Drilling Core Database

This note gives a high-level overview of the EARTHSEQUENCING effort to provide a self-consistent database of ocean drilling data and drill-core meta data.

Rationale

As part of the EARTHSEQUENCING project, we are developing a set of databases that facilitate the processing, analysis and linking of various ocean drilling related data and information.

The main aim is to make it possible to quickly and consistently obtain data that are otherwise slow to access, and scattered across various existing databases.

The databases contain

- · Information about DSDP/ODP/IODP Expeditions, Sites, Holes, Cores, Sections and related meta-data
- Actual selected, and mainly multi-sensor track related, data aggregated by Hole and Analysis (partly accessible as data grid on https://paloz. marum.de/database or via a dedicated viewer DBViewer).
- Selected processed digital image data, allowing fast generation of Site overviews, including core-correlation and splice visualisation (IODPCoreIm age).
- Information about some publicly available core-offset and splice tables (Core Affine Table, Splice Interval Table).

Eventually, further data, for example biostratigraphic occurrences, magnetostratigraphy, age models etc. can be linked into this structure. Here we give an overview about the Scientific Ocean Drilling core information part of the database, not the specific scientific measurements themselves (for that, see for example database overview).

Most data come from archived DSDP data, the old ODP Janus database, and the current IODP LIMS database, merged into a consistent format.

This project benefitted from the DFG funded PetaByte Storage Cluster (DFG Grant 405693605).

Overall Technical Infrastructure

The database system is not directly accessible externally due to security and "denial of service" considerations, but hooks are provided for human and machine readable access via web endpoints.

The databases are contained in a relational and filestore database system (Couchbase, Minio and several others). Public access is via an intermediary REST endpoint (Loopback).

Currently (February 2022), the database contains information about all DSDP/ODP/IODP expeditions conducted on the Glomar Challenger or Joides Resolution upto Expedition 385 (post-moratorium). Eventually MSP and Chikyu data might be added.

In detail, the database entities consist of

- (Drilling) Platform, e.g. Glomar Challenger, Joides Resolution, Chikyu, MSP
- Project (e.g. DSDP, ODP, IODP etc.)
- Expedition
- Site
- Hole
- Hole Occupation (e.g. Holes can be re-occupied)
- Core
- Core Section
- Section Half
- GeoLocation (to store co-ordinates of Holes)
- TimeStamp
- Person (e.g. CoChief Scientist, Expedition Project Manager)
- CoreAffineTable
- CoreAffineValue
- SpliceIntervalTable
- SpliceIntervalEntry

For the actual data storage, we use the two entities

- AnalysisMapping (providing meta-information of data formats and import locations)
- AnalysisHeader (per Hole, per Analysis compressed data and meta-data)

Data access

There are various ways to access these data, but as mentioned before, direct access is not available outside the private network for security reasons.

- 1. For an overview of measurement data available, consult https://paloz.marum.de/database. This is suitable for human download of text tables for individual holes and measurements.
- 2. Various REST endpoints are available for machine-readable access. Please contact H. Pälike for further information, also to ensure overloading the current server. See below for a few examples of how this could be accessed:
- 3. A current snapshot of the database (for OFFLINE viewing) is available as a macOS Application (see XXX).
- 4. A number of pre-built applications allow access to these data also, for example DBViewer, IODPCoreImage.

Programmatic access is available via REST endpoints, for example

- To get a list of all Expeditions, only returning the database ID and Expedition name, ordered by expedition number:
- https://paloz.marum.de/database/api/Expeditions?filter={"fields":{"id":true,"expeditionName":true},"order":"expeditionNumber ASC"} • To then get a specific Expedition by ID:
- https://paloz.marum.de/database/api/Expeditions/29D5ACB9-4A40-499F-A20E-B3978C6B1B3B-74499-0002C851BF3992F4 • or to get a list of all Site data for a given Expedition:
- https://paloz.marum.de/database/api/Expeditions/29D5ACB9-4A40-499F-A20E-B3978C6B1B3B-74499-0002C851BF3992F4/Sites etc. ..

A full list can be seen here:

REST endpoints

Offline Snapshot Viewer

A software for macOS only (sorry!) to view an offline snapshot of the database is available here:

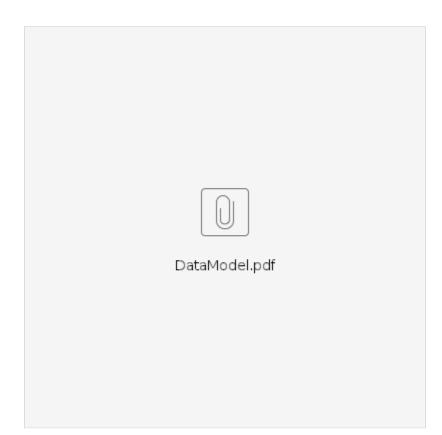
CoreDataEditor-ODPDATA

Prior to running, this requires the installation of a database file into "~/Library/Application Support/" by unzipping the ~1GB file stored here: DATABASE.

Example:

ITITIES	Object ID	CBLIS _ Rev	Expe	dition Area	Expedition Name	Expedition	Nu ^ Exp	edition Suffix	Objective				
E Analysis 208	pCBLB8AA41	1-3ba5d71	1-3ba5d71			314	nil		NanTroSE	IZE Stage 1: LWD	Transect		
E Analysis H 12826	pCBL76DED6	1-7688952			315	315	315 nil		NanTroSEIZE Stage 1: Megasplay Riser Pilot				
Analysis Mapp 70	pCBLB8CF6B	1-42581a9			316	316	316 nil		NanTroSEIZE Stage 1: Shallow Megasplay and Frontal Thru				
Core 76208 Core Affine T 290	pCBL14B5B2	562-9e0e.			317	317	317 nil		Canterbury Basin Sea Level				
Core Affin 290	pCBL75DA1A	333-9b2e			318	318	nil		Wilkes La	nd Glacial History			
E Expedition 306	pCBLA4C0D7	1-4176f6c			319	319	nil		NanTroSE	NanTroSEIZE Stage 2: Riser/Riserless Observatory 1			
Geo Location 5370	pCBL60C1C6	425-c628	·	/	320	320	320 nil 🖋		Pacific Equatorial Age Transect I				
E Hole 3750	pCBLD92365	14-3e09ffe			320T	320			USIO Sea Trials and Assessment of Readiness Transit (STA				
E Hole Occup 3781		000 0-11-0	08.841-6		0.01	0.01			Pacific Equatorial Age Transect II / Juan de Fuca				
E Meta 16	pCBLB5A75E	298-80106	98-80106		321	321	J nii		Pacific Equatorial Age Transect II / Juan de Fuca				
E Parameters 0	pCBL5E8C5C	1-91c730f1			322	322	22 nil		NanTroSEIZE Stage 2: Subduction Input				
E Person 570	pCBL2783BC	674-35ea8	674-35ea8		323	323	23 nil		Bering Sea Paleoceanography				
E Platform 12	pCBLF4BDB8	114-853			324	324	324 nil		Shatsky Rise Formation				
E Port 3686													
E Project 18	DCBL99B707 1-a8ac8c8				325		325 nil		Great Barrier Reef Environmental Changes				
🗉 Sample 🛛 🕕	+ -											Q~	
🗉 Sample Request 🚺	RELATIONSHIPS	Object	ID	CBLIS _ Rev	Advanced _	m Comr	nent	Core Label		^ Core Number	Core Type	Curated _m	Current
E Section 379933	Belongs To Co Chief Sci			9-1194b35 5.2		Shot	Shot Time: 320-U133		A-1_H	1	н	5.19	0
E Section Half 0			23 pCBL700E61E 9		-e4b6edc 9.5		Shot Time: 320-U13		A-2_H	2	н	9.87	1.5
No Validation Errors	M Hole Occu M Holes	16 16 pCBL			9-08240a 9.5		20:45 320-U133		A-3_H	3	н	9.69	2.91
	Logging Sta.		pCBL8BE16A		9.5	22:0	5	320-U1331	A-4_H	4	н	9.99	3.26
	MetaPort Begin	_	1 pCBL386B3F		9-0734ac9 9.5		23:35 320-U133		A-5_H	5	н	9.32	5.25
	O Port End M Sites	1 7 pCBL			c 9.5	01:0	5	320-U1331	A-6_H	6	н	9.45	7.16
	Staff Scienti.	D pCBL	0		9-d61a50c 9.5				A-7 H	7	н	9.95	9.81
	Time Stamp	0	045404		0.0	02.2	-	000 114004	-			0.00	0.01

Data Model Graph:



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Related articles

- IODPImageSplicerDrilling Core Database