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ICDP Data Set Report COSC–1
COSC–1 operational report: Explanatory remarks on the operational data sets

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Abstract

The Collisional Orogeny in the Scandinavian Caledonides (COSC) scientific drilling project focuses on mountain building processes in a major mid–Paleozoic orogen in western Scandinavia and its comparison with modern analogues. The transport and emplacement of subduction–related highgrade continent–ocean transition (COT) complexes onto the Baltoscandian platform and their influence on the underlying allochthons and basement will be studied in a section provided by two fully cored 2.5 km deep drill holes. This operational report concerns the first drill hole, COSC–1 (ICDP 5054–1–A), drilled from early May to late August 2014.

COSC–1 is located in the vicinity of the abandoned Fröå mine, close to the town of Åre in Jämtland, Sweden and was planned to sample a thick section of the Seve Nappe and to penetrate its basal thrust zone into the underlying lower grade metamorphosed allochthon. Despite substantial technical problems, the drill hole reached 2495.8 m driller's depth and nearly 100 % core recovery was achieved. Surprising was the homogeneity of the Seve Nappe rocks, the unexpected thickness of its basal thrust zone (> 500 m) and that the drill hole, therefore, did not penetrate the bottom of the thrust zone. However, lower grade metasedimentary rocks were encountered in the lowermost part of the drill hole together with tens of metres thick mylonites that are, unexpectedly, rich in large garnets.

The drill core was documented on–site and XRF scanned off site. During various stages of the drilling, the borehole was documented by comprehensive downhole logging. This operational data set report describes the available data sets and sample material. All data sets consist of metadata and data. The metadata part provides basic specifications for each data column of the corresponding data table. Additional to that some explanatory remarks are shown below.

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Coordinates of main spot: 63.4063, 13.203057

Common Conventions for All Data

- Throughout all data sets the common naming convention used is
  — Expedition, Site, Hole (the Expedition ID 5054 is used for COSC). See more details and example at the end of this report.
- Throughout all data sets the common date and time format used is
  — Month Day Year
  — Month Day Year Hours:Minutes
  — Month Day Year Hours:Minutes:Seconds
  The time zone is CET (Central European Time), hours are in 24-hours notation.
- Unique identifiers (IGSN, International GeoSample Number) are used in data sets showing sample material from the drill core and borehole. For more general information about IGSN please visit http://www.geosamples.org/igsnabout. The registration of IGSNs for COSC is in progress.
- In all depth-related data sets usually two or three different depths are stored:
  — The original driller's depth
  — Relative depth (to top of core or to top of section)
  — Corrected depth (MCD meter corrected depths)
  Throughout all data sets with measured values the metric unit system is used. It is recommended to use the MCD depth for any evaluation or visualization (see also the example at the end of this appendix).
- An integrative depth matching between core imagery/logs and downhole logs has been performed for the section from top down to 1606 m (as of March 2015).

Sites and Holes

- Latitude/Longitude in the geodetic datum WGS84 are used for geographic locations.
- PLATFORM R stands for 'land based drilling rig'.

Cores, Sections, and Boxes

- CORE is the complete core run recovered from the core barrel.
- CORE_TYPE Z stands for 'Advanced Diamond Core Barrel (ADCB)'. No other core type was used during COSC-1.

- SECTION of a core run is defined by the actually used core box layout. Top and bottom of a core section is defined by top or bottom of the core run and/or the top or bottom of a box slot.
- Core Box Images are in portrait orientation. The core boxes 1 to 501 (with core runs 1 to 522) have four slots, the boxes 502 to 719 (with core runs 523 to 696) have five slots depending on the actual core diameter.
- The POSITION T stands for 'at top of the core box', usually at top of slot 1.
- The POSITION B stands for 'somewhere at bottom of the core box', represented by the last core section in the box.
- The POSITION M stands for 'somewhere in the middle of the core box', any position between T and B.

Section Units, Visual Core Description

The macroscopic lithological description (Visual Core Description VCD) is based on section units. Each core section has been described separately following a common protocol based on predefined UNIT_CLASSes and corresponding UNIT_TYPEs (rock types). The UNIT_CLASSes are: MET – metamorphic rocks, IGN – igneous rocks, FRR – fault related rocks, UND – undefined. Additional attributes are DISTURBANCE, COLOUR, GRAINSIZE, FOLIATION, DISCONTINUITIES, and TEXTURES depicted as single choice terms from lists of predefined terms, whereas minerals are selected as multiple choice items concatenated in comma separated lists in the column UNIT_DESC4.

Borehole Measurements

- Borehole Measurements (BHM) or Downhole Measurements are represented here as three sets of metadata: BHM Campaigns, BHM Runs, and BHM Files.
- BHM Campaigns are the logging sessions performed at certain stages during the drilling operations.
- BHM Runs are the different logging runs done during a certain BHM campaign.
- BHM Files are the data files resulting from the BHM runs. The recorded data are stored in their original format or as PDF or TXT files. All data are checked and edited by the logging service teams.
- Additionally selected overview and composite log plots are prepared as PDF and WCL (WellCAD Log File) documents completed by corresponding TXT–files with the data to give a quick overview over the data sets.
- The depth matched logging data are also available in individual ASCII files. Depth reference is stored in the column "GR_DLL_Master" of the composite natural gamma log "5054_1_A_COSC–1_OSG_GR_RES_FTOT_CAL_ORI.txt" which is part of the data set "Composite Borehole Log Plots".

MSCL Data

The MSCL (Multi Sensor Core Logging) data set is a continuous measurement along all whole round core sections of COSC–1. The measurements have been done in 1 cm steps. The CORE_DEPTH is the corrected MCD depth, whereas the TDEPTH shows the original driller's depth. Be aware of the problems that are described in the operational report.

XRF Data

XRF geochemical data of the whole drill core were measured short after completion of the drilling operations. The measured values are integrated over 10cm intervals using the new Minalyze CS XRF scanner, provided by the Swedish company Minalyze AB. The dataset contains weight percent for Al2O3, SiO2, P2O5, S, Cl, K2O, CaO, TiO2, Fe2O3 and ppm for Cu, Zn, Ga, Rb, Sr, Y, Zr, Nb and Pb.

Sample Material vs. Samples

In general, “sample material” is all material recovered from the drill hole. This sample material is documented, put in suitable bins, and stored in a repository ready for being sampled (“samples”).

Sample Requests

A sample request is a more or less formal proposal to take samples from the project's sample material. Sampling is only allowed after the sample request was approved by the principal investigators. The time of sampling is crucial. Only COSC–1 science team members are allowed to get samples before the end of the defined moratorium period (1st March 2017). After that date all scientists can apply for samples and take samples after an informal approval.

Samples

The main stock of sample material is described under Cores, Sections, and Boxes. Some samples have already been taken on–site, mainly for microbiological investigations. Another group of sample material are Mud Samples (MU) taken from the flow line during the drilling operations. Some mud samples (MB) were also taken for microbiological investigations. A smaller number of MU samples are taken just for measuring temperature (out), pH, and conductivity, but have not been preserved for further sampling.

Images

A huge number of digital images of core boxes, core runs, and core sections are available. These are high–quality JPG–images converted from the originals. The originals are also available on request.

Core Boxes

All digital core box images (1 to 719) of COSC–1 are packed into one ZIP–file. The boxes are shown in portrait orientation. The image to the right shows the general box layout, and positioning of core section inside the boxes: Top of box at the upper left corner, slots 1 to 4 from left to right. Core run 178 in core box 169 – section 1 in slot 1 at Top of box, sections 2 and 3 in slots 2 and 3 in the Middle of the box, and section 4 in slot 4 at Bottom of the box. Empty space in slot 4 has not been filled up, the following core is stored in the following core box.

Figure 1: Example for a COSC-1 core box overview image.

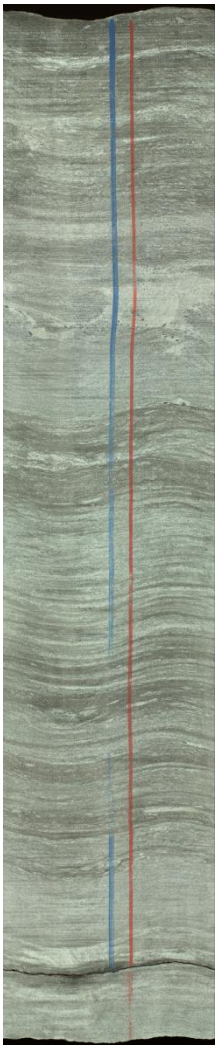

Figure 2: Example for a COSC-1 core section 360° (unrolled) scan image.

Core Section Images

Each core section of COSC–1 has been scanned in unrolled mode, i.e. the scan images show the 360 degrees outer face of the core pieces. These images are packed into a number of ZIP–files. Each package contains scan images of at least ten core runs. An example of a core scan is reproduced to the left: Top of core section 178–1 is indicated by the reference double line: the red line on the right side defines the top–to–bottom orientation of the core section.

Core Overviews

For each core run (1 to 696) of COSC– 1 a Core Overview image has been generated. These images are assembled in one PDF–file. An example is reproduced to the right: Top of core run 178Z at the upper left corner, core sections 1 to 4 from left to right.

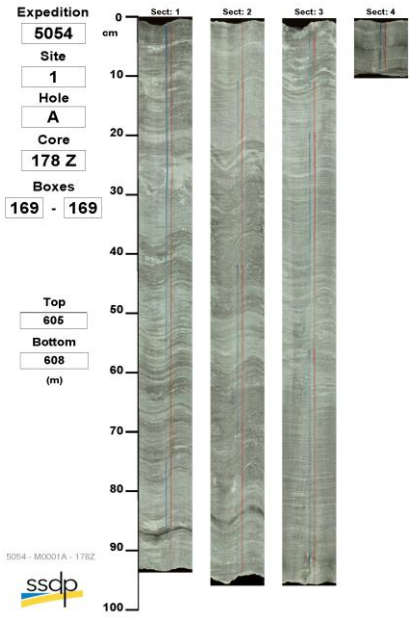

Figure 3: Example for a COSC-1 core run overview image.

Depth and ICDP–IODP naming convention

During the drilling operations, only driller's depth was documented. After the drilling, the depth was corrected as described in the operational report. This depth is the MCD depth (metres corrected depth). If you have to refer to total depth, use MCD depth. However, relative depth is preferable because it will remain correct after any corrections that might become necessary in the future. The relative depth refers to the top of the section and, thus, will move up or down with the section it refers to. The convention is the following:

- The COSC project has the ICDP project (expedition) number 5054.
- The COSC–1 site has the site number 1.
- The deep drill hole has the hole designation A, the 100 m observation drill hole the designation B, and the 50 m observation drill hole the designation C.
- Core runs are successively numbered beginning at 1, with the addendum Z for "advanced diamond core barrel" e.g. 178Z.
- Sections in the core box are successively numbered from the top of the core run downwards, beginning at 1 for each core run. An addendum describes whether the section is WR – whole round, A – archive half or W – working half.
- For depth measurements and samples, the distance from the top of the section is given in centimetres.
- Two numbers are used to describe an interval.

Example:
5054–1–A–178Z–3WR–54
Project–Site–Hole–Core Run–Section–cm from top of the section
5054–1–A–178Z–3WR–54–66
Project–Site–Hole–Core Run–Section–interval top and bottom in cm from top of the section

List of Data Files

The following table shows the file list of the COSC basic data set. The data are provided in two basic data formats:

- .txt files contain Tab-delimited ASCII data
- .xlsx comprises all .txt files as separate Excel spread sheet worksheets

Table 1: Available archive files with data sets from COSC-1

Data Sets	**Data File Name**	
All Data	5054_21_COSC-ALL.xlsx	
Sites	5054_20_COSC-SITES.txt	A
Holes	5054_19_COSC-HOLES.txt	A
Core Runs	5054_18_COSC-CORES.txt	A
Core Sections	5054_17_COSC-SECTIONS.txt	A
Core Boxes	5054_16_COSC-BOXES.txt	A
Core Overviews	5054_15_COSC_CO_001-to-696.pdf	
Lithological Descriptions	5054_14_COSC-SECTION-UNITS.txt	A
Sample Requests	5054_13_COSC-REQUESTS.txt	A
Core Samples taken	5054_12_COSC-SAMPLES.txt	A
Mud Samples taken	5054_11_COSC-MUD-SAMPLES.txt	A
Multi Sensor Core Logging	5054_10_COSC-MSCL-DATA.txt	A
XRF logging	5054_09_COSC-XRF-DATA.txt	A
Borehole Measurement Campaigns	5054_08_COSC-BHM-Campaigns.txt	A
Borehole Measurement Runs	5054_07_COSC-BHM-Runs.txt	A
Borehole Measurement Files	5054_06_COSC-BHM-Files.txt	A
Composite Borehole Log Plots	5054_05_COSC_Composite_Borehole_Data.zip	
Drilling Time Breakdown per Day	5054_04_COSC-DRP-REPORTS.txt	A
Drilling Time Breakdown of Tasks	5054_03_COSC-DRP-ACTIVITIES.txt	A
Drilling Technical Parameter	5054_02_COSC-DRP-TECHNIC.txt	A
Used Drill Bits	5054_01_COSC-DRP-TOOLS.txt	A

A = is part of the 'All Data' file

Metadata of the Data Tables

Sites

Table 2: data set table specification for COSC-1 sites

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	NAME	Text	site name or locality	text string of max. 40 characters	#
4	PLATFORM	Text	platform identifier, C=Chikyu, J=Joides, M=Mission Specific, R=Drill Rig	text string of max. 1 character	#
5	LATITUDE_DEG	Integer	decimal degrees of site latitude (latitude of hole 'A')	integer value between 0 and 90	deg.
6	LATITUDE_MIN	Double	decimal minutes of site latitude (latitude of hole 'A')	real value	min.
7	LATITUDE_DIR	Text	direction latitude	text string of max. 1 character	#
8	LONGITUDE_DEG	Integer	decimal degrees of site longitude (longitude of hole 'A')	integer value between 0 and 180	deg.
9	LONGITUDE_MIN	Double	decimal minutes of site longitude	real value	min.
10	LONGITUDE_DIR	Text	direction site longitude	text string of max. 1 character	m
11	DATE_START	Date	date of site start	date in UTC	dd-mmm-yyyy
12	DATE_END	Date	date of site end	date in UTC	dd-mmm-yyyy
13	REMARKS	Text	remarks on site	text string of max. 255 characters	#
14	LONGITUDE_DEC	Double	decimal longitude of site (hole 'A')	real value	deg.
15	LATITUDE_DEC	Double	decimal latitude of site (hole 'A')	real value	deg.
16	ELEVATION	Double	elevation of site	real value	m

Holes

Table 3: data set table specification for COSC-1 holes

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	LATITUDE_DEG	Integer	decimal degrees of hole latitude	integer value between 0 and 90	deg.
5	LATITUDE_MIN	Double	decimal minutes of hole latitude)	real value	min.
6	LATITUDE_DIR	Text	direction latitude	text string of max. 1 character	#
7	LONGITUDE_DEG	Integer	decimal degrees of hole longitude (longitude of hole 'A')	integer value between 0 and 180	deg.
8	LONGITUDE_MIN	Double	decimal minutes of hole longitude	real value	min.
9	LONGITUDE_DIR	Text	direction site longitude	text string of max. 1 character	m
10	LATITUDE_DEC	Double	decimal latitude of site (hole 'A')	real value	deg.
11	LONGITUDE_DEC	Double	decimal longitude of site (hole 'A')	real value	deg.
12	START_DATE	Date	date hole was started	date in UTC	dd-mmm-yyyy
13	END_DATE	Date	date hole ended	date in UTC	dd-mmm-yyyy
14	GEAR	Text	gear used for hole	text string of max. 25 characters ('drill' is default)	#
15	ELEVATION	Double	elevation of hole	real value	m
16	REMARKS	Text	remarks on activity	text string of max. 255 characters	#
17	IGSN	Text	International Geo Sample Number	text string of max. 15 characters	#

Core Runs

Table 4: data set table specification for COSC-1 core runs

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	CORE	Numeric	core identifier	integer value >=1	#
5	CORE_TYPE	Text	type of core, piston, gravity....	text string of max. 1 character (A_Z)	#
6	TOP_DEPTH	Double	driller's top depth of core	real value	m
7	DRILLED_LENGTH	Double	drilled length of the current core run	real value >=0.0	m
8	BOTTOM_DEPTH	Double	driller's bottom depth of core	real value	m
9	MCD_OFFSET	Double	offset to corrected depth for core	real value	m
10	MCD_TOP	Double	corrected top depth (mcd) of core	real value	m
11	MCD_BOTTOM	Double	corrected bottom depth (mcd of core	real value	m
12	CORE_RECOVERY	Double	length of recovered core	real value >=0.0	m
13	CORE_RECOVERY_PC	Double	percentage of core recovery	real value between 0 and 100	%
14	CORE_ONDECK	Date	date and time core comes on deck	date in UTC	dd-mmm-yyyy HH:mm
15	ORIENTED	Text	is core oriented ? true or false	text string of max. 5 characters	#
16	LAST_SECTION	Integer	no. of last section of core	integer value	#
17	CORE_CATCHER	Text	core has catcher section ? yes or no	text string of max. 5 characters	#
18	ANALYST	Text	initials of data operator	text string of max. 5 characters	#
19	REMARKS	Text	additional remarks, free text	text string of max. 255 characters	#
20	IGSN	Text	International Geo Sample Number	text string of max. 15 characters	#

Core Sections

Table 5: data set table specification for COSC-1 core sections

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	CORE	Numeric	core identifier	integer value >=1	#
5	CORE_TYPE	Text	type of core, piston, gravity....	text string of max. 1 character (A_Z)	#
6	SECTION	Numeric	section number	integer value >=1	#
7	SECTION_ID	Numeric	internal core section code	integer value >=1	#
8	INIT_LENGTH	Double	section length	real value	m
9	REV_LENGTH	Double	curated length	real value	m
10	TOP_DEPTH	Double	driller's top depth of section	real value	m
11	BOTTOM_DEPTH	Double	driller's bottom depth of section	real value	m
12	CC	Text	section is core catcher? yes or no	text string of max. 5 characters	#
13	MCD_TOP	Double	corrected top depth (mcd) of section	real value	m
14	MCD_BOTTOM	Double	corrected bottom depth (mcd) of section	real value	m
15	BOX	Integer	core box number	integer value >=1	#
16	SLOT	Integer	number of core box slot section is stored	integer value >=1	#
17	POSITION	Text	position of section in core box (T=top, M=middle, B=bottom, F=full)	text string of max. 1 character	#
18	ANALYST	Text	initials of the data operator	text string of max. 4 characters	#
19	REMARKS	Text	additional remarks, free text	text string of max. 255 characters	#
20	IGSN	Text	International Geo Sample Number	text string of max. 15 characters	#

Core Boxes

Table 6: data set table specification for COSC-1 core boxes

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	BOX	Integer	number of core box	integer value >=1	#
5	TOP_SLOT	Integer	number of first slot	integer value between 1 and 5	#
6	BOTTOM_SLOT	Integer	number of last slot	integer value between 1 and 5	#
7	TOP_DEPTH	Double	driller's top depth of core box	real value	m
8	BOTTOM_DEPTH	Double	driller's bottom depth of core box	real value	m
9	MCD_TOP	Double	corrected top depth of core box (mcd)	real value	m
10	MCD_BOTTOM	Double	corrected bottom depth of core box (mcd)	real value	m
11	TOP_CORE	Integer	core run number at top of box	integer value >=1	#
12	TOP_SECTION	Integer	core section number at top of box	integer value >=1	#
13	BOTTOM_CORE	Integer	core run number at bottom of box	integer value >=1	#
14	BOTTOM_SECTION	Integer	core section number at bottom of box	integer value >=1	#
15	ARCHIVING_DATE	Date	archiving date of core box	date in UTC	dd-mmm-yyyy HH:mm

Lithological Descriptions

Table 7: data set table specification for COSC-1 lithological descriptions

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	CORE	Numeric	core identifier	integer value >=1	#
5	SECTION	Numeric	section number	integer value >=1	#
6	SECTION_UNIT	Integer	section unit number	integer value >=1	#
7	SECTION_ID	Numeric	internal core section code	integer value >=1	#
8	TOP_INTERVAL	Double	distance from top of section-unit to top of section	real value >=0.0	cm
9	TOP_DEPTH	Double	calculated driller's top depth of section-unit	real value >=0.0	m
10	TOP_DEPTH_MCD	Double	calculated corrected top depth of section-unit (mcd)	real value >=0.0	m
11	UNIT_CLASS	Text	lithological class of section-unit	text string of max. 30 characters	#
12	UNIT_TYPE	Text	lithological type of section-unit	text string of max. 80 characters	#
13	REMARKS	Memo	general comments to current section-unit	unlimited text string	#
14	DISTURBANCE	Text	drilling induced core disturbance	text string of max. 30 characters	#
15	UNIT_DESC4	Text	optional additional section-unit descriptions	text string of max. 255 characters	#
16	COLOUR	Text	color of major lithology	text string of max. 30 characters	#
17	GRAINSIZE	Text	optional description of grain size	text string of max. 30 characters	#
18	COLOUR2	Text	color of major lithology	text string of max. 30 characters	#
19	GRAINSIZE2	Text	optional description of grain size	text string of max. 30 characters	#
20	FOLIATION	Text	foliation observed on cuttings	text string of max. 40 characters	#
21	DISCONTINUITIES	Text	optional description of discontinuities	text string of max. 30 characters	#
22	TEXTURES	Text	optional description of textures	text string of max. 30 characters	#

Sample Requests

Table 8: data set table specification for COSC-1 sample requests

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	REQUEST	Text	request identifier	text string of max. 8 characters	#
3	REQUEST_PART	Text	request part (A-Z)	text string of max. 1 character	#
4	REQUEST_TYPE	Text	type of sample request	text string of max. 10 characters	#
5	REQUEST_DATE	Date	date request was entered	date in UTC	dd-mmm-yyyy
6	SCIENTIST_1	Text	name of first related scientist	text string of max. 50 characters	#
7	SCIENTIST_2	Text	name of second related scientist	text string of max. 50 characters	#
8	SCIENTIST_3	Text	name of third related scientist	text string of max. 50 characters	#
9	PURPOSE	Memo	sample purpose	unlimited text	#
10	REMARKS	Text	optional additional remarks	text string of max. 255 characters	#
11	APPROVAL_DATE	Date	date request was approved	date in UTC	dd-mmm-yyyy
12	COMPLETION_DATE	Date	date request was completed	date in UTC	dd-mmm-yyyy

Core Samples taken

Table 9: data set table specification for COSC-1 core samples taken

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	CORE	Numeric	core identifier	integer value >=1	#
5	SECTION	Numeric	section number	integer value >=1	#
6	HALF	Text	section half sample is taken A=archive, W=working, WR=whole round	text string of max. 2 characters	#
7	TYPE	Text	sample code, default is '---' if a request is specified	text string of max. 30 characters	#
8	TOP_DEPTH	Double	relative top depth of sample	real value >=0.0	cm
9	BOTTOM_DEPTH	Double	relative bottom depth of sample	real value >=0.0	cm
10	MCD_TOP	Double	calculated corrected top depth (mcd) of sample	real value	m
11	VOLUME	Integer	volume of sample	integer value	ccm
12	LOCATION	Text	location identifier, shortcut of core repository	text string of max. 3 characters	#
13	REQUEST	Text	identifier of sample request	text string of max. 8 characters	#
14	REQUEST_PART	Text	identifier of request part sample was taken for	text string of max. 1 character	#
15	ANALYST	Text	initials of the data operator	text string of max. 4 characters	#
16	SAMPLE_DATE	Date	date and time sample was taken	date in UTC	dd-mmm-yyyy HH:mm
17	REMARKS	Text	optional additional remarks	text string of max. 255 characters	#
18	IGSN	Text	International Geo Sample Number	text string of max. 15 characters	#

Mud Samples taken

Table 10: data set table specification for COSC-1 mud samples taken

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	REPORT_DATE	Date	date of report	date in UTC	dd-mmm-yyyy
5	MUD_FROM	Text	mud sampled from flow line or pit	text string of max. 20 characters	#
6	TIME_OF_SAMPLING	Date	date/time of sampling	date in UTC	dd-mmm-yyyy HH:mm
7	CURRENT_DEPTH	Double	current depth while sampling	real value	m
8	MUD_TYPE	Text	type of mud	text string of max. 50 characters	#
9	OUT_TEMP	Double	temperature of mud on out flow	real value	degrees C
10	pH	Double	pH value of mud sample	real value	#
11	CONDUCTIVITY	Double	conductivity	real value	microS/cm
12	IGSN	Text	International Geo Sample Number	text string of max. 15 characters	#
13	SAMPLE	Text	sample preserved ? yes or no	text string of max. 10 characters	#

Borehole Measurement Campaigns

Table 11: data set table specification for COSC-1 borehole measurement campaigns

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	CAMPAIGNS	Numeric	unique identifier of the current borehole measurement	integer value >=1	#
5	TITLE	Text	title of logging campaign	required text string of max. 255 characters	#
6	START_TIME	Date	start date and time of the current campaign	date and time	dd-mmm-yyyy HH:mm
7	END_TIME	Date	end date and time of the current campaign	date and time	dd-mmm-yyyy HH:mm
8	TOTAL_TIME	Double	total time of the current borehole measurement	real value	h
9	COMPANY_1	Text	company or performer of the current borehole measurement	text string of max. 30 characters	#
10	COMPANY_2	Text	company or performer of the current borehole measurement	text string of max. 30 characters	#
11	COMPANY_3	Text	company or performer of the current borehole measurement	text string of max. 30 characters	#
12	PERSONS_1	Text	persons of company or performer of the current borehole measurement	text string of max. 255 characters	#
13	PERSONS_2	Text	persons of company or performer of the current borehole measurement	text string of max. 255 characters	#
14	PERSONS_3	Text	persons of company or performer of the current borehole measurement	text string of max. 255 characters	#
15	BIT_SIZE_OH	Text	bit size of open hole	text string of max. 255 characters	#
16	CASING	Text	casing	text string of max. 255 characters	#
17	OPEN_HOLE	Text	open hole interval	text string of max. 255 characters	#

18	MUD_DENSITY	Text	mud density	text string of max. 30 characters	#
19	MUD_TYPE	Text	mud type	text string of max. 30 characters	#
20	MUD_PH	Text	mud pH	text string of max. 30 characters	#
21	MUD_RESISTIVITY	Text	mud resistivity	text string of max. 30 characters	#
22	DEPTH_REFERENCE	Text	depth reference	text string of max. 100 characters	#
23	COMMENTS	Memo	important remarks to the current run	unlimited text string	#

Borehole Measurement Campaigns continued

Borehole Measurement Runs

Table 12: data set table specification for COSC-1 borehole measurement runs

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	CAMPAIGNS	Numeric	unique identifier of the current borehole measurement	integer value >=1	#
5	LOGNO	Text	unique identifier of the current borehole measurement	text string of max. 6 characters	#
6	STARTING_DEPTH	Double	top depth of the current run	required real value	m
7	ENDING_DEPTH	Double	bottom depth of the current run	required real value	m
8	START_TIME	Date	start time of the current run	date and time	dd-mmm-yyyy HH:mm
9	END_TIME	Date	end time of the current run	date and time	dd-mmm-yyyy HH:mm
10	MEAS_TIME	Double	time used for the current run	real value	h
11	SPEED_MIN	Double	logging speed	real value	m/min
12	SPEED_MAX	Double	logging speed	real value	m/min
13	MEASUREMENTS	Text	measurements done for the current run	text string of max. 255 characters	#
14	PARAMETER	Text	measured parameter	text string of max. 255 characters	#
15	HOLE_TYPE	Text	type of hole	text string of max. 30 characters	#
16	COMMENTS	Memo	important remarks to the current run	unlimited text string	#

Borehole Measurement Files

Table 13: data set table specification for COSC-1 borehole measurement files

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	CAMPAIGNS	Numeric	unique identifier of the current borehole measurement	integer value >=1	#
5	LOGNO	Text	unique identifier of the current borehole measurement	text string of max. 6 characters	#
6	FILENAME	Text	name of log that is linked	text string of max. 255 characters	#
7	FILE_TITLE	Text	title of data file	text string of max. 100 characters	#
8	FILE_TYPE	Text	type of data file	text string of max. 30 characters	#
9	STATUS	Text	status of data file	text string of max. 30 characters	#
10	FILE_SIZE	Long	size of the data file	integer value >0	byte

Multi Sensor Core Logging Data

Table 14: data set table specification for COSC-1 multi sensor core logging data

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	CORE	Numeric	core identifier	integer value >=1	#
5	SECTION	Numeric	section number	integer value >=1	#
6	CORE_DEPTH	Double	corrected core depth (mcd)	real value	m
7	SECTION_DEPTH	Double	section depth measured by core logger	real value	cm
8	ST	Double	sediment thickness	real value	cm
9	PW_AMP	Integer	P-wave amplitude	real value	#
10	PW_VEL	Integer	P-wave-velocity	real value	m/s
11	DENSITY	Double	density	real value	gm/cc
12	MAG_SUS	Double	magnetic susceptibility	real value	SI
13	IMP	Double	impedance	real value	#
14	FP	Double	fractional porosity	real value	#
15	NC_RES	Double	non contact-resistivity	real value	mV
16	TDEPTH	Double	core depth measured by core logger	real value	m
17	SECTION_ID	Numeric	internal core section code	integer value >=1	#

XRF Core Logging Data

Table 15: data set table specification for COSC-1 XRF core logging data

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	CORE	Numeric	core identifier	integer value >=1	#
5	SECTION	Numeric	section number	integer value >=1	#
6	SECTION_ID	Numeric	internal core section code	integer value >=1	#
7	TOP_DEPTH	Double	uncorrected top depth	real value	m
8	BOTTOM_DEPTH	Double	uncorrected bottom depth	real value	m
9	LENGTH	Integer	measuring interval	real value >0.0	m
10	BOX	Integer	integer value	integer value >=1	#
11	SLOT	Double	slot number	integer value >=1	#
12	MCD_TOP	Double	corrected top depth (mcd)	real value	m
13-24	H2O,Na2O,MgO,Al2O3, SiO2,P2O5,S,Cl,K2O,CaO TiO2,Fe2O3	Double	concentrations	real value >=0.0	weight percent
25-33	Cu,Zn,Ga,Rb,Sr,Y,Zr,Nb, Pb	Double	concentrations	real value >=0.0	ppm

Drilling Time Breakdown per Day

Table 16: data set table specification for COSC-1 drilling time break down per day

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	START_DEPTH	Double	measured starting depth of report	real value	m
5	END_DEPTH	Double	measured ending depth of report	real value	m
6	DRILLED_LENGTH	Double	drilled length (calculated)	real value	m
7	DAYS_CORING	Integer	days of coring	integer value	#
8	CORE_RECOVERY	Double	core recovery of report	real value	m
9	MAIN_ACTIVITY	Text	main activity	text string of max. 30 characters	#
10	TOTAL_CORE_RECOVERY	Double	total core recovery of hole	real value	m
11	DRILLING_METHOD	Text	drilling method	text string of max. 50 characters	#

Drilling Time Breakdown of Tasks

Table 17: data set table specification for COSC-1 drilling time break down of tasks

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	REPORT_DATE	Date	date of report	date in UTC	dd-mmm-yyyy
5	ACTIVITY_ID	Integer	number of activity for drilling report	integer value >=1	#
6	TIME_FROM	Text	time from	time value	HH:mm
7	TIME_TO	Text	time to	time value	HH:mm
8	TIME_HOURS	Double	hours	real value >0.0	h
9	STARTING_DEPTH	Double	starting depth of activity	real value	m
10	ENDING_DEPTH	Double	ending depth of activity	real value	m
11	CORE_NUMBER	Integer	core run number	integer value >=1	#
12	DRILLED_LENGTH	Double	drilled length during activity	real value >=0.0	m
13	CORE_RECOVERY	Double	core recovery during activity	real value >=0.0	m
14	CORE_RECOVERY_PC	Double	core recovery during activity in percentage	real value >=0.0	%
15	REMARKS	Text	remarks	text string of max. 255 characters	#
16	TOTAL_HOURS	Double	total duration of all activities in hours	real value >0.0	h

Drilling Technical Parameter

Table 18: data set table specification for COSC-1 drilling technical parameter

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	DEPTH	Double	driller's depth of measurement	real value	m
5	RPM_MIN	Double	min rotations per minute	real value >=0.0	#
6	RPM_MAX	Double	max rotations per minute	real value >=0.0	#
7	WOB_MIN	Double	min weight on bit	real value >=0.0	t
8	WOB_MAX	Double	max weight on bit	real value >=0.0	t
9	ROP_MIN	Double	min rate of penetration	real value >=0.0	cm/min
10	ROP_MAX	Double	max rate of penetration	real value >=0.0	cm/min
11	PUMP_RATE_MIN	Double	min pump rate	real value >=0.0	l/min
12	PUMP_RATE_MAX	Double	max pump rate	real value >=0.0	l/min
13	PUMP_PRESSURE	Double	pump pressure	real value >=0.0	bar
14	REMARKS	Text	remarks	text string of max. 255 characters	#

Used Drill Bits

Table 19: data set table specification for COSC-1 used drill bits

	Column Name	Data Type	Description	Validation Text	Unit
1	EXPEDITION	Numeric	expedition number	integer value	#
2	SITE	Numeric	site number	integer value	#
3	HOLE	Text	code for hole	text string of max. 1 character (A_Z)	#
4	BIT_SIZE	Text	bit size	text string of max. 10 characters	#
5	BIT_DESCRIPTION	Text	drill bit description	text string of max. 100 characters	#
6	STARTING_DEPTH	Double	starting depth for drill bit	real value	m
7	ENDING_DEPTH	Double	ending depth for drill bit	real value	m
8	TOTAL_LENGTH	Double	total length drilled	real value	m
9	REMARKS	Text	remarks	text string of max. 255 characters	#

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