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ICDP Operational Report

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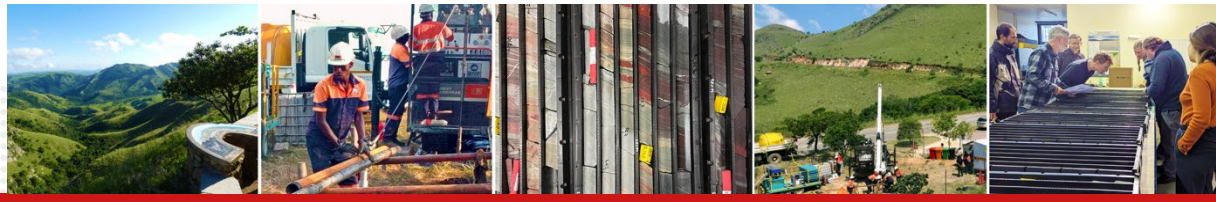

Explanatory Remarks on the Operational Dataset about Drilling in the Moodies Group of the Barberton Greenstone Belt (BASE – Barberton Archean Surface Environments)

C. Heubeck*, N. Beukes†, M. de Kock, M. Homann, E. J. Javaux, T. Kakegawa, S. Lalonde, P. Mason, M. Tice, P. Mashele, D. Paprika, C. Rippon, Rodney Tucker, Ryan Tucker, V. Ndazamo, A. Christianson, C. Kunkel

BASE Barberton Archaean Surface Environments

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Heubeck, C., Beukes, N., de Kock, M., Homann, M., Javaux, E. J., Kakegawa, T., Lalonde, S., Mason, P., Tice, M., Mashele, P., Paprika, D., Rippon, C., Tucker, R., Tucker, R., Ndazamo, V., Christianson, A., Kunkel, C. (2024). Explanatory Remarks on the Operational Dataset about Drilling in the Moodies Group of the Barberton Greenstone Belt (BASE – Barberton Archean Surface Environments), https://doi.org/10.48440/ICDP.5069.002

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Supplementary Data:
Heubeck, C., Beukes, N., de Kock, M., Homann, M., Javaux, E. J., Kakegawa, T., Lalonde, S., Mason, P., Tice, M., Mashele, P., Paprika, D., Rippon, C., Tucker, R., Tucker, R., Ndazamo, V., Christianson, A., Kunkel, C. (2024). Operational Dataset about drilling in the Moodies Group of the Barberton Greenstone Belt (BASE – Barberton Archean Surface Environments), https://doi.org/10.5880/ICDP.5069.001

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† deceased Jan. 9, 2023

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Abstract

All datasets provided in the operational dataset (Heubeck et al., 2024) of the ICDP project BASE (ICDP 5069) consist of metadata, data and/or images. Here, a summary of explanations of the tables, data and images exported from the database of the project (mDIS BASE) are given and are complimented by additional information on data from measurements done in the laboratory prior to the sampling party. Finally, the sampling data from the first two sampling parties are added. Some basic definitions of identifiers used in ICDP, depths corrections and measurements are also introduced.

Referencing Article:
Heubeck, C., Beukes, N., de Kock, M., Homann, M., Javaux, E. J., Kakegawa, T., Lalonde, S., Mason, P., Tice, M., Mashele, P., Paprika, D., Rippon, C., Tucker, R., Tucker, R., Ndazamo, V., Christianson, A., Kunkel, C. (2024). BASE - Drilling Paleoarchean coastal strata of the Barberton Greenstone Belt, Scientific Drilling, XX, https://doi.org/XXXXXXXXXXXX

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BASE Science Team:

Table 1: BASE Science Team. Principle and co-principle investigators in bold font.

Last name	First name	Organisation
Abbo	Avishai	University of Frankfurt/Main, Institute of Geosciences
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Ndou	Clement	Council for Geoscience, South Africa
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Table of Contents

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1. Introduction

1.1. ICDP Combined ID

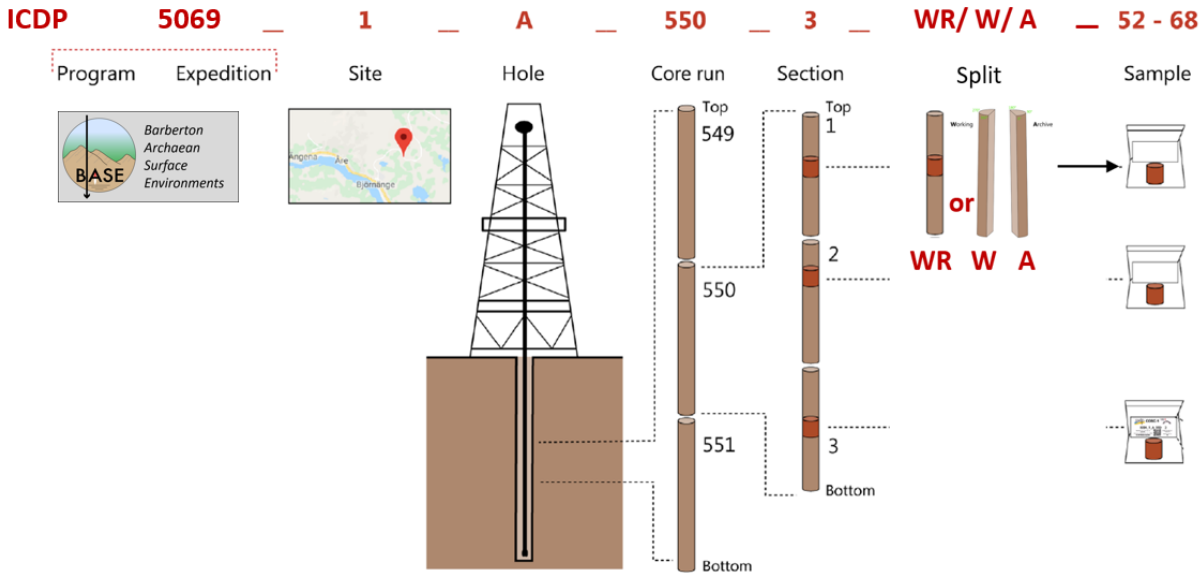

Figure 1: Example of a combined ID used in ICDPs naming convention. It allows the identification and location of any sample within the hierarchical structured data structure.

The ICDP naming convention uses the hierarchical relation of a sample taken from a section split of a core run retrieved from a drill hole (Fig. 1). The convention uses relative depth, which is preferable because it will remain constant even after later depth corrections.

The ICDP expedition code for the **BASE** project is **5069**. The BASE project has 5 sites with 1 to 3 holes at each site (A-C). Each hole is almost completely cored (Tab. 2). Core runs were done with a 3 m core barrel which delivered varying core recovery. Each core run is then cut into smaller sections, which vary in length to fit into the core trays. Each section (WR – Whole Round) was also cut along its long axis, dividing it into archive (A) and working (W) halves. The lithological descriptions and sampling were exclusively done on the working half of the section.

The top and bottom of a sample (= interval) is expressed as the distance to the top of the section. An example for a Combined ID of a sample is: 5069_3_A_090_4_W_56-69. This can be translated to a sample collected between 56 - 69 cm from the top of the working half of section 5069_3_A_090_4_W.

1.2. IGSN

Following the FAIR data principle, each hole, core, section split and sample has a unique identifier, the International Generic Sample Number (IGSN). This number is registered through an agent and allows for the sample to be findable via the IGSN data base. For details on the ICDP – IGSN application, please see Conze et al. (2017) and https://www.igsn.org/.

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Table 2: Overview of BASE boreholes.

Borehole Combined-ID	Borehole IGSN	Latitude WGS 84	Longitude WGS 84	Ground Level [m]	Cored length [m]	Drilled length [m]
5069_1_A	ICDP5069EHG0001	-25.734022	31.097521	897	473	497
5069_2_A	ICDP5069EHO0001	-25.793832	31.083739	1378	329	368
5069_3_A	ICDP5069EHN0001	-25.830172	31.090743	1460	271	280
5069_4_A	ICDP5069EHK0001	-25.831229	31.078173	1270	306	340
5069_4_B	ICDP5069EHL0001	-25.853269	31.048558	1370	322	355
5069_4_C	ICDP5069EHM0001	-25.860954	31.034172	1580	312	352
5069_5_A	ICDP5069EHH0001	-25.903700	30.845744	1600	421	451
5069_5_B	ICDP5069EHI0001	-25.900694	30.846800	1640	470	490

1.3. Depths: drillers depth and depths corrections

During drilling operations, only driller's depth is documented. In the BASE project, the drillers used the ground surface as their reference height. After drilling an MCD offset was used to correct for overlapping section top depths due to the varying core recovery (gain vs. loss).

No further depth correction has been made at the time of publication of the data set (DD MMM 2024). If you have to refer to total depth, use the depth given in column mcd_depth.

In all depth-related datasets, usually, two or three different depths are stored:

- The original driller's depth
- Top and bottom depths, which are equivalent to the driller's depth corrected only by any difference between drillers reference height and surface (= 0 meter below surface (mbs)
- Relative depth (to top of core or to top of section)
- Corrected depth (=mcd_depth = meter corrected depths)

As depth can change during a projects lifetime only the driller's depth is stored in the database. All other depths are calculated when data is called and is not stored in the database allowing flexibility and accuracy of the depth data at any time. Throughout all datasets with measured values the metric unit system is used. It is recommended to use the MCD depth for any evaluation or visualization.

1.4. mDIS data base scheme

The mobile Drilling Information System (mDIS) is a database management application developed and provided by ICDP for capturing and curating meta data on geological cores and samples, drilling progress, and lithology. In addition, images are directly added to the corresponding record. The mDIS structure is hierarchical and reflects the ICDP naming conventions (Fig. 2). Within the BASE project the mobile Drilling Information System (mDIS) Version v2.1.0 was used.

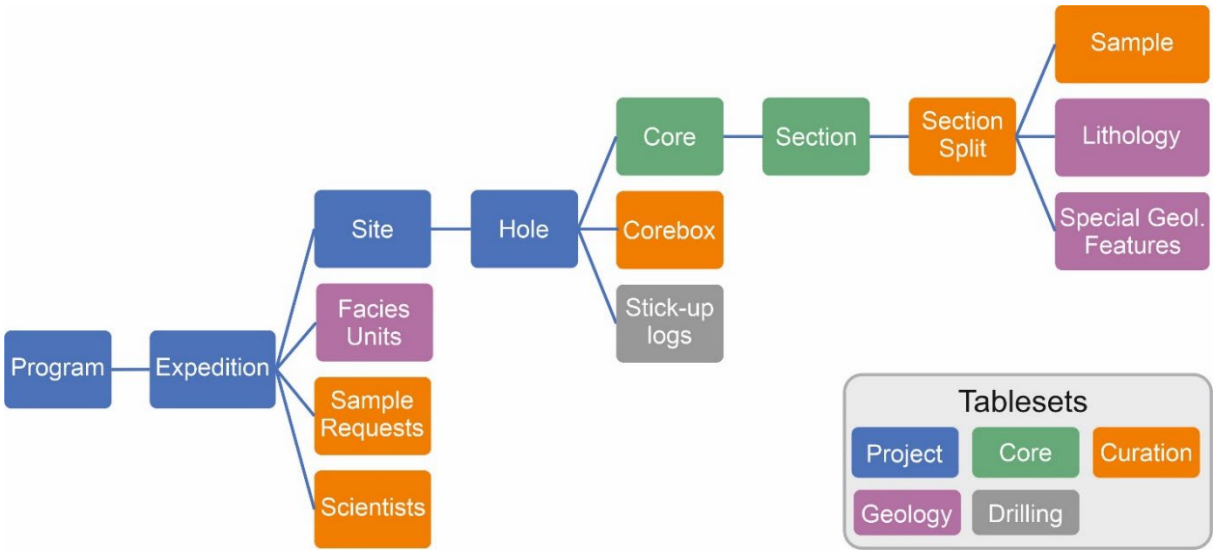

Figure 2: mDIS BASE relational hierarchy. Tablesets are used for thematic grouping of tables within mDIS.

2. Available data files

The BASE_5069 Dataset folder contains the curational datasets and 3 additional folders for files originating from hyperspectral measurements, geophysical borehole measurements and imaging of the core material.

BASE_5069_Dataset
- Data
- Images
- Geophysical Logging Data
- Hyperspectral Data

2.1. Datasets

The datasets were collected in and exported from mDIS (Tab. 3).

Table 3: Available data of the ICDP BASE project.

	DATA	File name	File Type	Remarks
1	All Data	5069_BASE-All-Data	xlsx	
2	Expeditions	5069_BASE	csv	
3	Sites	5069_BASE_Sites	csv	
4	Holes	5069_BASE_Holes	csv	
5	Cores	5069_BASE_1A_Cores	csv	
		5069_BASE_2A_Cores	csv	
		5069_BASE_3A_Cores	csv	
		5069_BASE_4A_Cores	csv	
		5069_BASE_4B_Cores	csv	
		5069_BASE_4C_Cores	csv	
		5069_BASE_5A_Cores	csv	
		5069_BASE_5B_Cores	csv	
6	Core Sections	5069_BASE_1A_Sections	csv	

		5069_BASE_2A_Sections	csv	
		5069_BASE_3A_Sections	csv	
		5069_BASE_4A_Sections	csv	
		5069_BASE_4B_Sections	csv	
		5069_BASE_4C_Sections	csv	
		5069_BASE_5A_Sections	csv	
		5069_BASE_5B_Sections	csv	
7	Section Splits	5069_BASE_1A_SectionSplits	csv	
		5069_BASE_2A_SectionSplits	csv	
		5069_BASE_3A_SectionSplits	csv	
		5069_BASE_4A_SectionSplits	csv	
		5069_BASE_4B_SectionSplits	csv	
		5069_BASE_4C_SectionSplits	csv	
		5069_BASE_5A_SectionSplits	csv	
		5069_BASE_5B_SectionSplits	csv	
8	Samples	5069_BASE_1A_Samples	csv	Samples of first two sampling parties (Sept. 2023 & March 2024)
		5069_BASE_2A_Samples	csv	
		5069_BASE_3A_Samples	csv	
		5069_BASE_4A_Samples	csv	
		5069_BASE_4B_Samples	csv	
		5069_BASE_4C_Samples	csv	
		5069_BASE_5A_Samples	csv	
		5069_BASE_5B_Samples	csv	
9	Sample Requests	5069_BASE_SampleRequests	csv	Requests for first two sampling parties (Sept. 2023 & March 2024)
10	Lithological Descriptions	5069_BASE_FaciesUnits	csv	
		5069_BASE_1A_Lithology	csv	
		5069_BASE_2A_Lithology	csv	
		5069_BASE_3A_Lithology	csv	
		5069_BASE_4A_Lithology	csv	
		5069_BASE_4B_Lithology	csv	
		5069_BASE_4C_Lithology	csv	
		5069_BASE_5A_Lithology	csv	
		5069_BASE_5B_Lithology	csv	
11	Special Geological Features	5069_BASE_1A_SpecialGeolFeatures	csv	
		5069_BASE_2A_SpecialGeolFeatures	csv	
		5069_BASE_3A_SpecialGeolFeatures	csv	
		5069_BASE_4A_SpecialGeolFeatures	csv	
		5069_BASE_4B_SpecialGeolFeatures	csv	
		5069_BASE_4C_SpecialGeolFeatures	csv	
		5069_BASE_5A_SpecialGeolFeatures	csv	
		5069_BASE_5B_SpecialGeolFeatures	csv	

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2.2. Images

All images are stored as zip files in batches of max. 500 MB (Tab. 4). Individual photos are available as jpg. Some working box photos are also available as high-resolution tiff. Missing photos are indicated by a textfile (txt) with the corresponding file name. The file naming starts with the ICDP file type followed by the Combined ID of the corebox. BWR = Whole Round Corebox, BW = Working Box, Sl = Split Core Closeup.

Table 4: Available images of the ICDP BASE project.

	DATA	Filename	File Type	Remarks
1	Whole Round Boxes	BWR_5069_1_A_CB001-095	zip, jpg, txt	Wet and dry corebox photos
		BWR_5069_2_A_CB001-065	zip, jpg, txt	
		BWR_5069_3_A_CB001-053	zip, jpg, txt	
		BWR_5069_4_A_CB001-062	zip, jpg, txt	
		BWR_5069_4_B_CB001-063	zip, jpg, txt	
		BWR_5069_4_C_CB001-063	zip, jpg, txt	
		BWR_5069_5_A_CB001-081	zip, jpg, txt	
2	Working Boxes	BW_5069_1_A_CB001-095	zip, jpg, txt	Wet and dry corebox photos of split sections
		BW_5069_2_A_CB001-065	zip, jpg, txt	
		BW_5069_3_A_CB001-053	zip, jpg, txt	
		BW_5069_4_A_CB001-062	zip, jpg, txt	
		BW_5069_4_B_CB001-063	zip, jpg, txt	
		BW_5069_4_C_CB001-063	zip, jpg, txt	
		BW_5069_5_A_CB001-081	zip, jpg, txt	
		BW_5069_2_A_CB002-011_HR	zip, tiff	High-resolution scans. Saved in batches of about 2 GB.
		BW_5069_2_A_CB012-020_HR	zip, tiff	
		BW_5069_2_A_CB021-028_HR	zip, tiff	
		BW_5069_2_A_CB029-038_HR	zip, tiff	
		BW_5069_2_A_CB039-047_HR	zip, tiff	
		BW_5069_2_A_CB048-055_HR	zip, tiff	
		BW_5069_2_A_CB056-061_HR	zip, tiff	
		BW_5069_3_A_CB002-009_HR	zip, tiff	
		BW_5069_3_A_CB010-017_HR	zip, tiff	
		BW_5069_3_A_CB018-035_HR	zip, tiff	
		BW_5069_3_A_CB036-043_HR	zip, tiff	
		BW_5069_3_A_CB044-051_HR	zip, tiff	
		BW_5069_3_A_CB052-053_HR	zip, tiff	
		BW_5069_4_A_CB038-043_HR	zip, tiff	
3	Archive Boxes	BA_5069_1_A_CB001-095	zip, jpg	Done at CGS, National Core Library, Donkerhoek, South Africa
		BA_5069_2_A_CB001-065	zip, jpg	
		BA_5069_3_A_CB001-053	zip, jpg	
		BA_5069_4_A_CB001-062	zip, jpg	
		BA_5069_4_B_CB001-063	zip, jpg	
		BA_5069_4_C_CB001-063	zip, jpg	
		BA_5069_5_A_CB001-081	zip, jpg	

4	Split Core Closeups	SI_5069_1_A_CB001-020	zip, jpg
		SI_5069_1_A_CB021-040	zip, jpg
		SI_5069_1_A_CB041-050	zip, jpg
		SI_5069_1_A_CB051-070	zip, jpg
		SI_5069_1_A_CB071-080	zip, jpg
		SI_5069_1_A_CB081-095	zip, jpg
		SI_5069_2_A_CB002-026	zip, jpg
		SI_5069_2_A_CB027-043	zip, jpg
		SI_5069_2_A_CB044-056	zip, jpg
		SI_5069_2_A_CB057-065	zip, jpg
		SI_5069_3_A_CB002-018	zip, jpg
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		SI_5069_4_B_CB031-054	zip, jpg
		SI_5069_4_B_CB055-063	zip, jpg
		SI_5069_4_C_CB002-027	zip, jpg
		SI_5069_4_C_CB028-040	zip, jpg
		SI_5069_4_C_CB041-050	zip, jpg
		SI_5069_4_C_CB051-057	zip, jpg
		SI_5069_4_C_CB058-063	zip, jpg
		SI_5069_5_A_CB001-012	zip, jpg
		SI_5069_5_A_CB013-022	zip, jpg
		SI_5069_5_A_CB023-029	zip, jpg
		SI_5069_5_A_CB030-035	zip, jpg
		SI_5069_5_A_CB036-042	zip, jpg
		SI_5069_5_A_CB043-048	zip, jpg
		SI_5069_5_A_CB049-053	zip, jpg
		SI_5069_5_A_CB054-062	zip, jpg
		SI_5069_5_A_CB063-071	zip, jpg
		SI_5069_5_A_CB072-077	zip, jpg
		SI_5069_5_A_CB078-081	zip, jpg

2.3. Geophysical Borehole Logging Data

Geophysical Logging Data is stored in different file types for compatibility. It contains data on Gamma Ray from 3-Arm Caliper, Magnetic Susceptibility, Borehole Fluid Temperature, 3-Arm Caliper, Borehole Acoustic Televiewer as well as log depth, true depth, hole title and azimuth, axial and polar coordinates (Tab. 5).

Table 5: Geophysical logging data of the ICDP BASE project.

DATA	Filename and File Type	Remarks

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1	Hole 1A – processed data	BASE_1A_Lithology_Log.csv BASE_1A_Lithology_Log.jpg BASE_1A_Lithology_Log.las BASE_1A_Lithology_Log.pdf BASE_1A_Lithology_Log.tif BASE_1A_Lithology_Log.WCL BASE_1A_Structure_Log.csv BASE_1A_Structure_Log.jpg BASE_1A_Structure_Log.las BASE_1A_Structure_Log.pdf BASE_1A_Structure_Log.tif BASE_1A_Structure_Log.WCL BASE_1A_Verticality_Analysis_Log.csv BASE_1A_Verticality_Analy-sis_Log.LAS BASE_1A_Verticality_Analysis_Log.pdf BASE_1A_Verticality_Analysis_Log.tif	
2	Hole 1A – raw data	03_OTV-094509_Base_1A.tfd 04_DD6-727_Base_1A.las 05_ATV-083602_Base_1A.tfd 06_ATV-083602_Base_1A_RUN_2.tfd 06_MG3-044_Base_1A.las Gyro-7030_Base_1A.csv	
3	Hole 2A – processed data	BASE2_Lithology_log.csv BASE2_Lithology_log.las BASE2_Lithology_log.pdf BASE2_Lithology_log.WCL BASE2_Structure_log.csv BASE2_Structure_log.pdf BASE2_Structure_log.WCL BASE2_Verticality_Analysis.csv BASE2_Verticality_Analysis.las BASE2_Verticality_Analysis.pdf	
4	Hole 2A – raw data	01_GC2-248_BASE2.las	
5	Hole 3A	Hole_3.csv Hole_3.las Hole_3.pdf Hole_3.tif	only log depth, true depth, hole title and azimuth, axial and polar coordinates were measured
6	Hole 4A	HOLE_4.csv HOLE_4.las HOLE_4.pdf HOLE_4.tif	only log depth, true depth, hole title and azimuth, axial and polar coordinates were measured
7	Hole 4B – processed data	HOLE_4B_Lithology_log.csv HOLE_4B_Lithology_log.las HOLE_4B_Lithology_log.pdf	

		HOLE_4B_Lithology_log.tif HOLE_4B_Lithology_log.WCL HOLE_4B_Structure_log.csv HOLE_4B_Structure_log.pdf HOLE_4B_Structure_log.tif HOLE_4B_Structure_log.WCL HOLE_4B_Verticality_Analysis.csv Hole_4B_Verticality_Analysis.las HOLE_4B_Verticality_Analysis.pdf Hole_4B_Verticality_Analysis.tif
8	Hole 4B – raw data	01_DD6-662_Hole_4B.las 02_MG3-063_Hole_4B.las 03_ATV-083602_Hole_4B.tfd 03_Gyro-7030_Hole_4B.csv
9	Hole 4C – processed data	Hole_4C_Lithology_Log.csv Hole_4C_Lithology_Log.las Hole_4C_Lithology_Log.pdf Hole_4C_Lithology_Log.tif Hole_4C_Lithology_Log.WCL Hole_4C_Structure_Log.csv Hole_4C_Structure_Log.las Hole_4C_Structure_Log.pdf Hole_4C_Structure_Log.tif Hole_4C_Structure_Log.WCL Hole_4C_Verticality_Analysis_Log.csv Hole_4C_Verticality_Analysis_Log.las Hole_4C_Verticality_Analysis_Log.pdf Hole_4C_Verticality_Analysis_Log.pdf
10	Hole 4C – raw data	00_Gyro-7730_Hole_4C.csv 02_ATV-083602_Hole_4C.tfd 02_DD6-662_Hole_4C(1).las 02_MG3-063_Hole_4C.las 03_ATV-083602_RUN_2.tfd
11	Hole 5A – processed data	Hole_5A_Lithology_Log.las Hole_5A_Lithology_Log.pdf Hole_5A_Lithology_Log.tif Hole_5A_Lithology_Log.WCL Hole_5A_Structure_Log.csv Hole_5A_Structure_Log.jpg Hole_5A_Structure_Log.las Hole_5A_Structure_Log.pdf Hole_5A_Structure_Log.tif Hole_5A_Structure_Log.WCL Hole_5A_Verticality_Analysis_Log.csv Hole_5A_Verticality_Analysis_Log.pdf

		Hole_5A_Verticality_Analysis_Log.tif Hole_5A_Verticality_Analysis_Log.txt	
12	Hole 5A – raw data		not available
13	Hole 5B – processed data	Hole_5B_Lithology_Log.csv Hole_5B_Lithology_Log.jpg Hole_5B_Lithology_Log.las Hole_5B_Lithology_Log.pdf Hole_5B_Lithology_Log.tif Hole_5B_Lithology_Log.WCL Hole_5B_Structure_Log.csv Hole_5B_Structure_Log.las Hole_5B_Structure_Log.pdf Hole_5B_Structure_Log.tif Hole_5B_Structure_Log.WCL Hole_5B_Verticality_Analysis_Log.csv Hole_5B_Verticality_Analysis_Log.las Hole_5B_Verticality_Analysis_Log.pdf Hole_5B_Verticality_Analysis_Log.tif	
14	Hole 5B – raw data	02_ATV-083602_Hole_5B.tfd DD6-727_Hole_5B.las Gyro-7030_Hole_5B.csv MG3-044_Hole_5B.las	

3. Meta data Files (mDIS)

3.1. All Data

This file contains all metadata exported from the mDIS database in one xlsx-file:

- Throughout all datasets the common naming convention is reflected by the Combined ID, which uses Expedition, Site, Hole (the Expedition ID 5069 is used for BASE).
- Throughout all datasets the common date and time format used is Day/Month/Year (Hours:Minutes:Seconds). Time is given in UTC.

3.2. Expedition

mDIS Table (1 File)

Table 6: Expedition Meta data from mDIS.

Name	**Expedition**
ParentModel	ProjectProgram

Column Name	**Data Type**	**Column Label**	**Description**
id	integer	Id	id (data base id)
program_id	integer	Program Id	parent id (database id)
name	string	Expedition Name	
expedition	string	Expedition Code	(ICDP: 4-digit number)
acr	string	Acronym	Abbreviation of project
chief_scientist	string_multiple	Chief Scientists	Name of Principle Investigators
start_date	dateTime	Start of Expedition	
end_date	dateTime	End of Expedition	
comment	string	Additional Information	
country	string_multiple	Country	Country in which the Drilling Takes Place
rock_classification	string_multiple	Rock Classification	Drilled Rock Types
geological_age	string_multiple	Geological Age	Age of Drilled Rocks
location_description	string	Location Description	
funding_agency	string	Funding Agency for Drilling	
name_alternative	string	Alternative Name for Expedition	
scientist_contact	string	Email chief scientist	
objectives	text	Objectives	Objectives Listed in Proposal
keywords	string_multiple	Keywords	Keywords other than Geological Age

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3.3. Sites

mDIS Table Site (1 File)

Table 7: Site Meta data from mDIS.

Name	**Site**
ParentModel	ProjectExpedition

Column Name	**Data Type**	**Column Label**	**Description**
id	integer	#	auto incremented id
expedition_id	integer	Expedition Id	parent id (database id)
combined_id	string	Combined Id	
site	string	Site Number	
name	string	Name of Site	(if any)
comment	string	Additional Information	
location_type	string	Location Type	e.g. land, sea, lake
description	string	Description of site	
city	string	City nearby drill site	
state	string	State	
county	string	County	
country	string	Country	

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3.4. Holes

mDIS Table Hole (1 File)

The coordinate system for decimal latitude and longitude is WGS84. The platform type "R" stands for land-based drilling rig and mbs = meter below surface.

Table 8: Hole Meta data from mDIS.

Name	**Hole**
ParentModel	ProjectSite

Name	**Type**	**Label**	**Description**
id	integer	#	auto incremented id
site_id	integer	Site Id	parent id (database id)
hole	string	Hole	Hole Identifier (one character A - Z)
combined_id	string	Combined Id	
latitude_dec	double	Latitude (decimal degrees)	
longitude_dec	double	Longitude (decimal degrees)	
coordinate_system	string	Coordinate System	WGS84
ground_level	double	Ground Level [m]	Height above Sea Level
depth_water	double	Water Depth [m]	Below Sea Surface
elevation_rig	double	Elevation of Rig Floor [m]	Height of Rig Floor above ground/above sea level
direction	string	Direction of Inclination	
inclination	double	Inclination [degree]	Degree of Inclination
start_date	dateTime	Start Date	Start of Drilling Operations
end_date	dateTime	End Date	End of Drilling Operations
comments	string	Additional Information	
drilling_depth_dsf	double	Drilled Depth Below Surface [mbs]	mbs = meter below surface; > 0
core_length	double	Core Length [m]	
comments_2	string	Additional Information	
igsn	string	IGSN	International Generic Sample Number
methods_in_hole	string_multiple	Methods In Hole	Measurements Done in Hole
gear	string_multiple	Gear	Equipment Info
comments_3	string_multiple	Comments 3	
drilling_method	string	Drilling Method	
platform_name	integer	Name of Platform	
platform_description	string	Description of Platform	
platform_type	string	Platform Type	
platform_operator	string	Platform Operator	
repository_name	string_multiple	Name of Repository	
repository_contact	string	Repository Contact	
moratorium_start	date	Start of Moratorium	
moratorium_end	date	End of Moratorium	
comment_4	string	Additional Information Re-pository	

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3.5. Cores

A core or core-run is the complete geological material recovered from a single core barrel. The top depth of each core is the depth given by the drillers, not a cumulative depth of curated sections. Different depths are indicated by different units: mbrf = meters below rig floor, mbs = meter below surface.

mDIS Table Core (one table for each hole)

Table 9: Core Meta data from mDIS.

Name	**Core**
ParentModel	ProjectHole

Name	**Type**	**Label**	**Description**
id	integer	#	auto incremented id
hole_id	integer	Hole Id	parent id (of table project_hole)
core	integer	Core	core identifier
combined_id	string	Combined Id	
analyst	string	Curator	Initials of Data Curator
core_ondeck	date	Core on Deck (CoD)	
core_type	string	Core Type	Method of Drilling
drillers_depth	double	Depth below Rig Floor [mbrf]	Depth below Rig Floor/Drillers Ref. Point
drilled_length	double	Drilled Core Length [m]	
drillers_bottom_depth	pseudo	Drillers Bottom Depth [mbrf]	
top_depth	pseudo	Top Core Depth Below Surface [mbs]	
bottom_depth	pseudo	Bottom Core Depth [mbs]	
core_recovery	double	Core Recovery [m]	Length of Recovered Core
core_recovery_pc	double	Core Recovery (%)	Percentage of Core Recovery; calculated
core_loss_reason	string	Core Loss Reason	
continuity	string	Continuity	Continuity Between Cores or Sections
last_section	integer	Section Count	Number of Core Sections
core_diameter	string	Core Diameter [mm]	
oriented	boolean	Core Oriented?	
rqd_abundance	string	RQD Abundance	RQD = Rock Quality Designation
comments	string	Additional Information	
igsn	string	IGSN	
fluid_type	string	Drilling Fluid Type	
bit_type	string	Bit Type	
comments_2	string	Additional Information	
comment_igsn	string	Comment IGSN	

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3.6. Sections

The core is cut into sections that fit in a corebox slot and can be handled in the repository and laboratory.

The individual section depths are calculated based on the top depth of the core, the length of the individual sections, and the cumulative length of the sections of one core. The top of the first section of a core always corresponds to the top depth of the core. All following section tops are calculated using *core top depth [mbs] + section length [m]* of the preceding sections of the same core. Bottom depths are calculated from *section top depth [m] + section length [m].*

mDIS Table Section (1 file for each hole)

Table 10: Section Meta data from mDIS.

Name	**Section**
ParentModel	CoreCore

Name	**Type**	**Label**	**Description**
id	integer	#	auto incremented id
core_id	integer	Core Id	parent id (of table core_core)
section	integer	Section	Section number
combined_id	string	Combined Id	
top_depth	pseudo	Section Top Depth [mbs]	
section_length	double	Section Length [m]	
bottom_depth	pseudo	Section Bottom Depth [mbs]	
analyst	string	Curator	Initials of Data Curator
section_condition	string	Section Condition	Broken, whole...
curated_length	double	Curated Length [cm]	
comment	string	Additional Information	
mcd_top_depth	pseudo	Corrected Top Depth/MCD Top Depth [mbs]	
mcd_offset	double	Depth correction: core MCD Offset [m]	Offset for Calculation of Composite Depth (=Core MCD)
mcd_bottom_depth	pseudo	Corrected Bottom Depth/MCD Bottom Depth [mbs]	
core_catcher	boolean	Core Catcher	Is this Section a Core Catcher?
core_splitted	pseudo	Section Splitted	
pieces	integer	Pieces	

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3.7. Splits

In mDIS a section is equivalent to a whole round section split (WR). This got split into a working (W) and an archive (A) half. All three halves have a persistent identifier (IGSN). All samples and lithological descriptions are related to one of the splits WR, W or A in the database.

mDIS Table SectionSplit (1 file for each hole)

Table 11: Section split meta data from mDIS.

Name	**SectionSplit**		
ParentModel	CoreSection		
Name	Type	Label	Description
id	integer	#	
section_id	integer	Section	
type	string	Type	Whole, Archive, Work, ...
origin_split_id	integer	Origin Split Id	
still_exists	boolean	Still exists	
sampleable	boolean	Sampleable	Can samples be taken
percent	integer	Percent [%]	Percent of the original section
combined_id	string	Combined ID	
igsn	string	IGSN	Section IGSN needs to be new for working half
remarks	string	Additional information	
curated_length	pseudo	Curated Length [cm]	BASE: Section Length = Curated Length
curator	string	Curator	
origin_split_type	pseudo	Origin Split Type	
mcd_top_depth	pseudo	MCD/Corrected Top Depth [mbs]	
corebox_name	string	Core box	Name of the core box
corebox_slot	integer	Slot in core box	Slot in the core box
corebox_position	string	Position in core box	Position in the core box
corebox_id	integer	Corebox Id	Id of the core box
comment_storage	string	Comment Storage	
mcd_bottom_depth	pseudo	MCD/Corrected Bottom Depth [mbs]	

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3.8. Facies Units

Used to define main lithologies that are then linked to and used in the lithology description.

mDIS Table FaciesUnits (1 file)

Table 12: Facies Unit meta data from mDIS.

Name	**FaciesUnits**		
ParentModel	ProjectExpedition		
Name	Type	Label	Description
id	integer	ID	
expedition_id	integer	Expedition	
facies_unit	string	Abbreviation of Facies Unit	
facies_unit_name	string	Name of Facies Unit	
rock_type	string	Rock Type	
rock_modifier_1	string_multiple	Rock Type Modifier	
dominant_grain_size	string_multiple	Dominant Grain Size	
secondary_grain_size	string_multiple	Secondary Grain Size	
color_munsell	string_multiple	Color Munsell	
sed_structure	string_multiple	Sed Structure	
recent_weathering	string_multiple	Recent Weathering	
paleo_fabric	string_multiple	Paleo Fabric	
description	string	Description	
combined_id	string	Combined Id	
thickness	string_multiple	Thickness	
contact_bottom	string	Contact Bottom	
structure_type	string_multiple	Structure Type	
alteration_minerals	string_multiple	Alteration Minerals	
packing_fabric	string_multiple	Packing Fabric	
sorting	string_multiple	Sorting	
rounding	string_multiple	Rounding	
clast_sphericity	string_multiple	Clast Sphericity	
sed_structure_post_depo	string_multiple	Sed Structure Post Depo	
grading	string_multiple	Grading	
bed_shape	string_multiple	Bed Shape	
carb_mats	string	Carb Mats	
compaction_degree	string	Compaction Degree	
fabric	string	Fabric	
paleo_weathering	string	Paleo Weathering	
nodularity	string	Nodularity	
rock_modifier_2	string_multiple	Rock Modifier 2	
cement	string	Cement	

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3.9. Lithology

mDIS Table Lithology (1 file for each section split)

Table 13: Lithology meta data from mDIS.

Name	**Lithology**
ParentModel	CurationSectionSplit

Name	**Type**	**Label**	**Description**
id	integer	ID	
section_split_id	integer	SectionSplit	
facies_unit	string_multiple	Facies Unit	
litho_unit	integer	Litho Unit	
split_combined_id	string	Split Combined Id	
top_depth	double	Unit Top Depth [cm]	Relative Top Depth in Section [cm]
interval	double	Unit Interval [cm]	Length of Lithological Unit [cm]
bottom_depth	double	Unit Bottom Depth [cm]	Relative Bottom Depth in Core Section [cm]
rock_class	string	Rock Class	
rock_type	string_multiple	Rock Type	
description	string	Description	Short Lithological Description
curator	string_multiple	Curator	
contact_bottom	string	Contact Bottom	
mcd_top_depth_unit	pseudo	Mcd Top Depth Unit [m]	
mcd_bottom_unit	pseudo	Mcd Bottom Unit [m]	
comment	string	Comment	
curated_length	pseudo	Curated Length [cm]	
color_munsell	string_multiple	Color Munsell	
structure_type	string_multiple	Structural Type	
fault_plane_orientation	string	Fault Plane Orientation	
fault_diffusiveness	string_multiple	Fault Diffusiveness	
fold_tightness	string_multiple	Fold Degree of Tightness	
fold_origin	string_multiple	Fold Origin	
fold_orientation	string_multiple	Fold Orientation	
vein_type	string_multiple	Vein Type	
vein_orientation_strike	integer	Vein Orientation Strike	
vein_orientation_dip	string	Vein Orientation Dip	
vein_filling	string_multiple	Vein Filling	
alteration_minerals	string_multiple	Alteration Minerals	
comment_structure	string	Additional Information	
rqd_abundance	pseudo	RQD Abundance	
rock_modifier_1	string_multiple	Rock Modifier 1	
rock_modifier_2	string_multiple	Rock Modifier 2	
cement	string	Cement	
packing_fabric	string_multiple	Packing Fabric	

dominant_grain_size	string	Dominant Grain Size
secondary_grain_size	string	Secondary Grain Size
sorting	string	Sorting
rounding	string	Rounding
clast_sphericity	string	Clast Sphericity
volcanic_specific	string	Volcanic Specific
sed_structure_primary	string	Sediment Structure Primary
foreset_type	string	Foreset Type
foreset_size	string	Foreset Size
sed_structure_post_depo	string	Sed Structure Post Depo
grading	string	Grading
bed_shape	string	Bed Shape
thickness	string	Thickness
contact_dip	double	Contact Dip
contact_dip_direction	double	Contact Dip Direction
carb_mats	string	Carb Mats
compaction_degree	string	Compaction Degree
fabric	string	Fabric
recent_weathering	string	Recent Weathering
paleo_weathering	string	Paleo Weathering
paleo_fabric	string	Paleo Fabric
other_features	string	Other Features
nodularity	string	Nodularity
combined_id	string	Combined Id

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3.10. Special Geological Features

In case geological features that do not belong to lithological descriptions occur, they were noted here. Mcd = meters corrected depth.

mDIS Table PrimDepoStructures (1 file for each split)

Table 14: Special Geological Features meta data from mDIS.

Name	**PrimDepoStructures**
ParentModel	CurationSectionSplit

Name	**Type**	**Label**	**Description**
id	integer	ID	
section_split_id	integer	SectionSplit	
prim_depo_structure	integer	Prim Depo Structure	
top_depth	double	Top Depth of Primary Depositional Structure [cm]	Relative Top Depth in Section [cm]
interval	double	Thickness of Primary Depositional Structure [cm]	Length of Primary Depositional Structure [cm]
bottom_depth	double	Bottom Depth of Primary Depositional Structure [cm]	Relative Bottom Depth in Section [cm]
prime_depo_structure	string	Prime Depo Structure	
comment	string	Comment	
mcd_top_depth	pseudo	Mcd Top Depth of Primary Depositional Structure [m]	
combined_id	string	Combined Id	
split_combined_id	string	Split Combined ID	

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3.11. Sample Requests

Before sampling, a sample request needs to be approved by the principal investigators. The table contains all sample request_IDs collected before the publication of the basic data set.

mDIS Table SampleRequests (1 file)

Table 15: Sample Request Meta data from mDIS.

Name	**SampleRequest**
ParentModel	ProjectExpedition

Name	**Type**	**Label**	**Description**
id	integer	ID	
expedition_id	integer	Expedition	
request_complete	string	Request Complete	
request_part	string	Request Part	
request_type	string	Request Type	Type of Sampling
scientist_1	string	Scientist 1	
scientist_2	string	Scientist 2	
scientist_3	string	Scientist 3	
purpose	string_multiple	Purpose	
request_date	date	Request Date	
approval_date	date	Approval Date	Date of Request Approval by PIs
completion_date	date	Completion Date	Date of Sampling
comments	string	Comments	
sample_material	string	Sample Material	Kind of Sample Material
volume_requested	double	Sample Volume Requested	Core Volume Used
request_no	integer	Request No	
number_samples	integer	Number Samples	
sample_unit	string	Sample Unit	
analyst	string	Analyst	
approved_by	string	Approved By	
destructive	boolean	Destructive	
sample_size	double	Sample Size	
comments_2	string	Comments 2	
expedition_acr	pseudo	Expedition Acr	

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3.12. Samples

mDIS Table Sample (one file for each section split)

Table 16: Sample meta data from mDIS.

Name	**Sample**
ParentModel	CurationSectionSplit

Name	**Type**	**Label**	**Description**
id	integer	ID	
section_split_id	integer	SectionSplit	
request_no	string	Request No	
sample_combined_id	string	Sample Combined Id	
igsn	string	Igsn	
sample_date	date	Sample Date	
top	double	Sample Top Depth [cm]	Distance from Section Top Depth
sample_length	double	Sample Length [cm]	
bottom	pseudo	Sample Bottom [cm]	Distance from Top of Section
curator	string	Curator	
sample_material	string	Sample Material	
comment	string	Additional Information	
sample_size	double	Sample Size	Number only
sample_size_unit	string	Sample Size Unit	
split_fraction_taken	integer	Fraction of Section Split [%]	
mcd_top_depth	pseudo	MCD Sample Top Depth [mcd]	
mcd_bottom_depth	pseudo	MCD Sample Bottom Depth [mcd]	
sample_type	string	Sample Type	
scientist	string	Scientist	
purpose	string_multiple	Purpose/Usage	
combined_id	string	Combined Id	
curated_length	pseudo	Curated Length	
box_name	pseudo	Box Name	
box_slot	pseudo	Box Slot	
box_position	pseudo	Box Position	

4. Images

Working Corebox (BW) and closeup (Sl) photos (were taken with different smartphone cameras directly onsite. Furthermore, high resolution corebox photos of the working halves were done at BGR, Federal Institute for Geosciences and Natural Resources, Spandau, Germany using a DMT core scan³. Archive Corebox photos were done with a Hyperspectral Scanner at CGS, National Core Library, Donkerhoek, South Africa.

4.1. Corebox Photos

Corebox photos are oriented horizontally (Fig. 3). Sections are filled from the upper left slot (top) to the lower right slot (bottom). Each box shows the corebox number, Expedition, Site, Hole, driller's depth and some additional information. The corebox total length is 1 m. The core can be identified by its number (e.g. C66) and the end of a core is marked by a green or yellow divider with the driller's depth. Each core is divided into sections, which are filled into a corebox slot. If a section does not fill a slot, the first section of the next core is filled into the same slot.

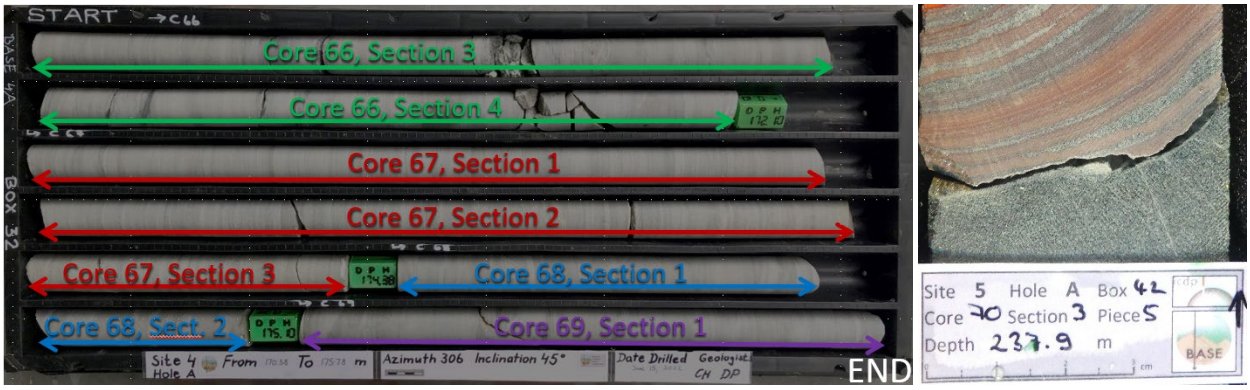

Figure 3: left: Corebox layout of the BASE project, right: Example of a closeup photo with label.

Photos are available for whole round core sections as well as for split core sections (working halves in wet and dry conditions).

4.2. Closeup Photos

Closeup images of working half splits were taken for areas of special interest. Each photo includes a label with core information, driller's depth, a scale and an arrow showing towards the top (Fig. 3 right).

5. Geophysical Borehole Measurements

5.1. Borehole Logging Files

The recorded field data are stored in ASCII files. The exception is the non-line data generated with the BHTV, Sonic and VSP probes. The extensive ultrasonic images of the borehole wall registered by the BHTV sonde are stored as TFD files for use e.g. with the WellCAD software. The complete wavefields registered by the SONIC sonde are stored as DLIS files. The VSP data are given in SGY format. All data are checked and edited.

The preprocessed line data for each hole and campaign are summarized in a composite file (ASCII). Additionally, composite log plots (1:1000) are prepared as PDF documents to give a quick overview over the line data.

6. References

Conze, R., Lorenz, H., Ulbricht, D., Elger, K., & Gorgas, T. (2017). Utilizing the International Geo Sample Number Concept in Continental Scientific Drilling During ICDP Expedition COSC-1. In Data Science Journal (Vol. 16). Ubiquity Press, Ltd. https://doi.org/10.5334/dsj-2017-002