DANMARKS OG GRØNLANDS GEOLOGISKE UNDERSØGELSE RAPPORT 2013/28

Dunken-2 core Well, GGU 517006, eastern Peary Land, North Greenland: Completion report

Anders Pilgaard

GEOLOGICAL SURVEY OF DENMARK AND GREENLAND
MINISTRY OF ENVIRONMENT AND ENERGY

GEUS

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Confidential report

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1. General information

1.1 Borehole data

Country	Greenland / Denmark
Borehole number	GGU 517006
Borehole name	Dunken-2 (after nearby mountain Dunken) (Ca. 1 m west of Dunken-2 another well named Dunken-1 was drilled but abandoned at 18.84 m)
Area	Northern Kim Fjelde, eastern Peary Land, North Greenland
Operator	GEUS
Drilling operator	GEUS

Borehole Location	
Altitude:	212 m above mean sea level.
Coordinates WGS 84:	Latitude: 82°40.204´ N, Longitude: 21°04.850´ W
UTM (wgs84):	9179629 N 498849 E (UTM Zone 27)

Drill rig	Sandvik DE 130
Drilling contractor	GEUS
Casing diameter	64/57 mm,
Casing depth	Casing 64/57 mm to 12.08 m
Borehole diameter	56 mm
Core diameter	42 mm
Total depth	141.84 m
Total core recovery	96%
Status	Top of casing closed with a steel cap.

Logistic history:

First drilling crew members arrive on Station Nord	July 13th 2012
Transportation of rig and crew from Station Nord to drill site	July 16th –18th 2012
Establishment of field camp and drilling rig	July 16th –19th 2012
Spud	July 21st 2012
Drilling completed	July 30th 2012
Demobilization and transportation to a new drill site	July 31st - August 6th 2012
Effective drilling	5 days
Total days on drill location	22 days

1.2 Borehole summary

Dunken-2, GGU 517006, was drilled during the summer of 2012 in eastern Peary Land, North Greenland, approximately 140 km NNW of Station Nord and 820 km from the North Pole (Fig. 1.1). The name Dunken-2 is derived from the nearby mountain "Dunken".

Dunken-2 is the sixth core hole in an onshore drilling program in East, North-East and North Greenland that began in 2008. The drilling program is part of collaboration between GEUS and a number of oil companies called *Petroleum Geological Studies, Services and Data in East, North-East Greenland*. The drilling programme includes following cores: Blokelv in central Jameson Land (2008); Rødryggen-1 on Wollaston Forland (2009); Store Koldewey-1 on Store Koldewey and Brorson Halvø-1 on Wollaston Forland (2010); and Nanok-1 on Hold with Hope (2011). The results of the 2012 drilling season were Dunken-1, Dunken-2 and Kim Fjelde-1 in northern and eastern Kim Fjelde, and the cores are thus the first core data from the western continuation of the Barents Sea *i.e.* the Wandel Sea Basin. Approximately 1 m east of Dunken-2 another well, Dunken-1, was cored to 18.84 m but abandoned due to a frozen drill string. This core will not be discussed in this report.

The primary objective of Dunken-2 was to core the fine-grained lower part of the siliciclastic marine Lower–Middle Triassic Dunken Formation (Trolle Land Group), to obtain fresh unweathered and continuous core samples for investigations of source rock potential and depositional setting in the essentially unknown succession.

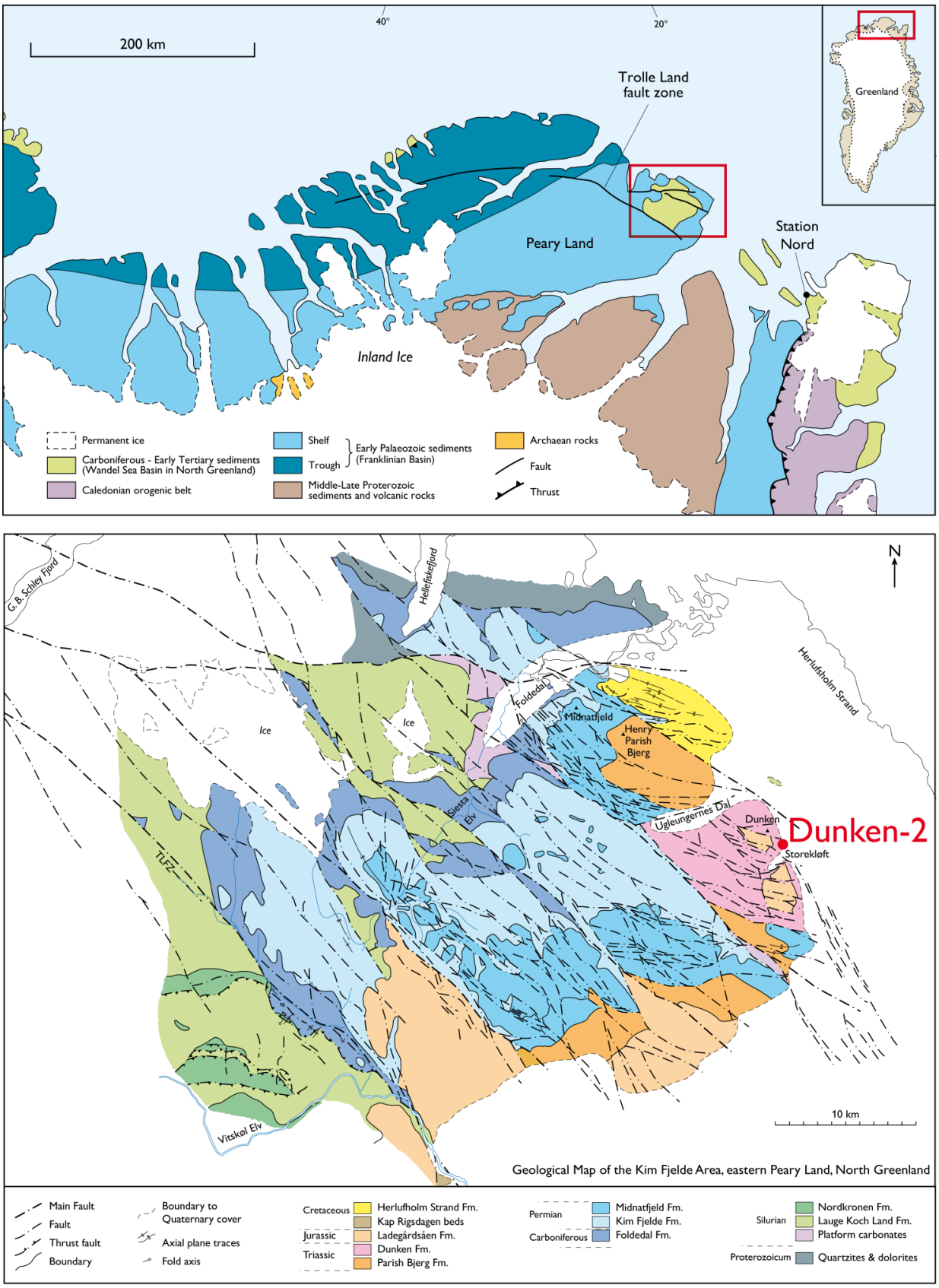
A detailed description and interpretation of Dunken-2 together with a source rock analytical programme were planned and announced in Appendix B5 (not this report). But due to bad source rock quality in the preliminary results from the core the appendix was withdrawn on the 29th of November 2012. Instead a more regional study of the Trias succession will be proposed in the future including a detailed description and integration of the Dunken-2 well.

The Dunken-2 borehole was spudded on July 21st 2012 and completed on July 30th 2012 at a total depth of 141.84 m, covering most of the targetted lithostratigraphic succession. The core recovery from the surface to TD was 96%. The core diameter is 42 mm and cores are stored in 21 core boxes of c. 25 kg each.

Drilled formations: Quaternary (0.0-4.7 m), lower part of Dunken Formation (4.7-141.84 m). Depth measured below surface.

A total gamma log was made in the hole from 134.5 m to the surface.

The borehole was abandoned plugged at the top by a steel cap. Drill string and casing were left frozen in the hole.



Figur 1.1 Upper map: Map showing the present extension of the sediments from the Wandel Sea Basin in North Greenland, reprinted with modifications from Stemmerik *et al.* (1996) and Kragh *et al.* (1997). Lower map: The existing compiled detailed map from 1994 of the Kim Fjelde Area, Eastern Peary Land (Zinck-Jørgensen and Håkansson, 1994). Dunken-2 is marked with a red dot.

2. Drilling operation

The drilling camp personnel:

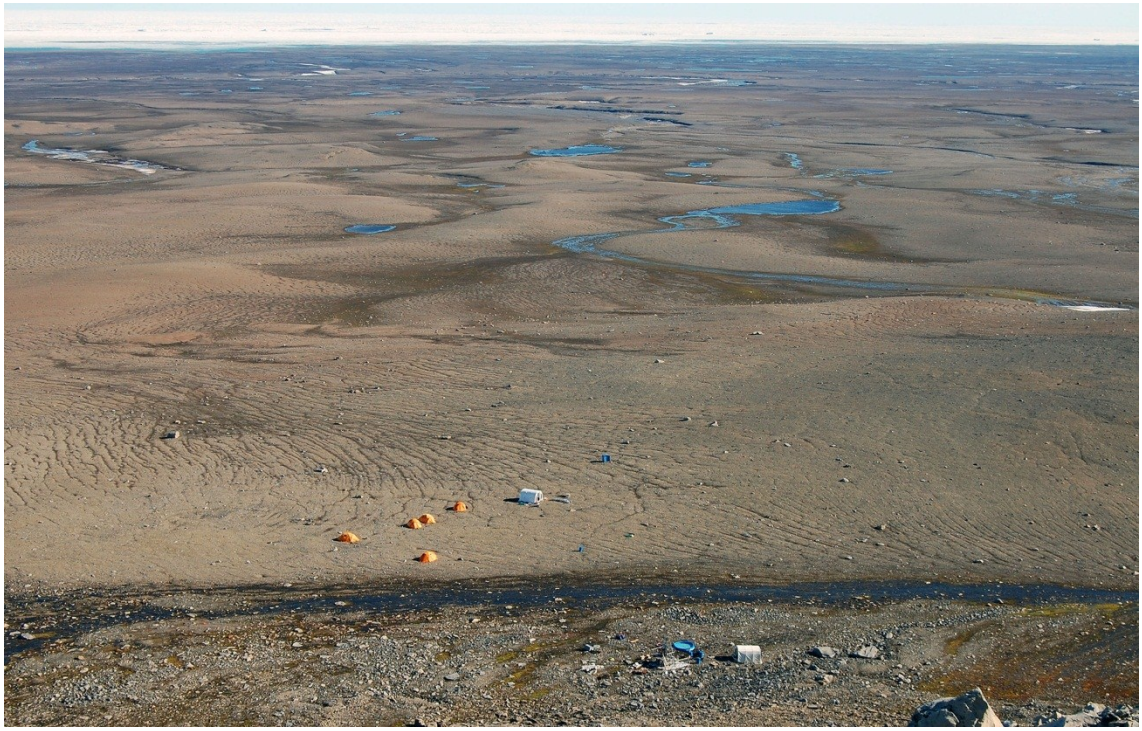
Senior technician John Boserup, GEUS
Driller Jan Varup, Varup Consult
Technician Anders Clausen, Dana Geo-Consult
Well site geologist Anders Pilgaard, GEUS
Driller's assistant Fredrik Sønderholm, GEUS

Drilling was carried out by a Sandvik DE 130 wire line rig. The borehole diameter is 56 mm, whereas the core diameter is 42 mm. The casing had an inner and outer diameter of 57 mm and 64 mm, respectively. For safety reasons, especially concerning overpressured formations, it is decided by GEUS that the maximum drilling depth is approximately 250 m. Water for drilling was supplied from a glacial stream by a diesel-driven water pump through hoses into an inflatable 5000 ℓ basin, the water was heated to approximately 35°C before entering the drill hole and small amounts of salt was dissolved in the water when necessarily. Permafrost was present from a few metres below terrain surface and down to TD.

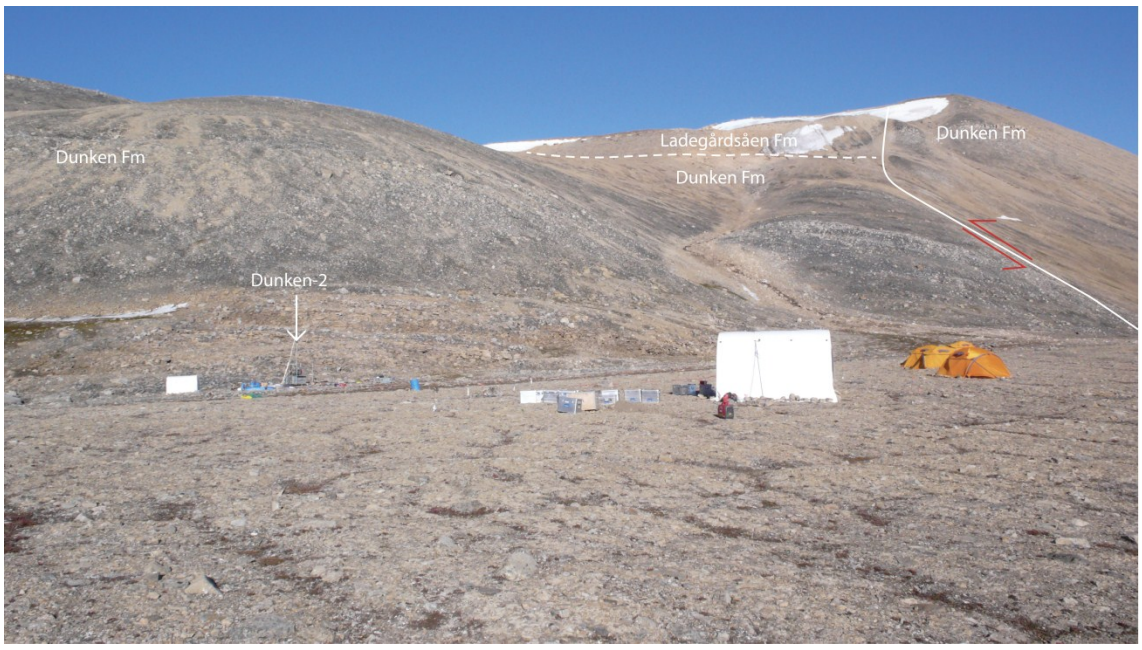
The military Station Nord acted as official GEUS-Basecamp during the field season. Logistics were handled by GEUS in corporation with POLOG and for field support a helicopter from Air Greenland (Eurocopter AS-350) was chartered of Greenland Air for a full field season.

Drill rig and field equipment were flown from Aalborg to Station Nord by an ANTONOV-12 transport plane. From Station Nord the drill rig parts and equipment were transported in sling nets with helicopter to the drill site at northern Kim Fjelde, a distance of c. 140 km. The helicopter was a Eurocopter AS-350, which has a maximum sling load of 1.3–1.4 tons (less actual load capacity with longer distances). After completion of the Dunken-2 well, the drilling operation continued at the Kim Fjelde-1 well c. 9 km to the west. After the season all equipment including drill rig and drill cores returned to Aalborg in an ANTONOV-12 transport plane.

Mobilisation of the drill rig was initiated at Station Nord. Transport to drill site and camp mobilisation took 4 days and the effective drilling took 5 days (Fig. 2.3 and Appendix A). The drilling was impeded by one abandoned well due to permafrost, Dunken-1, and two days of inactivity during storm. In Dunken-2 casing was drilled to 12.08 m, and drill core recovered to 141.84 m. During demobilisation and transport to new drill site, Kim Fjelde-1, the helicopter was grounded for 5 days and delayed the demobilisations process to a total of 7 days.

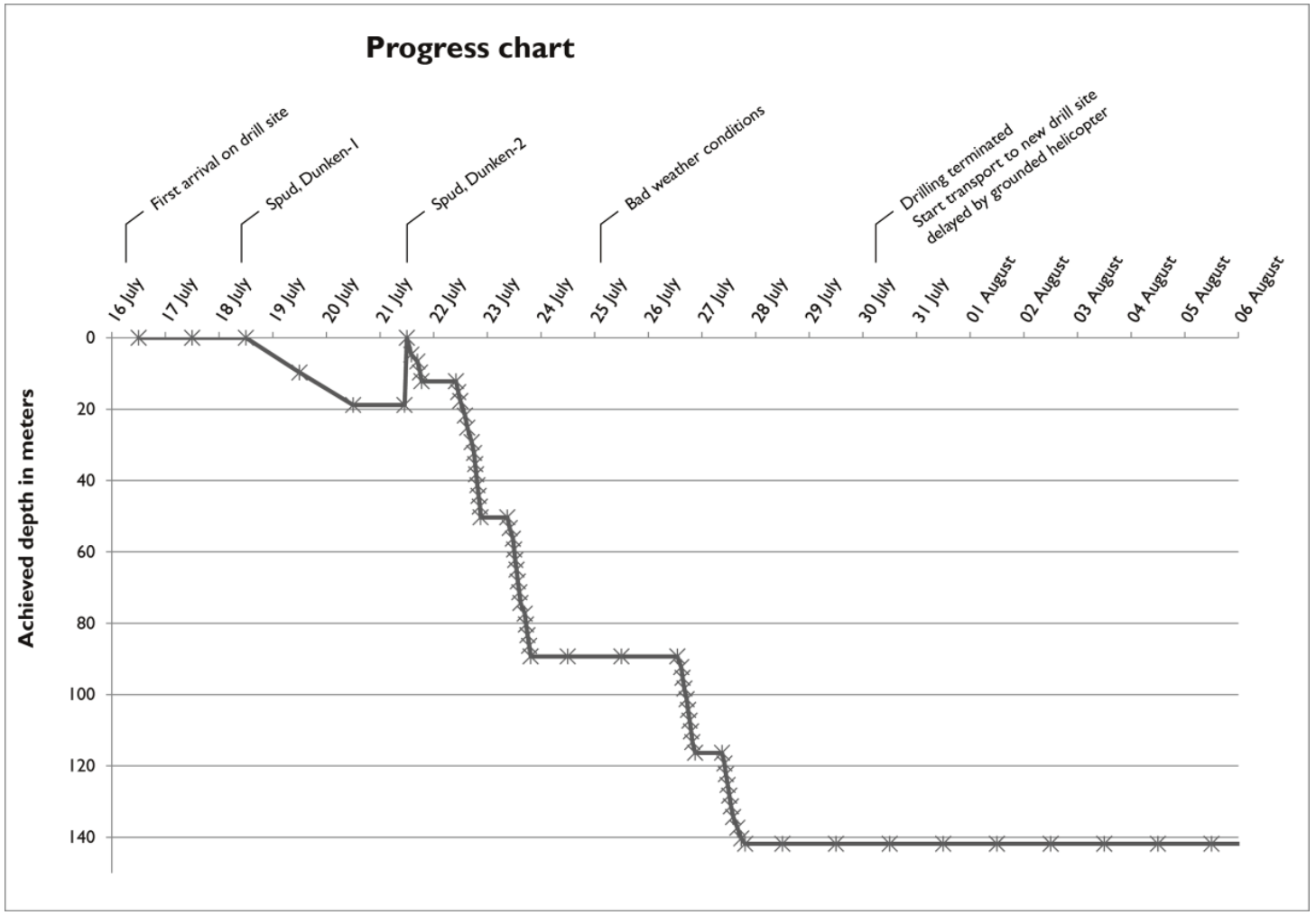


Figur 2.1 View of Dunken drill camp, notice the arctic coast and the drift ice in the horizon towards the NE.



Figur 2.2 View of the Dunken drill site with the white kitchen tent in the front, Dunken-2 at the foot of the hill and the southern part of the Mountain Dunken in the background. Dunken Formation, Ladegårdsåen Formation, and a fault are indicated.

Figur 2.3 Progress chart; achieved drilling depth in meters during presence at the Dunken drill site. See appendix A for detailed description.



3. Geological and geophysical data

The Dunken-2 borehole is located in the northern part of Kim Fjelde, eastern Peary Land, North Greenland (Fig. 1.1), at the mouth of the canyon Storekløft. The south-eastern slope of the mountain Dunken rises just a few meters west of the drill site.

3.1 Objectives

The target of the well was the clastic marine Lower to Middle Triassic Dunken Formation, Trolle Land Group, a sand-rich formation relative unknown regarding thickness, sedimentology, age, and source rock potential etc. The primary objective for the drilling programme was to investigate the source rock potential for the lower, finer grained, and more mudstone prone section of Dunken Formation. In addition, the drilling programme aims to describe sedimentary facies, interpret depositional environments, erect biostratigraphic divisions, determine diagenesis patterns, reservoir potential and seal capacity, and to assess uplift history (using AFTA).

3.2 Drilling results

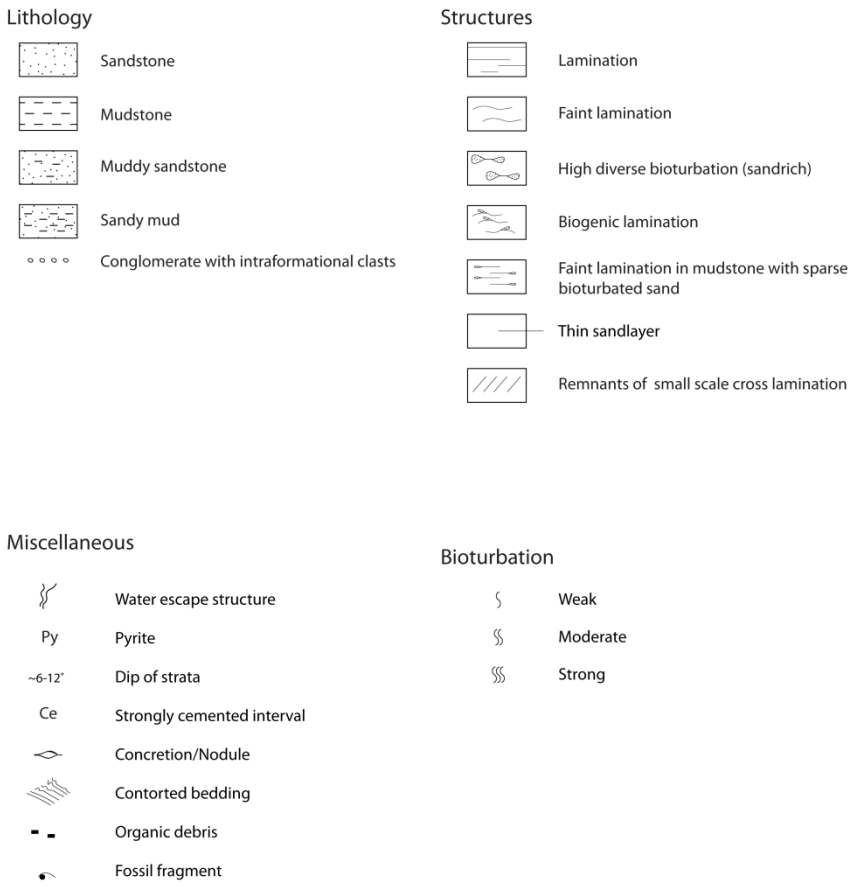
The Dunken-2 core recovered a 141.84 m thick clastic marine succession from the lower section of Dunken Formation. The succession overall shows a coarsening upward development: At TD the core is dominated by unbioturbated mudstone with contorted sand lenses; the middle part of the core is dominated by highly bioturbated sandy mudstone; and upper part of the core consists mainly of medium grained weakly bioturbated sandstone with water escape structures. A number of coarsening upward cycles are present and distinct pyrite-bearing conglomeratic layers occurs throughout the cored succession.

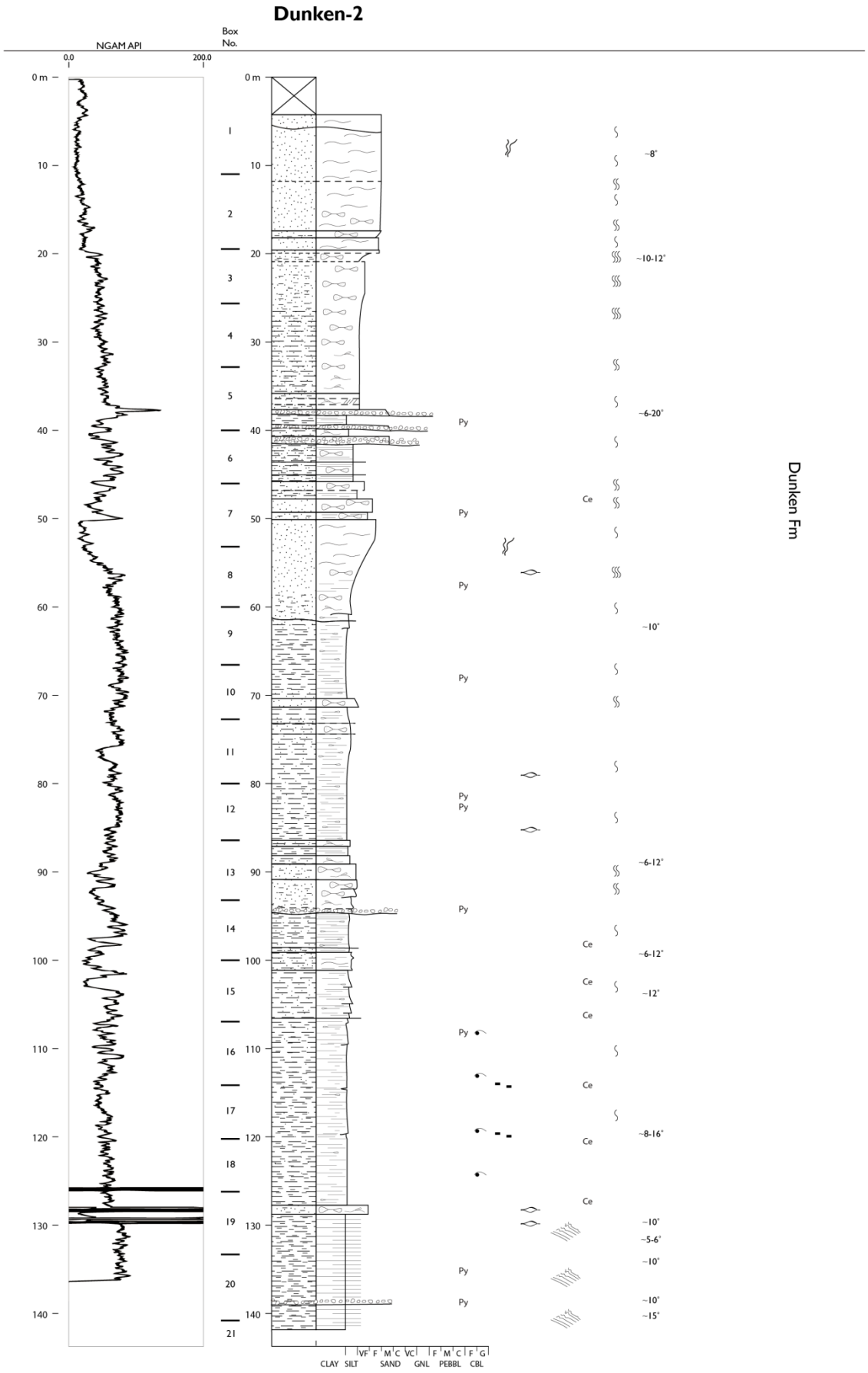
The base of Dunken Formation was not reached.

3.3 Coring

Conventional coring was performed from terrain surface to TD at 141.84 m. The core recovery was 96% from the surface to TD and 99% from 4.71 m to TD. The quality of the core is excellent. A preliminary sedimentological log was carried out on site on the unslapped core (Fig. 3.1, condensed sedimentological log).

Figur 3.1 Following page: Condensed preliminary sedimentological log of the Dunken-2 core with Natural GR-log (in API units). GR log was measured in the drill hole. The abnormal oscillations in the GR readings between 125 and 130 m were caused by a bad connection in a wire. Dunken-2 was drilled in Dunken Formation. This page: Legend to sedimentological log.




Dunken-2
NGAM API
0.0
200.0
Box No.
0 m
10
20
30
40
50
60
70
80
90
100
110
120
130
140
1
2
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16
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19
20
21
Py
Ce
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~6-20°
~10°
~6-12°
~12°
~8-16°
~5-6°
~15°
CLAY
SILT
VF F M C VC
SAND
F M C F G
GNL
PEBBL
CBL
Dunken Fm

3.4 Sampling programme at the drill site

A total of 18 whole core samples from mudstone-intervals for gas analyses were collected immediately of the recovered core for every 6 m in average. Samples have lengths up to about 10 cm and they were stored in sealed metal cans. 122 samples from the core were collected for Rock-Eval/TOC screening and biostratigraphic age identification based on palynomorphs at GEUS. (See appendix C.)

3.5 Natural GR-log

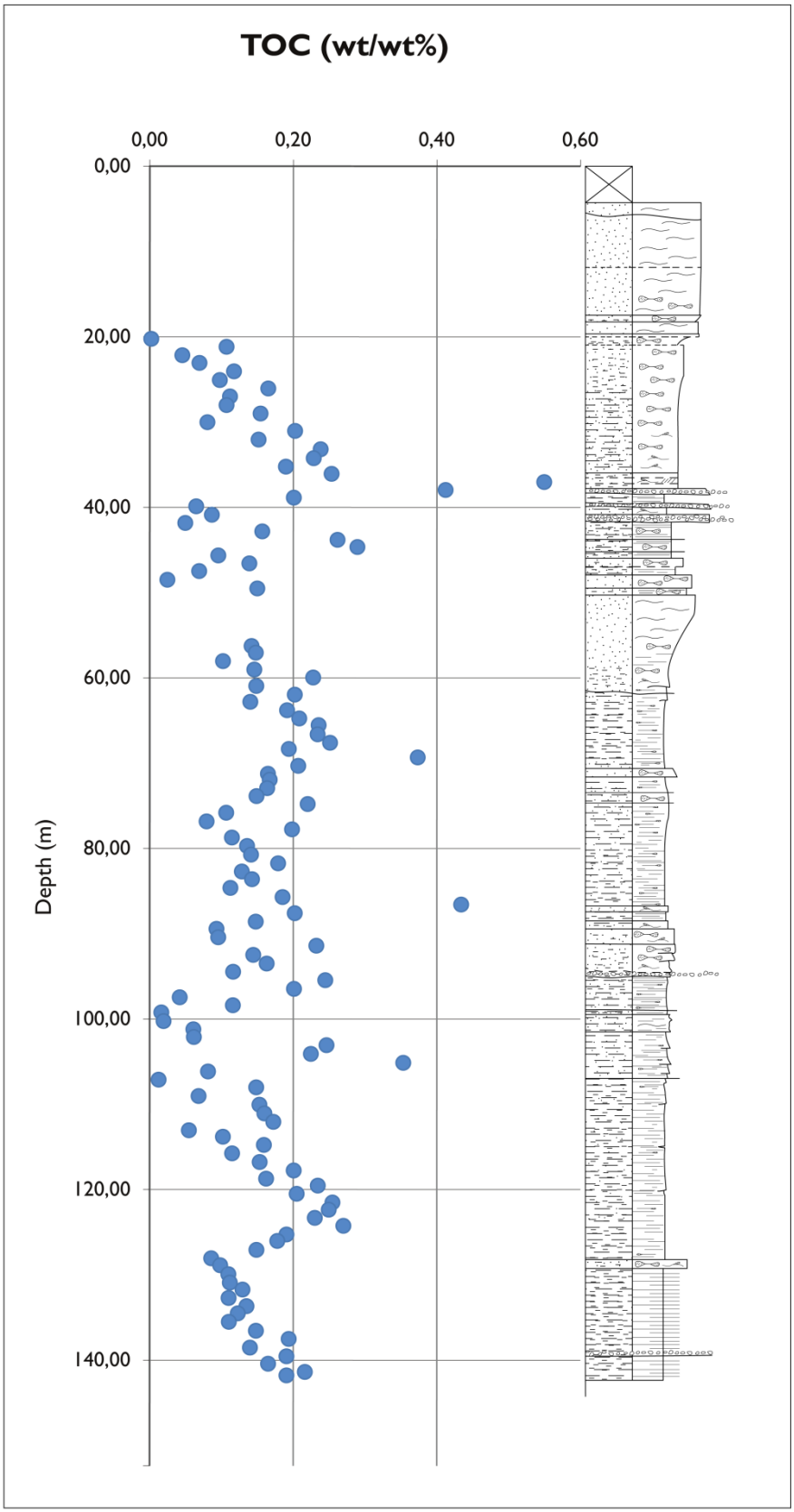
A natural gamma ray (GR) log in API units was run in the drill string after drilling completed from 134.5 m and upwards, which was the safety distance for the probe to TD (Fig. 3.1). Abnormal oscillations in the GR reading between 125 and 130 m were caused by a bad connection in a wire. A GR log covering the missing lower part will be performed at GEUS laboratory among with a density-log covering the upper sandy interval.

The GR-readings show an upward decreasing trend. Maximum stable GR-readings were obtained in the intervals 129.0-141.84 m and 64.0-68.0 m, and minimum stable GR-readings were obtained in the interval 50-54 m and near the top from 20.0 m to the surface. A major peak was measured at depth 37.0 m and the intervals 89-107 m and 39-50 m were characterized by oscillating readings.

3.6 TOC screening

Samples collected in the field for TOC screening were analyzed immediately after returning to Copenhagen. The results are given in Figur 3.2.

The TOC-screening reveals surprisingly low values through the entire cored succession, simple average being 0.16 wt%, and it can be concluded that the cored succession does not possess any source rock potential.



Figur 3.2 Next page: TOC screening results of the Dunken-2 core from samples collected during drilling. No measurements were made in clean sandstone-units.

3.7 Biostratigraphy of the cored succession

Earlier works on Dunken Formation have dated the formation based on mainly arctoceratid ammonoids (essentially Kummel, 1953; Mølgaard et al., 1994). According to this previous work the lower part belongs to Lower Triassic (Smithian), the middle part to Middle Triassic (Anisian), whereas the upper part of Dunken Formation remains undated (Mølgaard et al., 1994). The cored section is probably Smithian in age, but need further study. Detailed age descriptions based on dinoflagelate cysts will be attempted at GEUS, and the preliminary studies shows that the cored succession probably belongs to the Lower Triassic.

3.8 Description of lithology

The Dunken-2 core is preliminary divided into intervals with overall sedimentological similar characteristics, disregarding sequence stratigraphy, biostratigraphy etc.

0.0-4.7 m
Quaternary cover

4.7-37.5 m

Upward coarsening interval. Gradually coarsening upward from sandy mudstone to sandstone at c. 20 m.

SANDY MUDSTONE, grey, silty/sandy, without sedimentary structures, instead strongly bioturbated, at places by high diversity (though dominated by cross-cutting massive sandy tube and dark centered tubes), and in the lower parts dominated by horizontal trace fossils with a wavy disrupted bioturbation lamination fabric as result.

SANDSTONE, white – grey, fine to medium grained, in places mud-rich, at places diffuse laminated with water escape structures, appears at places structureless, and at places weakly to strongly bioturbated (mottled). Trace fossils include light centered tubes with narrow dark circles, some rare vertical burrows. The sandstones have examples of internal boundaries separating distinct 8-50 cm thick layers with erosional bases. A sharp boundary at 20 m marks a transition upwards to nearly pure sandstone. Strata dip 10°-12°.

37.5-50 m

Heterogenic interval containing sandy bioturbated mudstones, thin unbioturbated heterolithic layers with small-scale ripples, thin dark mudstone layers and conglomerates.

CONGLOMERATES are erosional layers, 2-20 cm thick, they are clast- to matrix supported with well-rounded ?intraformational and ?extraformational clasts and with fine to medium grained sand as matrix. Slightly normal graded. Strata dip 6°-20°.

50-85 m

Upward coarsening interval. Dominated by mudstone coarsening gradually upwards into sandy mudstone at depth c. 76 m and again from mudstone to sandstone at 55 m.

MUDSTONE, dark grey, in part with faint lamination and weakly bioturbated, dominating trace fossil is a massive sandy tube. Visible pyrite is rare. Open fractures with crushed core material and brownish weathering are common.

SANDSTONE, white – grey, fine grained, in places mud-rich, at places diffuse laminated with water escape structures, and at places weakly to strongly bioturbated. Trace fossils include light centered tubes with narrow dark circles. Strata dip 6°-10°.

85-97 m

SANDY MUDSTONE, dark grey – grey, sandy, moderate to strongly bioturbated. Trace fossils include close to horizontal traces with “spreiten”, dark centered tube traces, sandy massive tubes and a vertical burrow. A number of dark mudstone layers, c. 1 cm thick, with weak but distinct boundaries intercalate the sandy mudstone. At depth 94 m a c. 2 cm thick conglomaretic erosional layer (clast-supported) with well-rounded ?intraformational pyritized clasts and mud matrix separates the interval in a sandy upper part and a mud-rich lower part. Strata dip 6°-12°.

97-107 m

SILTY MUDSTONE, grey, silty and sandy, laminated (at places possible ripple-lamination occurs) to weakly bioturbated. It is densely calcite cemented with numerous calcite filled fractures. Internal sharp boundaries are common, subdividing the interval in fining upwards units. Strata dip 6°-8°.

107-129 m

MUDSTONE, dark grey – grey, amount of sand and silt vary rhythmically along with the degree of bioturbation (weak to ?unbioturbated), giving sandy/silty and unbioturbated layers a slightly laminated appearance. The mudstone contains in places high amounts of fossil fragments and weakly oriented organic debris. It is densely ?calcite cemented and have vertical calcite filled fractures. A few vague internal boundaries are visible, and one sand layer, 3 cm thick, of very fine sand with sharp undulating boundaries occurs. Strata dip 8°-16°.

129-141.84 m

MUDSTONES, dark grey, laminated and mostly unbioturbated, and a few laminae are pyritized. The mudstones are interlaminated with numerous sand laminae. They are thin (0.1-0.4 cm), white, very fine-grained, straight to lens-shaped; thicker (0.4 cm) layers show low-angle ripple-lamination and can be calcite cemented. The sand layers have sharp boundaries to the mudstones and are increasing in abundance upwards and show many examples of contorted bedding or otherwise disturbed lamination, and one example with a small normal fault. The strata dip between 5° to 15°. At 137.6 m the interval contains a c. 2 cm thick

conglomaretic erosional layer (clast-supported) with well-rounded pyritized ?intraformational clasts and mud matrix.

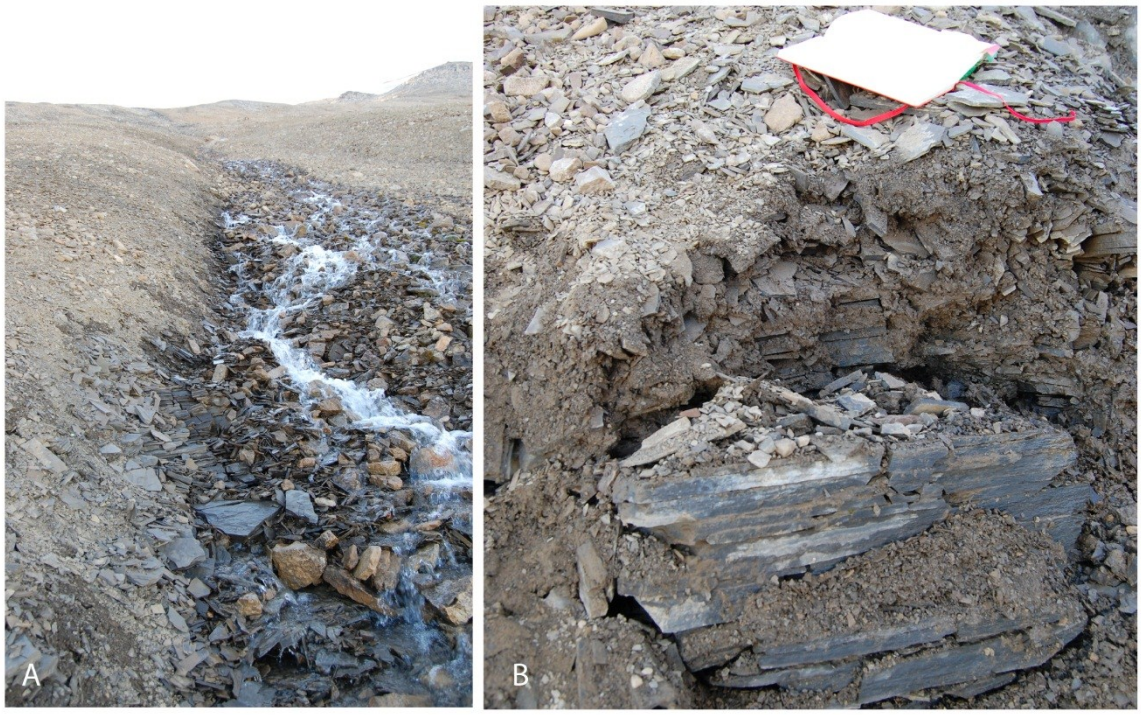
Figur 3.3. Three examples of core box photos from the Dunken-2 core. The cores are dry and stratigraphic up is in the top left corner and stratigraphic down is in the lower right corner.
Upper picture: Core box 2. 11.34-19.44 m.
Central picture: Core box 12. 79.74-86.56 m.
Lower picture: Core box 20. 133.58-140.34 m.

3.9 Relation to nearby outcrops

In the slope immediately above the drill site (elevation c. 230-45 m), sandstones of Dunken Formation are exposed, characterized by yellow weathered, fine to medium grained, cemented sandstones with remnants of small scale ripples, some with dark drapings, and some sandstones are clearly bioturbated (mottled) or without any visible structures but a rubbly appearance (see Fig. 2.2 and and 3.4) . A distinct trace fossil is a horizontal tunnel system with spreiten (*Rhizocoralium* sp.). Ammonoids are abundant in at least one horizon. 50 m higher in the succession (elevation c. 300 m) in structureless medium grained sandstones are exposed with distinct 5-30 cm spherically shaped cavities, some with remnants of nodules. Near the top of the mountain about 300 m higher in the succession (elevation c. 600-642 m) the Dunken Formation is erosionally overlain by Upper Jurassic to Lower Cretaceous Ladegårdsåen Formation, characterized by two distinct medium to coarse grained sandstone units with cross-bedding. Strata dip 5°-7° to the north.

The Dunken-2 drill site was placed at the foot of above-mentioned succession and represents the lower, finer grained, and mudstone prone section of the Dunken Formation. The section is exposed further to the north towards the main Dunken profile where it contains mainly muddy sandstone and silty to sandy mudstone with varying degree of bioturbation, lamination, and rare examples of linquoid ripples (Fig. 3.3).

The lithostratigraphic unit below the Dunken Formation is not known and there is presently no consensus about the differences and similarities between the Parish Bjerg Formation and the Dunken Formation (Mølgaard et al., 1994; Stemmerik, 2012).



Figur 3.4 Outcrop north of the drill site exposing the drilled section of Dunken Formation. A. Picture of the small creek with exposed mudstones. B. Close up of the exposed shaly mudstone. Notebook for scale.

Figur 3.5 Picture of outcrops at the drill site stratigraphical overlying the cored section of Dunken-2 well. A. Fine to medium grained sandstone of Dunken Formation. Notebook and GPS for scale. B. A shadowy picture of nodules in Dunken Formation. C. Trace fossil with “spreiten” in Dunken Formation - Rhizocorallium sp. (Dam, 1990). D. Medium grained cross-bedded sandstone of the Ladegårdsåen Formation.

Future investigations

As a result of the pure source rock potential in the Dunken-2 core it is considered untenable to complete a full source rock study of the core, and the future investigations are thus revised. The source rock study announced in Appendix B5 (not this report) was withdrawn on 29th of November 2012.

Instead the results of ongoing analysis of the Dunken-2 core will become a part of a broader study of the whole Triassic succession in North Greenland based on additional extensive field work and described in a new appendix. The important object of such a wider study will be to contribute to the knowledge of the western margin of the greater Barents Sea, which in some present day studies remains a question mark (fx Henriksen et al., 2011).

The project will be announced in the new appendix after the summer 2013 field season.

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APPENDIX

Appendix A: Daily drilling activities for Dunken drill site.

Appendix B: Dunken-2, GGU 517006, Core Box Depths.

Appendix C : Dunken-2, GGU 517006. Core Samples Depths.

Appendix A: Daily drilling activities for Dunken drill site.

Date	Cored (m)	Remarks
16/07-19/07 2012		Flying out crew and equipment from Station Nord to drill site at northern Kim Fjelde, eastern Peary Land. Establishment of drill rig and camp.
19/07 2012	9.74	Spud, Dunken-1. Core drilling 0-9.74 m with >99% core recovery from 4.46 m.
20/07 2012	9.1	Casing drilling 0-9.06 m (64/57). Core drilling 9.74-18.84 m with >99% core recovery. Critical permafrost problems. Drill string frozen.
21/07 2012	12.20	Abandoning and closing of Dunken-1 well and 1 m relocation of drill head. Spud, Dunken-2 well. Casing drilling 0-5.28 m. Core drilling 0-12.20 m with >99% core recovery from 4.20 m
22/07 2012	38.14	Casing drilling 5.28-12.08 m. Core drilling 12.20-50.34 m with >99% core recovery.
23/07 2012	39.00	Core drilling 50.34-89.34 m with >99% core recovery. Core drilling interrupted by permafrost difficulties.
24/07 2012	0.0	Drilling suspended due to bad weather.
25/07 2012	0.0	Drilling suspended due to bad weather.
26/07 2012	27.36	Core drilling 89.34-116.70 m with >99% core recovery. Core drilling interrupted by permafrost difficulties.
27/07 2012	25.50	Core drilling 116.70-141.84 m with >99% core recovery. Critical permafrost problems. Drill string frozen.
28/07 2012	0.0	Bad weather. Trying to recover drill string.
29/07 2012	0.0	Trying to recover drill string.
30/07 2012	0.0	In the hole gamma logging of Dunken-2. Abandoning and closing of Dunken-2 well.
31/07-06/08 2012		Dismantling of drill rig and camp, flying equipment and crew to new drill site. In the process the helicopter was grounded for five days due to technical problems and one day were spend in bad weather.

Appendix B: Dunken-2, GGU 517006, Core box depths.

Box	Box marked	Box top (m)	Box bottom (m)	Box cove-ring (m)
Box 1	Dunken-2	0.00	11.20	11.20
Box 2	Dunken-2	11.34	19.44	8.10
Box 3	Dunken-2	19.34	26.04	6.70
Box 4	Dunken-2	26.04	33.16	7.12
Box 5	Dunken-2	33.11	39.85	6.74
Box 6	Dunken-2	39.88	46.55	6.67
Box 7	Dunken-2	46.52	53.44	6.92
Box 8	Dunken-2	53.25	59.94	6.69
Box 9	Dunken-2	59.91	66.56	6.65
Box 10	Dunken-2	66.40	72.89	6.49
Box 11	Dunken-2	72.91	79.68	6.77
Box 12	Dunken-2	79.74	86.56	6.82
Box 13	Dunken-2	86.48	93.49	7.01
Box 14	Dunken-2	93.46	100.19	6.73
Box 15	Dunken-2	100.24	107.10	6.86
Box 16	Dunken-2	107.03	113.77	6.74
Box 17	Dunken-2	113.90	120.44	6.54
Box 18	Dunken-2	120.45	127.02	6.57
Box 19	Dunken-2	126.93	133.71	6.78
Box 20	Dunken-2	133.58	140.34	6.76
Box 21	Dunken-2	140.39	141.84	1.45

Appendix C : Dunken-2, GGU 517006. Core Samples Depths (sampled in the field).

Sub nr	Marker (m)	Marker to sample top (m)	Sample length (cm)	Core box	Purpose	Mean depth (m)
1	35.24	0.00	10	5	Head	35.29
2	41.34	0.17	10	6	Head	41.56
3	44.84	2.92	8	7	Head	47.80
4	56.34	0.35	10	8	Head	56.74
5	62.34	0.07	8	9	Head	62.45
6	65.00	3.04	8	10	Head	68.08
7	71.34	2.20	10	11	Head	73.59
8	77.34	2.08	9	11	Head	79.47
9	83.34	2.26	9	12	Head	85.65
10	89.34	2.03	8	13	Head	91.41
11	95.34	0.00	8	14	Head	95.38
12	101.34	0.00	10	15	Head	101.39
13	109.34	0.27	7	16	Head	109.65
14	113.34	0.00	10	16	Head	113.39
15	119.34	0.00	7	17	Head	119.38
16	125.34	0.00	9	18	Head	125.39
17	131.34	0.14	10	19	Head	131.53
18	137.34	0.00	9	20	Head	137.39

Sub nr.	Marker (m)	Marker to sample top (m)	Sample length (cm)	Core box	Purpose	Mean depth (m)
51	19.44	0.80	4	3	Screening	20.26
52	19.44	1.72	5	3	Screening	21.19
53	19.44	2.70	5	3	Screening	22.17
54	22.74	0.30	4	3	Screening	23.06
55	22.74	1.30	4	3	Screening	24.06
56	22.74	2.32	5	3	Screening	25.09
57	26.04	0.00	3	4	Screening	26.06
58	26.04	0.94	6	4	Screening	27.01
59	26.04	1.96	4	4	Screening	28.02
60	26.04	2.95	5	4	Screening	29.02
61	29.24	0.76	4	4	Screening	30.02
62	29.24	1.78	3	4	Screening	31.04
63	29.24	2.79	4	4	Screening	32.05
64	32.30	0.87	4	5	Screening	33.19
65	32.30	1.90	5	5	Screening	34.23
66	32.30	2.91	3	5	Screening	35.23
67	35.24	0.82	4	5	Screening	36.08
68	35.24	1.77	3	5	Screening	37.03

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Sub nr.	Marker (m)	Marker to sample top (m)	Sample length (cm)	Core box	Purpose	Mean depth (m)
69	35.24	2.72	4	5	Screening	37.98
70	38.29	0.57	3	5	Screening	38.88
71	38.29	1.57	5	6	Screening	39.89
72	38.29	2.57	4	6	Screening	40.88
73	41.34	0.48	3	6	Screening	41.84
74	41.34	1.46	3	6	Screening	42.82
75	41.34	2.45	4	6	Screening	43.81
76	44.34	0.28	5	6	Screening	44.65
77	44.34	1.29	6	6	Screening	45.66
78	44.34	2.23	4	7	Screening	46.59
79	47.34	0.12	6	7	Screening	47.49
80	47.34	1.14	6	7	Screening	48.51
81	47.34	2.16	6	7	Screening	49.53
82	53.34	2.90	6	8	Screening	56.27
83	56.34	0.67	5	8	Screening	57.04
84	56.34	1.67	7	8	Screening	58.05
85	56.34	2.67	4	8	Screening	59.03
86	59.34	0.60	6	9	Screening	59.97
87	59.34	1.58	6	9	Screening	60.95
88	59.34	2.59	5	9	Screening	61.96
89	62.34	0.43	5	9	Screening	62.80
90	62.34	1.43	5	9	Screening	63.80
91	62.34	2.39	4	9	Screening	64.75
92	65.00	0.51	6	9	Screening	65.54
93	65.00	1.59	4	10	Screening	66.61
94	65.00	2.59	5	10	Screening	67.62
95	68.30	0.00	6	10	Screening	68.33
96	68.30	1.00	6	10	Screening	69.33
97	68.30	1.98	5	10	Screening	70.31
98	68.30	2.92	4	10	Screening	71.24
99	71.34	0.57	5	10	Screening	71.94
100	71.34	1.57	5	11	Screening	72.94
101	71.34	2.51	6	11	Screening	73.88
102	74.34	0.42	7	11	Screening	74.80
103	74.34	1.45	5	11	Screening	75.82
104	74.34	2.47	4	11	Screening	76.83
105	77.34	0.39	5	11	Screening	77.76
106	77.34	1.36	5	11	Screening	78.73

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Sub nr.	Marker (m)	Marker to sample top (m)	Sample length (cm)	Core box	Purpose	Mean depth (m)
107	77.34	2.33	7	12	Screening	79.71
108	80.34	0.37	6	12	Screening	80.74
109	80.34	1.37	8	12	Screening	81.75
110	80.34	2.34	7	12	Screening	82.72
111	83.34	0.24	5	2	Screening	83.61
112	83.34	1.26	7	12	Screening	84.64
113	83.34	2.35	4	12	Screening	85.71
114	86.34	0.22	4	3	Screening	86.58
115	86.34	1.22	6	13	Screening	87.59
116	86.34	2.23	4	13	Screening	88.59
117	89.34	0.06	7	13	Screening	89.44
118	89.34	1.06	5	13	Screening	90.43
119	89.34	2.05	4	13	Screening	91.41
120	92.34	0.13	3	13	Screening	92.49
121	92.34	1.13	6	14	Screening	93.50
122	92.34	2.11	6	14	Screening	94.48
123	95.34	0.08	5	14	Screening	95.45
124	95.34	1.08	9	14	Screening	96.47
125	95.34	2.09	4	14	Screening	97.45
126	95.34	3.03	4	14	Screening	98.39
127	98.34	0.87	6	14	Screening	99.24
128	98.34	1.87	7	15	Screening	100.25
129	98.34	2.86	6	15	Screening	101.23
130	101.34	0.75	7	15	Screening	102.13
131	101.34	1.70	5	15	Screening	103.07
132	101.34	2.72	5	15	Screening	104.09
133	104.34	0.75	7	15	Screening	105.13
134	104.34	1.77	7	15	Screening	106.15
135	104.34	2.77	4	16	Screening	107.13
136	107.34	0.65	4	16	Screening	108.01
137	107.34	1.68	5	16	Screening	109.05
138	107.34	2.67	7	16	Screening	110.05
139	110.34	0.71	5	16	Screening	111.08
140	110.34	1.71	6	16	Screening	112.08
141	110.34	2.69	6	16	Screening	113.06
142	113.34	0.43	6	17	Screening	113.80
143	113.34	1.41	5	17	Screening	114.78
144	113.34	2.38	6	17	Screening	115.75

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Sub nr.	Marker (m)	Marker to sample top (m)	Sample length (cm)	Core box	Purpose	Mean depth (m)
145	116.70	0.06	6	17	Screening	116.79
146	116.70	1.02	7	17	Screening	117.76
147	116.70	2.01	5	17	Screening	118.74
148	119.34	0.17	5	17	Screening	119.54
149	119.34	1.14	6	18	Screening	120.51
150	119.34	2.15	5	18	Screening	121.52
151	122.34	0.00	5	18	Screening	122.37
152	122.34	0.96	5	18	Screening	123.33
153	122.34	1.89	5	18	Screening	124.26
154	122.34	2.92	5	18	Screening	125.29
155	125.34	0.67	5	19	Screening	126.04
156	125.34	1.70	5	19	Screening	127.07
157	125.34	2.70	5	19	Screening	128.07
158	128.34	0.52	5	19	Screening	128.89
159	128.34	1.54	7	19	Screening	129.92
160	128.34	2.54	5	19	Screening	130.91
161	131.34	0.37	6	19	Screening	131.74
162	131.34	1.34	5	19	Screening	132.71
163	131.34	2.31	5	20	Screening	133.68
164	134.34	0.17	5	20	Screening	134.54
165	134.34	1.16	4	20	Screening	135.52
166	134.34	2.18	5	20	Screening	136.55
167	137.34	0.16	5	20	Screening	137.53
168	137.34	1.17	5	20	Screening	138.54
169	137.34	2.19	6	20	Screening	139.56
170	140.34	0.05	5	21	Screening	140.42
171	140.34	1.03	5	21	Screening	141.40
172	140.34	1.42	6	21	Screening	141.79