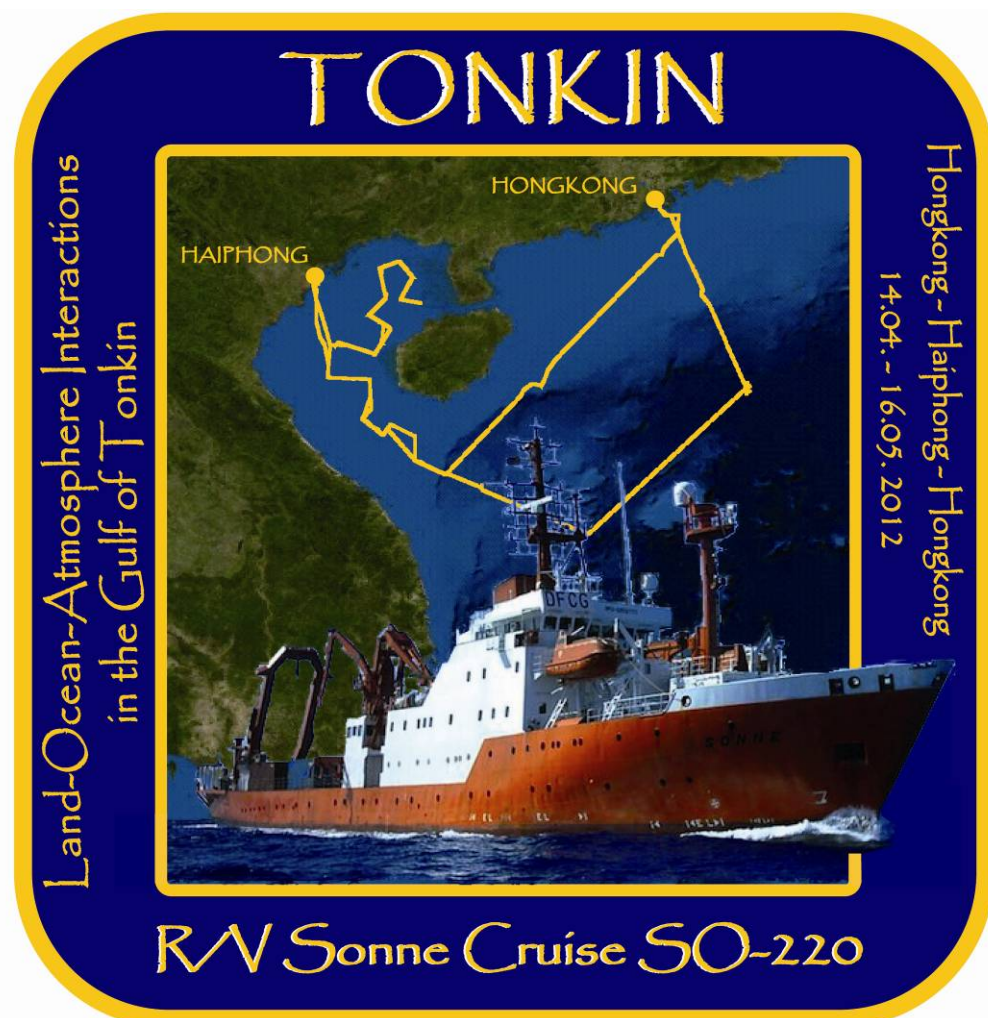


CRUISE REPORT RV SONNE 220



CHINA

‘LAND-OCEAN-ATMOSPHERE INTERACTIONS IN THE GULF OF TONKIN’

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Fig. 1: Scientific participants of cruise SO-220

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1. Research Programme and Objectives

The work of SO-220 pursued a multidisciplinary approach. The continental shelf of the Gulf of Tonkin and its continental slope at the transition to the deep-sea areas in the South China Sea were surveyed by three teams from a biogeochemical (sub-project 1), physical oceanographic (sub-project 2) and coastal-marine geologic (sub-project 3) approach.

The study aims

- to determine the processes controlling the nutrient availability and the resultant material fluxes, their seasonality, inter-annual variability and linking to the rivers draining the hinterland;
- to monitor the biogeochemical fluxes by means of sediment traps;
- to assess the nitrogen sources and nutrient dynamics;
- to analyze the plankton assemblages and to tune paleo-proxies;
- to describe the upwelling system and transport pathways of (re)suspended matter by means of oceanographic models based on hydrological and climatological in-situ and remotely sensed data as well as in-situ data on the concentration and granulometry of the particles suspended in the water column;
- to determine, in comparison with this data, the depositional environment and stratigraphic sequence of the sedimentary deposits and surfaces and the present-day hydrodynamic and sediment-dynamical processes;
- to trace back sedimentation events until the late Pleistocene;
- to assess the impact of the changes in climate, hydrography and morphology associated with the early Holocene sea level rise in the Gulf, especially the flooding of the incised Red River valley.

Integration of the present-day and past scenarios in combination with investigations performed by the applicants on the inner Sunda Shelf and off central Vietnam will contribute to a better understanding of the consequences of global change in SE-Asia. The results will serve to establish a data base for protective and preventive measures to resist the expected increase in frequency and amplitude of both ENSO events and typhoons, and significant rise in sea level.

The objectives of the biogeochemical investigations (sub-project 1) are to quantify the extent of the ENSO-induced anomalies in the material fluxes the upwelling region off Hainan and the oligotrophic northern South China Sea as a reference station. Already anchored traps for settling matter were recovered and redeployed in order to record the particle flux at the SCS-W station under El Niño conditions which are to be expected until 2014 within the planned duration of the project. Sediment samples at SCS-W will help to reconstruct particle fluxes under ENSO-neutral conditions. In addition, this station will also be used to record changes in the biogeochemical materials flows in the oligotrophic area of the South China Sea caused by ENSO in order to describe the extent of these anomalies throughout the basin. Paleo-proxies will be calibrated using the recent suspended and settling matter and, together with sub-project 3, the sediment dynamics in the upwelling region is to be traced back as far as the late Pleistocene using sediment cores. The concentration and particle sizes of the suspended matter will be determined along the sampling lines in the Gulf of Tonkin. In sub-project 2 this information will be included in oceanographic models to show transport routes and sources of the suspended matter.

The aim of the physical-oceanographic investigations (sub-project 2) is to document upwelling events and transport off the coast and into the adjacent deep sea basin. During the upwelling phase, a complex frontal system consisting of warm coastal water, water from the South China Sea and low-saline water from the Red River and other rivers develops off the coast. Investigations are carried out to determine how the interaction of these three water masses influences the upwelling. In particular, the influence of river water on the stability of the water column and its effect on baroclinic instabilities that evolve within the fronts are examined. To do so, the hydrographic characteristics in the Gulf of Tonkin were recorded by means of a CTD/multi water sampler, light and fluorescence meter as well as an acoustic Doppler current profiler along selected sampling lines. This hydrographic work aims at depicting the salinity, temperature fields and derived quantities as well as the flow field and the localization of upwelling and fronts. After data evaluation, the investigations in the Gulf of Tonkin are to be put on a broader basis by including historical data. The objective is to show, in particular, the interaction between wind conditions, density stratification, tidal turbulence and frontal processes. Together with the data on the concentration and granulometry of suspended matter obtained on the station grid discussed in sub-project 1, the transport, deposition and resuspension of sediments in the area under investigation will be analyzed using SPM modelling and then

compared with the characteristics of the surface sediments determined in sub-project 3. The sources of the material collected in the sediment traps in the upwelling region off Hainan and the northern South China Sea will be determined by means of a Lagrangian tracer model.

The objective of the coastal and marine geological investigations is to provide a spatial-temporal reconstruction of the presently little known marine development in the Gulf of Tonkin from the last glacial maximum up to the present. By measuring and analyzing sediment bodies and sediment surfaces, their depositional environment and age succession as well as the hydro- and sediment dynamic processes that take place today from the shallow inner shelf area to the continental slope are reconstructed. Together with sub-project 1, the sediment dynamics in the area of the Hainan upwelling are investigated and traced back as far as the late Pleistocene. This will be followed by investigations on the balancing of terrigenous sediment input as well as the postglacial sea-level rise in the Gulf of Tonkin. Special significance was placed on recording and mapping the incised valleys and the sedimentation processes that take place there. From sediment cores ranging from water depths between 20 and 120 m, we expect new findings on the coastal morphology at the time of the sea-level lowstand 20,000 years ago and the subsequent changes to the coast, shelf and river system of the Red River during the postglacial flood, focusing in particular on the size and chronological classification of meltwater pulse 1C and its effects on the coastal zone. The results will provide a scientifically founded reference for the geological evolution of the Gulf of Tonkin during the past 20,000 years.

2. Previous Studies

Sonne Cruise 219 Holocene environmental evolution and anthropogenic impact of Tonkin Gulf, South China Sea (December 2011) investigated meso- to large scale energy and material fluxes of the Tonkin Gulf as an answer to natural and anthropogenic forces. The Gulf of Tonkin plays an important role for the understanding of changes in accumulation conditions of recent sediments and the balance of inshore element input, nearsurface degradation of organic material and therefore induced element fluxes. The greater aim of SO-219 was a temporal and regional characterization of the region for the NE monsoon period regarding the biogeochemically important elements (C, N, P, nutrients, metals and pollutants). The combination of biogeochemical analysis in the water column, suspended particular matter and sediment will contribute to the understanding of sources, sinks and transformations of organic material, organic contaminants and selected trace metals.

Sonne cruise 187 Land-Ocean-Atmosphere Interactions in the Coastal Zone of Vietnam, (April/May 2006) was dedicated to the biological, geological and oceanographic forcings triggering major changes in the coastal zone of southern Vietnam. (Global and Planetary Change, Special Issue, Statterger et al., in prep.; Bombar et al., 2010, 2011; Unverricht et al., accepted, in review).

Overall goal was to obtain information on the biological, geological and oceanographic forcings triggering major changes in the coastal zone of southern Vietnam. A synoptical view of land-ocean interactions on the short-term perspective of seasonality and extreme events and on the long-term perspective of coastal and shelf evolution is a necessary condition to improve the predictability of the future behavior and evolution of this unique coastal system. Special attention was given to a comprehensive sediment coring program to decipher the flooding history of the shelf and the incised Mekong valley after last glaciation (Tjallingii et al., 2010; Wetzel et al., 2010).

3. Leg 1: Hong Kong – Haiphong, 15.04. - 26.04.2012

3.1 Participants

Table 1: Names, affiliations and tasks of the scientific participants of Leg 1

Member	Affiliation	Tasks
Stattegger, Karl	IfG*	Chief Scientist
Wiesner, Martin	IfBM [†]	Sediment Traps, Sediments, Coring
Lahajnar, Niko	IfBM [†]	Sediment Traps
Heddaeus, Annette	IfBM [†]	Sediment Traps, Sediments, Seismic
Metzke, Marc	IfBM [†]	Sediment Traps
Unverricht, Daniel	IfG*	Seismic, sediment, Coring
Schönke, Mischa	IfG*	Seismic, sediment, Coring
Steen, Eric	IfG*	Coring
Szczygielski, Agata	IfG*	Seismic, sediment, Coring
Heyckendorf, Kay	MPI [#] University of Hamburg	X-ray Radiographies, Sediments
Wetzel, Andreas	GPI [§] University of Basel	X-ray Radiographies, Sediments
Chen, Fajin	SIO ^{***}	Sediments, Seismic, Coring
Wang, Xiaohua	SIO ^{***}	Sediments, Seismic, Coring
Li, Xiajing	Tongji University, Shanghai	Sediments, Seismic, Coring
Peleo-Alampay, Alyssa	NIGS ^{**}	Sediment Traps, Sediments, Seismic, Coring

*IfG – Institut für Geowissenschaften (Institute of Geosciences) University of Kiel, Germany

[†]IfBM – Institut für Biogeochemie und Meereschemie (Institute of Biogeochemistry and Marine Chemistry), University of Hamburg, Germany

[#]MPI – Mineralogical-Petrographical Institute

[§]GPI – Geological-Paleontological Institute

^{**}NIGS – National Institute of Geological Sciences, University of the Philippines, Diliman

^{***}SIO – Second Institute of Oceanography (SIO), Hangzhou, China

3.2 Cruise Narrative

The cruise track of SO-220 covered the Gulf of Tonkin and the adjacent continental slope.

Purpose of cruise included

- Mooring with re-deployment of 2 sediment traps in the northern part of the South China Sea to investigate marine biogeochemical cycles and to quantify the extent of the ENSO-induced anomalies in the material fluxes
- Oceanographic and sediment dynamic measurements in the water column of the Gulf of Tonkin to record hydrographical characteristics and particle transport in the Gulf of Tonkin along transects and at mooring stations
- Parasound profiling and collection of sediment cores in the Gulf of Tonkin to reconstruct the deglacial evolution and flooding history of the Gulf of Tonkin.

Recovery and re-deployment of two sediment traps in the northern South China Sea were carried out at the beginning of the cruise. Major part of the cruise focussed on the Chinese sector of the Gulf of Tonkin. 19 Parasound profiles with 615 nm in total were recorded in the central and eastern Tonkin Gulf area. Oceanographic and sediment dynamic measurements along the Parasound profiles comprised 118 CTD stations including 110 shallow-water LISST deployments, 26 filtration pumping deployments and 22 water samplings over the water column. 30 sediment stations were sampled by 30 giant box cores and 44 gravity cores. Key sediment-stations were sampled by two cores, one core for the German and one core for the Chinese party respectively.

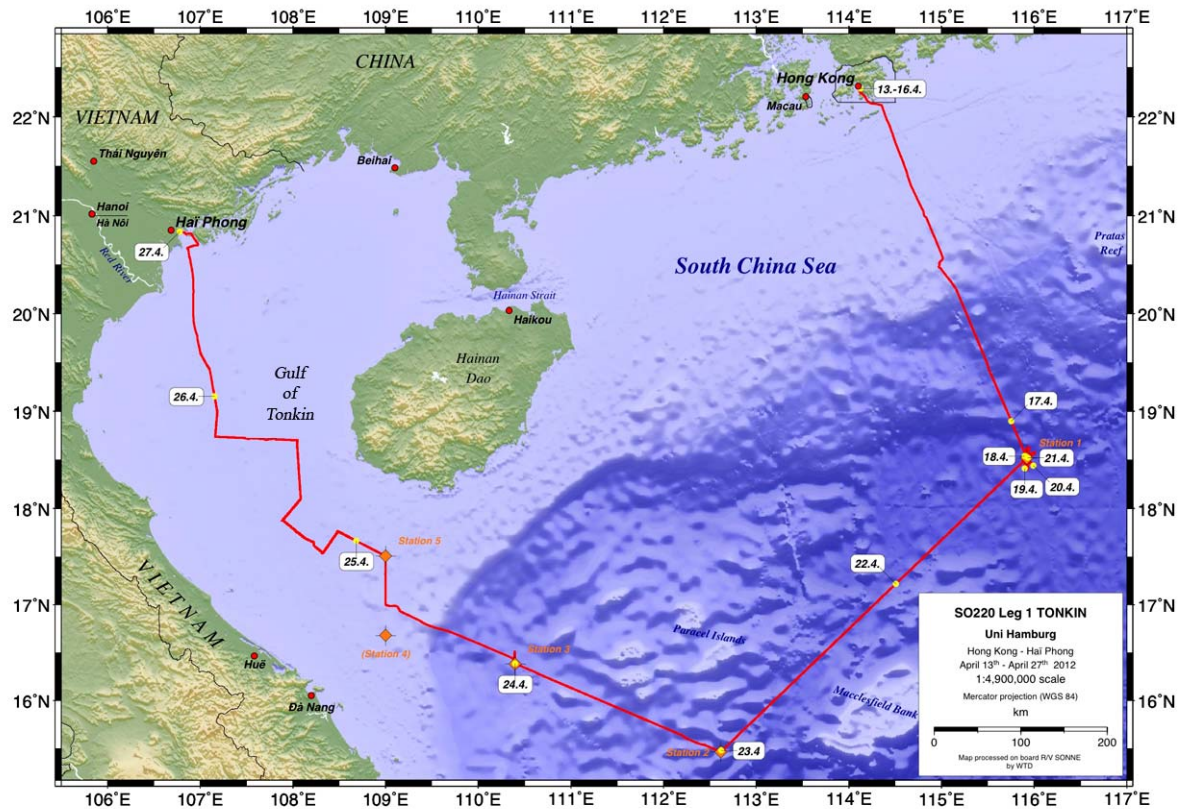


Fig. 2: Cruise track of SO-220-Leg 1

Leg 1

RV Sonne left Hong Kong on April 16th at 13:00 local time. Sediment trap SCS-N was reached on April 17th 10:30. Due to delays in permission from Chinese Authorities standby at the station lasted until April 20th 18:30. Recovery of the sediment trap started on April 21st at 05:30, re-deployment ended successfully at 20:00. Sediment station SCS-W was reached on April 23rd at 05:00. Work at the station comprised recovery, maintenance and re-deployment of the sediment trap as well as sediment sampling using Giant Box Core (GBC) and Gravity Corer (GC) and was completed at 19:00. After transit overnight we started shallow-seismic Parasound-profiling in the southern part of the Gulf of Tonkin on April 24th at 07:00 and continued until April 26th, 07:00. Thereafter RV Sonne sailed to Haiphong for the exchange of scientists. Haiphong harbour was reached on April 26th at 20:00. On April 27th the exchange of German and Chinese scientists took place.

3.3 Stations and Sampling Procedures

A list of all sediment stations of Leg 1 including time, position, water depth and devices employed is given in Table 2. CTD-Station of Leg 1 are listed in Table 3

Table 2: Sediment stations of Leg 1 (GBC= giant box corer, GC-12 = gravity corer (12 m tube))

No.	Station	Date	Time UTC	Pos. Lat.	Pos. Lon.	Water Depth [m]	Device
01	SO220-006-1	23.04.12	02:01	15° 29,00' N	112° 37,76' E	2181	GBC
	SO220-007-1	23.04.12	03:39	15° 29,01' N	112° 37,75' E	2181	GC 12

Table 3: CTD- station of Leg 1

Station	Date	UTC	Pos. Lat	Pos. Long	Water Depth [m]	Device
SO220-002-1	21.04.12	04:06	18° 30,98' N	115° 55,24' E	0	CTD
SO220-005-1	22.04.12	23:31	15° 28,57' N	112° 37,05' E	2160	CTD

3.4 Preliminary Results













Mooring Diagram		Mooring Description	Deployment	Recovery
m.a.b.	m.b.s.		Time out [local]	Time in [local]
Mooring-I.D.: SCS-N-04			Deployment Date: 15.05.2011	
Release Code:	Enable: 6 C Release: 6 A (Benthos 865-A SN 508)		Start: 03:14	
Strobe Light:	2 Burst Mode		Anchor Drop: 07:48	
Radio Frequency:	RF-700A1 160.725 MHz, 2 sec on, 4 sec off		Topfloat u. water	
Float Color:	Topfloat: red, Floats: yellow		End of Triangulation 09:10	
Deployment Position:	Anchor Drop: 18°31.067'N 115°55.175'E			
	Triangulation: 18°31.05'N 115°55.25'E		Recovery Date: 21.04.2011	
Buoyancy speed:	Deployment: -75 m/min		Start: 05:37	
	Recovery: 80 m/min		End: 09:10	
2778	958	 3 Ball Float (red) + Flasher/Radio	03:14	6:27
2776	960	 6 Benthos 17" Floats (yellow) on chain, 6m (new)	03:18	6:28
2761	975	Wire 3/16", 10 m  6 Benthos 17" Floats (yellow) on chain, 6m (new) Nylon Rope, 20 m (new)	03:26	06:31
2733	1003	Chain, 2 m (new)  SCS-N-03 Shallow Mark 7G-21 Sediment Trap 10426-2 Timer: 11616-01	03:36	06:39
2728	1008	Chain, 2 m (new)  Sontek Argonaut MD D-336 1.5 MHz	03:36	06:38
		Wire 3/16", 500 m (new)	04:16	06:59
		Wire 3/16", 500 m (new)	04:56	07:17
		Wire 3/16", 100 m (new)	05:09	07:21
		Wire 3/16", 20 m (new)	05:12	07:23
1608	2128	 8 Benthos 17" Floats on chain, 7 m (new) Nylon Rope, 20 m (new)	05:13	07:26
1578	2158	Chain, 2 m (new)  SCS-N-03 Middle Mark 78H-21 Sediment Trap 11373 Timer: 11373	05:22	07:33
1572	2164	Chain, 2 m (new)  Aanderaa RCM 8 Current Meter RCM-8 9815	05:25	07:36
		Wire 3/16", 500 m (new)	06:05	07:53
		Wire 3/16", 500 m (new)	06:45	08:15
570	3166	 8 Benthos 17" Floats on chain, 7 m (new) Nylon Rope, 20 m (new)	06:50	Entanglement! 08:22
540	3196	Chain, 2 m (new)  SCS-N-03 Deep Mark 7G-21 Sediment Trap 10414.2 Timer: 11616-02	06:55	Entanglement! 08:17
		Chain, 2 m (new)		Entanglement!
		Wire 3/16", 500 m (new)	07:35	09:09 Entanglement!
32	3704	 5 Benthos 17" Floats on chain, 5m (new)	07:40	09:10
25	3711	Benthos Release 865 S/N 508, 13 V	07:40	09:10
		Nylon Rope 20 m (old)		1 single missing on 5 ball benthos chain on deck: 09:38
0	3736	 Anchor (1 concrete block, ca. 1.8t)	07:48	

Table 4: Mooring diagram of SCS-N-04

SCS-N-04	Recovery		
Date	21.04.2012		
Ship, Cruise	Sonne SO-220		
Mooring Position	18°31.067'N 115°56.245'E		
Captain	Lutz Mallon		
Chief Scientist	Karl Stattegger		
Boatswain/Restech	Peter Mucke		
Mooring Master	Niko Lahajnar		
Recorder	Alyssa Peleo-Alampay		
Scientific Hands	Martin Wiesner, Marc Metzke, Eric Steen		
Scientific/Technical Hands			
Weather Conditions	Sunny, Wind 2, Sea 1, 29°C		
Release Model	Benthos 865-A, S/N 508, 13V		
Enable Code	6 C		
Release Code	6 A		
Release Armed	Kui Wang		
Witnessed by	Niko Lahajnar, Martin Wiesner		
Release Battery Check in	22.04.12, OK, 14.49 / 14.50 V		
Mooring Top	McLane 6600, red		
Radio Type and Frequency	RF-700A1 SN X10-109; 160.725 MHz, 2 sec on, 4 sec off		
Type of Strobe Light, Flashes	Novatech ST-400A R08-066, 2 bursts		
Trap Depths [m]	SCS-N-03 Shallow: 1003	SCS-N-03 Middle: 2158	SCS-N-03 Deep: 3196
Frame S/N	10426-2	11373.00	10414-2
Timer S/N	ML-11616-01	ML-11373	ML-11616-02
Stepper Motor S/N	ML-11616-01	ML-11373	ML-11616-02
Timer Battery Check	18.8 V	18.8 V	18.8 V
Cup Type	HDPE, 250 ml	HDPE, 250 ml	HDPE, 250 ml
Number of Cups	20	20	20
Type of Cup-Water	Distilled Water	Distilled Water	Distilled Water
Poison Type	HgCl ₂ , 3.3 g/L	HgCl ₂ , 3.3 g/L	HgCl ₂ , 3.3 g/L
Additives	NaCl, 66 g/L	NaCl, 66 g/L	NaCl, 66 g/L
Deployed on Cup Number	1 („Open Hole“)	1 („Open Hole“)	1 („Open Hole“)
Recovered on Cup Number	Open Hole	Open Hole	Open Hole
Current Meter	Argonaut MD, D-336	RCM 8, 9815	
DSU Unit		2990, SN 8281, Nov. 2006	
Battery		3382, 7.2 V	
Temperature Range		Wide	
Time Interval	60 min, Full record	60 min, Full record	
Pre-Deployment Test Traps			
Pre-Deployment Test Release			
Pre-Deployment Test Current Meter			

Table 5: Recover sheet of SCS-N-04
































Mooring Diagram		Mooring Description	Deployment	Recovery
m.a.b.	m.b.s.		Time out [local]	Time in [local]
2788	958	 3 Ball Float (red) + Flasher/Radio	17:48	
2786	950	 6 Benthos 17'' Floats (yellow) on chain, 6m (new)	17:48	
2761	975	 Wire 3/16'', 20 m		
		 6 Benthos 17'' Floats (yellow) on chain, 6m (new)	18:00	
		 Nylon Rope, 20 m (new)		
		 Chain, 2 m (old)		
2733	1003	 SCS-N-03 Shallow Mark 7G-21 Sediment Trap 10426-2 Timer: 11616-01	18:09	
2728	1008	 Chain, 2 m (old)		
		 Sontek Argonaut MD D-336 1.5 MHz	18:09	
		 Wire 3/16'', 500 m (old)	18:28	
		 Wire 3/16'', 100 m (old)	18:33	
		 Wire 3/16'', 500 m (old)	18:51	
		 Wire 3/16'', 20 m (new)	18:54	
1608	2128	 8 Benthos 17'' Floats on chain, 7 m (old)	18:59	
		 Nylon Rope, 20 m (new)		
		 Chain, 2 m (old)		
1578	2158	 SCS-N-03 Middle Mark 78H-21 Sediment Trap 11373 Timer: 11373	19:08	
		 Chain, 2 m (old)		
1572	2164	 Aanderaa RCM 8 Current Meter RCM-8 9815	19:09	
		 Wire 3/16'', 500 m (old)	19 :25	
		 Wire 3/16'', 500 m (old)	19:47	
570	3166	 8 Benthos 17'' Floats on chain, 7 m (new)	19:47	
		 Nylon Rope, 20 m (new)		
		 Chain, 2 m (old)		
540	3196	 SCS-N-03 Deep Mark 7G-21 Sediment Trap 10414.2 Timer: 11616-02	19:55	
		 Chain, 2 m (old)		
		 Wire 3/16'', 500 m (new)	20:15	
32	3704	 5 Benthos 17'' Floats on chain, 5m (old)	20:21	
25	3711	 Benthos Release 865 S/N 508, 13 V	20:28	
		 Nylon Rope 20 m (old)		Release armed: X. Li, Witness: N. Lahajnar
0	3736	 Anchor (4 Railroad Wheels, 1,2 t)	20:29	

Table 6: Mooring diagram of SCS-N-05

SCS-N-05	Deployment		
Date	21.04.2011		
Ship, Cruise	Sonne SO-220		
Mooring Position	18°30.85'N 115°54.55'E		
Captain	Lutz Mallon		
Chief Scientist	Karl Stattegger		
Boatswain/Restech	Peter Mucke		
Mooring Master	Niko Lahajnar		
Recorder	Alyssa Peleo-Alampay		
Scientific Hands	Martin Wiesner, Marc Metzke, Eric Steen		
Scientific/Technical Hands			
Weather Conditions	Sunny, Wind 2, Sea 1, 28°C		
Release Model	Benthos 865-A, S/N 51903, 13V		
Enable Code	5 C		
Release Code	5 A		
Release Armed	Xiajing Li		
Witnessed by	Niko Lahajnar		
Release Battery Check Out	19.054.11, OK, 14.28 / 14.28 V		
Mooring Top	McLane 6600, red		
Radio Type and Frequency	RF-700A1 SN X10-109; 160.725 MHz, 2 sec on, 4 sec off		
Type of Strobe Light, Flashes	Novatech ST-400A R08-066, 2 bursts		
Trap Depths [m]	SCS-N-03 Shallow: 1003	SCS-N-03 Middle: 2158	SCS-N-03 Deep: 3196
Frame S/N	10426-2	11373.00	10414-2
Timer S/N	ML-11616-01	ML-11373	ML-11616-02
Stepper Motor S/N	ML-11616-01	ML-11373	ML-11616-02
Timer Battery Check	22.4 V	22.4 V	22.4 V
Cup Type	HDPE, 250 ml	HDPE, 250 ml	HDPE, 250 ml
Number of Cups	20	20	20
Type of Cup-Water	CTD-Water 2000 m	CTD-Water 2000 m	CTD-Water 2000 m
Poison Type	HgCl ₂ , 3.3 g/L	HgCl ₂ , 3.3 g/L	HgCl ₂ , 3.3 g/L
Additives	NaCl, 33 g/L	NaCl, 33 g/L	NaCl, 33 g/L
Deployed on Cup Number	1 („Open Hole“)	1 („Open Hole“)	1 („Open Hole“)
Recovered on Cup Number			
Current Meter	Argonaut MD, D-336	RCM 8, 9815	
DSU Unit		2990, SN 8281, Nov. 2006	
Battery		3382, 7.38 V	
Temperature Range		Wide	
Time Interval	60 min	60 min	
Pre-Deployment Test Traps	OK, 21.04.12		
Pre-Deployment Test Release	OK, 21.04.12		
Pre-Deployment Test Current Meter	OK, 21.04.12		

Table 7: Deployment sheet of SCS-N-05










Mooring Diagram		Mooring Description	Deployment	Recovery
m.a.b.	m.b.s.		Time out [local]	Time in [local]
1059	1072	 3 Ball Radio Float + Flasher (yellow)	20:59	06:43
1057	1074	 G-6600-3 Triple Float (red)	21:03	06:45
1056	1075	 G-6600-3 Triple Float (yellow)	21:03	06:45
1055	1076	 G-6600-3 Triple Float (red)	21 :04	06 :45
		Nylon Rope 20 m (new)		
1031	1100	 Mark 7G-21 Sediment Trap Timer: ML 11616-3 SCS-W-01	21:09	06:51
		Chain 2 m		
1028	1103	 Aanderaa RCM9 Current Meter S/N 574	21:09	06:51
		Wire 3/16" 500 m (old)		07:13
		Wire 3/16" 500 m (new)	22 :30	07 :31
27	2104	 G-6600-3 Triple Float (orange)	22:40	07:31
25	2106	 Benthos Release 865 A S/N 756, 13V	22:40	07:31
		Nylon Rope 20 m		
0	2131	 Anchor (1 concrete block, 1800 kg)	23:30	

Table 8: Mooring diagram of SCS-W-02

SCS-W-02	Recovery
Date	23.04.2012
Ship, Cruise	SONNE SO-220
Mooring Position	15°27.79'N 112°37.07'E
Captain	Lutz Mallon
Chief Scientist	Karl Stattegger
Boatswain/Restech	Peter Mucke
Mooring Master	Niko Lahajnar
Recorder	Alyssa Peleo-Alampay
Scientific Hands	Martin Wiesner, Marc Metzke
Scientific/Technical Hands	
Weather Conditions	Sunny, Wind 1, Sea 1, 27°C
Release Model	Benthos 865-A, S/N 756
Enable Code	1 C
Release Code	1 A
Release Armed	Kui Wang
Witnessed by	Niko Lahajnar, Martin Wiesner
Release Battery Check	16.05.11, OK, 14.49 / 14.49V, Out: 12,91 / 12,91 V
Mooring Top	McLane 6600, yellow
Radio Type and Frequency	Novatech RF-700A S/N 18617, 156.625 MHz (Channel 72)
Type of Strobe Light, Flashes	Novatech ST-400A R08-067, 2 bursts
Trap Depths	1100 m
Frame S/N	Mark 7G-21, 10426-1
Timer S/N	ML 11616-3
Stepper Motor S/N	ML 11616-3
Timer Battery Check	16.06.09 OK
Sampling Interval	16 days
Cup Type	250 ml
Number of Cups	20
Type of Cup-Water	Distilled Water
Poison Type	3.3 g/L HgCl ₂
Additives	66 g/L NaCl
Deployed on Cup Number	1 ("Open Hole")
Recovered on Cup Number	Open Hole
Current Meter	Aanderaa RCM 9, S/N 574 - Water inside - BROKEN
DSU Unit	2990E, S/N 12199
Battery	3614, 9.68 V
Temperature Range	Wide
Time Interval	120 min
	Turbidity Sensor 3612A, 0-20 NTU S/N 1130
Pre-Deployment Test Traps	OK, 16.05.11
Pre-Deployment Test Release	OK, 16.05.11
Pre-Deployment Test Current Meter	OK, 16.05.11

Table 9: Recover sheet of SCS-W-02




Mooring Diagram		Mooring Description	Deployment	Recovery
m.a.b.	m.b.s.		Time out [local]	Time in [local]
1059	1091	 3 Ball Radio Float + Flasher (yellow)	15:30	
1057	1093	G-6600-3 Triple Float (red)	15:30	
1056	1094	G-6600-3 Triple Float (red)	15:30	
1055	1095	G-6600-3 Triple Float (yellow)	15:30	
		Nylon Rope 20 m (new)		
1031	1119	 Mark 7G-21 Sediment Trap Timer: ML 11616-3 SCS-W-01 Chain 2 m	15:40	
		Wire 3/16" 500 m (old)	15:56	
		Wire 3/16" 500 m (old)	16:16	
27	2123	G-6600-3 Triple Float (yellow)	16:18	
25	2125	Benthos Release 865 A S/N 508, 13V	16:44	Armed: A. Heddaeus, N. Lahajnar
		Nylon Rope 20 m		
0	2150	 Anchor (3 Railroad Wheels, 1 t)	16:53	

Table 10: Mooring diagram of SCS-W-03

SCS-W-03	Deployment
Date	23.04.2012
Ship, Cruise	SONNE SO-220
Mooring Position	15°27.73'N 112°37.15'E
Captain	Lutz Mallon
Chief Scientist	Karl Stattegger
Boatswain/Restech	Peter Mucke
Mooring Master	Niko Lahajnar
Recorder	Annette Heddaeus
Scientific Hands	Martin Wiesner, Marc Metzke
Scientific/Technical Hands	
Weather Conditions	Sunny, Wind 3, Sea 2, 28°C
Release Model	Benthos 865-A, S/N 508
Enable Code	6 C
Release Code	6 A
Release Armed	Annette Heddaeus
Witnessed by	Niko Lahajnar, Martin Wiesner
Release Battery Check	22.04.12, OK, 14.3 / 14.3V
Mooring Top	McLane 6600, yellow
Radio Type and Frequency	Novatech RF-700A S/N 18617, 156.625 MHz (Channel 72)
Type of Strobe Light, Flashes	Novatech ST-400A R08-067, 2 bursts
Trap Depths	1120 m
Frame S/N	Mark 7G-21, 10426-1
Timer S/N	ML 11616-3
Stepper Motor S/N	ML 11616-3
Timer Battery Check	23.04.12 OK
Sampling Interval	16 days
Cup Type	250 ml
Number of Cups	20
Type of Cup-Water	CTD-Water 1100 m
Poison Type	3.3 g/L HgCl ₂
Additives	33 g/L NaCl
Deployed on Cup Number	1 ("Open Hole")
Recovered on Cup Number	
Current Meter	
DSU Unit	
Battery	
Temperature Range	
Time Interval	
Pre-Deployment Test Traps	OK, 16.05.11
Pre-Deployment Test Release	OK, 16.05.11
Pre-Deployment Test Current Meter	

Table 11: Deployment sheet of SCS-W-03

Station: 220-7 - 1 (GC) Water depth: 2181 m
 Position: 15°29.026'N / 112°37.740'E Recovery: 1034 cm
 Date: 23.04.2012 Interval: 0-1034 cm

Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
	brownish-dark brown, streaks	Gley 1 5/5 Y	mottled/ bioturbated	silty clay	mud, foraminifera
	grayish	5Y 7/2	mottled/ bioturbated	silty clay	mud, foraminifera
	dark brown, streaks	5Y 4/2	mottled/ bioturbated	silty clay	mud, foraminifera
	light grayish greenish gray	5Y 6/2	moddled	silty clay	mud, foraminifera
	dark greenish gray	Gley 1 6/5 GY	moddled bioturbated homogenous		80-82cm Zoophycus open borrows filled partly with mud, 50cm&56cm brittle mud,
	greenish gray	Gley 1 4/5 GY	indistinctly mottled	silty clay	
	greenish gray	Gley 1 6/5 GY	indistinctly mottled	silty clay	176cm mottled 5GY 6, 245cm mottled dark gray
	greenish gray	Gley 1 5/5 GY	indistinctly mottled	silty clay	mud, foraminifera; tubes filled with mud
	greenish gray	Gley 1 6/5 GY	mottled	silty clay	mud, foraminifera
	greenish gray	Gley 1 5/5 GY	mottled	silty clay	423cm borrow fill 5G 5, 455cm borrow fill 5G 5, 463cm borrow fill 5G 5, 465 borrow fill 5G 5, 504cm borrow fill 5G 5
	greenish gray	Gley 1 6/5 GY	mottled	silty clay	slightly more foraminifer; 532cm borrow fill 5G 5 green mottled with dark halo
	greenish gray, dark mud	Gley 1 5/10 Y	bioturbated	silty clay	foraminifer mud, 605cm green mottled with dark halo, 609cm green mottled with dark halo, 633cm green mottled with dark halo
	greenish gray	Gley 1 5/5 GY	mottled	silty clay	foraminifer mud, Mottles Typ1 Gley 1 6/5 G, Mottles Typ2 Gley 1 5/10 Y
	greenish gray	Gley 1 6/5 G, Gley 1 5/10 Y	mottles goes up to fey cm in size	silty clay	foraminifer mud, homogenous, mottled 1-2 cm, 743cm Zoophycus, 803cm 0,5cm diameter open tubes, 806cm 0,5cm diameter open tubes, 816cm 0,5cm diameter open tubes, 822cm 0,5cm diameter open tubes
	greenish gray	Gley 1 5/10 GY	mottled	silty clay	foraminifer mud, homogenous, mottled 1-2 cm
	dark greenish gray	Gley 1 4/10GY	bioturbated	silty clay	bioturbated transition
greenish gray	Gley 1 5/10Y	mottled	silty clay	foraminifer mud, homogenous, mottled	
greenish gray	Gley 1 5/10GY	mottled	silty clay	foraminifer mud, homogenous, mottled	
greenish gray	Gley 1 6/10 Y	mottled	silty clay		

Description of sediment core near the position of sediment trap SCS-W-02 (Table 2)

The core is presented as photo and X-ray log with initial description.

4. LEG 2: Haiphong – Honk Kong, 27.04. - 13.05.2012

4.1 Participants

Table 12: Names, affiliations and tasks of the scientific participants of Leg 2

Member	Affiliation	Tasks
Stattegger, Karl	IfG*	Chief Scientist
Wiesner, Martin	IfBM**	Sediments, core picture, Coring
Heddaeus, Annette	IfBM**	Sediments, Seismic, Coring, water samples, X-ray Radiographies
Schwarzer, Klaus	IfG*	Sediments, Coring
Unverricht, Daniel	IfG*	Seismic, sediments, Coring, LISST, CTD, water samples, X-ray Radiographies
Schönke, Mischa	IfG*	Seismic, sediments, Coring, LISST, CTD, water samples, X-ray Radiographies
Steen, Eric	IfG*	Coring
Szczygielski, Agata	IfG*	Seismic, sediments, Coring, LISST, CTD, water samples, X-ray Radiographies
Jechlitschek, Hendrik	IfG*	Coring
Müller, Samuel	IfG*	Coring
Heyckendorf, Kay	MPI [#] University of Hamburg	X-ray Radiographies, core picture, Sediments
Wetzel, Andreas	GPI [§] University of Basel	X-ray Radiographies, Sediments
Chen, Fajin	SIO***	Sediments, Seismic, Coring, Water pump, CTD, water samples
Liu, Zhifei	Tongji University, Shanghai	Sediments, Seismic, Coring, Water pump
Zhao, Yulong	Tongji University, Shanghai	Sediments, Seismic, Coring, Water pump
Peleo-Alampay, Alyssa	NIGS**	Sediments, LISST

Liskow, Iris	IOW****	CTD, water samples
Welsch, Andreas	IfM [†]	CTD, water samples
Pohlmann, Thomas	IfM [†]	CTD, water samples
Lorenc, Stanislaw	IfG*****	Sediments, Coring

*IfG – Institut für Geowissenschaften (Institute of Geosciences) University of Kiel, Germany

†IfBM – Institut für Biogeochemie und Meereschemie (Institute of Biogeochemistry and Marine Chemistry), University of Hamburg, Germany

#MPI – Mineralogical-Petrographical Institute

§GPI – Geological-Paleontological Institute

**NIGS – National Institute of Geological Sciences, University of the Philippines, Diliman

***SIO – Second Institute of Oceanography (SIO), Hangzhou, China

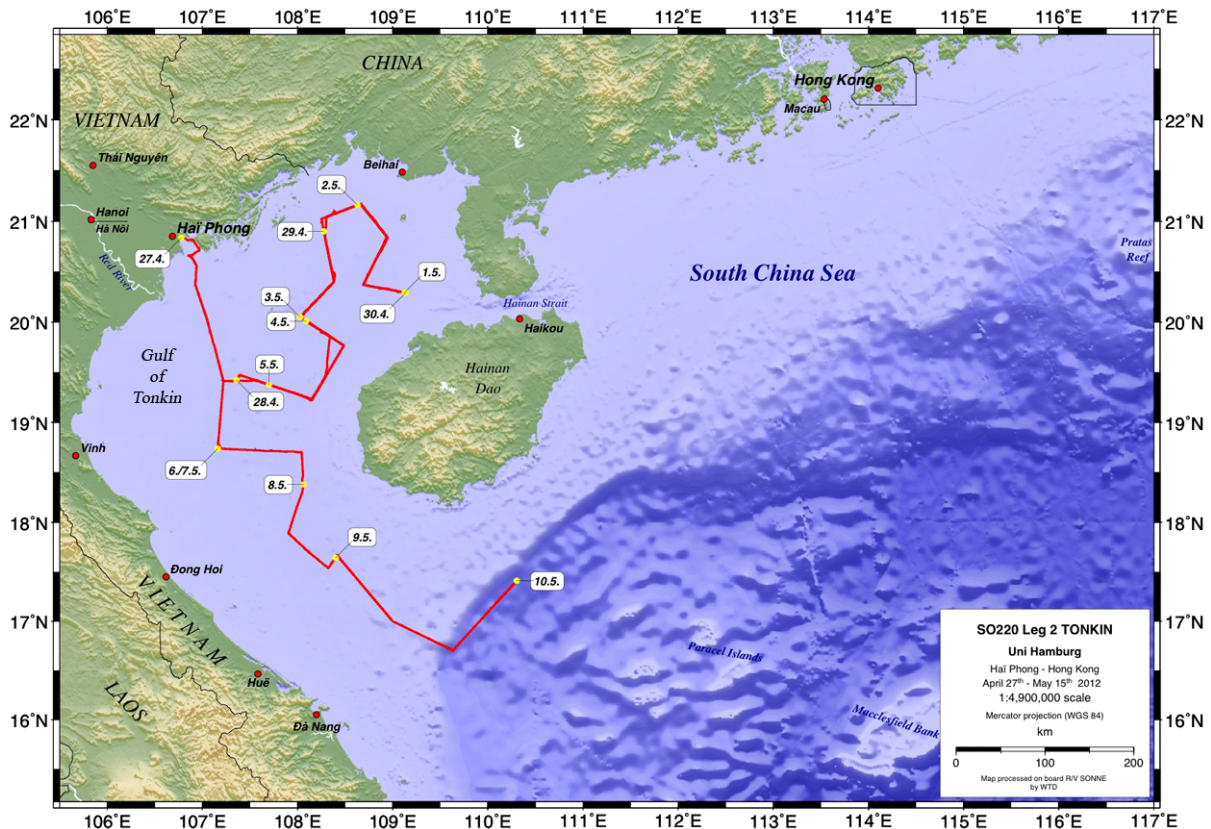
****IOW – Institut für Ostseeforschung Warnemünde (Institute for Baltic Research Warnemünde)

***** IfG - Institute of Geology, Adam Mickiewicz University, Poznań, Poland

4.2 Cruise Narrative

Leg 2

Since the working permission for RV Sonne was not approved by Vietnam authorities SO-220 cruise was continued in Chinese waters. The vessel left Haiphong harbour on April 27th at 20:00. After transit overnight Parasound profiling was continued in the north-eastern sector of the Gulf of Tonkin from April 28th, 08:00 until April 29th, 24:00. Then a mooring station for oceanographic and particle measurements and water sampling over the water column was operated for 25 hours. Sediment sampling by GBC and GC was carried out at 8 stations as well as oceanographic and particle measurements and water sampling at 10 stations along the Parasound transects in the north-eastern part of the gulf during May 1st and 2nd. Until May 4th, 06:00 followed a 25 hours mooring station for oceanographic and particle measurements and water sampling northwest of Hainan Island. Sediment and water sampling was continued to the central part of the gulf at 8 stations together with 10 stations of oceanographic and particle measurements. A third 25-hours oceanographic mooring station in the central part of the gulf was operated until May 7th, 09:00. Then



followed sediment and water sampling

Fig. 3: Cruise track of SO-220-Leg 2

together with oceanographic and particle measurements in the central and southern part of the Gulf of Tonkin including the upper continental slope at 18 stations. Work at sea had to be

stopped on May 10th, 02:30 three days earlier than foreseen on the direct orders of Chinese authorities. RV Sonne reached Hong Kong harbour on May13th, 08:00.

4.3 Stations and Sampling Procedures

A list of all sediment station of Leg 2 including position, water depth and devices employed is given in Table 13. Fig. 4 show coring locations, seismic and cruise tracks. After sucking of water from the giant box corers, the sediment has been described, photographed and sampled in detail.

Gravity cores have been cut into meter sections and the split in halves and been opened. This step was followed by photography and sedimentological description. Special focus was given to organic material for later AMS dating purposes. Additionally, the sedimentary structures and relative changes in grain size were documented in the sediment cores using digital X-radiography images obtained from 1 cm thin slabs of the split core surfaces.

The overview of all CTD- and LISST-stations of Leg 2 is given in Fig. 5 and Table 14 including date, time (UTC), position and water depth. Table 15 represents the water samples taken in the water column to investigate the nitrogen and carbon content.



Fig. 4: Coring location in the study area (Leg 1 and Leg 2)

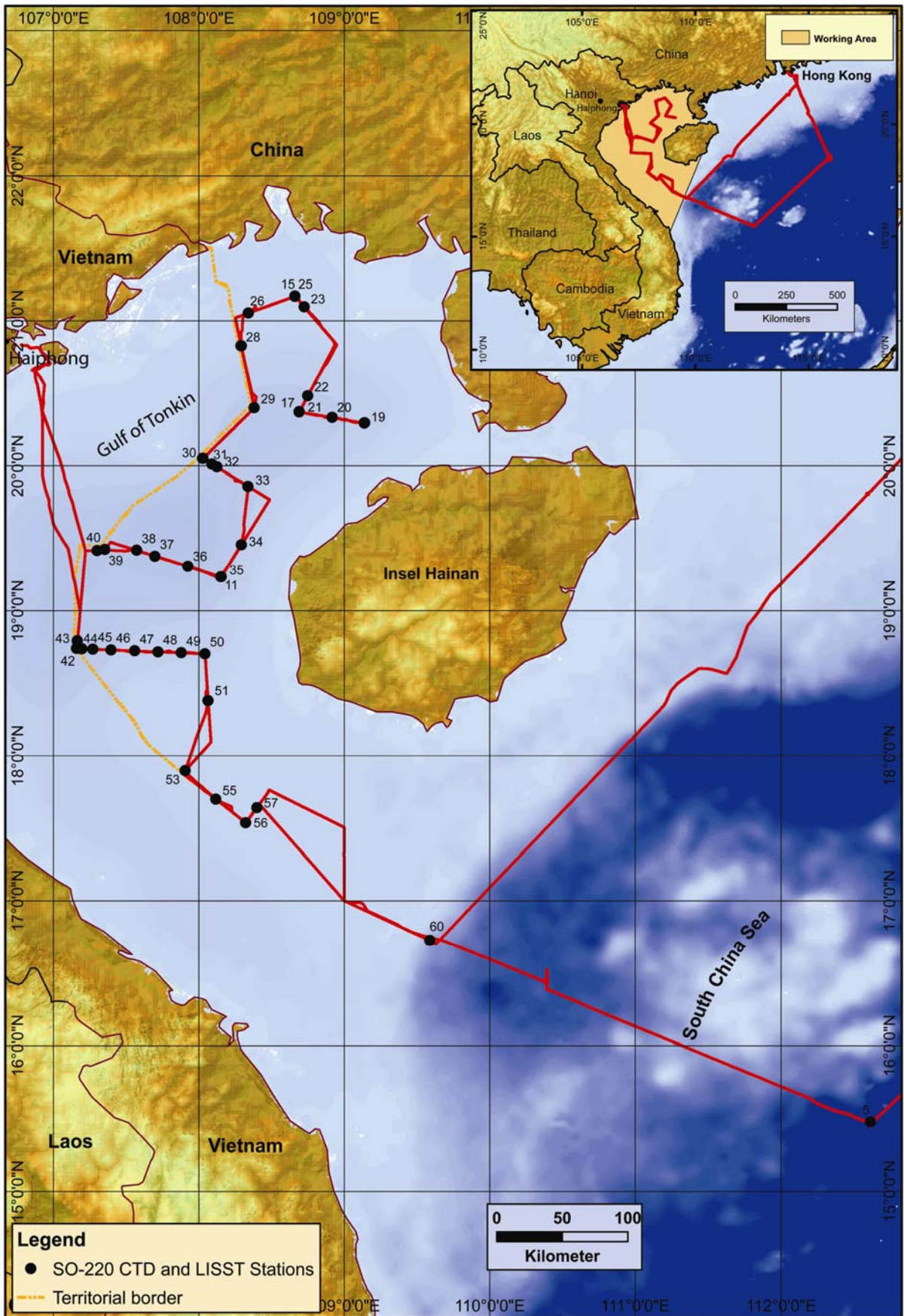


Fig. 5: Location of all CTD and LISST stations (Leg 1 and Leg 2)

Table 13: Sediment stations of Leg 2 (GBC= giant box corer, GC-12 = gravity corer (12 m tube))

No.	Station	Date	Time UTC	Pos. Lat.	Pos. Long	Depth	Device	Recovery [cm]	Internal Station-code
01	SO220-019-30	30.04.12	22:16	20° 17,63' N	109° 08,29' E	17	GBC	50	
	SO220-019-31	30.04.12	22:50	20° 17,61' N	109° 08,27' E	17	GC 6	575	N1
	SO220-019-32	30.04.12	23:35	20° 17,65' N	109° 08,31' E	17	GC 6	575	N1-2
02	SO220-020-4	01.05.12	03:23	20° 19,89' N	108° 55,09' E	40	GBC	70	
	SO220-020-6	01.05.12	05:33	20° 19,95' N	108° 55,10' E	44	GC 6	120	N2
03	SO220-022-3	01.05.12	11:18	20° 28,99' N	108° 44,95' E	43	GBC	60	
	SO220-022-4	01.05.12	11:40	20° 28,98' N	108° 44,95' E	45	GC 6	140?	N3
	SO220-022-5	01.05.12	12:50	20° 28,98' N	108° 44,95' E	43	GC 3	0	N3-2
04	SO220-023-3	01.05.12	18:52	21° 05,83' N	108° 43,52' E	22	GBC	26	
	SO220-023-4	01.05.12	19:15	21° 05,84' N	108° 43,54' E	22	GC 3	154	N4
05	SO220-024-1	01.05.12	20:04	21° 06,68' N	108° 42,78' E	22	GBC	34	
	SO220-024-2	01.05.12	20:25	21° 06,68' N	108° 42,79' E	23	GC 3	300	N4A
	SO220-024-3	01.05.12	21:18	21° 06,69' N	108° 42,80' E	21	GC 6	544	N4A-2
05	SO220-026-4	02.05.12	03:48	21° 03,42' N	108° 20,48' E	27	GBC	55	
	SO220-026-5	02.05.12	04:14	21° 03,42' N	108° 20,49' E	30	GC 6	566	N5
06	SO220-027-1	02.05.12	05:23	21° 02,54' N	108° 18,15' E	27	GBC	56	
	SO220-027-2	02.05.12	05:43	21° 02,52' N	108° 18,16' E	36	GC 6	575	N5A
	SO220-027-3	02.05.12	06:25	21° 02,51' N	108° 18,15' E	33	GC 12	1011	N5A-2
07	SO220-028-5	02.05.12	10:28	20° 49,78' N	108° 17,46' E	41	GBC	60	
	SO220-028-6	02.05.12	10:58	20° 49,76' N	108° 17,46' E	38	GC 6	575	N6
08	SO220-029-3	02.05.12	15:37	20° 24,01' N	108° 22,88' E	44	GBC	22	
09	SO220-031-2	03.05.12	23:49	20° 00,65' N	108° 05,47' E	49	GBC	22	
	SO220-031-3	04.05.12	00:16	20° 00,64' N	108° 05,47' E	49	GC 3	199	N7
10	SO220-032-3	04.05.12	02:44	19° 59,49' N	108° 07,45' E	63	GBC	35	
	SO220-032-4	04.05.12	03:14	19° 59,48' N	108° 07,43' E	62	GC 3	245	N8
11	SO220-033-4	04.05.12	07:05	19° 51,54' N	108° 20,41' E	58	GBC	32	
	SO220-033-5	04.05.12	07:26	19° 51,54' N	108° 20,41' E	56	GC 3	300	N9
	SO220-033-6	04.05.12	07:58	19° 51,54' N	108° 20,39' E	56	GC 6	575	N9-2
	SO220-033-7	04.05.12	08:35	19° 51,56' N	108° 20,39' E	55	GC 6	?	
12	SO220-034-3	04.05.12	14:00	19° 27,43' N	108° 17,56' E	57	GBC	65	
	SO220-034-4	04.05.12	14:25	19° 27,45' N	108° 17,58' E	62	GC 6	575	N9A
	SO220-034-5	04.05.12	15:21	19° 27,45' N	108° 17,57' E	61	GC 12	606	N9A-2
13	SO220-035-3	04.05.12	19:20	19° 14,00' N	108° 09,23' E	44	GBC	72	
14	SO220-037-3	05.05.12	01:32	19° 22,66' N	107° 41,90' E	63	GBC	35	
	SO220-037-4	05.05.12	01:58	19° 22,66' N	107° 41,91' E	67	GC 6	575	N10
	SO220-037-5	05.05.12	02:32	19° 22,65' N	107° 41,90' E	64	GC 12	787	N10-2

No.	Station	Date	Time UTC	Pos. Lat.	Pos. Long	Depth	Device	Recovery [cm]	Internal Station-code
15	SO220-038-4	05.05.12	06:05	19° 25,05' N	107° 34,33' E	61	GBC	35	
	SO220-038-5	05.05.12	06:33	19° 25,05' N	107° 34,34' E	67	GC 6	575	N11
	SO220-038-6	05.05.12	07:45	19° 25,05' N	107° 34,35' E	61	GC 9	673	N11-2
16	SO220-039-3	05.05.12	11:43	19° 25,44' N	107° 21,34' E	63	GBC	50	
	SO220-039-4	05.05.12	12:20	19° 25,45' N	107° 21,35' E	56	GC 6	575	N12
17	SO220-040-2	05.05.12	14:27	19° 25,02' N	107° 18,06' E	58	GBC	42	
	SO220-040-3	05.05.12	14:49	19° 25,03' N	107° 18,03' E	55	GC 6	575	N13
18	SO220-042-30	07.05.12	01:29	18° 44,32' N	107° 09,68' E	61	GBC	45	
19	SO220-043-2	07.05.12	02:59	18° 47,56' N	107° 09,95' E	60	GBC	47	
	SO220-043-3	07.05.12	03:18	18° 47,54' N	107° 09,95' E	61	GC 9	736	S1
30	SO220-044-3	07.05.12	05:15	18° 44,23' N	107° 11,78' E	67	GBC	44	
	SO220-044-4	07.05.12	05:35	18° 44,24' N	107° 11,77' E	64	GC 9	783	S2
	SO220-044-5	07.05.12	06:46	18° 44,23' N	107° 11,76' E	62	GC 15	827	S2-2
31	SO220-045-2	07.05.12	08:31	18° 44,04' N	107° 16,24' E	66	GBC	42	
	SO220-045-3	07.05.12	08:54	18° 44,04' N	107° 16,23' E	63	GC 9	874	S3
	SO220-045-4	07.05.12	10:39	18° 44,03' N	107° 16,23' E	69	GC 15	850	S3-2
32	SO220-051-4	08.05.12	01:42	18° 22,80' N	108° 03,83' E	71	GBC	50	
	SO220-051-5	08.05.12	02:13	18° 22,80' N	108° 03,84' E	71	GC 9	650	S6
	SO220-051-6	08.05.12	03:01	18° 22,83' N	108° 03,82' E	71	GC 9	555	S6-2
33	SO220-052-1	08.05.12	04:09	18° 22,39' N	108° 03,88' E	72	GBC	48	
	SO220-052-2	08.05.12	04:37	18° 22,38' N	108° 03,88' E	72	GC 9	550?	S6A
34	SO220-053-4	08.05.12	10:06	17° 53,80' N	107° 54,46' E	91	GBC	34	
	SO220-053-5	08.05.12	10:27	17° 53,80' N	107° 54,46' E	89	GC 9	455	S7
	SO220-053-6	08.05.12	11:12	17° 53,80' N	107° 54,47' E	88	GC 9	485	S7-2
	SO220-054-1	08.05.12	12:03	17° 53,43' N	107° 54,13' E	89	GC 9	670	S7A
35	SO220-054-2	08.05.12	13:03	17° 53,41' N	107° 54,10' E	90	GBC	47	
36	SO220-055-3	08.05.12	17:12	17° 41,96' N	108° 07,02' E	83	GBC	50	
	SO220-055-4	08.05.12	17:37	17° 41,96' N	108° 07,02' E	83	GC 9	140	S10
	SO220-055-5	08.05.12	18:45	17° 41,96' N	108° 07,02' E	83	GC 3	155	S10-2
37	SO220-057-3	09.05.12	01:21	17° 38,41' N	108° 23,87' E	105	GBC	39	
	SO220-057-4	09.05.12	01:44	17° 38,41' N	108° 23,88' E	105	GC 6	575	S11
	SO220-057-5	09.05.12	02:42	17° 38,41' N	108° 23,88' E	105	GC 12	1037	S11-2
38	SO220-058-1	09.05.12	04:07	17° 39,94' N	108° 24,99' E	104	GBC	38	
	SO220-058-2	09.05.12	04:32	17° 39,92' N	108° 24,99' E	104	GC 12	930	S12
39	SO220-060-2	09.05.12	15:36	16° 43,53' N	109° 35,34' E	546	GBC	67	
	SO220-060-3	09.05.12	16:19	16° 43,54' N	109° 35,36' E	549	GC 12	663	S13
	SO220-060-4	09.05.12	17:24	16° 43,54' N	109° 35,35' E	548	GC 12	630?	S13-2

Table 14: CTD- and LISST stations of LEG 2

Station	Date	UTC	Pos. Lat	Pos. Long	Water depth [m]	Device
SO220-011-1	28.04.12	06:35	19° 14,04' N	108° 9,17' E	51	CTD
SO220-013-1	28.04.12	15:56	20° 3,06' N	108° 1,71' E	49	CTD
SO220-015-1	29.04.12	04:20	21° 10,33' N	108° 39,68' E	23	CTD
SO220-017-1	29.04.12	12:01	20° 22,32' N	108° 41,44' E	46	CTD
SO220-019-1	29.04.12	16:00	20° 17,68' N	109° 8,44' E	19	CTD with LISST
SO220-019-2	29.04.12	17:00	20° 17,62' N	109° 8,32' E	21	CTD with LISST
SO220-019-3	29.04.12	18:00	20° 17,61' N	109° 8,30' E	20	CTD with LISST
SO220-019-4	29.04.12	19:00	20° 17,61' N	109° 8,29' E	24	CTD with LISST
SO220-019-5	29.04.12	20:00	20° 17,60' N	109° 8,29' E	21	CTD with LISST
SO220-019-6	29.04.12	21:00	20° 17,63' N	109° 8,22' E	20	CTD with LISST
SO220-019-7	29.04.12	22:00	20° 17,63' N	109° 8,23' E	18	CTD with LISST
SO220-019-8	29.04.12	23:00	20° 17,61' N	109° 8,26' E	18	CTD with LISST
SO220-019-9	30.04.12	00:00	20° 17,64' N	109° 8,28' E	17	CTD with LISST
SO220-019-10	30.04.12	01:00	20° 17,70' N	109° 8,29' E	19	CTD with LISST
SO220-019-11	30.04.12	01:59	20° 17,67' N	109° 8,33' E	16	CTD with LISST
SO220-019-12	30.04.12	03:00	20° 17,54' N	109° 8,26' E	17	CTD with LISST
SO220-019-14	30.04.12	04:00	20° 17,68' N	109° 8,28' E	17	CTD with LISST
SO220-019-15	30.04.12	05:00	20° 17,63' N	109° 8,30' E	18	CTD with LISST
SO220-019-16	30.04.12	06:00	20° 17,63' N	109° 8,31' E	20	CTD with LISST
SO220-019-17	30.04.12	07:00	20° 17,62' N	109° 8,30' E	18	CTD with LISST
SO220-019-19	30.04.12	08:00	20° 17,65' N	109° 8,31' E	20	CTD with LISST
SO220-019-20	30.04.12	09:00	20° 17,62' N	109° 8,30' E	18	CTD with LISST
SO220-019-21	30.04.12	10:00	20° 17,63' N	109° 8,30' E	18	CTD with LISST
SO220-019-22	30.04.12	11:00	20° 17,62' N	109° 8,30' E	20	CTD with LISST
SO220-019-23	30.04.12	12:00	20° 17,63' N	109° 8,30' E	20	CTD with LISST
SO220-019-24	30.04.12	13:00	20° 17,63' N	109° 8,31' E	18	CTD with LISST
SO220-019-25	30.04.12	14:00	20° 17,61' N	109° 8,30' E	20	CTD with LISST
SO220-019-26	30.04.12	15:00	20° 17,61' N	109° 8,30' E	22	CTD with LISST
SO220-019-27	30.04.12	16:00	20° 17,59' N	109° 8,26' E	19	CTD with LISST
SO220-019-28	30.04.12	16:59	20° 17,58' N	109° 8,29' E	24	CTD with LISST
SO220-020-1	01.05.12	01:36	20° 19,92' N	108° 55,08' E	43	CTD
SO220-021-1	01.05.12	07:22	20° 22,27' N	108° 41,46' E	44	CTD with LISST
SO220-022-1	01.05.12	09:43	20° 29,01' N	108° 44,97' E	43	CTD with LISST
SO220-023-1	01.05.12	17:18	21° 5,87' N	108° 43,51' E	22	CTD with LISST

Station	Date	UTC	Pos. Lat	Pos. Long	Water depth [m]	Device
SO220-025-1	01.05.12	22:27	21° 10,24' N	108° 39,66' E	18	CTD with LISST
SO220-026-1	02.05.12	01:48	21° 3,38' N	108° 20,51' E	27	CTD with LISST
SO220-028-1	02.05.12	08:24	20° 49,77' N	108° 17,52' E	39	CTD with LISST
SO220-028-3	02.05.12	09:01	20° 49,79' N	108° 17,48' E	39	CTD with LISST
SO220-029-1	02.05.12	13:54	20° 24,01' N	108° 22,91' E	43	CTD with LISST
SO220-030-1	02.05.12	19:00	20° 3,04' N	108° 1,67' E	48	CTD with LISST
SO220-030-2	02.05.12	20:00	20° 3,01' N	108° 1,66' E	48	CTD with LISST
SO220-030-3	02.05.12	21:00	20° 3,02' N	108° 1,66' E	48	CTD with LISST
SO220-030-4	02.05.12	22:00	20° 3,01' N	108° 1,66' E	48	CTD with LISST
SO220-030-5	02.05.12	23:00	20° 2,99' N	108° 1,66' E	48	CTD with LISST
SO220-030-6	03.05.12	00:00	20° 3,01' N	108° 1,66' E	48	CTD with LISST
SO220-030-7	03.05.12	01:00	20° 3,05' N	108° 1,64' E	47	CTD with LISST
SO220-030-9	03.05.12	02:00	20° 2,97' N	108° 1,66' E	48	CTD with LISST
SO220-030-10	03.05.12	03:00	20° 3,01' N	108° 1,65' E	48	CTD with LISST
SO220-030-11	03.05.12	04:00	20° 3,01' N	108° 1,67' E	47	CTD with LISST
SO220-030-12	03.05.12	05:00	20° 3,01' N	108° 1,66' E	48	CTD with LISST
SO220-030-13	03.05.12	06:00	20° 3,02' N	108° 1,66' E	48	CTD with LISST
SO220-030-15	03.05.12	06:59	20° 3,02' N	108° 1,66' E	52	CTD with LISST
SO220-030-16	03.05.12	08:00	20° 3,02' N	108° 1,67' E	52	CTD with LISST
SO220-030-17	03.05.12	09:00	20° 3,01' N	108° 1,67' E	52	CTD with LISST
SO220-030-18	03.05.12	10:00	20° 2,99' N	108° 1,66' E	47	CTD with LISST
SO220-030-19	03.05.12	11:00	20° 3,01' N	108° 1,66' E	47	CTD with LISST
SO220-030-20	03.05.12	12:00	20° 3,01' N	108° 1,66' E	47	CTD with LISST
SO220-030-21	03.05.12	13:00	20° 2,99' N	108° 1,67' E	48	CTD with LISST
SO220-030-22	03.05.12	14:00	20° 3,04' N	108° 1,66' E	48	CTD with LISST
SO220-030-23	03.05.12	15:00	20° 3,04' N	108° 1,68' E	48	CTD with LISST
SO220-030-24	03.05.12	16:00	20° 3,01' N	108° 1,67' E	48	CTD with LISST
SO220-030-25	03.05.12	17:00	20° 3,01' N	108° 1,66' E	48	CTD with LISST
SO220-030-26	03.05.12	18:00	20° 3,01' N	108° 1,66' E	48	CTD with LISST
SO220-030-27	03.05.12	19:00	20° 3,00' N	108° 1,66' E	48	CTD with LISST
SO220-030-28	03.05.12	20:00	20° 3,01' N	108° 1,66' E	48	CTD with LISST
SO220-031-1	03.05.12	23:04	20° 0,67' N	108° 5,46' E	49	CTD with LISST
SO220-032-1	04.05.12	01:08	19° 59,48' N	108° 7,45' E	65	CTD with LISST
SO220-033-1	04.05.12	05:21	19° 51,55' N	108° 20,35' E	57	CTD with LISST
SO220-034-1	04.05.12	11:53	19° 27,43' N	108° 17,55' E	61	CTD with LISST
SO220-035-1	04.05.12	17:39	19° 14,06' N	108° 9,23' E	50	CTD with LISST

Station	Date	UTC	Pos. Lat	Pos. Long	Water depth [m]	Device
SO220-036-1	04.05.12	21:00	19° 18,37' N	107° 55,55' E	51	CTD with LISST
SO220-037-1	04.05.12	23:42	19° 22,63' N	107° 41,83' E	66	CTD with LISST
SO220-038-1	05.05.12	04:06	19° 25,06' N	107° 34,35' E	63	CTD with LISST
SO220-039-1	05.05.12	09:18	19° 25,42' N	107° 21,33' E	57	CTD with LISST
SO220-040-1	05.05.12	13:50	19° 24,99' N	107° 18,03' E	56	CTD with LISST
SO220-042-1	05.05.12	22:00	18° 44,33' N	107° 9,69' E	60	CTD with LISST
SO220-042-2	05.05.12	23:00	18° 44,31' N	107° 9,69' E	60	CTD with LISST
SO220-042-3	06.05.12	00:00	18° 44,31' N	107° 9,67' E	60	CTD with LISST
SO220-042-5	06.05.12	01:00	18° 44,33' N	107° 9,65' E	61	CTD with LISST
SO220-042-6	06.05.12	02:00	18° 44,32' N	107° 9,66' E	61	CTD with LISST
SO220-042-7	06.05.12	03:00	18° 44,30' N	107° 9,67' E	62	CTD with LISST
SO220-042-8	06.05.12	04:00	18° 44,31' N	107° 9,67' E	62	CTD with LISST
SO220-042-9	06.05.12	05:00	18° 44,31' N	107° 9,67' E	62	CTD with LISST
SO220-042-10	06.05.12	06:00	18° 44,31' N	107° 9,67' E	62	CTD with LISST
SO220-042-12	06.05.12	07:00	18° 44,31' N	107° 9,67' E	62	CTD with LISST
SO220-042-13	06.05.12	08:00	18° 44,31' N	107° 9,67' E	62	CTD with LISST
SO220-042-14	06.05.12	09:00	18° 44,30' N	107° 9,67' E	62	CTD with LISST
SO220-042-15	06.05.12	10:00	18° 44,30' N	107° 9,67' E	64	CTD with LISST
SO220-042-16	06.05.12	11:00	18° 44,30' N	107° 9,65' E	61	CTD with LISST
SO220-042-17	06.05.12	12:00	18° 44,28' N	107° 9,67' E	65	CTD with LISST
SO220-042-18	06.05.12	13:00	18° 44,38' N	107° 9,66' E	62	CTD with LISST
SO220-042-19	06.05.12	14:00	18° 44,30' N	107° 9,68' E	60	CTD with LISST
SO220-042-20	06.05.12	15:00	18° 44,30' N	107° 9,69' E	67	CTD with LISST
SO220-042-21	06.05.12	16:00	18° 44,31' N	107° 9,67' E	66	CTD with LISST
SO220-042-22	06.05.12	17:00	18° 44,32' N	107° 9,67' E	67	CTD with LISST
SO220-042-23	06.05.12	18:00	18° 44,30' N	107° 9,67' E	65	CTD with LISST
SO220-042-24	06.05.12	19:00	18° 44,33' N	107° 9,67' E	60	CTD with LISST
SO220-042-25	06.05.12	20:00	18° 44,31' N	107° 9,68' E	67	CTD with LISST
SO220-042-26	06.05.12	21:00	18° 44,31' N	107° 9,68' E	60	CTD with LISST
SO220-042-27	06.05.12	22:00	18° 44,31' N	107° 9,67' E	60	CTD with LISST
SO220-042-28	06.05.12	23:00	18° 44,32' N	107° 9,66' E	60	CTD with LISST
SO220-043-1	07.05.12	02:22	18° 47,55' N	107° 9,96' E	60	CTD with LISST
SO220-044-1	07.05.12	04:25	18° 44,24' N	107° 11,76' E	71	CTD with LISST
SO220-045-1	07.05.12	08:00	18° 44,04' N	107° 16,23' E	70	CTD with LISST
SO220-045-1	07.05.12	08:01	18° 44,04' N	107° 16,23' E	71	CTD with LISST
SO220-046-1	07.05.12	12:29	18° 43,73' N	107° 23,77' E	68	CTD with LISST

Station	Date	UTC	Pos. Lat	Pos. Long	Water depth [m]	Device
SO220-047-1	07.05.12	13:53	18° 43,32' N	107° 33,50' E	59	CTD with LISST
SO220-048-1	07.05.12	15:19	18° 42,90' N	107° 43,18' E	58	CTD with LISST
SO220-049-1	07.05.12	18:30	18° 42,54' N	107° 52,85' E	63	CTD with LISST
SO220-050-1	07.05.12	19:56	18° 42,15' N	108° 2,48' E	55	CTD with LISST
SO220-051-1	07.05.12	23:50	18° 22,85' N	108° 3,82' E	70	CTD with LISST
SO220-053-1	08.05.12	08:03	17° 53,84' N	107° 54,44' E	89	CTD with LISST
SO220-055-1	08.05.12	15:00	17° 41,98' N	108° 7,02' E	83	CTD with LISST
SO220-056-1	08.05.12	20:35	17° 32,21' N	108° 19,40' E	82	CTD
SO220-057-1	08.05.12	23:26	17° 38,43' N	108° 23,96' E	104	CTD with LISST
SO220-060-1	09.05.12	14:21	16° 43,56' N	109° 35,35' E	547	CTD with LISST

Table 15: Samples in the water column for geochemical analysis

No.	Station	water depth [m]	POM	Chlorophyll	Nutrients	NC-Fixation experiments
1	St. 11	25	X	X	X	X
	04.28.2012	10	X	X	X	X
		5	X	X	X	X
		44	X	X	X	X
2	St. 15	5	X	X	X	X
	04.29.2012	10	X	X	X	X
		16	X	X	X	X
3	St.19-9	5	X	X	X	X
	04.30.2012	10	X	X	X	X
4	St.19-15	5	X	X	X	X
	04.30.2012	12	X	X	X	X
5	St.20	5	X	X	X	X
	05.01.2012	10	X	X	X	X
		19	X	X	X	
		40	X	X	X	X
6	St.25	5	X	X	X	X
	05.02.2012	10	X	X	X	X
		15	X	X	X	X
7	St.26	5	X	X	X	X
	05.02.2012	15	X	X	X	X
		20	X	X	X	X
8	St.28	5	X	X	X	X
	05.02.2012	12	X	X	X	X
		16	X	X	X	X
		22	X	X	X	X
9	St.30_7	5	X	X	X	X
	05.03.2012	10	X	X	X	X
		36	X	X	X	X
		50	X	X	X	
10	St.30_13	5	X	X	X	X
	05.03.2012	10	X	X	X	X
		37	X	X	X	X
		50	X	X	X	
11	St.33	5	X	X	X	X
	05.04.2012	10	X	X	X	X
		50	X	X	X	X
		57	X	X	X	
12	St.35	5	X	X	X	X
	05.04.2012	10	X	X	X	X
		40	X	X	X	X
		46	X	X	X	
13	St.38	5	X	X	X	X
	05.05.2012	10	X	X	X	X

No.	Station	water depth [m]	POM	Chlorophyll	Nutrients	NC-Fixation experiments
		37	X	X	X	X
		50	X	X	X	
		63	X	X	X	
14	St.42_3	5	X	X	X	X
	05.06.2012	15	X	X	X	X
		26	X	X	X	X
		63	X	X	X	
15	St.42_9	5	X	X	X	X
	05.06.2012	10	X	X	X	X
		30	X	X	X	X
		63	X	X	X	
16	45	5	X	X		
17	St.48	5	X	X	X	X
	05.07.2012	10	X	X	X	X
		25	X	X	X	
		40	X	X	X	X
18	St.50	5	X	X	X	X
	05.07.2012	10	X	X	X	X
		25	X	X	X	
		40	X	X	X	X
19	St.51	5	X	X	X	X
	05.08.2012	10	X	X	X	X
		25	X	X	X	
		40	X	X	X	X
		73	X	X	X	
20	St.53	5	X	X	X	X
	05.08.2012	10	X	X	X	X
		43	X	X	X	X
		90	X	X	X	
21	St.56	5	X	X	X	X
	05.08.2012	10	X	X	X	X
		25	X	X	X	
		40	X	X	X	X
22	St.60	5	X	X	X	X
	05.09.2012	10	X	X	X	X
		70	X	X	X	X
		300	X	X	X	
		555	X	X	X	

Table 16: List of filter samples for the suspended matter analysis

No.	Station Ship	Station-form	Internal-Station-code	Sub-station	Water depth[m]	Sampling Time [local]	Date [mm.dd.yyyy]
1	Stat. 19-CTD-LISST	Mooring	M1	2	19	01:00	04.29.2012
2	Stat. 19-CTD-LISST	Mooring	M1	2	13	01:00	04.29.2012
3	Stat. 19-CTD-LISST	Mooring	M1	2	7	01:00	04.29.2012
4	Stat. 19-CTD-LISST	Mooring	M1	3	18	02:00	04.29.2012
5	Stat. 19-CTD-LISST	Mooring	M1	3	14	02:00	04.29.2012
6	Stat. 19-CTD-LISST	Mooring	M1	3	7	02:00	04.29.2012
7	Stat. 19-CTD-LISST	Mooring	M1	4	18	03:00	04.29.2012
8	Stat. 19-CTD-LISST	Mooring	M1	4	14	03:00	04.29.2012
9	Stat. 19-CTD-LISST	Mooring	M1	4	9	03:00	04.29.2012
10	Stat. 19-CTD-LISST	Mooring	M1	5	18	04:00	04.29.2012
11	Stat. 19-CTD-LISST	Mooring	M1	5	14	04:00	04.29.2012
12	Stat. 19-CTD-LISST	Mooring	M1	6	16	05:00	04.29.2012
13	Stat. 19-CTD-LISST	Mooring	M1	6	11	05:00	04.29.2012
14	Stat. 19-CTD-LISST	Mooring	M1	6	7	05:00	04.29.2012
15	Stat. 19-CTD-LISST	Mooring	M1	7	17	06:00	04.29.2012
16	Stat. 19-CTD-LISST	Mooring	M1	7	7.5	06:00	04.29.2012
17	Stat. 19-CTD-LISST	Mooring	M1	8	8	07:00	04.29.2012
18	Stat. 19-CTD-LISST	Mooring	M1	8	13	07:00	04.29.2012
19	Stat. 19-CTD-LISST	Mooring	M1	8	17	07:00	04.29.2012
20	Stat. 19-CTD-LISST	Mooring	M1	9	17	08:00	04.30.2012
21	Stat. 19-CTD-LISST	Mooring	M1	10	19	09:00	04.30.2012
22	Stat. 19-CTD-LISST	Mooring	M1	10	10	09:00	04.30.2012
23	Stat. 19-CTD-LISST	Mooring	M1	11	17	10:00	04.30.2012
24	Stat. 19-CTD-LISST	Mooring	M1	11	8	10:00	04.30.2012
25	Stat. 19-CTD-LISST	Mooring	M1	12	17	11:00	04.30.2012
26	Stat. 19-CTD-LISST	Mooring	M1	12	14	11:00	04.30.2012
27	Stat. 19-CTD-LISST	Mooring	M1	12	10	11:00	04.30.2012
28	Stat. 19-CTD-LISST	Mooring	M1	13	18	12:00	04.30.2012
29	Stat. 19-CTD-LISST	Mooring	M1	13	15	12:00	04.30.2012
30	Stat. 19-CTD-LISST	Mooring	M1	13	10	12:00	04.30.2012
31	Stat. 19-CTD-LISST	Mooring	M1	13	2	12:00	04.30.2012
32	Stat. 19-CTD-LISST	Mooring	M1	14	18	13:00	04.30.2012
33	Stat. 19-CTD-LISST	Mooring	M1	14	8	13:00	04.30.2012
34	Stat. 19-CTD-LISST	Mooring	M1	15	20	14:00	04.30.2012

No.	Station Ship	Station-form	Internal-Station-code	Sub-station	Water depth[m]	Sampling Time [local]	Date [mm.dd.yyyy]
35	Stat. 19-CTD-LISST	Mooring	M1	15	15	14:00	04.30.2012
36	Stat. 19-CTD-LISST	Mooring	M1	15	9	14:00	04.30.2012
37	Stat. 19-CTD-LISST	Mooring	M1	18	20	17:00	04.30.2012
38	Stat. 19-CTD-LISST	Mooring	M1	18	12	17:00	04.30.2012
39	Stat. 19-CTD-LISST	Mooring	M1	18	6	17:00	04.30.2012
40	Stat. 19-CTD-LISST	Mooring	M1	19	20	18:00	04.30.2012
41	Stat. 19-CTD-LISST	Mooring	M1	19	16	18:00	04.30.2012
42	Stat. 19-CTD-LISST	Mooring	M1	19	11	18:00	04.30.2012
43	Stat. 19-CTD-LISST	Mooring	M1	20	20	19:00	04.30.2012
44	Stat. 19-CTD-LISST	Mooring	M1	20	13	19:00	04.30.2012
45	Stat. 19-CTD-LISST	Mooring	M1	20	5	19:00	04.30.2012
46	Stat. 19-CTD-LISST	Mooring	M1	21	21	20:00	04.30.2012
47	Stat. 19-CTD-LISST	Mooring	M1	21	16	20:00	04.30.2012
48	Stat. 19-CTD-LISST	Mooring	M1	21	4	20:00	04.30.2012
49	Stat. 19-CTD-LISST	Mooring	M1	22	21	21:00	04.30.2012
50	Stat. 19-CTD-LISST	Mooring	M1	22	18	21:00	04.30.2012
51	Stat. 19-CTD-LISST	Mooring	M1	23	21	22:00	04.30.2012
52	Stat. 19-CTD-LISST	Mooring	M1	23	19	22:00	04.30.2012
53	Stat. 19-CTD-LISST	Mooring	M1	23	4	22:00	04.30.2012
54	Stat. 19-CTD-LISST	Mooring	M1	24	21	23:00	04.30.2012
55	Stat. 19-CTD-LISST	Mooring	M1	25	21	00:00	04.30.2012
56	Stat. 19-CTD-LISST	Mooring	M1	25	11	00:00	04.30.2012
57	Stat. 19-CTD-LISST	Mooring	M1	25	5	00:00	04.30.2012
58	Stat. 19-CTD-LISST	Mooring	M1	26	20	01:00	04.30.2012
59	Stat. 19-CTD-LISST	Mooring	M1	26	13	01:00	04.30.2012
60	Stat. 19-CTD-LISST	Mooring	M1	26	8	01:00	04.30.2012
61	Stat-21	Normal-CTD/LISST	21	1	44	15:25	05.01.2012
62	Stat-21	Normal-CTD/LISST	21	1	30	15:25	05.01.2012
63	Stat-21	Normal-CTD/LISST	21	1	5	15:25	05.01.2012
64	Stat-22	Normal-CTD/LISST	22	1	42	18:28	05.01.2012
65	Stat-22	Normal-CTD/LISST	22	1	31	18:28	05.01.2012
66	Stat-22	Normal-CTD/LISST	22	1	5	18:28	05.01.2012
67	Stat-23	Normal-CTD/LISST	23	1	4	02:00	05.01.2012
68	Stat-23	Normal-CTD/LISST	23	1	15	02:00	05.01.2012
69	Stat-23	Normal-CTD/LISST	23	1	15	02:00	05.01.2012
70	Stat-23	Normal-CTD/LISST	23	1	22	02:00	05.01.2012

No.	Station Ship	Station-form	Internal-Station-code	Sub-station	Water depth[m]	Sampling Time [local]	Date [mm.dd.yyyy]
71	Stat-25	Normal-CTD/LISST	25	1	18	07:00	05.01.2012
72	Stat-25	Normal-CTD/LISST	25	1	10	07:00	05.01.2012
73	Stat-25	Normal-CTD/LISST	25	1	5	07:00	05.01.2012
74	Stat-28	Normal-CTD/LISST	28	1	37	09:00	05.02.2012
75	Stat-28	Normal-CTD/LISST	28	1	22	09:00	05.02.2012
76	Stat-28	Normal-CTD/LISST	28	1	17	09:00	05.02.2012
77	Stat-28	Normal-CTD/LISST	28	1	9	09:00	05.02.2012
78	Stat.29	Normal-CTD/LISST	29	1	45	22:00	05.02.2012
79	Stat.29	Normal-CTD/LISST	29	1	35	22:00	05.02.2012
80	Stat.29	Normal-CTD/LISST	29	1	25	22:00	05.02.2012
81	Stat.29	Normal-CTD/LISST	29	1	5	22:00	05.02.2012
82	Stat.30	Mooring	M2	1	48	03:30	05.02.2012
83	Stat.30	Mooring	M2	1	37	03:30	05.02.2012
84	Stat.30	Mooring	M2	1	4	03:30	05.02.2012
85	Stat.30	Mooring	M2	2	50	04:30	05.02.2012
86	Stat.30	Mooring	M2	2	36	04:30	05.02.2012
87	Stat.30	Mooring	M2	2	4	04:30	05.02.2012
88	Stat.30	Mooring	M2	3	50	05:30	05.02.2012
89	Stat.30	Mooring	M2	3	36	05:30	05.02.2012
90	Stat.30	Mooring	M2	3	4	05:30	05.02.2012
91	Stat.30	Mooring	M2	4	45	06:30	05.02.2012
92	Stat.30	Mooring	M2	4	35	06:30	05.02.2012
93	Stat.30	Mooring	M2	4	4	06:30	05.02.2012
94	Stat.30	Mooring	M2	5	50	07:30	05.02.2012
95	Stat.30	Mooring	M2	5	42	07:30	05.02.2012
96	Stat.30	Mooring	M2	5	36	07:30	05.02.2012
97	Stat.30	Mooring	M2	5	4	07:30	05.02.2012
98	Stat.30	Mooring	M2	6	45	08:30	05.03.2012
99	Stat.30	Mooring	M2	6	38	08:30	05.03.2012
100	Stat.30	Mooring	M2	6	4	08:30	05.03.2012
101	Stat.30	Mooring	M2	7	50	09:30	05.03.2012
102	Stat.30	Mooring	M2	7	45	09:30	05.03.2012
103	Stat.30	Mooring	M2	7	36	09:30	05.03.2012
104	Stat.30	Mooring	M2	7	6	09:30	05.03.2012
105	Stat.30	Mooring	M2	8	46	10:30	05.03.2012
106	Stat.30	Mooring	M2	8	39	10:30	05.03.2012

No.	Station Ship	Station-form	Internal-Station-code	Sub-station	Water depth[m]	Sampling Time [local]	Date [mm.dd.yyyy]
107	Stat.30	Mooring	M2	8	4	10:30	05.03.2012
108	Stat.30	Mooring	M2	9	46	11:30	05.03.2012
109	Stat.30	Mooring	M2	9	40	11:30	05.03.2012
110	Stat.30	Mooring	M2	9	34	11:30	05.03.2012
111	Stat.30	Mooring	M2	9	4	11:30	05.03.2012
112	Stat.30	Mooring	M2	10	50	12:30	05.03.2012
113	Stat.30	Mooring	M2	10	38	12:30	05.03.2012
114	Stat.30	Mooring	M2	10	4	12:30	05.03.2012
115	Stat.30	Mooring	M2	11	50	13:30	05.03.2012
116	Stat.30	Mooring	M2	11	38	13:30	05.03.2012
117	Stat.30	Mooring	M2	11	4	13:30	05.03.2012
118	Stat.30	Mooring	M2	12	46	14:30	05.03.2012
119	Stat.30	Mooring	M2	12	37	14:30	05.03.2012
120	Stat.30	Mooring	M2	12	4	14:30	05.03.2012
121	Stat.30	Mooring	M2	13	50	15:30	05.03.2012
122	Stat.30	Mooring	M2	13	37.5	15:30	05.03.2012
123	Stat.30	Mooring	M2	13	5	15:30	05.03.2012
124	Stat.30	Mooring	M2	14	50	16:30	05.03.2012
125	Stat.30	Mooring	M2	14	38	16:30	05.03.2012
126	Stat.30	Mooring	M2	14	4	16:30	05.03.2012
127	Stat.30	Mooring	M2	15	49	17:30	05.03.2012
128	Stat.30	Mooring	M2	15	40	17:30	05.03.2012
129	Stat.30	Mooring	M2	15	4	17:30	05.03.2012
130	Stat.30	Mooring	M2	16	50	18:30	05.03.2012
131	Stat.30	Mooring	M2	16	42	18:30	05.03.2012
132	Stat.30	Mooring	M2	16	38	18:30	05.03.2012
133	Stat.30	Mooring	M2	16	4	18:30	05.03.2012
134	Stat.30	Mooring	M2	17	49	19:30	05.03.2012
135	Stat.30	Mooring	M2	17	42	19:30	05.03.2012
136	Stat.30	Mooring	M2	17	38	19:30	05.03.2012
137	Stat.30	Mooring	M2	17	4	19:30	05.03.2012
138	Stat.30	Mooring	M2	18	49	20:30	05.03.2012
139	Stat.30	Mooring	M2	18	40	20:30	05.03.2012
140	Stat.30	Mooring	M2	18	36	20:30	05.03.2012
141	Stat.30	Mooring	M2	18	4	20:30	05.03.2012
142	Stat.30	Mooring	M2	19	49	21:30	05.03.2012

No.	Station Ship	Station-form	Internal-Station-code	Sub-station	Water depth[m]	Sampling Time [local]	Date [mm.dd.yyyy]
143	Stat.30	Mooring	M2	19	40	21:30	05.03.2012
144	Stat.30	Mooring	M2	19	36	21:30	05.03.2012
145	Stat.30	Mooring	M2	19	4	21:30	05.03.2012
146	Stat.30	Mooring	M2	20	49	22:30	05.03.2012
147	Stat.30	Mooring	M2	20	40	22:30	05.03.2012
148	Stat.30	Mooring	M2	20	33	22:30	05.03.2012
149	Stat.30	Mooring	M2	20	4	22:30	05.03.2012
150	Stat.30	Mooring	M2	21	49	23:30	05.03.2012
151	Stat.30	Mooring	M2	21	44	23:30	05.03.2012
152	Stat.30	Mooring	M2	21	36	23:30	05.03.2012
153	Stat.30	Mooring	M2	21	4	23:30	05.03.2012
154	Stat.30	Mooring	M2	22	49	00:30	05.03.2012
155	Stat.30	Mooring	M2	22	42	00:30	05.03.2012
156	Stat.30	Mooring	M2	22	36	00:30	05.03.2012
157	Stat.30	Mooring	M2	22	3	00:30	05.03.2012
158	Stat.30	Mooring	M2	23	50	01:30	05.03.2012
159	Stat.30	Mooring	M2	23	44	01:30	05.03.2012
160	Stat.30	Mooring	M2	23	34	01:30	05.03.2012
161	Stat.30	Mooring	M2	23	4	01:30	05.03.2012
162	Stat.30	Mooring	M2	24	50	02:30	05.03.2012
163	Stat.30	Mooring	M2	24	46	02:30	05.03.2012
164	Stat.30	Mooring	M2	24	34	02:30	05.03.2012
165	Stat.30	Mooring	M2	24	4	02:30	05.03.2012
166	Stat.30	Mooring	M2	25	49	03:30	05.03.2012
167	Stat.30	Mooring	M2	25	46	03:30	05.03.2012
168	Stat.30	Mooring	M2	25	35	03:30	05.03.2012
169	Stat.30	Mooring	M2	25	4	03:30	05.03.2012
170	Stat.30	Mooring	M2	26	50	04:30	05.03.2012
171	Stat.30	Mooring	M2	26	42	04:30	05.03.2012
172	Stat.30	Mooring	M2	26	34	04:30	05.03.2012
173	Stat.30	Mooring	M2	26	4	04:30	05.03.2012
174	Stat.33	Normal-CTD/LISST	33	1	58	14:00	05.04.2012
175	Stat.33	Normal-CTD/LISST	33	1	50	14:00	05.04.2012
176	Stat.33	Normal-CTD/LISST	33	1	5	14:00	05.04.2012
177	Stat.34	Normal-CTD/LISST	34	1	58	20:20	05.04.2012
178	Stat.34	Normal-CTD/LISST	34	1	50	20:20	05.04.2012

No.	Station Ship	Station-form	Internal-Station-code	Sub-station	Water depth[m]	Sampling Time [local]	Date [mm.dd.yyyy]
179	Stat.34	Normal-CTD/LISST	34	1	5	20:20	05.04.2012
180	Stat.35	Normal-CTD/LISST	35	1	46	02:20	05.05.2012
181	Stat.35	Normal-CTD/LISST	35	1	40	02:20	05.05.2012
182	Stat.35	Normal-CTD/LISST	35	1	5	02:20	05.05.2012
183	Stat.39	Normal-CTD/LISST	39	1	59	18:30	05.05.2012
184	Stat.39	Normal-CTD/LISST	39	1	38	18:30	05.05.2012
185	Stat.39	Normal-CTD/LISST	39	1	33	18:30	05.05.2012
186	Stat.39	Normal-CTD/LISST	39	1	4	18:30	05.05.2012
187	Stat. 40	Normal-CTD/LISST	40	1	56	22:45	05.05.2012
188	Stat. 40	Normal-CTD/LISST	40	1	44	22:45	05.05.2012
189	Stat. 40	Normal-CTD/LISST	40	1	4	22:45	05.05.2012
190	Stat.42	Mooring	42	1	62	06:45	05.06.2012
191	Stat.42	Mooring	42	1	25	06:45	05.06.2012
192	Stat.42	Mooring	42	1	22	06:45	05.06.2012
193	Stat.42	Mooring	42	1	5	06:45	05.06.2012
194	Stat.42	Mooring	42	2	63	07:40	05.06.2012
195	Stat.42	Mooring	42	2	25	07:40	05.06.2012
196	Stat.42	Mooring	42	2	21	07:40	05.06.2012
197	Stat.42	Mooring	42	2	5	07:40	05.06.2012
198	Stat.42	Mooring	42	3	63	08:40	05.06.2012
199	Stat.42	Mooring	42	3	25	08:40	05.06.2012
200	Stat.42	Mooring	42	3	21	08:40	05.06.2012
201	Stat.42	Mooring	42	3	5	08:40	05.06.2012
202	Stat.42	Mooring	42	4	62	09:30	05.06.2012
203	Stat.42	Mooring	42	4	47	09:30	05.06.2012
204	Stat.42	Mooring	42	4	27	09:30	05.06.2012
205	Stat.42	Mooring	42	4	5	09:30	05.06.2012
206	Stat.42	Mooring	42	5	63	10:30	05.06.2012
207	Stat.42	Mooring	42	5	36	10:30	05.06.2012
208	Stat.42	Mooring	42	5	24	10:30	05.06.2012
209	Stat.42	Mooring	42	5	4	10:30	05.06.2012
210	Stat.42	Mooring	42	6	64	11:30	05.06.2012
211	Stat.42	Mooring	42	6	34	11:30	05.06.2012
212	Stat.42	Mooring	42	6	25	11:30	05.06.2012
213	Stat.42	Mooring	42	6	19	11:30	05.06.2012
214	Stat.42	Mooring	42	6	4	11:30	05.06.2012

No.	Station Ship	Station-form	Internal-Station-code	Sub-station	Water depth[m]	Sampling Time [local]	Date [mm.dd.yyyy]
215	Stat.42	Mooring	42	7	64	12:30	05.06.2012
216	Stat.42	Mooring	42	7	36	12:30	05.06.2012
217	Stat.42	Mooring	42	7	24	12:30	05.06.2012
218	Stat.42	Mooring	42	7	18	12:30	05.06.2012
219	Stat.42	Mooring	42	7	4	12:30	05.06.2012
220	Stat.42	Mooring	42	8	63	13:30	05.06.2012
221	Stat.42	Mooring	42	8	34	13:30	05.06.2012
222	Stat.42	Mooring	42	8	22	13:30	05.06.2012
223	Stat.42	Mooring	42	8	18	13:30	05.06.2012
224	Stat.42	Mooring	42	8	4	13:30	05.06.2012
225	Stat.42	Mooring	42	9	63	14:30	05.06.2012
226	Stat.42	Mooring	42	9	30	14:30	05.06.2012
227	Stat.42	Mooring	42	9	18	14:30	05.06.2012
228	Stat.42	Mooring	42	9	5	14:30	05.06.2012
229	Stat.42	Mooring	42	10	64	15:30	05.06.2012
230	Stat.42	Mooring	42	10	38	15:30	05.06.2012
231	Stat.42	Mooring	42	10	22	15:30	05.06.2012
232	Stat.42	Mooring	42	10	16	15:30	05.06.2012
233	Stat.42	Mooring	42	10	4	15:30	05.06.2012
234	Stat.42	Mooring	42	11	64	16:30	05.06.2012
235	Stat.42	Mooring	42	11	54	16:30	05.06.2012
236	Stat.42	Mooring	42	11	38	16:30	05.06.2012
237	Stat.42	Mooring	42	11	25	16:30	05.06.2012
238	Stat.42	Mooring	42	11	4	16:30	05.06.2012
239	Stat.42	Mooring	42	12	64	17:30	05.06.2012
240	Stat.42	Mooring	42	12	32	17:30	05.06.2012
241	Stat.42	Mooring	42	12	26	17:30	05.06.2012
242	Stat.42	Mooring	42	12	18	17:30	05.06.2012
243	Stat.42	Mooring	42	12	4	17:30	05.06.2012
244	Stat.42	Mooring	42	13	64	18:30	05.06.2012
245	Stat.42	Mooring	42	13	36	18:30	05.06.2012
246	Stat.42	Mooring	42	13	26	18:30	05.06.2012
247	Stat.42	Mooring	42	13	20	18:30	05.06.2012
248	Stat.42	Mooring	42	13	4	18:30	05.06.2012
249	Stat.42	Mooring	42	14	64	19:30	05.06.2012
250	Stat.42	Mooring	42	14	38	19:30	05.06.2012

No.	Station Ship	Station-form	Internal-Station-code	Sub-station	Water depth[m]	Sampling Time [local]	Date [mm.dd.yyyy]
251	Stat.42	Mooring	42	14	26	19:30	05.06.2012
252	Stat.42	Mooring	42	14	18	19:30	05.06.2012
253	Stat.42	Mooring	42	14	4	19:30	05.06.2012
254	Stat.42	Mooring	42	15	63	20:40	05.06.2012
255	Stat.42	Mooring	42	15	39	20:40	05.06.2012
256	Stat.42	Mooring	42	15	26	20:40	05.06.2012
257	Stat.42	Mooring	42	15	19	20:40	05.06.2012
258	Stat.42	Mooring	42	15	5	20:40	05.06.2012
259	Stat.42	Mooring	42	16	63	21:30	05.06.2012
260	Stat.42	Mooring	42	16	33	21:30	05.06.2012
261	Stat.42	Mooring	42	16	21	21:30	05.06.2012
262	Stat.42	Mooring	42	16	19	21:30	05.06.2012
263	Stat.42	Mooring	42	16	6	21:30	05.06.2012
264	Stat.42	Mooring	42	17	63	22:30	05.06.2012
265	Stat.42	Mooring	42	17	39	22:30	05.06.2012
266	Stat.42	Mooring	42	17	20	22:30	05.06.2012
267	Stat.42	Mooring	42	17	5	22:30	05.06.2012
268	Stat.42	Mooring	42	18	64	22:30	05.06.2012
269	Stat.42	Mooring	42	18	21	23:30	05.06.2012
270	Stat.42	Mooring	42	18	14	23:30	05.06.2012
271	Stat.42	Mooring	42	18	6	23:30	05.06.2012
272	Stat.42	Mooring	42	19	63	00:30	05.07.2012
273	Stat.42	Mooring	42	19	24	00:30	05.07.2012
274	Stat.42	Mooring	42	19	20	00:30	05.07.2012
275	Stat.42	Mooring	42	19	15	00:30	05.07.2012
276	Stat.42	Mooring	42	19	4	00:30	05.07.2012
277	Stat.42	Mooring	42	20	63	01:30	05.07.2012
278	Stat.42	Mooring	42	20	26	01:30	05.07.2012
279	Stat.42	Mooring	42	20	18	01:30	05.07.2012
280	Stat.42	Mooring	42	20	14	01:30	05.07.2012
281	Stat.42	Mooring	42	20	4	01:30	05.07.2012
282	Stat.42	Mooring	42	21	63	02:30	05.07.2012
283	Stat.42	Mooring	42	21	24	02:30	05.07.2012
284	Stat.42	Mooring	42	21	20	02:30	05.07.2012
285	Stat.42	Mooring	42	21	16	02:30	05.07.2012
286	Stat.42	Mooring	42	21	4	02:30	05.07.2012

No.	Station Ship	Station-form	Internal-Station-code	Sub-station	Water depth[m]	Sampling Time [local]	Date [mm.dd.yyyy]
287	Stat.42	Mooring	42	22	63	03:30	05.07.2012
288	Stat.42	Mooring	42	22	24	03:30	05.07.2012
289	Stat.42	Mooring	42	22	21	03:30	05.07.2012
290	Stat.42	Mooring	42	22	18	03:30	05.07.2012
291	Stat.42	Mooring	42	22	4	03:30	05.07.2012
292	Stat.42	Mooring	42	23	63	04:30	05.07.2012
293	Stat.42	Mooring	42	23	26	04:30	05.07.2012
294	Stat.42	Mooring	42	23	23	04:30	05.07.2012
295	Stat.42	Mooring	42	23	17	04:30	05.07.2012
296	Stat.42	Mooring	42	23	4	04:30	05.07.2012
297	Stat.42	Mooring	42	24	62	05:30	05.07.2012
298	Stat.42	Mooring	42	24	26	05:30	05.07.2012
299	Stat.42	Mooring	42	24	24	05:30	05.07.2012
300	Stat.42	Mooring	42	24	18	05:30	05.07.2012
301	Stat.42	Mooring	42	24	4	05:30	05.07.2012
302	Stat.42	Mooring	42	25	62	06:30	05.07.2012
303	Stat.42	Mooring	42	25	27	06:30	05.07.2012
304	Stat.42	Mooring	42	25	23	06:30	05.07.2012
305	Stat.42	Mooring	42	25	19	06:30	05.07.2012
306	Stat.42	Mooring	42	25	4	06:30	05.07.2012
307	Stat.42	Mooring	42	26	62	07:30	05.07.2012
308	Stat.42	Mooring	42	26	26	07:30	05.07.2012
309	Stat.42	Mooring	42	26	22	07:30	05.07.2012
310	Stat.42	Mooring	42	26	19	07:30	05.07.2012
311	Stat.42	Mooring	42	26	4	07:30	05.07.2012
312	Stat.43	Normal-CTD/LISST	43	1	62	10:50	05.07.2012
313	Stat.43	Normal-CTD/LISST	43	1	29	10:50	05.07.2012
314	Stat.43	Normal-CTD/LISST	43	1	23	10:50	05.07.2012
315	Stat.43	Normal-CTD/LISST	43	1	17	10:50	05.07.2012
316	Stat.43	Normal-CTD/LISST	43	1	4	10:50	05.07.2012
317	Stat.44	Normal-CTD/LISST	44	2	64	13:25	05.07.2012
318	Stat.44	Normal-CTD/LISST	44	2	34	13:25	05.07.2012
319	Stat.45	Normal-CTD/LISST	44	2	26	13:25	05.07.2012
320	Stat.45	Normal-CTD/LISST	44	2	5	13:25	05.07.2012
321	Stat.46	Normal-CTD/LISST	46	1	65	16:50	05.07.2012
322	Stat.46	Normal-CTD/LISST	46	1	44	16:50	05.07.2012

No.	Station Ship	Station-form	Internal-Station-code	Sub-station	Water depth[m]	Sampling Time [local]	Date [mm.dd.yyyy]
323	Stat.46	Normal-CTD/LISST	46	1	25	16:50	05.07.2012
324	Stat.46	Normal-CTD/LISST	46	1	18	16:50	05.07.2012
325	Stat.46	Normal-CTD/LISST	46	1	5	16:50	05.07.2012
326	Stat.47	Normal-CTD/LISST	47	1	58	22:20	05.07.2012
327	Stat.47	Normal-CTD/LISST	47	1	20	22:20	05.07.2012
328	Stat.47	Normal-CTD/LISST	47	1	3	22:20	05.07.2012
329	Stat.48	Normal-CTD/LISST	48	1	56	23:45	05.07.2012
330	Stat.48	Normal-CTD/LISST	48	1	25	23:45	05.07.2012
331	Stat.48	Normal-CTD/LISST	48	1	5	23:45	05.07.2012
332	Stat.49	Normal-CTD/LISST	49	1	66	02:55	05.08.2012
333	Stat.49	Normal-CTD/LISST	49	1	26	02:55	05.08.2012
334	Stat.49	Normal-CTD/LISST	49	1	4	02:55	05.08.2012
335	Stat.50	Normal-CTD/LISST	50	1	59	04:25	05.08.2012
336	Stat.50	Normal-CTD/LISST	50	1	25	04:25	05.08.2012
337	Stat.50	Normal-CTD/LISST	50	1	5	04:25	05.08.2012
338	Stat.53	Normal-CTD/LISST	53	1	90	17:00	05.08.2012
339	Stat.53	Normal-CTD/LISST	53	1	43	17:00	05.08.2012
340	Stat.53	Normal-CTD/LISST	53	1	5	17:00	05.08.2012
341	Stat.54	Normal-CTD/LISST	54	1	85	23:30	05.08.2012
342	Stat.54	Normal-CTD/LISST	54	1	36	23:30	05.08.2012
343	Stat.54	Normal-CTD/LISST	54	1	4	23:30	05.08.2012

4.4 Preliminary Results

4.4.1 CTD Station (Table 14)

First Results of CTD measurements are displayed in Fig. 7 to Fig. 13.

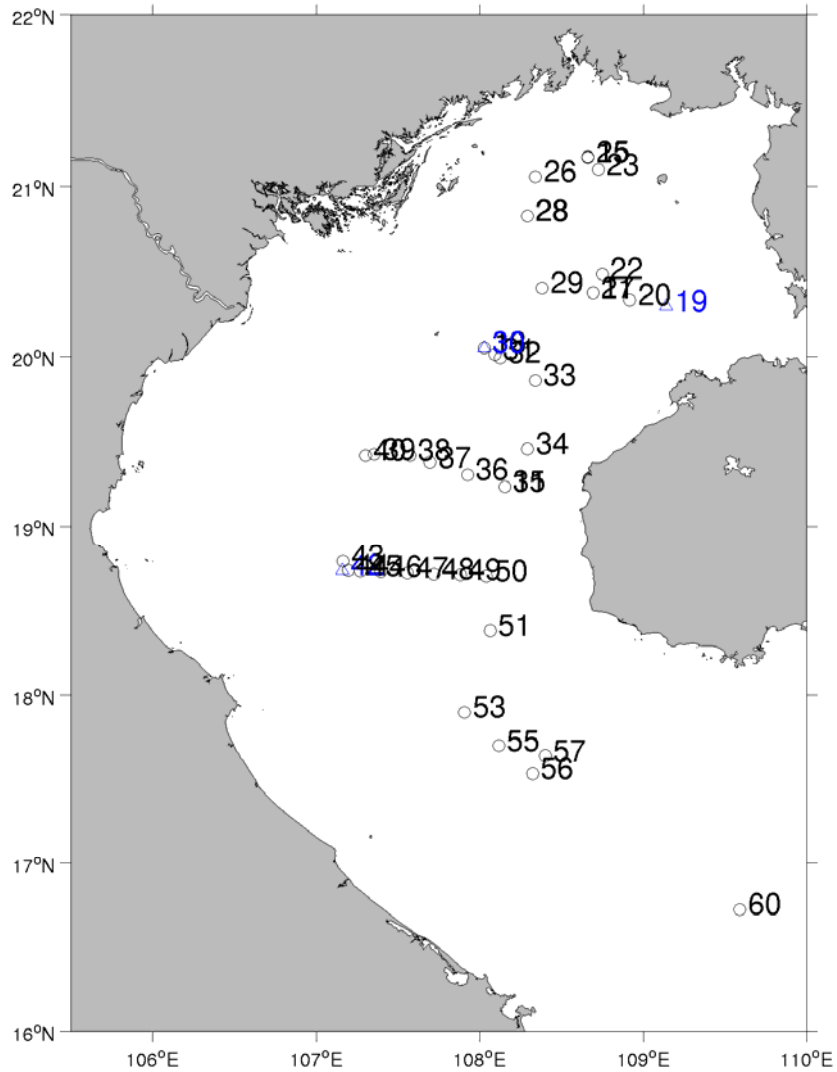


Fig. 6: The position and number of CTD stations. The blue triangles are permanent stations with 25 hours observation (S19, S30, S42). The red lines represent two sections, one is approx. along latitude 19,2° (cf. Fig. 11), another is approx. along longitude 108

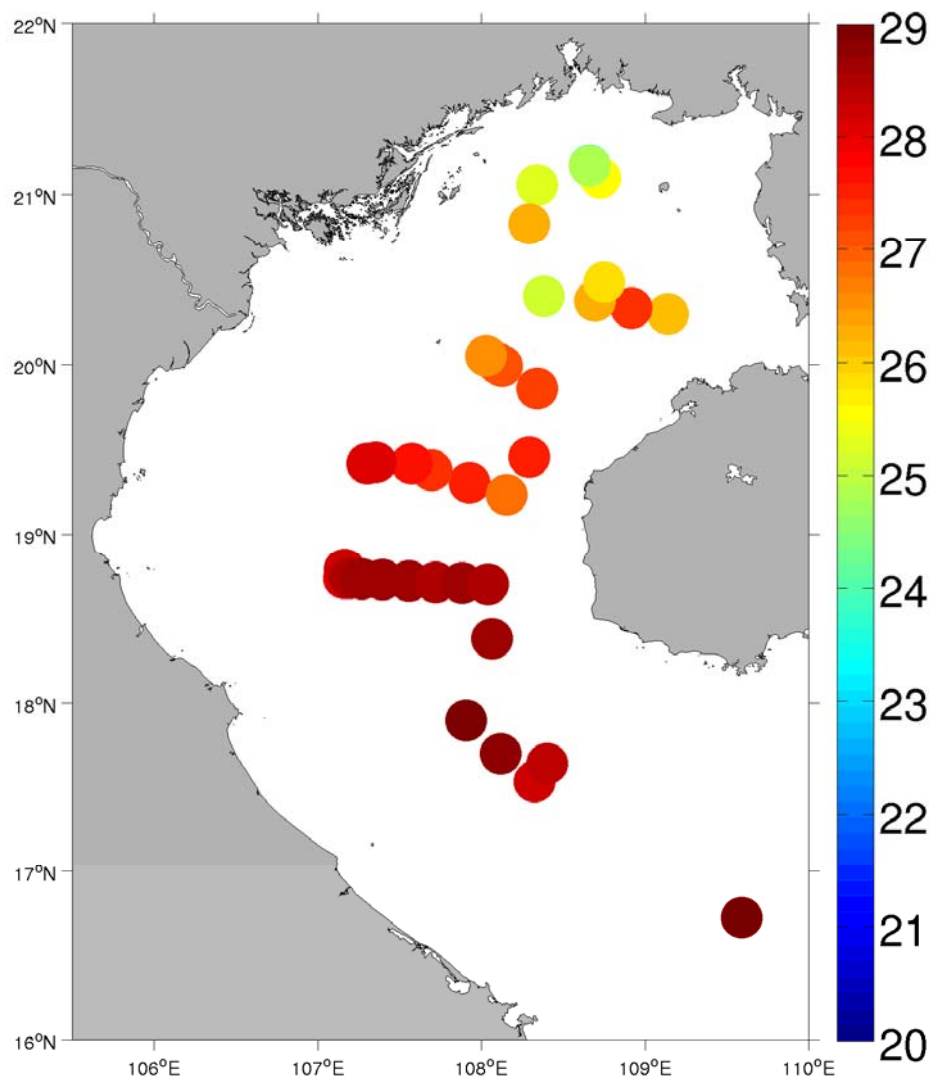


Fig. 7: Sea surface temperature (SST) distribution (~ 5m, permanent station only plot first hour observation).

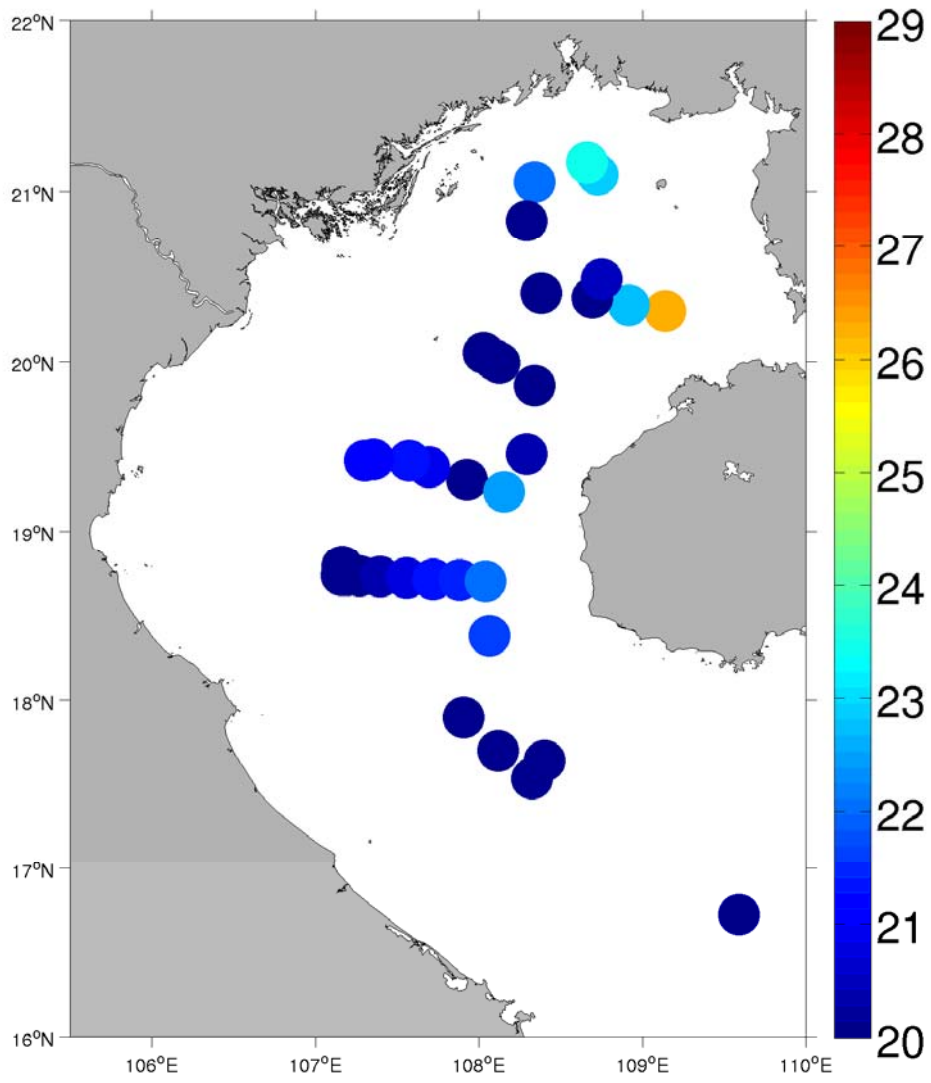


Fig. 8: Bottom temperature distribution.

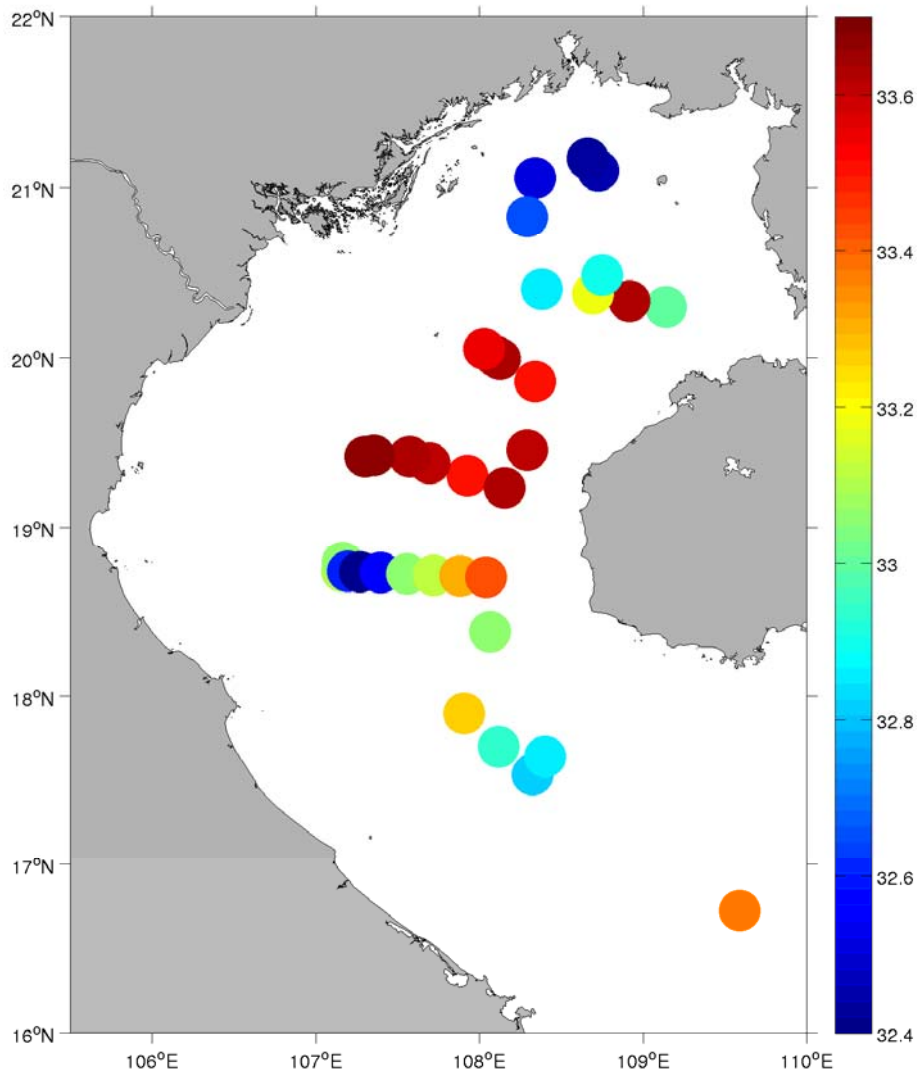


Fig. 9: Sea surface salinity (SSS) distribution.

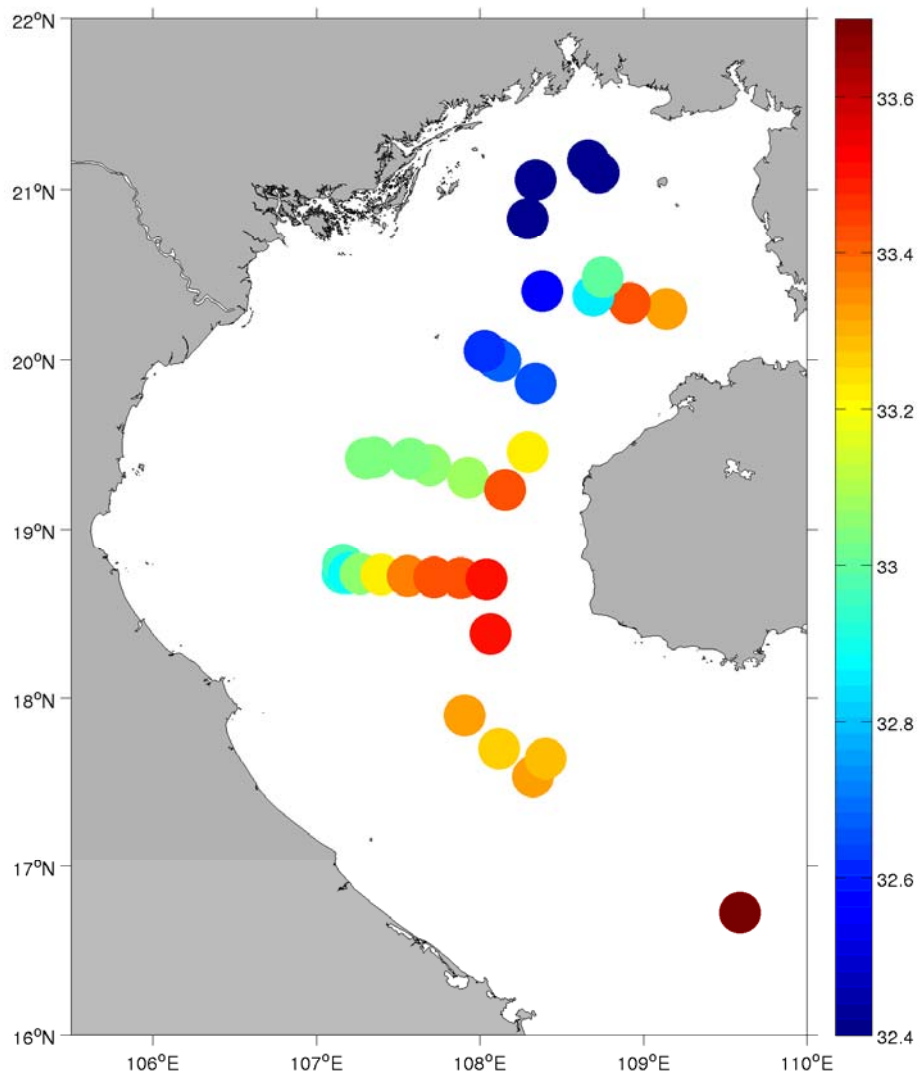


Fig. 10: Bottom salinity distribution

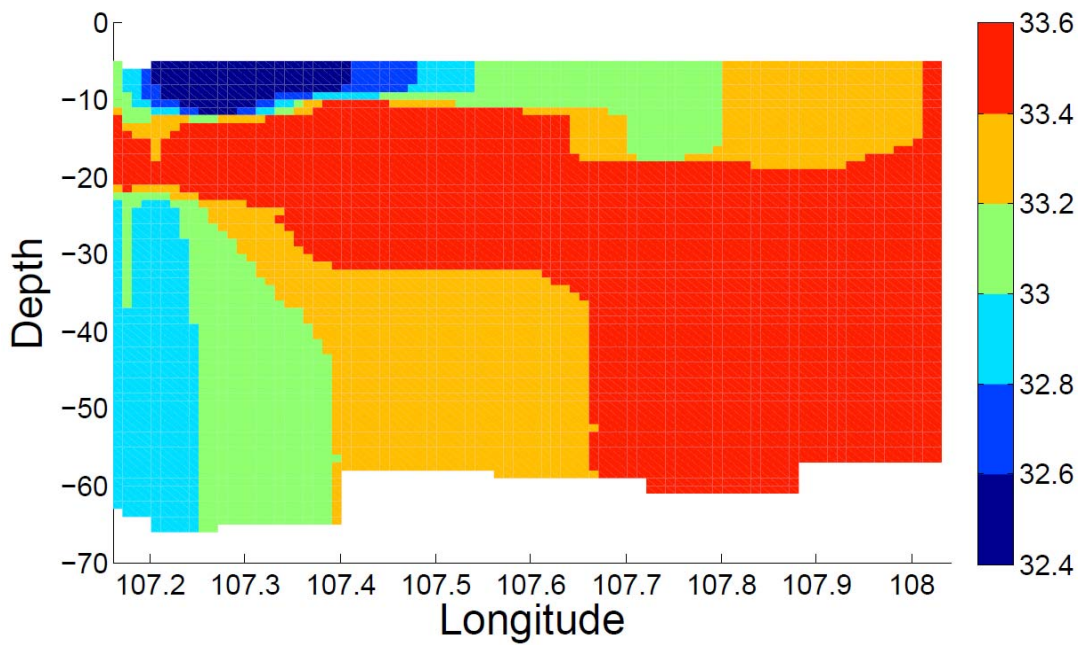
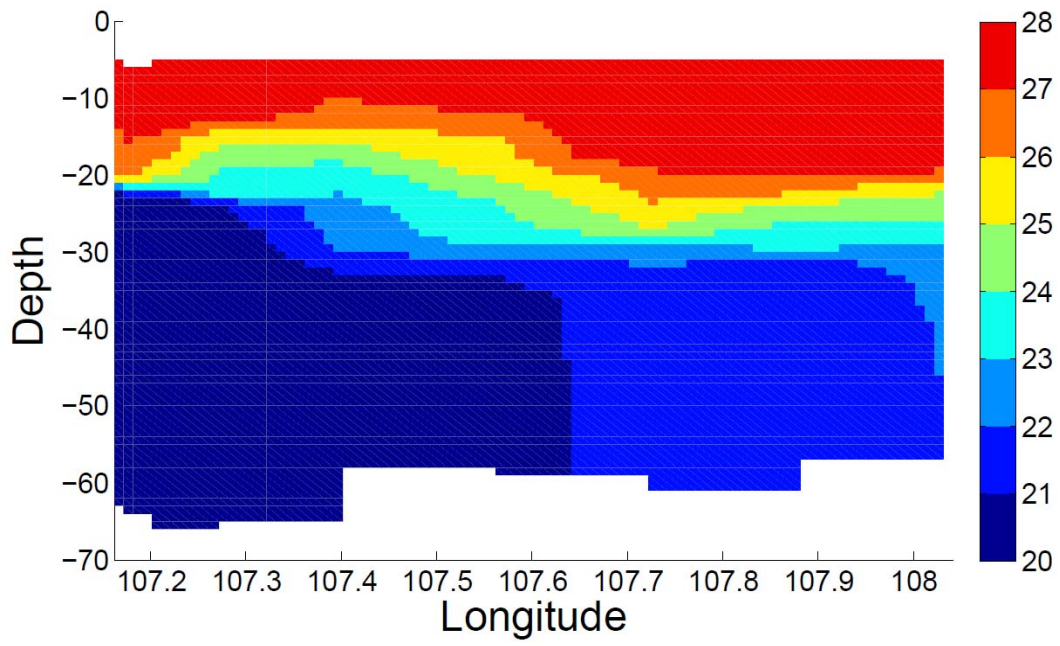


Fig. 11: Vertical distribution of Temperature (upper) and Salinity (lower) along section latitude 19°.

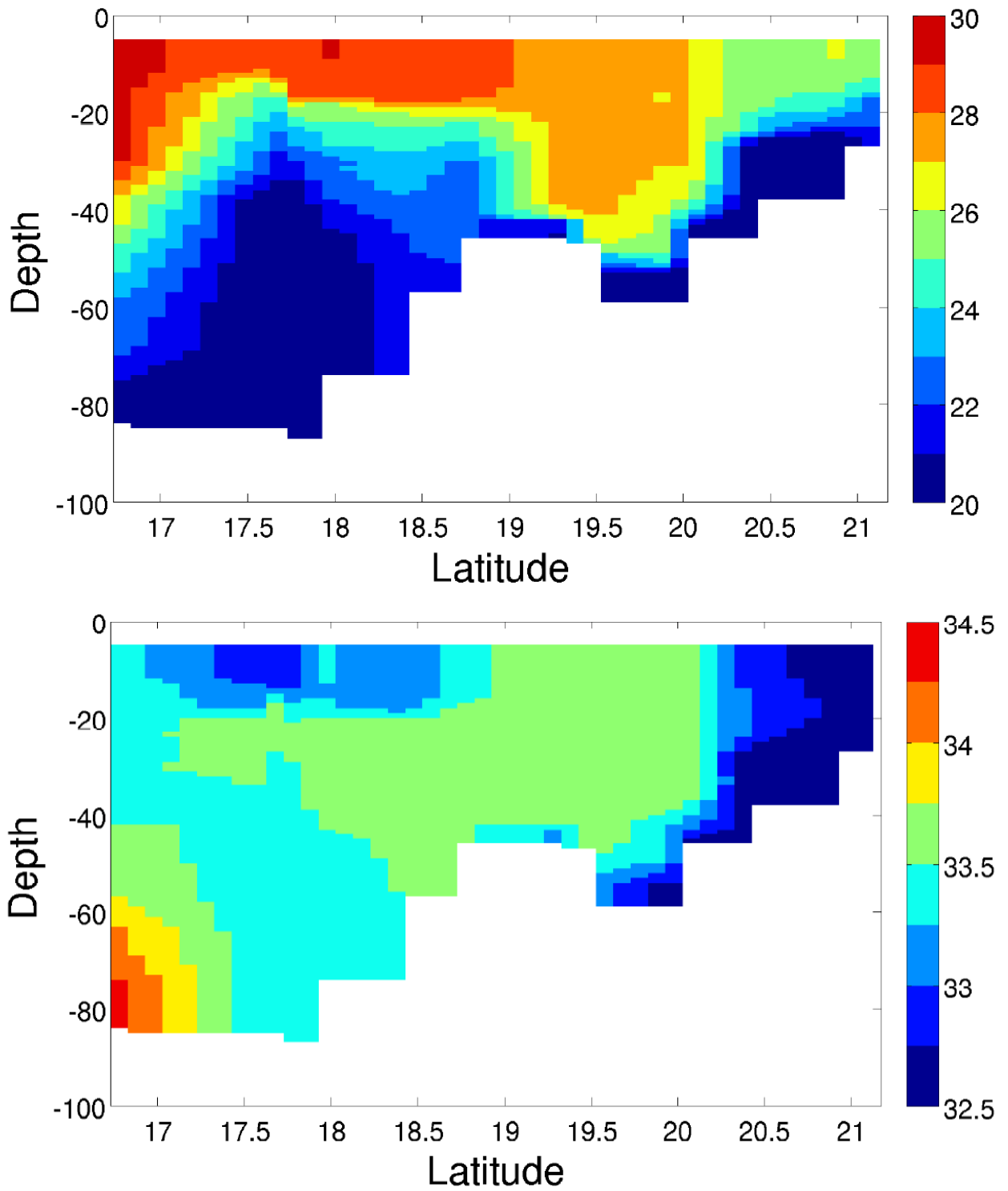


Fig. 12: Vertical distribution of Temperature (upper) and Salinity (lower) along the main axis of the Gulf of Tonkin at approx. longitude 108°. The depth at station 60 is more than 100 m.

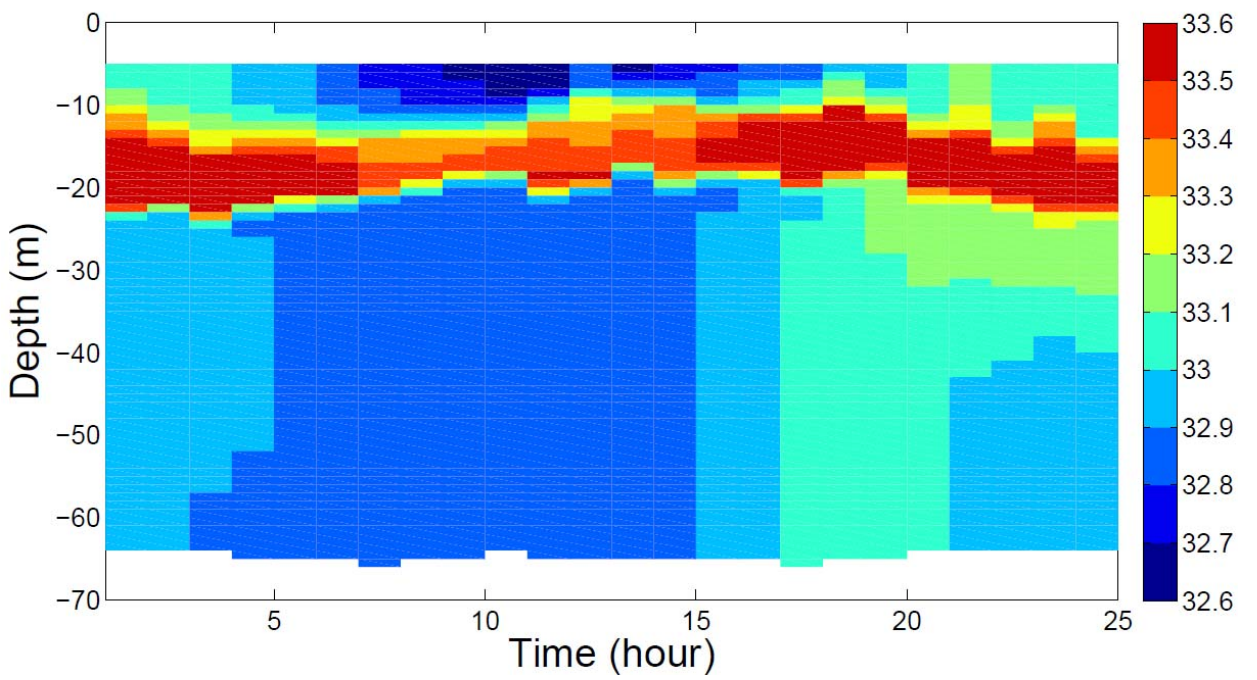
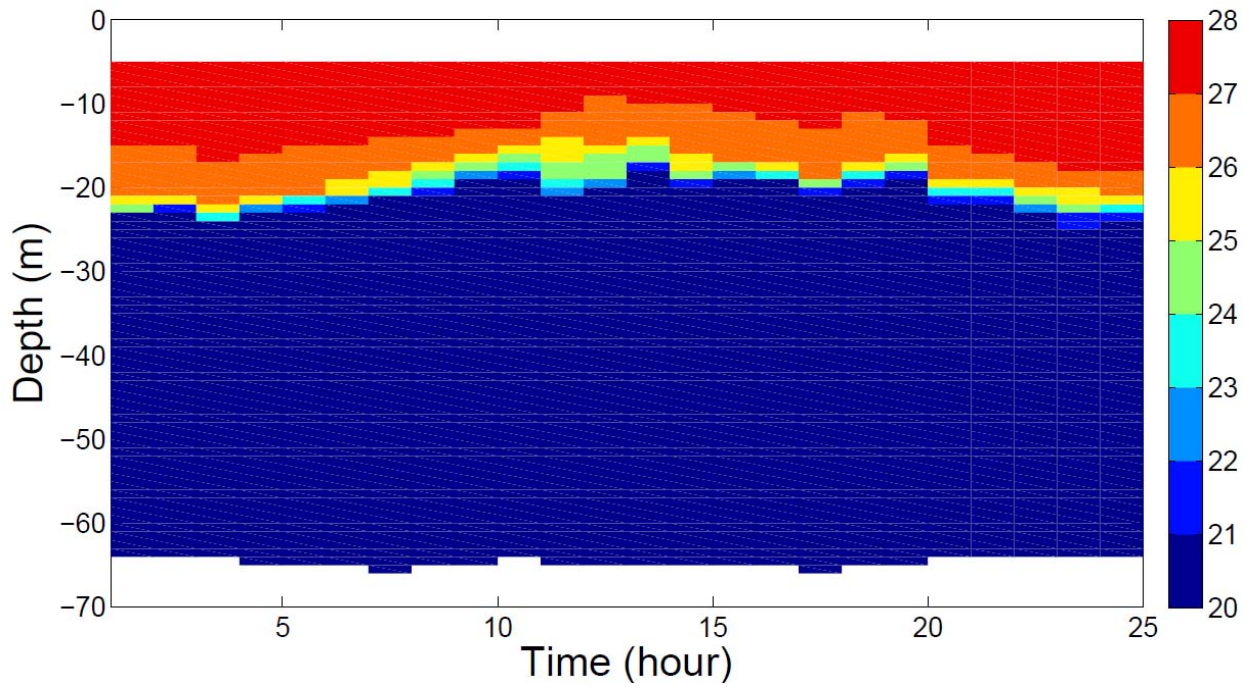


Fig. 13: Vertical distribution of Temperature (upper) and Salinity (lower) at the permanent station 42.


4.4.2 Description of sediment cores (Table 13)

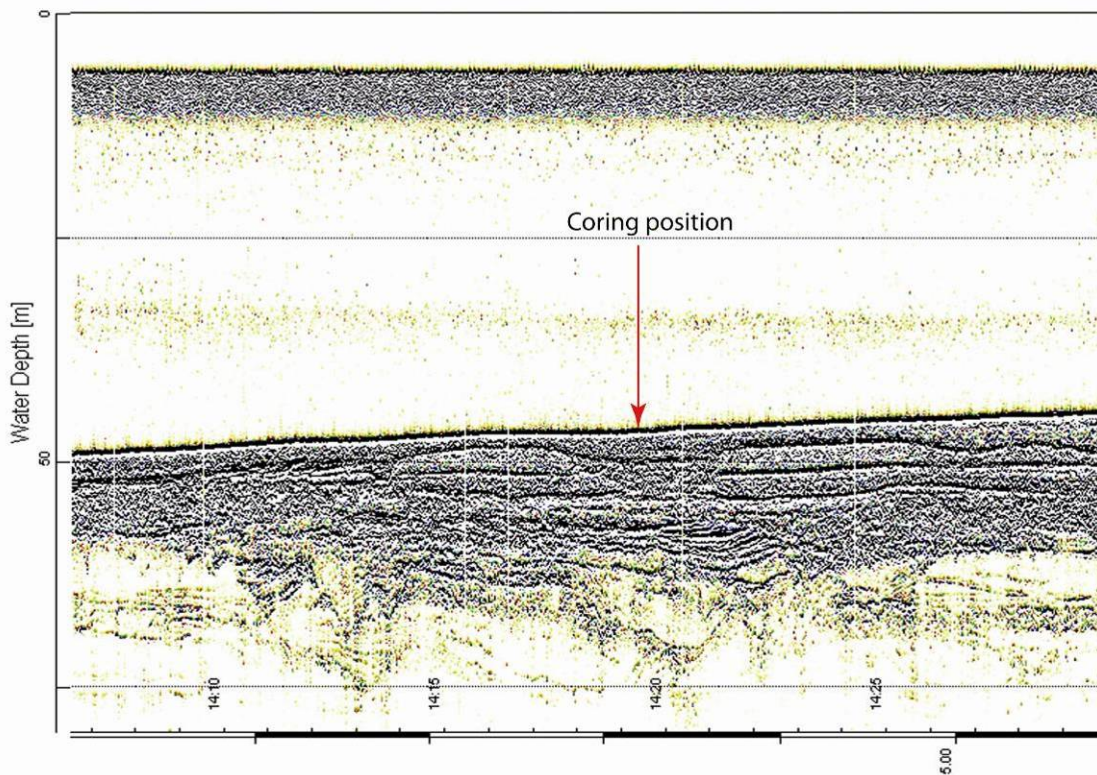
Sediment cores are presented as photo and X-ray logs with initial description. Core positions are marked in seismic (Parasound) profiles.

Station: 220-19 - 31 (GC) Water depth: 22 m
 Position: 20°17.613'N / 109°8,266'E Recovery: 575 cm
 Date: 01.05.2012 Interval: 0-575 cm

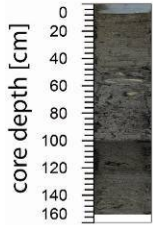
	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0		dark greenish gray	Gley 1 4/5 GY	bioturbated	silty clay	homogenous mud, partly sandy, high amount of small shells and shell fragments, bioturbation darkly traces.
20		dark greenish gray	Gley 1 4/5 GY	bioturbated	silty clay	homogenous mud, high amount of shell, 115cm shell 5 cm diameter, bioturbated
40		dark greenish gray	Gley 1 4/5 GY	bioturbated	silty clay	homogenous mud, Shellfragments in 233cm depth, bioturbation
60		dark greenish gray	Gley 1 4/5 GY	bioturbated	silty clay	homogenous mud, numerous bioturbation traces, partly some shell layers frequency 's
80		dark greenish gray	Gley 1 4/5 GY	bioturbated	silty clay	homogenous mud, numerous bioturbation traces, partly some shell layer frequency, at 440cm shell with 6cm Diameter
100		dark greenish gray	Gley 1 4/5 GY, Gley 1 5/10 Y	bioturbated	silty clay	homogenous mud, numerous bioturbation traces, partly some shell layer frequency, at 496cm shell with 4cm Diameter
120		dark greenish gray	Gley 1 5/10 Y	bioturbated	silty clay	
140						
160						
180						
200						
220						
240						
260						
280						
300						
320						
340						
360						
380						
400						
420						
440						
460						
480						
500						
520						
540						
560						
580						

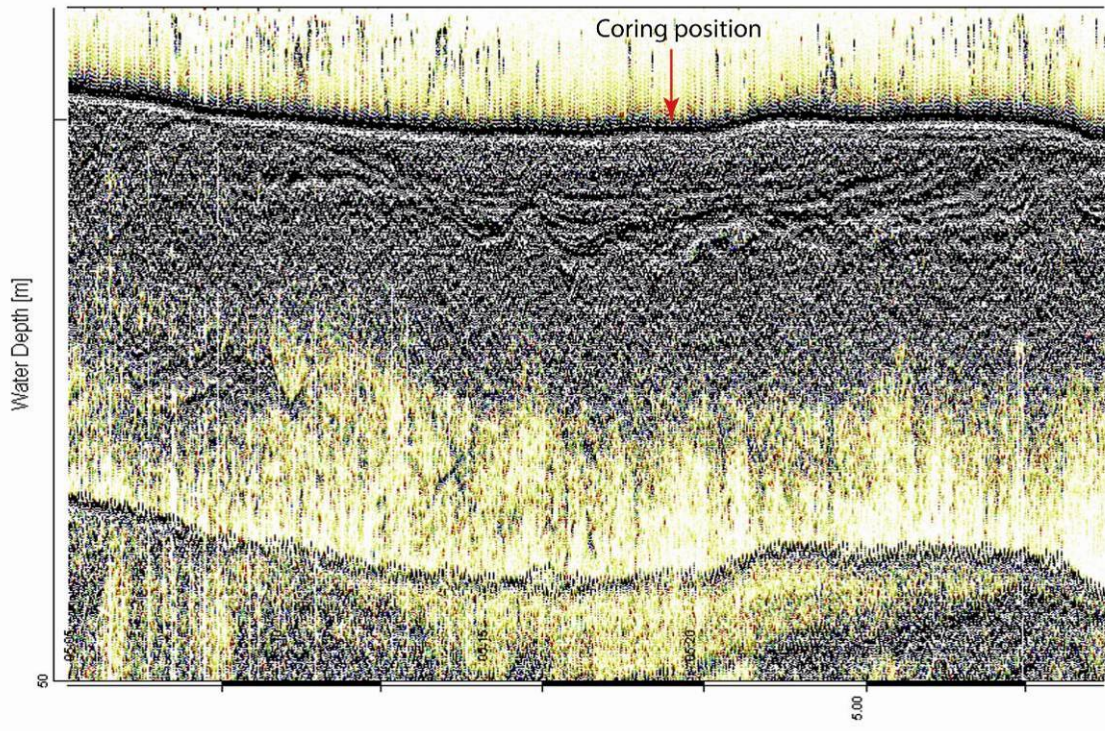
Station: 220- 20 - 6 (GC) Water depth: 45 m
 Position: 20°19.941'N / 108°55.093'E Recovery: 120 cm
 Date: 01.05.2012 Interval: 0-120 cm

Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
	greenish gray	Gley 1 5/10 Y	gradational mottled	silty clay	indistintolly lamination
	brownish yellow	10YR 6/6	gradational laminae	silty clay	gray-brownish-redly colored with indistinolly laminae, at 60cm the gray color is disappear with a appearance of fine sandy laninae



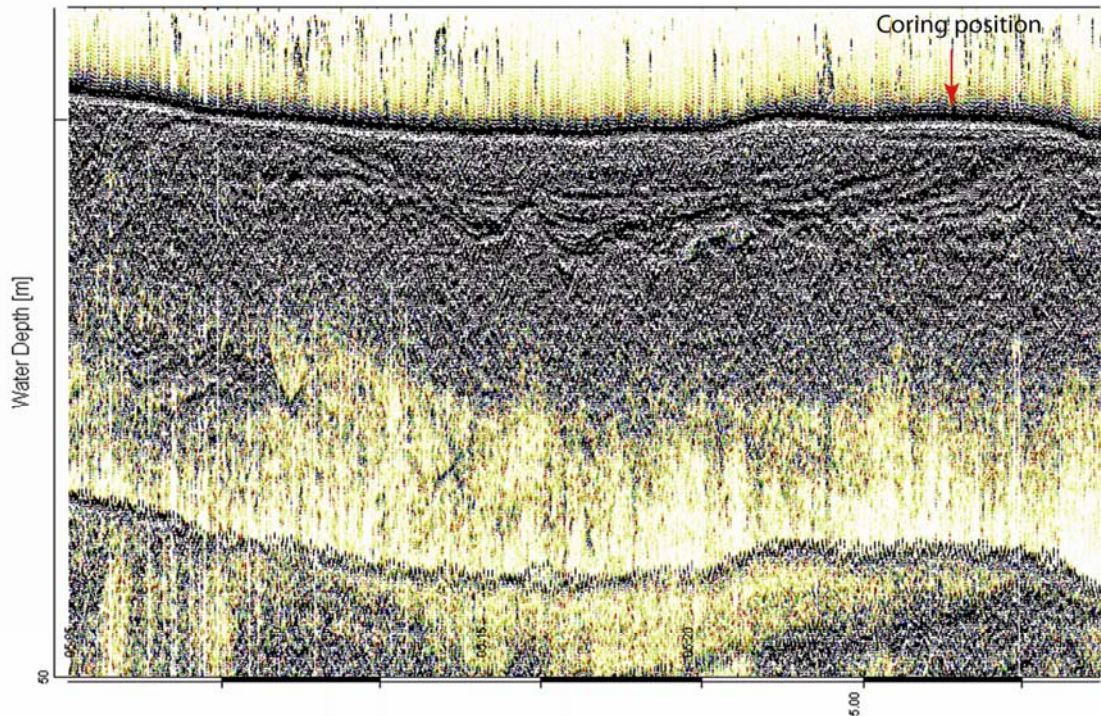
Station: 220- 23 - 4 (GC) Water depth: 27 m
 Position: 21°5.838'N / 108°43,534'E Recovery: 154 cm
 Date: 01.05.2012 Interval: 0-154 cm

Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
	dark greenish gray	Gley 1 4/5 GY	bioturbated	silty clay, sandy clay mud	homogenous mud, with small amount of sand, high amount of shell fragments, at 56-59cm high amount of shell and shellfragments up to 8cm diameter, at 132 cm color change to more brownish

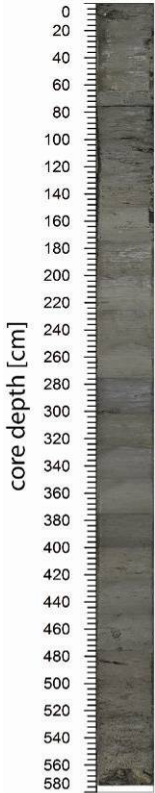


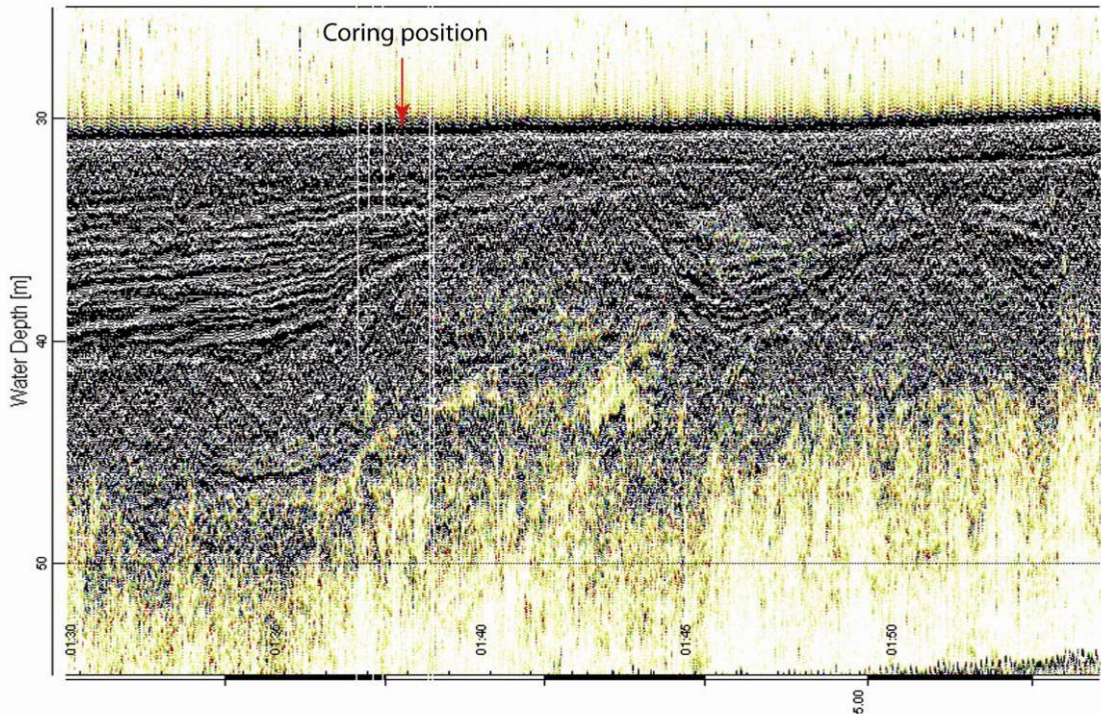
Station: 220- 24 - 3 (GC) Water depth: 26 m
 Position: 21°6.694'N / 108°42.797'E Recovery: 544 cm
 Date: 01.05.2012 Interval: 0-544 cm

Photo	X-Ray	Colour	Munsell	Structure	Grainsize	Description
		greenish gray	Gley 1 5/10 Y	bioturbated	silty clay	homogenous mud, high amount of shells and shell fragments
		dark greenish gray	Gley 1 4/10 Y	bioturbated	silty clay	homogenous mud, high amount of shells and shell fragments
		greenish gray	Gley 1 5/5 GY	bioturbated	silty clay	homogenous mud, high amount of shells and shell fragments, at the bottom part high amount of completely stored shell
		greenish gray	Gley 1 5/5 GY	bioturbated	silty clay	homogenous mud, high amount of completely stored shells at 110-116cm, 149-153cm, 175-177cm, in addition an high amount of shell fragments, at 89-90cm, at 89-90cm plantfragment(?)
		dark greenish gray	Gley 1 4/10 GY	bioturbated	silty clay	homogenous mud, high amount of shells and shell fragments
		dark greenish gray	Gley 1 4/5 GY, 6/10YR	bioturbated	silty clay, sandy clay	homogenous mud, high amount of shells and shell fragments, complete shells at 504cm, at 504cm to 510cm a step by step increasing in sand, at 503-505cm medium- core sand layer with sharp boundary, at the bottom part homogenous mud with borrows



Station: 220- 26 - 5 (GC) Water depth: 28 m
 Position: 21°3.421'N / 108°20.488'E Recovery: 566 cm
 Date: 02.05.2012 Interval: 0-566 cm

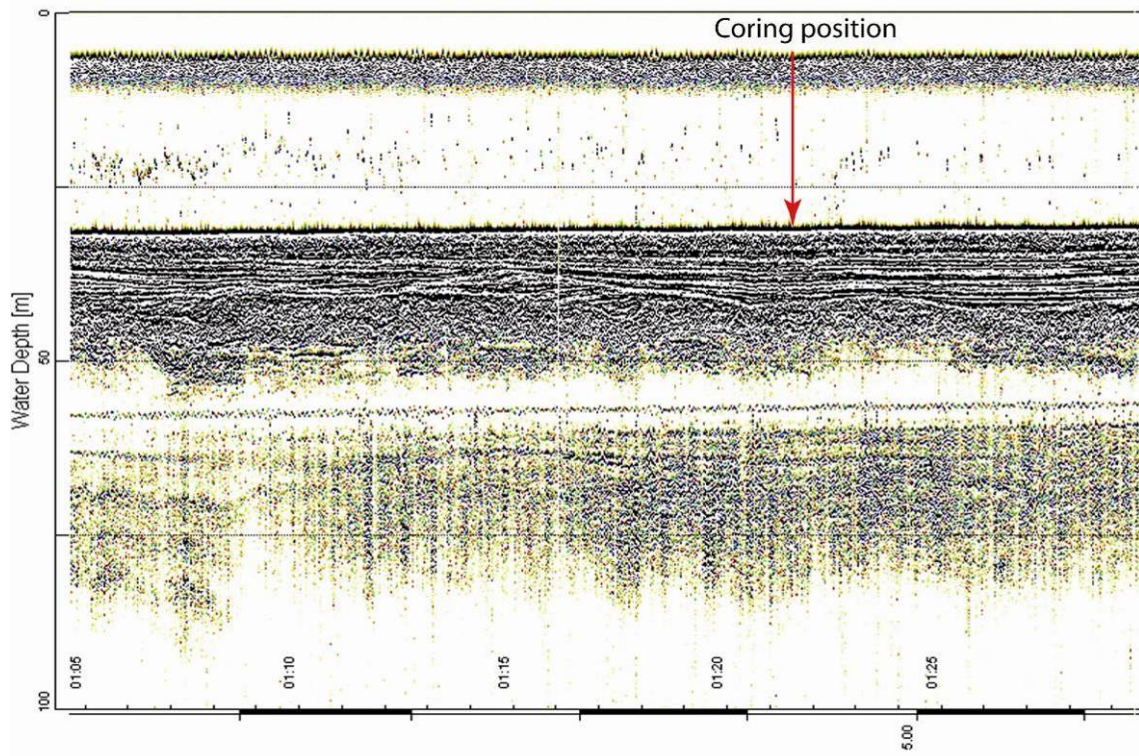
Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description	
	0-20 20-40 40-60 60-80 80-100 100-120 120-140 140-160 160-180 180-200 200-220 220-240 240-260 260-280 280-300 300-320 320-340 340-360 360-380 380-400 400-420 420-440 440-460 460-480 480-500 500-520 520-540 540-560 560-580	greenish gray, light yellow brown, bluish gray	Gley 1 6/10 GY, 2.5Y 6/3, Gley 2 5/5 B	mottled	silty clay	25-75cm shells& Gastropods in bioturbation traces, shells at 64cm, color change at 64 cm, shell fragments at 72 cm
	light yellow brown, gray	Gley 2 5/5 B, 2.5 YR 5/1	mottled	silty clay	from 84cm sand amount increases, pokets with shell fragments at 90, 100, 106-108, 130, 135-140cm, 117cm Gastropode, at 137cm colorchanges 2.5 YR 5/1 , mottles in Gley 1 5/5 G, bioturbation traces, at 170cm sand disappears, at 107cm and 165cm shell taken for 14C sample	
	greenish gray	Gley 1 5/10 Y	sometimes mottled	silty clay	170-275cm silty clay with fine sand pockets, sometimes unmottled in Gley 1 5/5 G, at 220cm Organic rest	
	greenish gray	Gley 1 5/10 GY	mud	silty clay	from 275cm silty clay with sand pockes disappear, at 300cm sedimentconcretion, at 326cm sediment 2.5 Y 6/3	
	greenish gray	Gley 1 5/10 GY	mottled, bioturbated	silty clay	375-405cm silty caly, 405-415cm silt with small sand pockets, 415-417 sand pockets/ layer, 450woodfragments in bioutbation traces for 14C sampel, 460-475cm bioturbationtraces filled with sand	
	greenish gray	Gley 1 5/10 GY	mud	stily clay	483-487cm woodfragments for 14C sample, from 520cm sandto fine gravel dominating in silty clay	



Station: 220- 27 - 3 (GC) Water depth: 32 m
 Position: 21°2.518'N / 108°18.151'E Recovery: 986 cm
 Date: 02.05.2012 Interval: 0-986 cm

	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description	
0						most top25cm are missing, 24cm bioturbation traces filled with silty sediments	
20		greenish gray	Gley 1 5/5 GY	mud	stily clay		
40							
60							
80							
100							
120		dark greenish gray	Gley 1 4/5 G	mud	silty clay		110cm piece of shell fragment, from 110cm on sediment becomes stiffer and less shell fragments, pockets with fine sand
140							
160							
180							
200							
220	dark greenish gray	Gley 1 4/5 G			sandy clay	207-230cm content of shell fragments increases, higher finesandcontent	
240	dark greenish gray	Gley 1 4/5 G	strong mottled		silty clay	strong mottled, mottled in 2.5 YR 5/1, silty clay	
260	greenish gray						
280	reddish gray	2.5 YR 5/1	mottles			mottles but color change, 287cm small pocket of shell fragments for 14C sample	
300							
320							
340	reddish gray	2.5 YR 5/1			silty clay	334cm this fine sandlayer with less shell fragments, 384cm Bioturbation trace, color changes slightly from 395cm	
360							
380							
400							
420							
440	greenish gray	Gley 1 6/10Y	mottled		silty clay	sideritlayer 2.5 Y 7/6 at 439cm, 444cm, 480cm , sideritconcretion at 439cm with sample taken bay Andreas Wetzler, 443,5-444,5cm finesandlayer	
460							
480							
500							
520	greenish gray	Gley 1 6/10Y	mottled		silty clay	frequency of sideritlayer increases stiffer, sideritlayer at 515-516cm, 536-573cm, 550-551cm are colored in 2.5 Y 7/6, from 560cm mottled with 2.5 Y 7/6 525cm thin finesandlayer	
540							
560							
580							
600							
620	greenish gray	Gley 1 5/10 GY	mottled		silty clay	637-642cm layer with Castrophods (Turitelliden)in clay with 14C sample. 658 thin peatlayer sideritlayer, at 612-613cm, 650-653cm, 668cm sideritlayer 2.5 Y 7/6, pockets of finesand 617-673cm	
640							
660							
680							
700							
720							
740	greenish gray	Gley 1 5/10 GY	mottled		silty clay	still sideritlayer and sometimes mottled, finesandpockets at 709-712cm,	
760							
780							
800							
820	greenish gray	Gley 1 5/10 GY	mottled		silty clay	mottled mottles are 2.5 Y 7/6, 846cm shellfragments for 14C from 846cm less mottled, 870cm finesandpocket, 886cm sandlayer with shell fragments, 890 and 897cm sandpockets with shell fragments, 899cm end of silty clay dominance	
840							
860							
880							
900							
920	dark grayish brown	2.5 Y 4/2			sand with fine gravel	from 899cm sand with fine gravel and shells, 944-948cm mediumsandlayer, some organic material, some layer are better sorted, 910cm 14C sample, 955cm clay clast, 965cm silty clay 5YR 4/1, 922cm and 950cm 14C sample	
940							
960							
980							
1000							

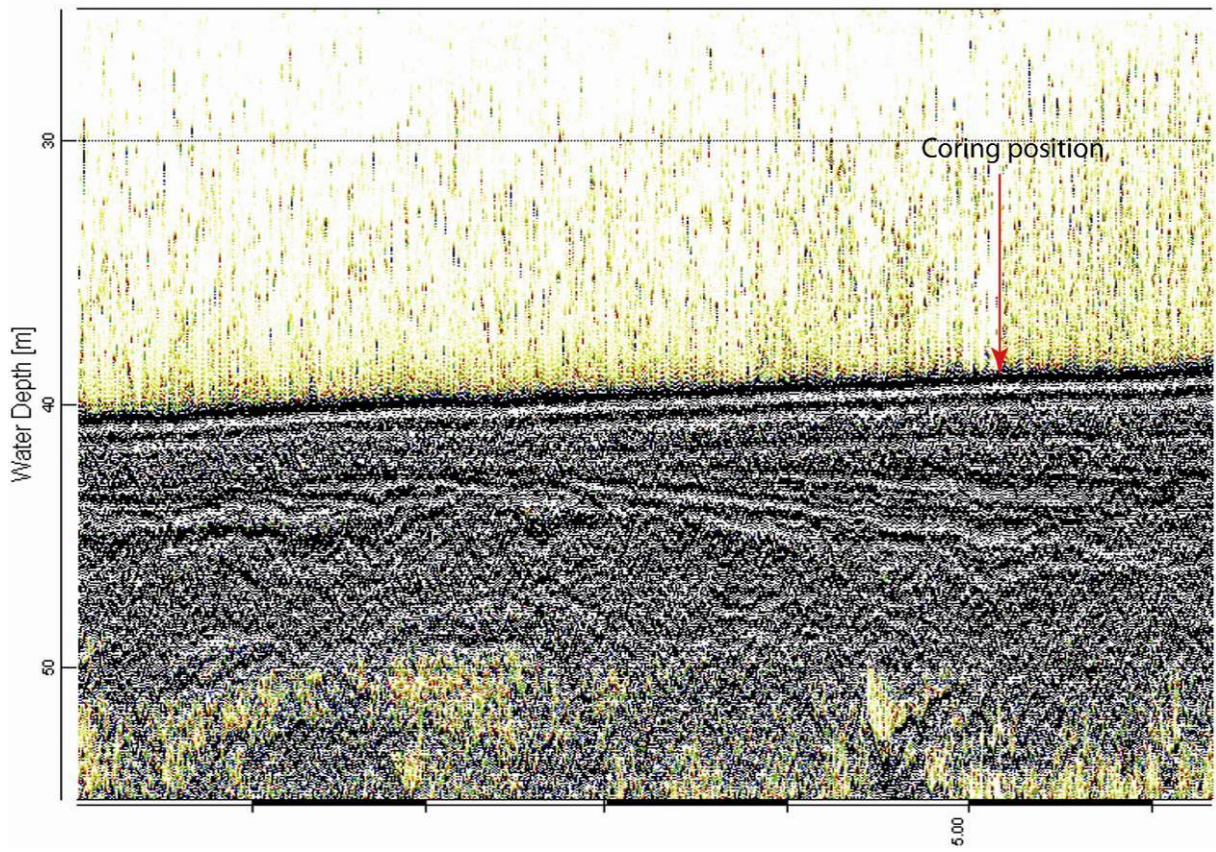
Seismic track with coring position of Station SO-220-27-3



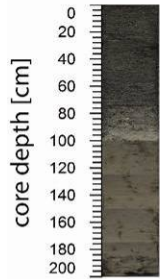
Station: 220-28 - 4 (GC) Water depth: 40 m
 Position: 20°49.763'N / 108°17.464'E Recovery: 575 cm
 Date: 02.05.2012 Interval: 0-575 cm

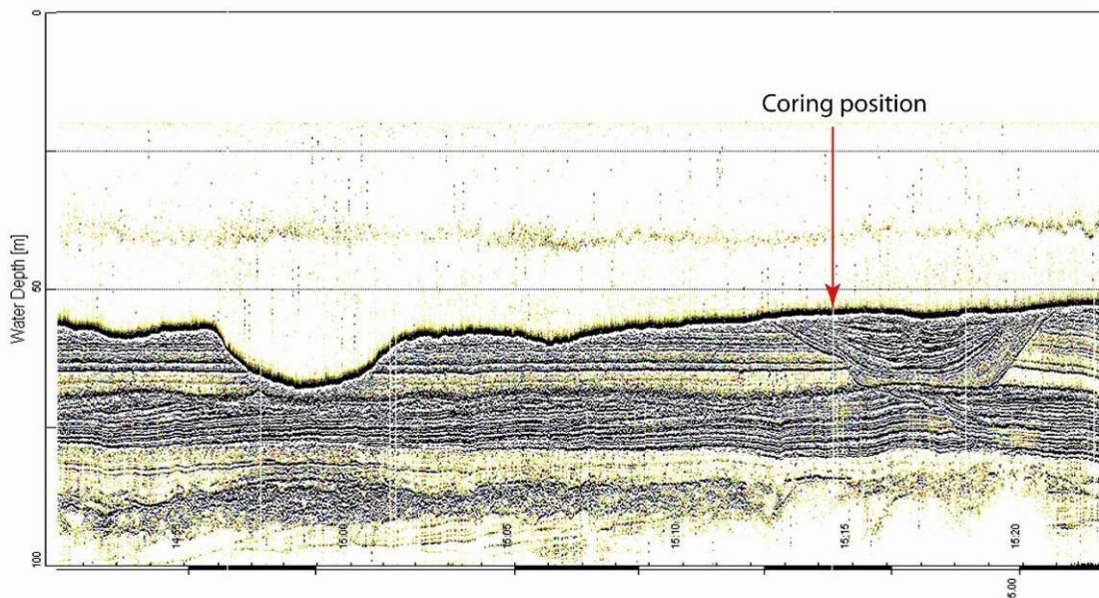
	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0						
20						
40		dark grayish brown	Gley 1 4/5 GY	bioturbated	mud	homogenous mud, few shells 17cm and 24cm, numerous bioturbation traces
60						
80						
100		dark grayish brown	Gley 1 4/5 GY	bioturbated	mud	homogenous mud, shells and bioturbation
120						
140		dark grayish brown	Gley 1 4/5 GY	bioturbated	mud with finesand	mud with finesand
160		dark grayish brown	Gley 1 4/5 GY	bioturbated	mud	homogenous mud without sand
180		dark grayish brown	Gley 1 4/5 GY	bioturbated	mud	mud with finesand
200		dark grayish brown	Gley 1 4/5 GY	bioturbated	mud	mud with numerous bioturbation traces, at 230-245cm increase of bioturbation traces with different shapes
220		dark grayish brown		bioturbated	mud	
240		dark grayish brown	Gley 1 4/10 Y	bioturbated	mud	
260		dark grayish brown		bioturbated	mud	
280		dark grayish brown		bioturbated	mud	
300		dark grayish brown	Gley 1 4/10 Y	bioturbated	mud	290-293cm bioturbation borrow with a shape like a channel
320	dark grayish brown		bioturbated	mud	homogeneous mud with bioturbation	
340						
360	dark gray	Gley 1 4/ N	bioturbated	mud		
380						
400						
420	dark gray	Gley 1 4/ N	very strong bioturbated	mud	homogenous mud with very strong bioturbation	
440						
460	dark gray	Gley 1 4/ N	bioturbated	mud	homogenous mud with bioturbation	
480	dark gray	Gley 1 4/ N	strong bioturbated	mud	mud with strong bioturbation	
500	dark gray	Gley 1 4/ N	bioturbated	mud	mud with bioturbation	
520	dark gray	Gley 1 4/ N	strong bioturbated	mud	mud with strong bioturbation	
540						
560	dark gray	Gley 1 4/ N	bioturbated	mud	homogenous mud with bioturbation	
580						

Seismic track with coring position of Station SO-220-28-4



Station: 220- 31 - 3 (GC) Water depth: 49 m
 Position: 20°0.637'N / 108°5.476'E Recovery: 199 cm
 Date: 04.05.2012 Interval: 0-199 cm

Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
	dark greenish gray	Gley 2 4/10 G	bioturbated	mud	fine and medium sand with big amount of clay, numerous shelly and shellfragments
	dark greenish gray	Gley 2 4/10 G	bioturbated	sandy	finer sand with some brownish clay fragments (erosion?)
	dark reddish brown	5YR 3/2	bioturbated	mud	at the top part bioturbation, at the bottom part brownish clay, with plant-(?) and woodfragments,



Station: 220- 32 - 4 (GC)

Water depth: 66 m

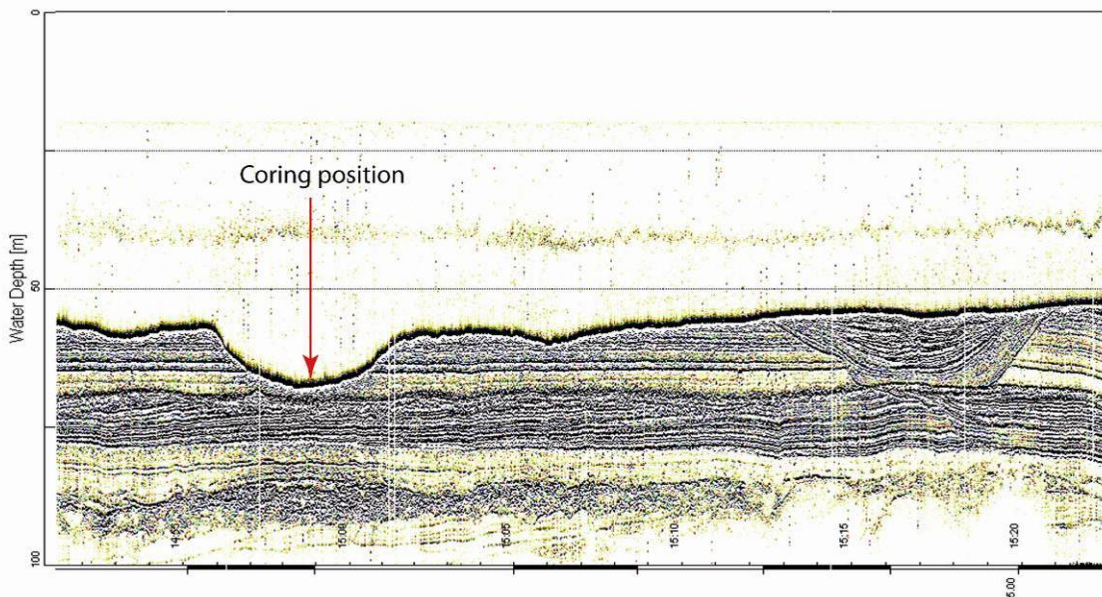
Position: 19°59.529'N / 108°7.444'E

Recovery: 245 cm

Date: 04.05.2012

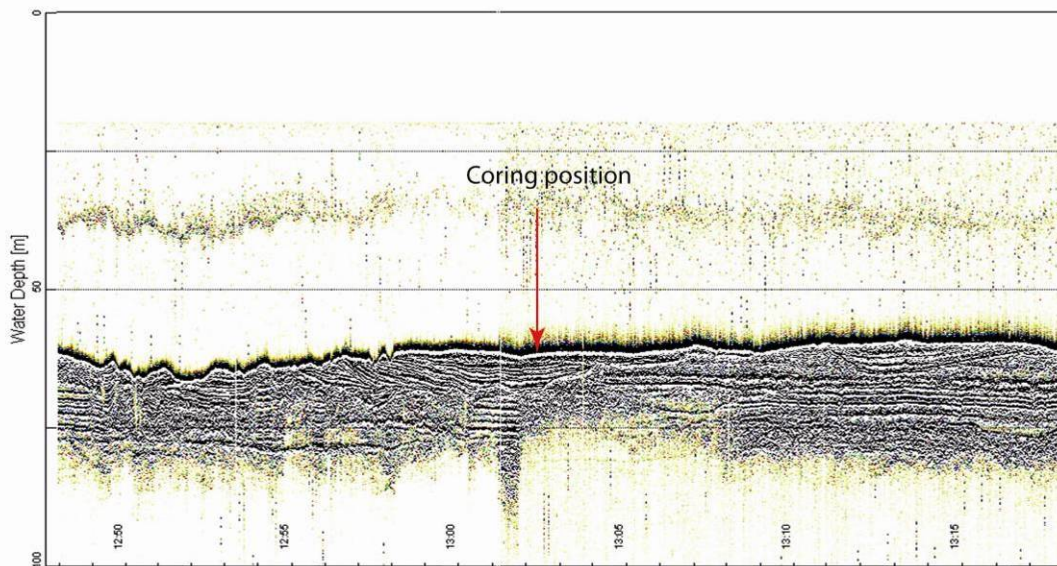
Interval: 0-245 cm

	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0		dark greenish gray	Gley 1 4/5 GY	bioturbation	silty clay	homogenous mud with numerous shells and bioturbation traces
20		dark greenish gray	Gley 1 4/5 GY	bioturbation	clay	homogenous clay, chanel color darkly brownish 2.5 Y 3 with 2-3cm diameter (Cancer?) filled with sand
40		dark greenish gray	Gley 1 4/5 GY	bioturbation	clay	homogenous clay without chanel
60		dark greenish gray	Gley 1 4/5 GY	bioturbation	clay	homogenous clay without chanel
80		dark greenish gray	Gley 1 4/5 GY	bioturbation	clay	homogenous clay without chanel
100						
120						
140						
160						
180						
200						
220						
240						
260						



Station: 220-33-5 (GC) Water depth: 55 m
 Position: 19°51.526'N / 108°20.382'E Recovery: 575 cm
 Date: 04.05.2012 Interval: 0-575 cm

	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description	
0		dark greenish gray, dark olive gray	Gley 1 4/5 G, 5Y 3/2	layer	silty sandy, clay	sand and silt clay layer, 0-65cm some small shell fragments in sand layer, color changes at 60cm to 5Y 3/2, lost sediment between 67 and 75cm	
20							
40							
60							
80							
100							
120		dark olive gray	5Y 3/2	layer	sand, clay	sand layers dominated interrupted by thin silty clay layers and pockets, some silty clay layers Gley 1 4/5 GY, 14C sample at 79cm	
140							
160							
180							
200							
220		dark olive gray	5Y 3/2	layer	silty clay	from 189cm frequency of silty clay layer increases, 211-212cm silty clay layer in 5Y 6/2, from 233cm color changes again, 233-260 mainly silty clay layer interrupted by sand layer 5Y 6/2, 260 color changes again and sand layers frequency increases again 2.5 Y 4/2	
240							
260							
280							
300							
320		dark grayish brown	2.5 Y 4/2	layer	sandy and silty clay	stronger interlayered bedding in 0.5mm diversions, sandy layer 2.5 4/2 silty clay layer Gley 1 4/10Y, from 353cm silty clay layer disappear and occur again at 379cm	
340							
360							
380							
400							
420		greenish gray	Gley 1 5/10 GY, Gley 1 5/5 GY	lamination	silty clay, sand	379-4110 mainly silty clay layer in two different colors Gley 1 5/10 GY, Gley 1 5/5 GY, sandy layer in between 2.5 Y 4/2, from 410-464cm interlayered sand and silty clay bedding, 470cm sand layers disappear completely, from 470cm Gley 5/10 GY	
440							
460							
480							
500							
520		dark greenish gray	Gley 1 4/10 GY, Gley 1 5/10 GY		silty clay, sand	485cm ripplemark, from 481 to 502cm sand layer interrupt silty clay layers, 509-532cm very thin sand layers interrupted by silty clay layers, 532-573cm thickness of sand layers increases, sand layers 10 YR 4/2	
540							
560							
580							



Station: 220-34 - 5 (GC)

Water depth: 59 m

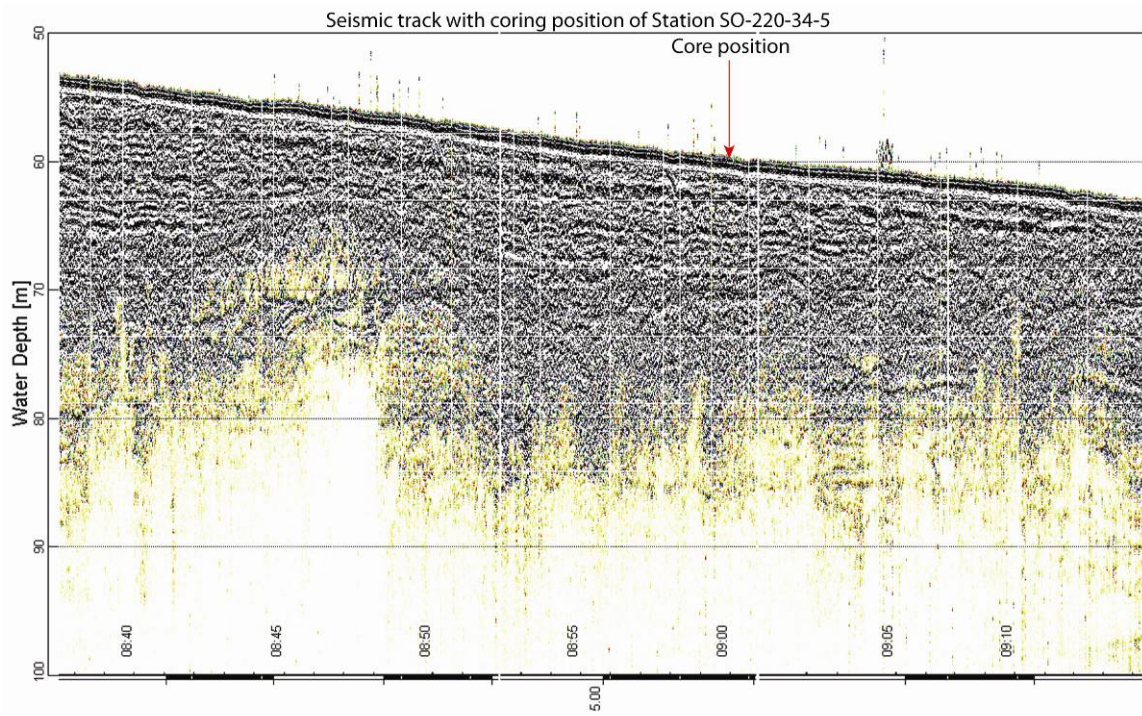
Position: 19°27.453'N / 108°17.587'E

Recovery: 623cm

Date: 04.05.2012

Interval: 0-623 cm

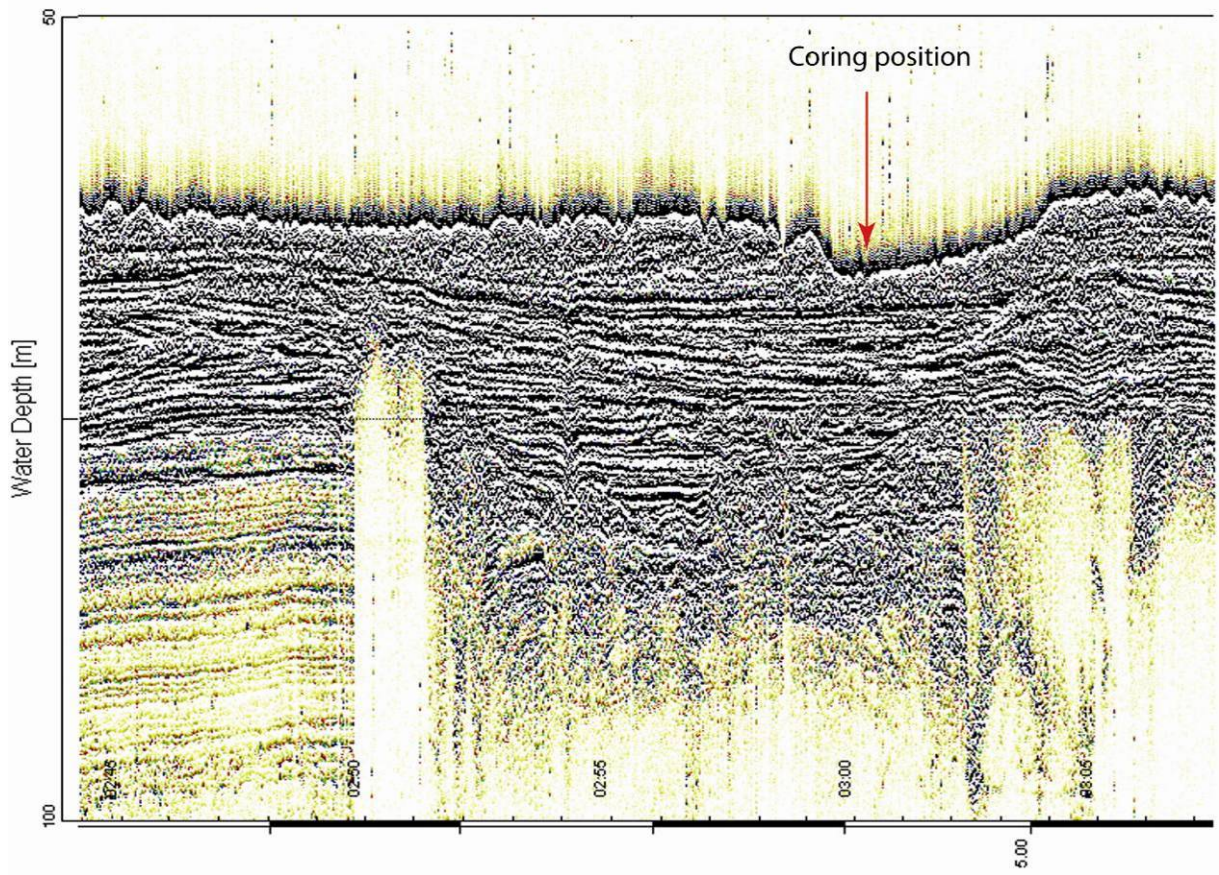
	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0		greenish gray	Gley 1 5/5 GY	mud	soft silty clay	styroporring compact first 23
20						some wormtraces, from 117-190cm Stiffner
40		greenish gray	Gley 1 5/5 GY	bioturbation	clay	
60						
80						
100						
120						
140		greenish gray	Gley 1 5/5 GY	mud	clay	from 190-230cm very soft
160						
180						
200						
220						
240		greenish gray	Gley 1 5/5 GY	bioturbation	clay	from 230 stiffner silty clay, 320-323cm bioturbation trace filled with soft silt
260						
280						
300						
320						
340	greenish gray, dark greenish gray	Gley 1 5/5 GY, Gley 1 4/10 GY	bioturbation	clay	334cm Gastropod for 14C Sample, from 396cm color changes to Gley 1 4/10 GY	
360						
380						
400						
420						
440	dark greenish gray	Gley 1 4/10 GY	bioturbation	clay	455cm Gastropod for 14C Sample, 515cm Shell Bivalve for 14C Sample	
460						
480						
500						
520						
540	dark greenish gray	Gley 1 4/10 GY	bioturbation	clay	from 591cm Sand and Shellfragments in Silty clay	
560						
580						
600						
620						
640						



Station: 220-37 - 5 (GC) Water depth: 66 m
 Position: 19°22.655'N / 107°41.945'E Recovery: 787cm
 Date: 05.05.2012 Interval: 0-787 cm

	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0		dark gray	Gley 1 4/N	bioturbation	clay	homogenous gray mud with bioturbation traces in the upper part
20		dark gray	Gley 1 4/N	bioturbation	clay	gray mud with nomerous shells and bioturbation traces
40		dark gray	Gley 1 4/N	bioturbation	clay	gray mud
60		dark gray	Gley 1 4/N	bioturbation	clay	gray mud with biotrurbation traces
80		dark gray	Gley 1 4/N	bioturbation	clay	homogenous gray mud
100		dark gray	Gley 1 4/N	bioturbation	clay	homogenous gray mud with nomerous shell fragments and bioturbaion traces
120		dark gray	Gley 1 4/N	strong bioturbation	clay	
140		dark gray	Gley 1 4/N	strong bioturbation	clay	
160		dark gray	Gley 1 4/N	strong bioturbation	clay	
180		dark gray	Gley 1 4/N	strong bioturbation	clay	
200		dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay	bioturbaionzone, change form gray to brownish clay, depositions and transition struktures, nomerous pure clay laminae and few laminae with a high silty composition ontop of propably unorganic components, there are few plantfragments too
220		dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay	
240		dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay	
260		dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay	
280		dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay	
300		dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay	
320		dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay	
340		dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay	
360		dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay	
380		dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay	
400	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
420	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
440	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
460	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
480	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
500	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
520	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
540	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
560	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
580	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
600	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
620	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
640	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
660	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
680	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
700	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
720	dark gray, week red	Gley 1 4/N, 10R 4/2	strong bioturbation, transition zones	clay		
740	week red	10R 4/2	sediment clast	clay	brownish clay with clay clast (Intraklast) 1-2cm in size bettet in a clay Matrix (redeposition)	
760	week red	10R 4/2	sediment clast	clay		
780	week red	10R 4/2	sediment clast	clay		
800	week red	10R 4/2	sediment clast	clay		

Seismic track with coring position of Station SO-220-37-5



Station: 220-38 - 5 (GC)

Water depth: 65 m

Position: 19°25.059'N / 107°34.341'E

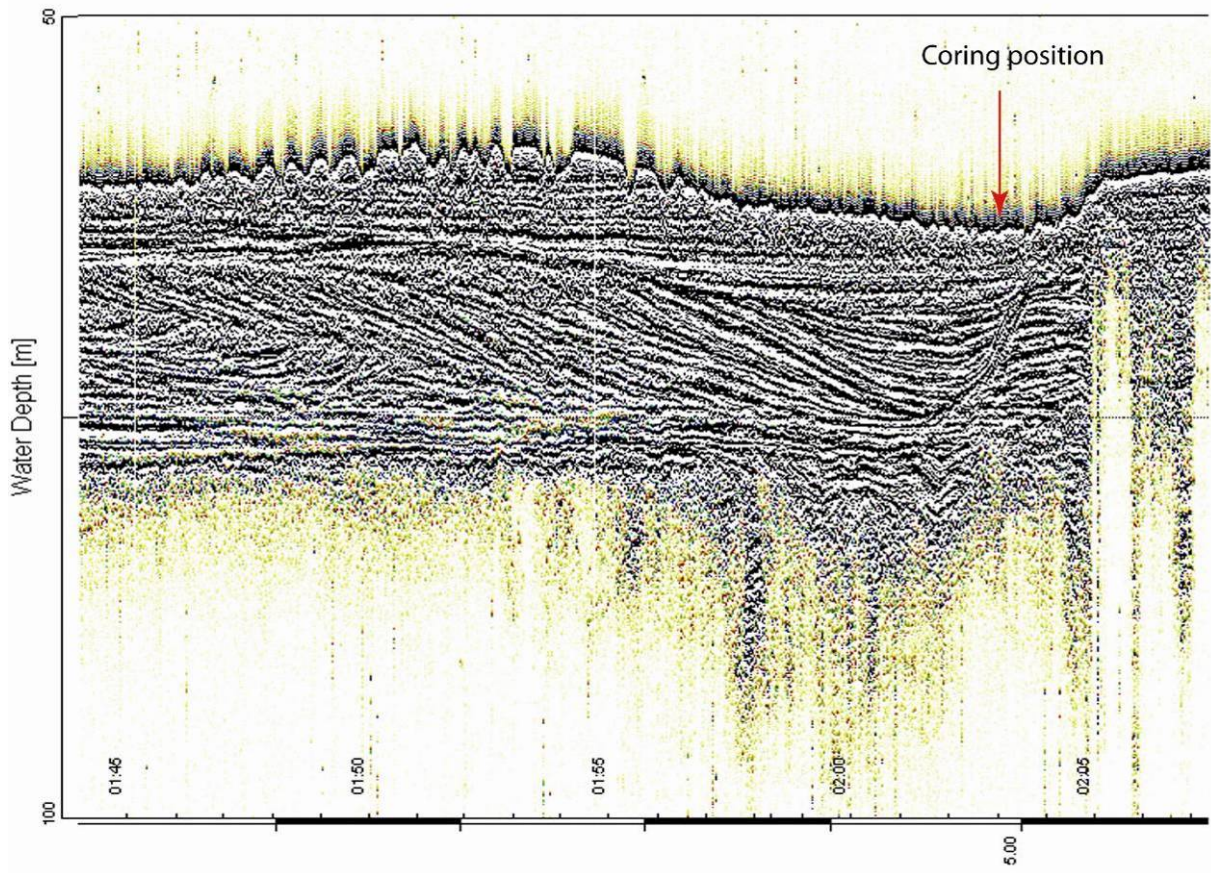
Recovery: 673cm

Date: 05.05.2012

Interval: 0-673 cm

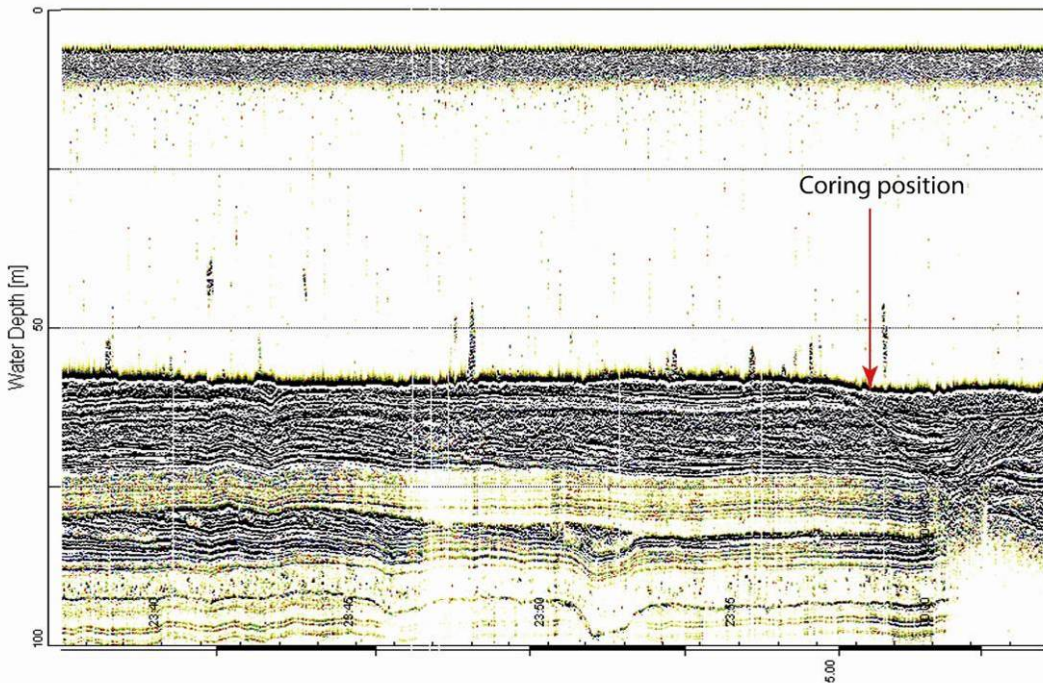
	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0		greenish gray	Gley 1 5/10 Y	bioturbation	clay	silty clay with some very fine sand pockets and shell fragments, 45-46cm filled with bioturbation traces
20		greenish gray	Gley 1 5/10 Y	bioturbation	clay	sediments is a little bit softer from 140-158cm, 14C Sample at 164, 179, 186, 197cm, from 158cm sandy silty clay with shell fragments, mottled and color changes appear at 158cm to 208cm with silty clay 10R 4/1
40		dark greenish gray	Gley 1 4/10 GY	strong mottled	clay, silt, sandy silt, clay	208-235 very strong mottled with a mixture of sandy silty clay and silty clay, from 235cm silty clay, at 260cm bioturbation traces
60		dark greenish gray	Gley 1 4/10 GY	strong mottled	clay, silt, sandy silt, clay	from 273cm strong mottled, mottled in 2.5 YR 4/1 (dark reddish gray), from 355cm stronger mottled
80		dark reddish gray	2.5YR 4/1	mottled	silty clay	from 400cm main color changes and mottles Gley 1 4/10 GY (dark greenish gray), at 428 sand pocket layer
100		dark reddish gray	2.5YR 4/1	strong mottled	silty clay	from 517cm more sand pockets occur, less gray 1/4 10 GY mottles, mottles occur changes 10YR 5/2 and 5YR 4/1, at 567cm a shell fragment taken for 14C Sample
120		dark reddish gray	2.5YR 4/1	mottled	silty clay	at 580cm mottle 10YR 5/2, 578-630 sand pockets/ layers increase, less sandlayers between 630cm and 640 cm
140						
160						
180						
200						
220						
240						
260						
280						
300						
320						
340						
360						
380						
400						
420						
440						
460						
480						
500						
520						
540						
560						
580						
600						
620						
640						
660						
680						

Seismic track with coring position of Station SO-220-38-5



Station: 220-39 - 4 (GC) Water depth: 61 m
 Position: 19°25.441'N / 107°21.333'E Recovery: 575cm
 Date: 05.05.2012 Interval: 0-575 cm

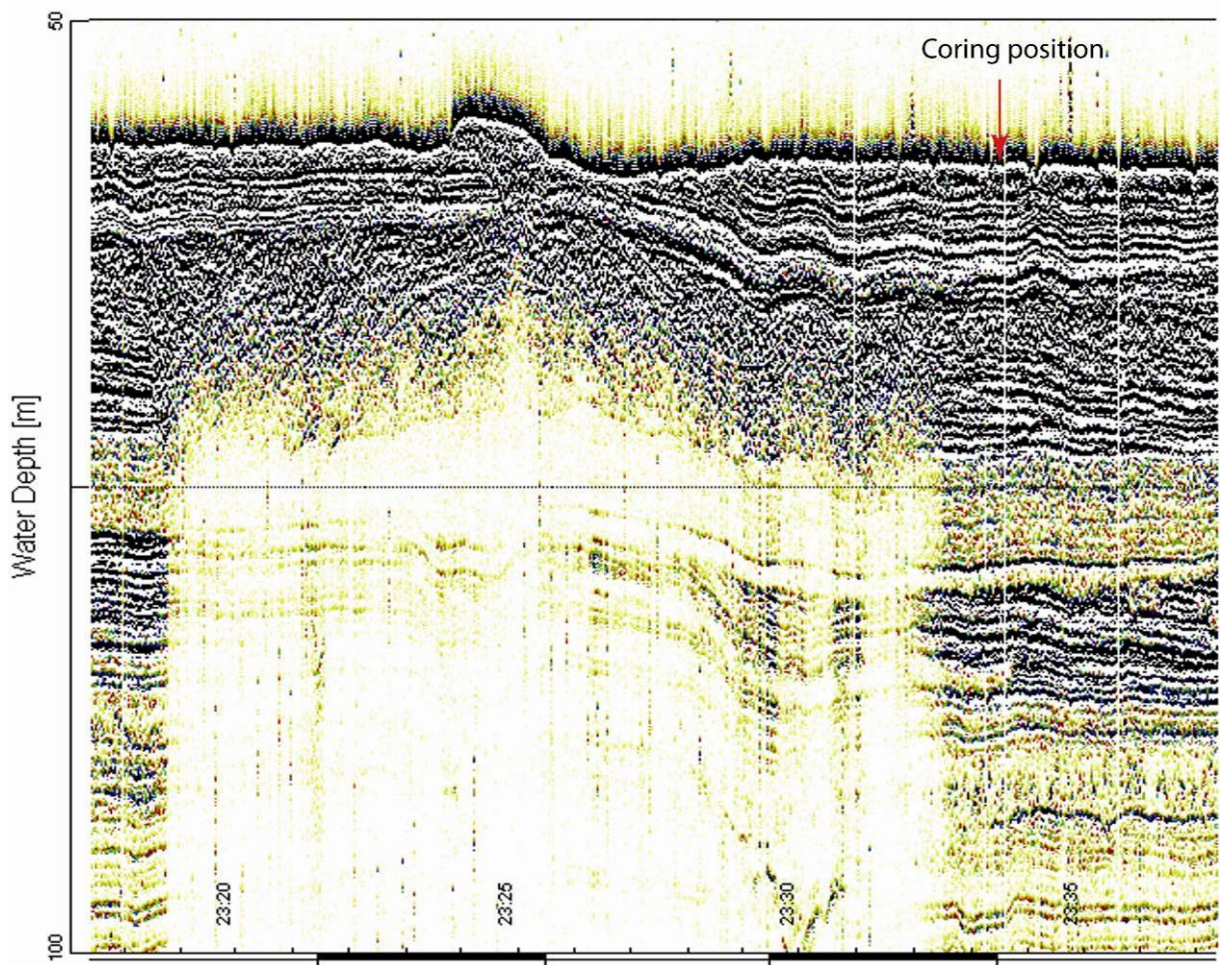
	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0						
20		dark greenish gray	Glau 1 4/5 GY	bioturbation	clay	homogenous grey clay, bioturbation, partly with a little silt amount
40		dark greenish gray	Glau 1 4/5 GY	mud with clast	clay	brownish(5 YR 4/1) irregular clay clast in gray clay, sediment shows a conglomeration character, partly some shells and shell fragments
60						
80		dark grey	5 YR 4/1	bioturbation	clay	brwonish clay with darker pseudolaminae(1-2mm), bioturbation at 194, 213 and 221cm , a small shell fragment
100						
120						
140						
160						
180						
200		dark grey	5 YR 4/1	bioturbation	clay	
220						
240						
260						
280						
300		dark grey	5 YR 4/1	bioturbation	clay	homogenous clay
320						
340						
360						
380						
400	dark grey	5 YR 4/1	bioturbation	clay	homogenous clay	
420	dark grey	5 YR 4/1	bioturbation, clast	clay	Zone with small shell fragments and bioturbation traces, one 1cm in diameter sandstone fragment!	
440	dark grey	5 YR 4/1	bioturbation	clay	brownish clay with darker pseudolaminae, little bit silty and a few bioturbation traces	
460	dark grey	5 YR 4/1	bioturbation	clay	bioturbated	
480	dark grey	5 YR 4/1	bioturbation, with clast	clay	one silty clast with 10cm in diameter with the same color as the main	
500					fine sized lamination a rhtmical character	
520						
540	dark grey	5 YR 4/1	lamination	clay		
560						
580						



Station: 220-40 - 3 (GC) Water depth: 58 m
 Position: 19°25.034'N / 107°18.047'E Recovery: 570 cm
 Date: 05.05.2012 Interval: 0-570 cm

	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0		dark greenish gray	Gley 1 4/10 Y	bioturbated	clay	gray clay with numerous borrows
20		very dark greenish gray	Gley 1 3/10 Y	bioturbated	mud	homogenous mud with numerous shells and borrows
40		very dark greenish gray	Gley 1 3/10 Y	bioturbated	mud	homogenous mud with numerous shells and borrows
60		very dark greenish gray	Gley 1 3/10 Y	bioturbated	mud	homogenous mud with numerous shells and borrows
80		very dark greenish gray	Gley 1 3/10 Y	bioturbated	mud	homogenous mud with numerous shells and borrows
100		very dark greenish gray	Gley 1 3/10 Y	bioturbated	mud	homogenous mud with numerous shells and borrows
120		very dark greenish gray	Gley 1 3/10 Y	bioturbated	mud	homogenous mud with numerous shells and borrows
140		very dark greenish gray	Gley 1 3/10 Y	bioturbated	mud	homogenous mud with numerous shells and borrows
160		dark greenish gray	Gley 1 4/10 Y	bioturbated	Clay, mud	homogenous gray clay to the bottom more muddy, sharp boundary
180		dark gray	7.5 YR 4/1	bioturbated	mud	homogenous mud with some gray clay clast and borrows
200		dark gray	7.5 YR 4/1	bioturbated	mud	homogenous mud with some gray clay clast and borrows
220	dark gray	7.5 YR 4/1	bioturbated	mud	homogenous mud with some gray clay clast and borrows	
240	dark gray	7.5 YR 4/1	bioturbated	mud	homogenous mud with some gray clay clast and borrows	
260	dark gray	7.5 YR 4/1	bioturbated	mud	homogenous mud with some gray clay clast and borrows	
280	dark gray	7.5 YR 4/1	bioturbated	mud	homogenous mud with some gray clay clast and borrows	
300	dark gray	5 RY 1/4	bioturbated	mud	homogenous mud with some gray clay clast and borrows	
320	dark gray	5 RY 1/4	bioturbated	mud	homogenous mud with some gray clay clast and borrows	
340	dark gray	5 RY 1/4	bioturbated	mud	homogenous mud with some gray clay clast and borrows	
360	dark gray	5 RY 1/4	bioturbated	mud	homogenous mud with some gray clay clast and borrows	
380	dark gray	5 RY 1/4	bioturbated	mud	brownish homogenous clay	
400	dark gray	5 RY 1/4	bioturbated	mud	brownish homogenous clay, with an unclearly lamination	
420	dark gray	5 RY 1/4	bioturbated	mud	brownish homogenous clay, with an unclearly lamination	
440	dark gray	5 RY 1/4	bioturbated	mud	brownish homogenous clay, with an unclearly lamination	
460	dark gray	5 RY 1/4	bioturbated	mud	brownish homogenous clay, with an unclearly lamination	
480	dark gray	5 RY 1/4	bioturbated	mud	brownish homogenous clay, with an unclearly lamination, numerous borrows	
500	dark gray	5 RY 1/4	bioturbated	mud	brownish homogenous clay, with an unclearly lamination, numerous borrows	
520	dark gray	5 RY 1/4	bioturbated	mud	brownish homogenous clay, with an unclearly lamination, numerous borrows	
540	dark gray	5 RY 1/4	bioturbated	mud	brownish homogenous clay, with an unclearly lamination, numerous borrows	
560	dark gray	5 RY 1/4	bioturbated	mud	brownish homogenous clay, with an unclearly lamination, numerous borrows	
580	dark gray	5 RY 1/4	bioturbated	mud	brownish homogenous clay, with an unclearly lamination, numerous borrows	

Seismic track with coring position of Station SO-220-40-3



Station: 220-43 - 3 (GC)

Water depth: 65 m

Position: 18°47.548'N / 107°9.967'E

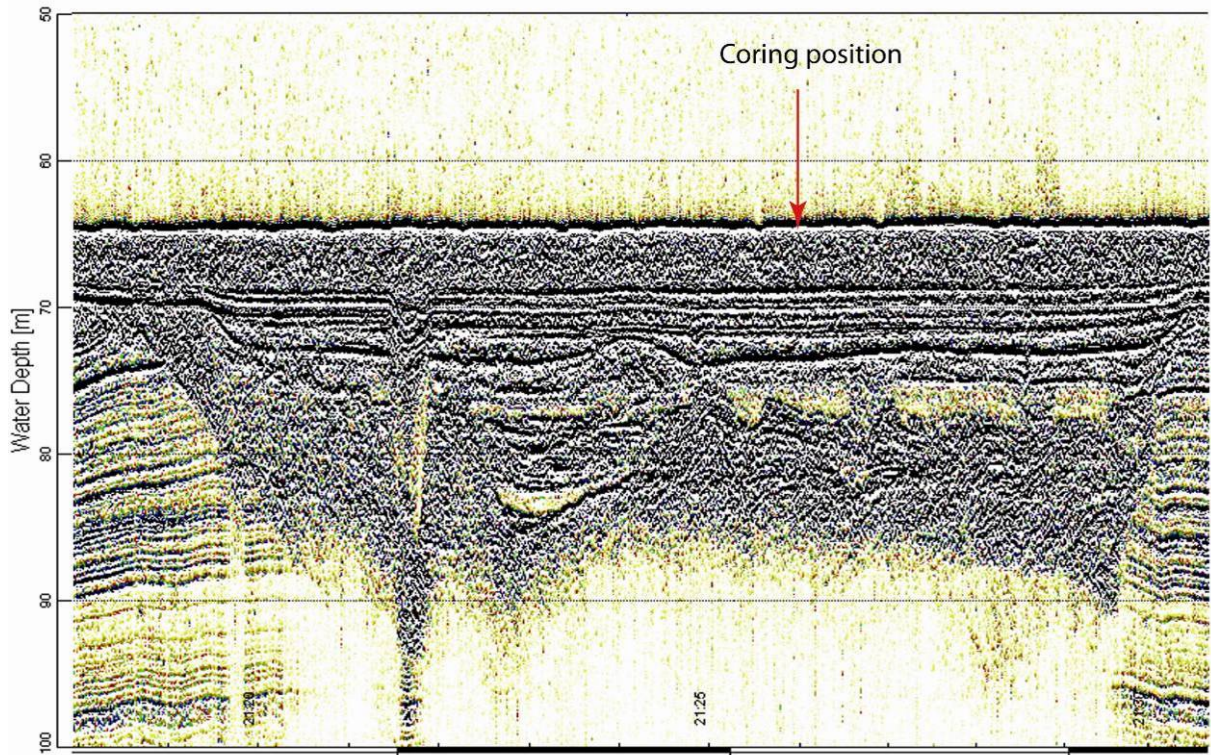
Recovery: 732 cm

Date: 07.05.2012

Interval: 0-732 cm

	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0		dark greenish gray	Gley 1 4/10 Y		clay	homogenous gray clay
20		dark greenish gray	Gley 1 4/10 Y	bioturbated	clay	homogenous gray sandy clay, shells and bioturbation at 105, 140, 175, 197, 230cm, only bioturbation traces at 200-215cm
40						
60						
80		dark greenish gray	Gley 1 4/10 Y	bioturbated	clay	285cm some big shells and numerous small shells, 295-315cm brownish clay clast are "swimming" in the grey clay, boundary to the erosion
100						
120		very dark brown	10 YR 2/2	bioturbated	clay	homogenous brownish partly pseudolaminated clay
140						
160	lost	lost	lost	lost	lost	brownish clay with unclear lamination, sometimes an appearance of pseudolamination colored a little bit darker and a little bit sandy
180						
200	very dark brown	10 YR 2/2	bioturbated	clay	brownish clay with unclear lamination, sometimes an appearance of pseudolamination colored a little bit darker and a little bit sandy; at 488-535cm Shells, at 604, 615, 638cm bioturbation traces	
220						
240	very dark brown	10 YR 2/2	bioturbated	clay	brownish clay with unclear lamination, sometimes an appearance of pseudolamination colored a little bit darker and a little bit sandy, increase of pseudolamination and wood peaces at the corecather	
260						
280	very dark brown	10 YR 2/2	bioturbated	clay		
300						
320	very dark brown	10 YR 2/2	bioturbated	clay		
340						
360	very dark brown	10 YR 2/2	bioturbated	clay		
380						
400	very dark brown	10 YR 2/2	bioturbated	clay		
420						
440	very dark brown	10 YR 2/2	bioturbated	clay		
460						
480	very dark brown	10 YR 2/2	bioturbated	clay		
500						
520	very dark brown	10 YR 2/2	bioturbated	clay		
540						
560	very dark brown	10 YR 2/2	bioturbated	clay		
580						
600	very dark brown	10 YR 2/2	bioturbated	clay		
620						
640	very dark brown	10 YR 2/2	bioturbated	clay		
660						
680	very dark brown	10 YR 2/2	bioturbated	clay		
700						
720	very dark brown	10 YR 2/2	bioturbated	clay		
740						

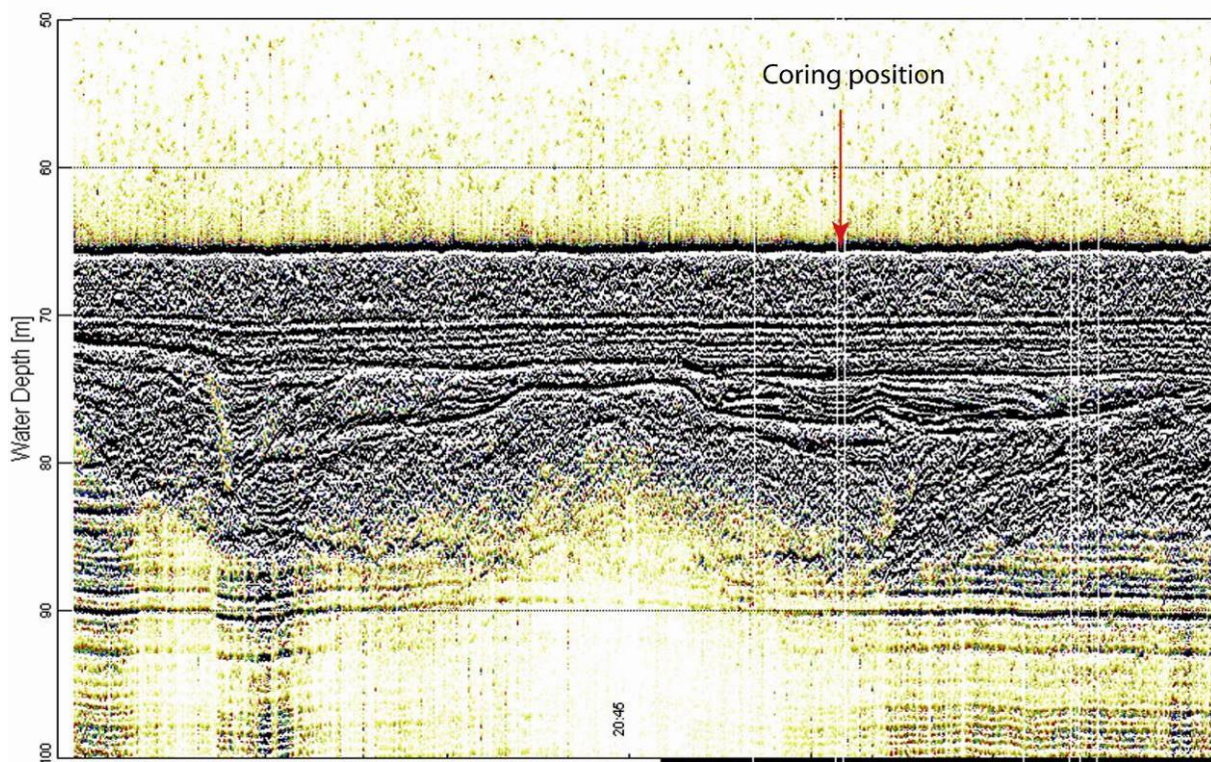
Seismic track with coring position of Station SO-220-43-3



Station: 220-44 - 5 (GC) Water depth: 67 m
 Position: 18°44.227'N / 107°11.764'E Recovery: 827 cm
 Date: 07.05.2012 Interval: 0-827 cm

	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description	
0		greenish gray	Gley 1 5/5 GY	clay	silty		
20							
40							
60			greenish gray	Gley 1 5/5 GY	clay	silty	some small bioturbation traces, 83-87cm bioturbation traces filled with small fragments and silt, 111cm sehl, 116cm woodfragments, 132cm sandpockets
80							
100							
120							
140							
160			greenish gray	Gley 1 5/5 GY	clay	silty clay	170cm sandpockets, 206cm shellfragments in smallpockets
180							
200							
220							
240							
260			greenish gray, dark greenish gray	Gley 1 5/5 GY, Gley 1 4/5 GY, Gley 1 5/5 GY	clay	silty clay	247cm shellfragments in pockets, 250-260cm some shellfragments, 297-312cm color change, 300cm a 1cm layer in Gley 1 5/5 GY, from 312cm slightly mottled
280							
300							
320							
340							
360		greenish gray, dark gray	Gley 1 5/5 GY, 7.5 YR 4/1	clay	silty clay	393cm small shellfragments, 399cm-403cm layer filled with gastrophods & bivalves with two times 14C Samples, 405cm color changes mottles form 405cm to 420cm in Gley 1 5/5 GY	
380							
400							
420							
440							
460		dark gray	7.5 YR 4/1	mottled	silty clay	slightly mottled, 466cm-472cm bioturbationtraces filled with silt in clay 1 5/10y, from 474cm some sandpockets or layer occur to 517cm	
480							
500							
520							
540							
560						still mottled, 623-631cm peat layer occur	
580		dark gray	7.5 YR 4/1	mottled	silty clay		
600							
620							
640							
660		dark gray, dark greenish gray	7.5 YR 4/1, Gley 1 4/10GY	mottled	silty clay	657 shell fragments taken for 14C sample, mottled with mottles in Gley 1 4/10 Y besidertilayer, 718-719cm Sideritcouncretion 2.5 Y 5/2	
680							
700							
720							
740							
760		dark greenish gray, very dark gray	Gley 1 4/10 GY, 2.5 Y 3/1	mottled	silty clay	mottled, 800-813 Peat layer taken for 14C Sample, 809-813cm sandpockets in silty clay, color change at 813cm	
780							
800							
820							
840							

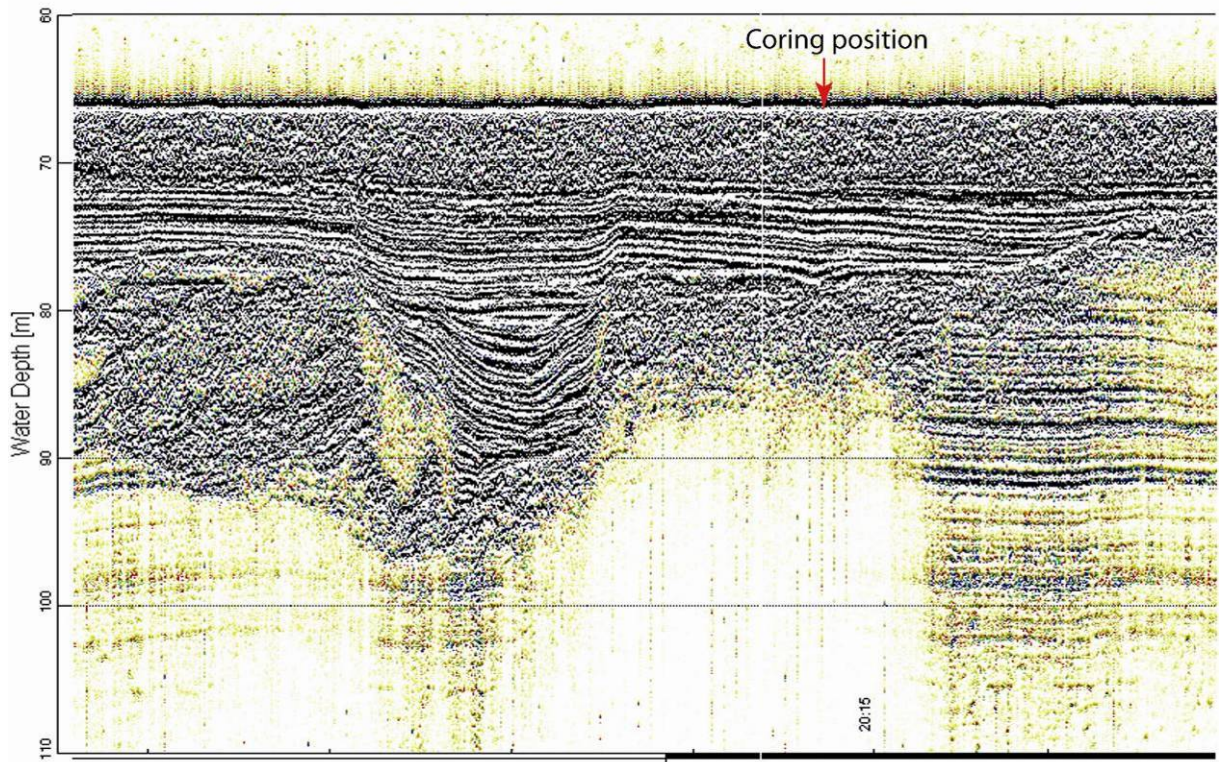
Seismic track with coring position of Station SO-220-44-5




Station: 220-45 - 4 (GC) Water depth: 67 m
 Position: 18°44.040'N / 107°16.236'E Recovery: 835 cm
 Date: 07.05.2012 Interval: 0-835 cm

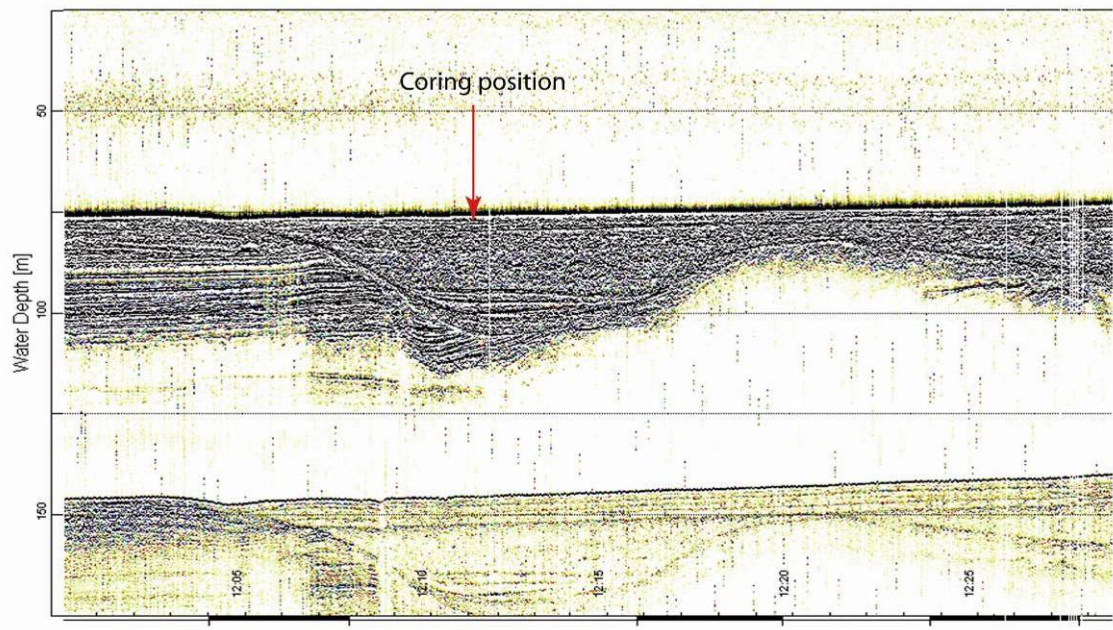
	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0		greenish gray	Gley 1 5/5 GY	mud	silty clay	silty clay
20						
40						
60						
80						
100		greenish gray	Gley 1 5/5 GY	mud	silty clay	74-82cm soft silt pocket and with sand, at 116cm pockets with shell fragments from 114 to 135cm some small shell fragments
120						
140						
160						
180		greenish gray	Gley 1 5/5 GY	mud	silty clay	188cm pockets with shell fragments 2 times 14C sample, (juvelimer corolle, echinoid), 220cm small pockets with sand, from 220 very small shell fragments occur, 14C sample at 238cm
200						
220						
240						
260						
280	greenish gray, dark greenish gray	Gley 1 5/5 GY, Gley 1 4/10 Y	mottled	silty clay	258cm echinoid, from 258cm sediment becomes stiffer, from 258cm color changes slightly mottled: mottles Gley 1 4/10 Y less mottles, 14C sample taken at 258cm, 262-263cm	
300						
320						
340						
360						
380	dark greenish gray, dark gray	Gley 1 4/10 Y, 7.5 YR 4/1	mottled	silty clay	sand content increases from 365cm on, shell layer, gastropoda (Weinbergschnecke), at 385cm color change again, 408cm layer with gravel and shell fragments, from 420 to 450cm just sand, 14C sample at 407-408cm, 408cm, 420-450 just muddy sand	
400						
420						
440						
460						
480	dark gray	7.5 YR 4/1	mottled	silty clay	from 450cm silty clay mottles with sand pockets, 470cm juvelimer corolle, mottled, 14C sample at 470cm	
500						
520						
540						
560						
580						
600	dark gray	7.5 YR 4/1	mottled	silty clay	still silty clay mottled with sandy pockets, mottled, at 600cm some thin sand layer interrupt silty clay layer, less sandy layer or pockets from 600cm	
620						
640						
660						
680						
700	dark gray	7.5 YR 4/1	strong mottled	silty clay	strong mottled, from 660cm more sand pockets, 666 to 674cm bioturbation traces filled with sand	
720						
740						
760						
780						
800	dark gray, light olive gray, olive	7.5 YR 4/1, 5Y 6/2, 5Y 5/3	mottled	silty clay	less mottled, less sand pockets from 750-810cm at 795cm, sand pockets with fines and to coarsand, wood fragments at 805-808cm with 14C sample taken, from 810cm to 835cm very strong consolidated muddy sand. 810-824cm filled bioturbation glimmer traces, color changes at 810cm, insitu wood fragment with 14C sample	
820						
840						

Seismic track with coring position of Station SO-220-45-4



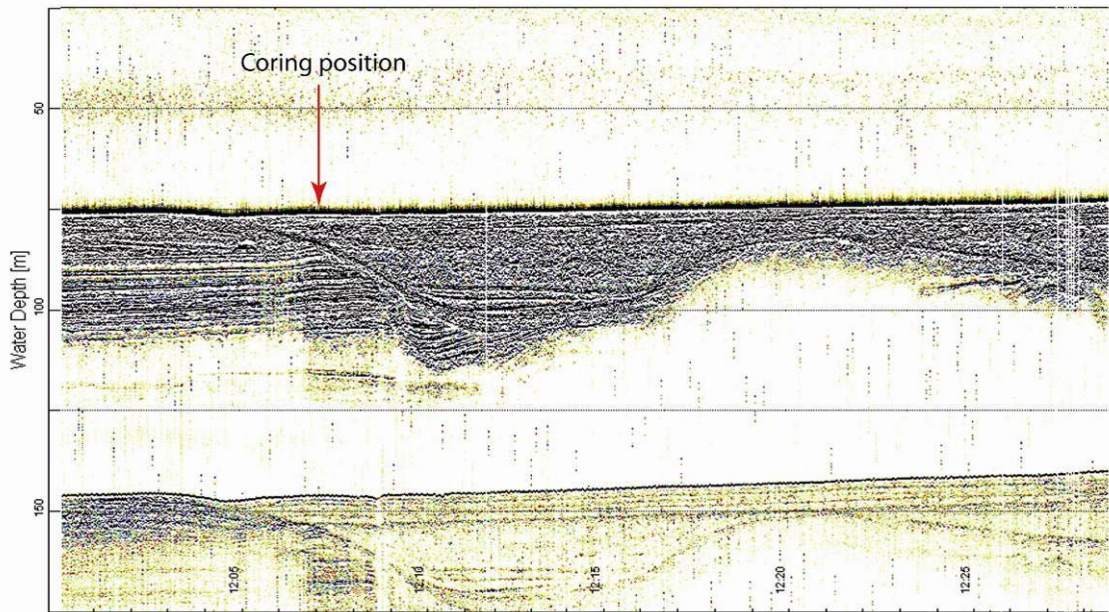
Station: 220-51 - 4 (GC) Water depth: 75 m
 Position: 18°22.809'N / 108°3.829'E Recovery: 553cm
 Date: 08.05.2012 Interval: 0-553 cm

	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0		dark greenish gray	Gley 1 4/10 Y	mud	silty clay	Zitat Wetzel "grüne Pampe" (green mud)
20						some bioturbation traces
40		dark greenish gray	Gley 1 4/10 Y	mud	silty clay	
60						at 215cm pockets filled with very fine sand, 250cm fine sand layer
80		dark greenish gray	Gley 1 4/10 Y	mud	silty clay	
100						300cm a shellfragment, from 330cm more small sandpockets occur
120		dark greenish gray	Gley 1 4/10 Y	mud	silty clay	
140						still small sandpockets, mottled
160		dark greenish gray	Gley 1 4/10 Y	mottled	silty clay	
180						sandcontent increases , more mottled, some very small shell fragment
200	dark greenish gray	Gley 1 4/10 Y	mottled	silty clay, sandy		
220						
240						
260						
280						
300						
320						
340						
360						
380						
400						
420						
440						
460						
480						
500						
520						
540						
560						
580						



Station: 220-52 - 2 (GC) Water depth: 76 m
 Position: 18°22.378'N / 108°3.873'E Recovery: 480cm
 Date: 08.05.2012 Interval: 0-480 cm

	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0						homogenous mud, homogenous colored
20		dark greenish gray	Gley 1 4/10 Y	mud	silty clay	
40		dark greenish gray	Gley 1 4/10 Y	bioturbated	silty clay	80-180 gray colored, partly with fine Pseudolaminae slightly darker with silt, very few borrows
60		dark greenish gray	Gley 1 4/10 Y	bioturbated	silty clay	180-280 gray colored, partly with fine Pseudolaminae slightly darker with silt, very few borrows, at 188, 235, 240cm and from 226-250cm are borrows
80		dark greenish gray	Gley 1 4/10 Y	bioturbated	silty clay	gray colored, partly with fine Pseudolaminae slightly darker with silt, more bioturbation traces, at 337cm a shell with 4cm diameter
100						
120						
140						
160						
180						
200						
220						
240						
260						
280						
300						
320						
340						
360						
380						
400						
420						
440						
460						
480						



Station: 220-54 - 1 (GC)

Water depth: 91 m

Position: 17°53.425'N / 107°54.124'E

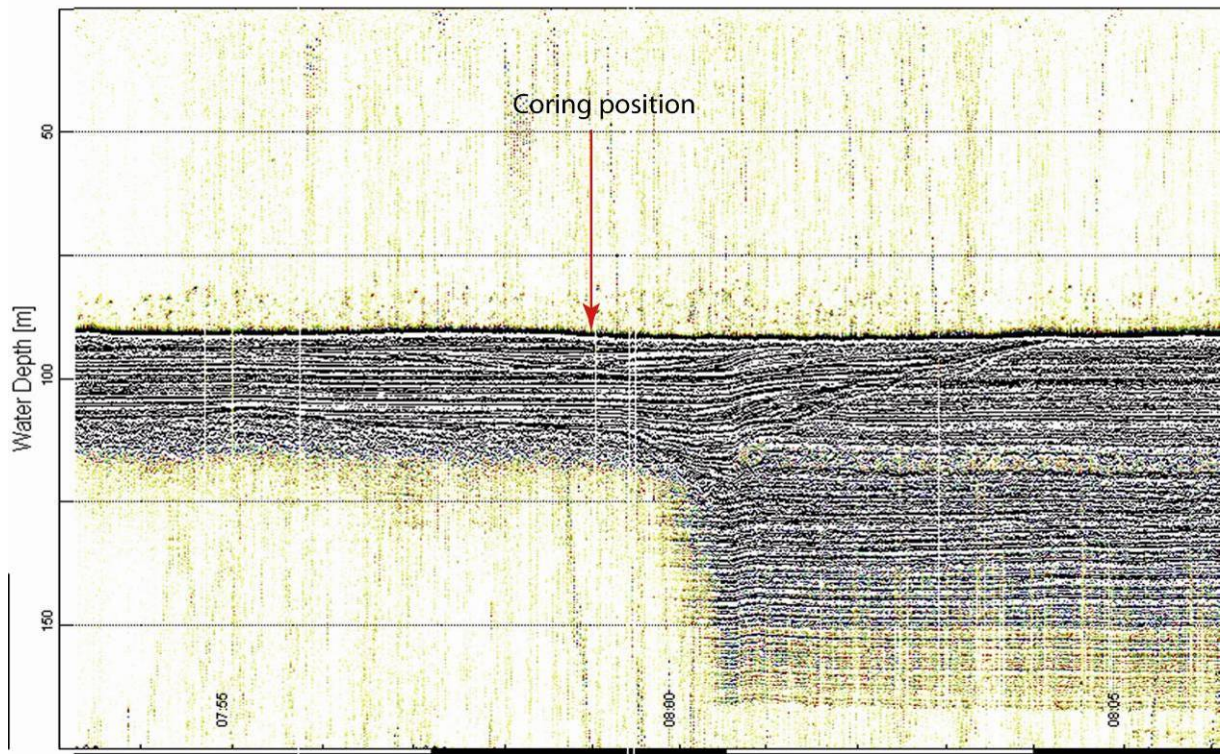
Recovery: 664cm

Date: 08.05.2012


Interval: 0-664 cm

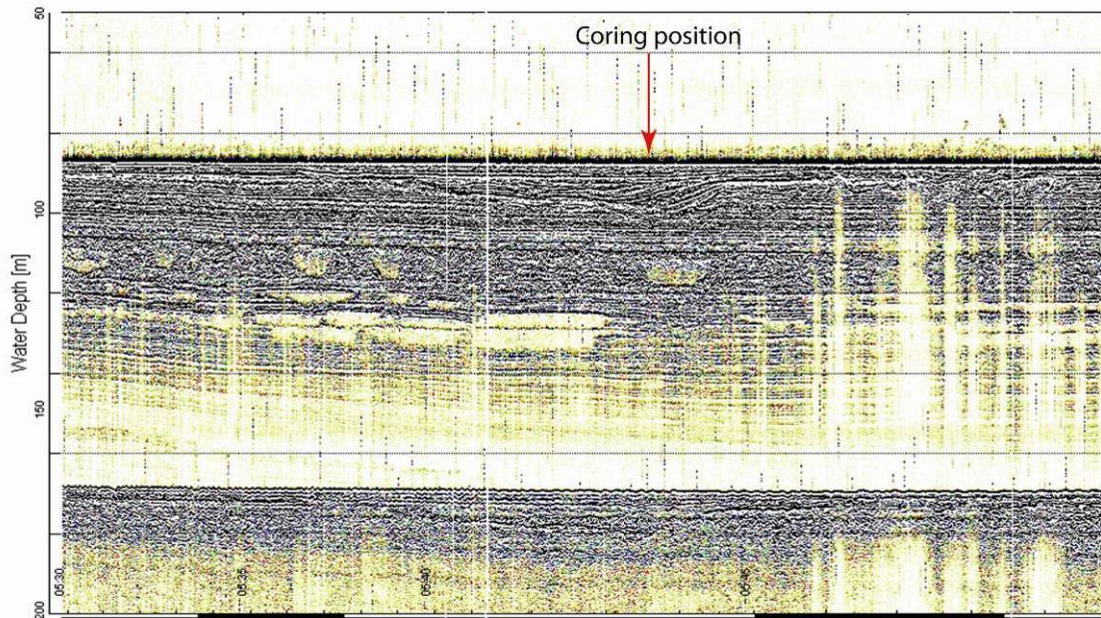
	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0		dark greenish gray	Gley 1 4/10 Y	bioturbated	sandy clay	gray, sandy clay with high amount of shells, at 20, 30, 38, 63cm shellfragments and borrows
20						
40						
60						
80						
100	dark greenish gray	Gley 1 4/10 Y	bioturbated	silty clay	gray homogenous clay with numerous borrows and shellfragments	
120						
140						
160						
180						
200	dark grey	2.5 Y 4/1	bioturbated, laminae	silty clay	sharp boundary to brownish clay, from 277cm with unclear laminae (and slightly lighter Pseudolaminae with 2mm size),	
220						
240						
260						
280						
300	dark grey	2.5 Y 4/1	bioturbated, laminae	silty clay	from 364cm a rhythmical lamination of the clay, some good visible transions zones probably neotectonic cause,	
320						
340						
360						
380						
400	dark grey	2.5 Y 4/1	bioturbated, laminae	silty clay	homogenous clay with rhythmical laminae and neotectonic, small tansionion zones and slids, in the end more homogenous brownish clay without laminae	
420						
440						
460						
480						
500	dark grey	2.5 Y 4/1	bioturbated, laminae	silty clay		
520						
540						
560						
580						
600						
620						
640						
660						
680						

Seismic track with coring position of Station SO-220-54-1



Station: 220-55 - 5 (GC) Water depth: 87 m
 Position: 17°41.959'N / 108°7.020'E Recovery: 155cm
 Date: 08.05.2012 Interval: 0-155 cm

Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	gray, homogenous clay mud with numerous shells at 16, 33, 55cm and smaller shellfragments, at the bottom part few borrows
	dark yellowish brown	10 YR 3/4	bioturbation	silty clay	ab 109cm to 130cm gradational boundary between brownish (10 YR 3/4) and gray clay to palaeo soiled with plantroots in the most base 15cm



Station: 220-57 - 5 (GC)

Water depth: 109 m

Position: 17°38.420'N / 108°23.869'E

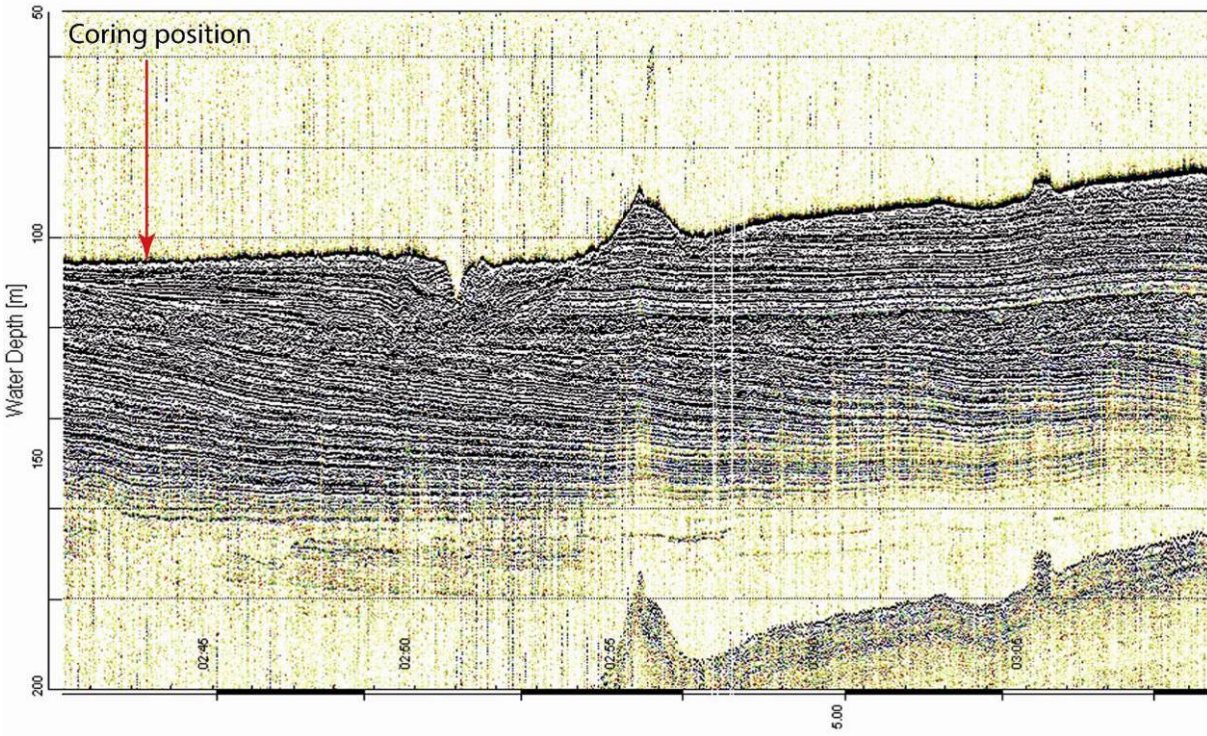
Recovery: 1037cm

Date: 09.05.2012

Interval: 0-1037 cm

	Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description
0		dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	0-7cm gray clay mit silt and numerous shellfragments and bioturbation, 7-37cm gray homogenous clay with few borrows
20		dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	37-137cm grauer einheitlicher Ton, at 57cm, 97cm, 133cm organic traces
40		dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	
60		dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	
80		dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	
100		dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	
120		dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	
140		dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	
160		dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	
180		dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	
200	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
220	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
240	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
260	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
280	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
300	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
320	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
340	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
360	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
380	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
400	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
420	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
440	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
460	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
480	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
500	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
520	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
540	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
560	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
580	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
600	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
620	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
640	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
660	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
680	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
700	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
720	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
740	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
760	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
780	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
800	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
820	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
840	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
860	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
880	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
900	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
920	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
940	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
960	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
980	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
1000	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
1020	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		
1040	dark greenish gray	Gley 1 4/10 Y	bioturbation	clay		

Seismic track with coring position of Station SO-220-57-5



Station: 220-58 - 2 (GC)

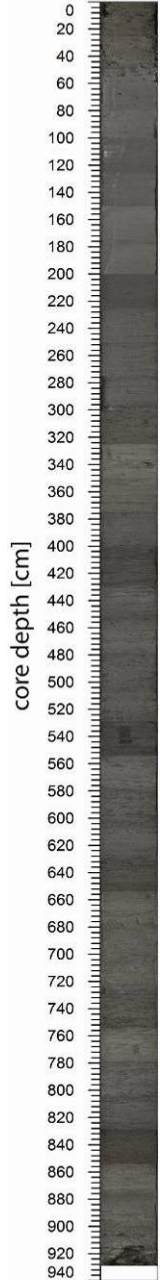
Water depth: 107 m

Position: 17°39.925'N / 108°24.997'E

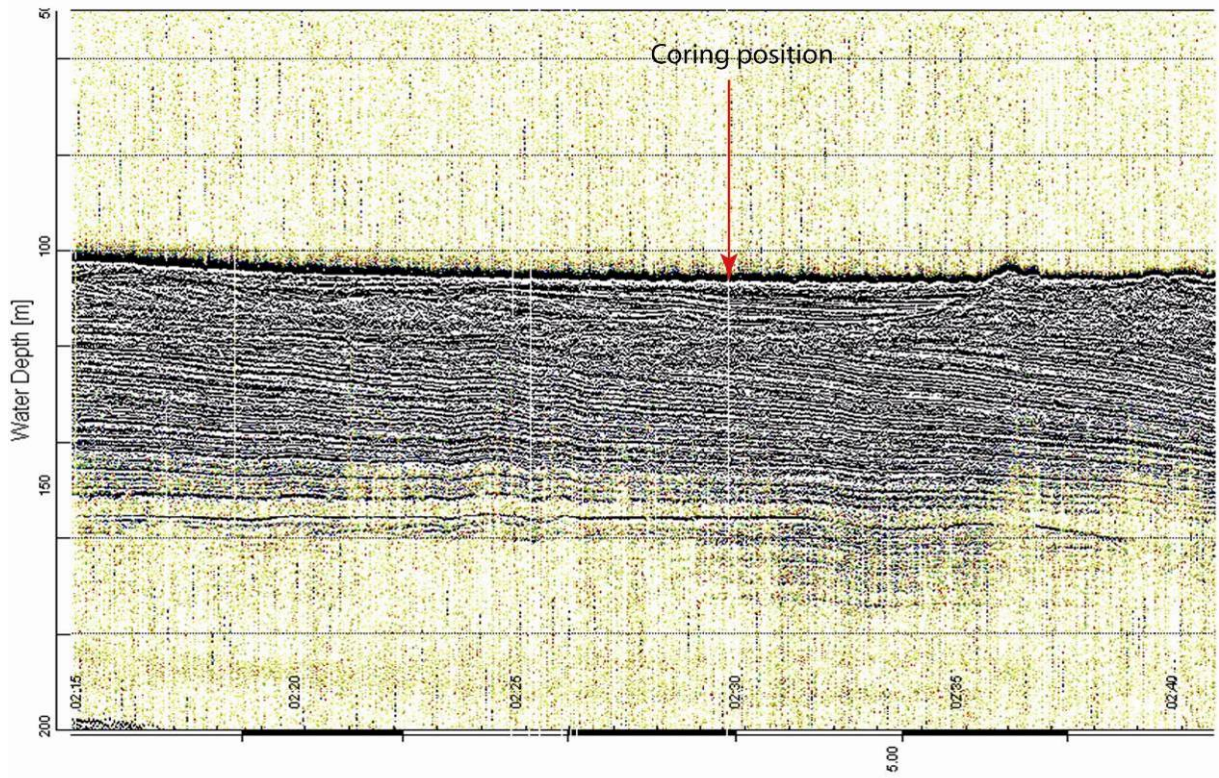
Recovery: 929cm

Date: 09.05.2012

Interval: 0-929 cm

Photo X-Ray	Colour	Munsell	Structure	Grainsize	Description	
	dark grey	2.5 Y 4/1	bioturbation	clay	homogenous gray mud with numerous shellfragments and borrows	
	dark grey	2.5 Y 4/1	bioturbation	clay	sharp boundary (erosion?) homogenous gray clay with one borrow at 60 and 69cm and shellfragments at 96cm	
	dark grey	2.5 Y 4/1	bioturbation	clay	homogenous gray clay with few borrows at 125 and 192cm and shells at 161cm	
	gray	2.5 Y 5/1	bioturbation	clay	a bit lighter homogenous clay with fine borrows at 227cm , 245-265cm, 280-290cm, 297cm	
	gray	2.5 Y 5/1	bioturbation	clay	homogenous gray clay with numerous borrows with horizontal and vertical appearance, at 338cm a shell	
	gray	2.5 Y 5/1	bioturbation	clay	homogenous gray mud with numerous borrows at 425-429cm, 438-450cm, 480-529cm,	
	gray	2.5 Y 5/1	bioturbation	clay	homogenous gray mud with numerous borrows (3cm diameter, 13cm length, laying vertical); at 513-545cm and 613-620cm the sediment is totally reworked through bioturbation,	
	gray	2.5 Y 5/1	bioturbation	clay	homogenous gray mud with numerous big borrows , 775-785 borrows filled with darker sand	
	gray	2.5 Y 5/1	bioturbation	clay	strong bioturbated, clay sediment, at 870-875cm fine sand, 890cm 2-3 layer of brownish clay	

Seismic track with coring position of Station SO-220-58-2



Station: 220-60 - 3 (GC)

Water depth: 553 m

Position: 16°43.544'N / 109°35.360'E

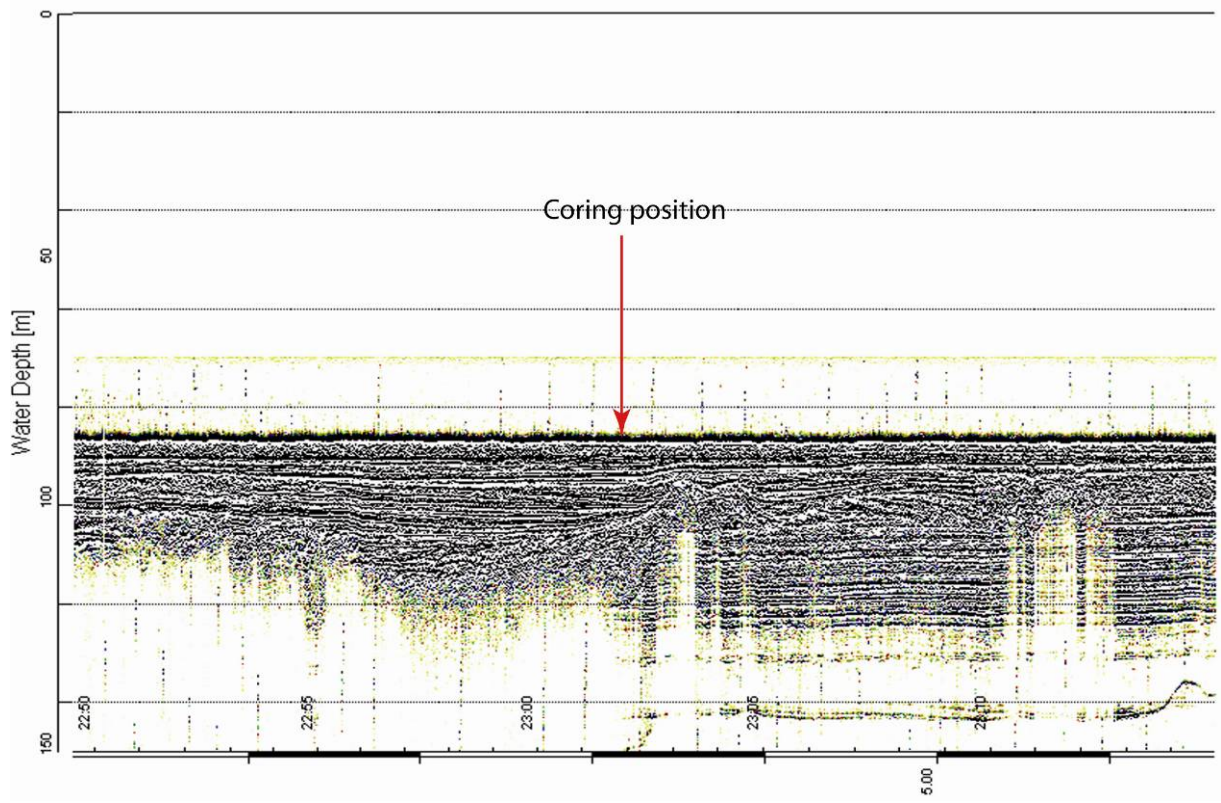
Recovery: 663cm

Date: 09.05.2012

Interval: 0-663 cm

	Photo	X-Ray	Colour	Munsell	Structure	Grainsize	Description	
0			dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	homogenous gray clay	
20								
40								
60								
80								
100								
120			dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	homogenous gray clay, with few borrows at 103cm, 104cm, 150cm,	
140								
160								
180								
200								
220								
240								
260								
280								
300			dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	homogenous gray clay with rarely shellfragments and borrows at 320-330cm	
320								
340								
360								
380								
400			dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	homogenous gray clay	
420								
440								
460								
480								
500								
520								
540								
560			dark greenish gray	Gley 1 4/10 Y	bioturbation	clay	homogenous gray clay, at 580cm black pseudolaminae	
580								
600								
620								
640								
660								
680								

Seismic track with coring position of Station SO-220-60-3



5. References

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6. Acknowledgements

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