mobile Drilling Information System

ICDP sample and data management team

Data Management | ICDP Operational Support Group | dm@icdp-online.org

IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
(D.D. n. 130/2022 - CUP B53C22002150006) Funded by EU - Next Generation EU PNRR-Mission 4 "Education and Research" - Component 2: "From research to business" - Investment 3.1: "Fund for the realisation of an integrated system of research and innovation infrastructures"

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani

Pavia 04/02/2025

KTB in Windischeschenbach – the forerunner of ICDP and (m)DIS

German Continental Deep Drilling Program KTB

Depth: 9101 m (main borehole)
Duration: 1987 - 1995

An international meeting was held at GFZ in Potsdam in 1993 to examine

-> the scientific justification and
-> management needs for a multilateral international scientific drilling program

ICDP – International Continental Scientific Drilling Program – since 1996

The ICDP officially started on February 26, 1996 when the MoU was ratified by representatives of USA, China and Germany at the German Embassy in Tokyo.

www.icdp-online.org

ICDP in a nutshell

- The **International Continental Scientific Drilling Program ICDP** is an international non-profit research consortium.

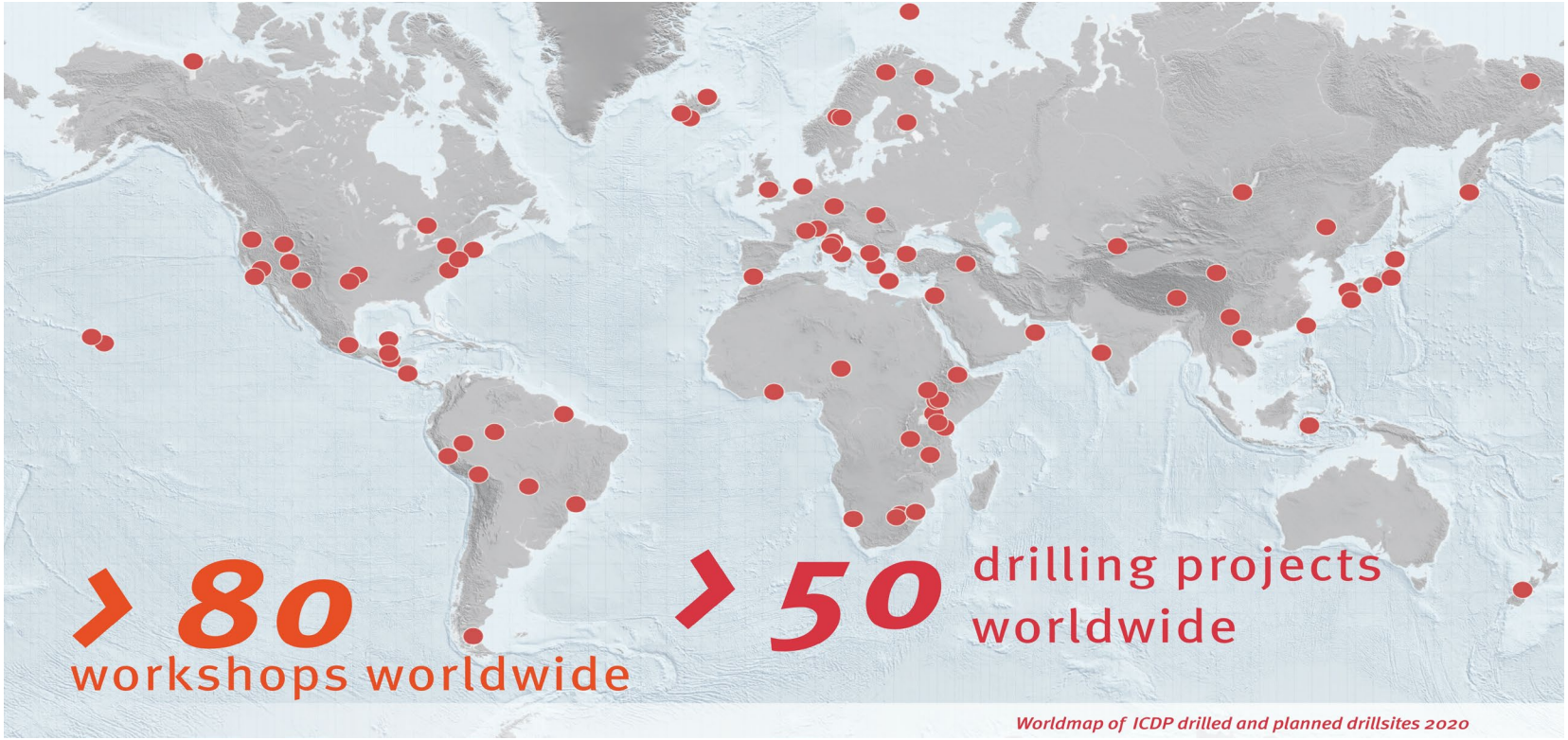
- ICDP supports international research teams with a critical need for continental scientific drilling with **financial** and **operational** support.

- ICDP support is based on proposals. PIs from ICDP member countries with a project idea in line with the ICDP Science Plan and of far-reaching societal relevance that requires continental drilling can apply for funding and operational support through ICDP.

ICDP Members

- Australia
- Austria
- Belgium
- China
- Czech Republic
- Estonia
- France
- Germany
- Iceland
- India
- Israel
- Italy
- Japan
- New Zealand
- Norway
- South Africa
- Spain
- Sweden
- Switzerland
- The Netherlands
- UNESCO
- United Kingdom
- USA

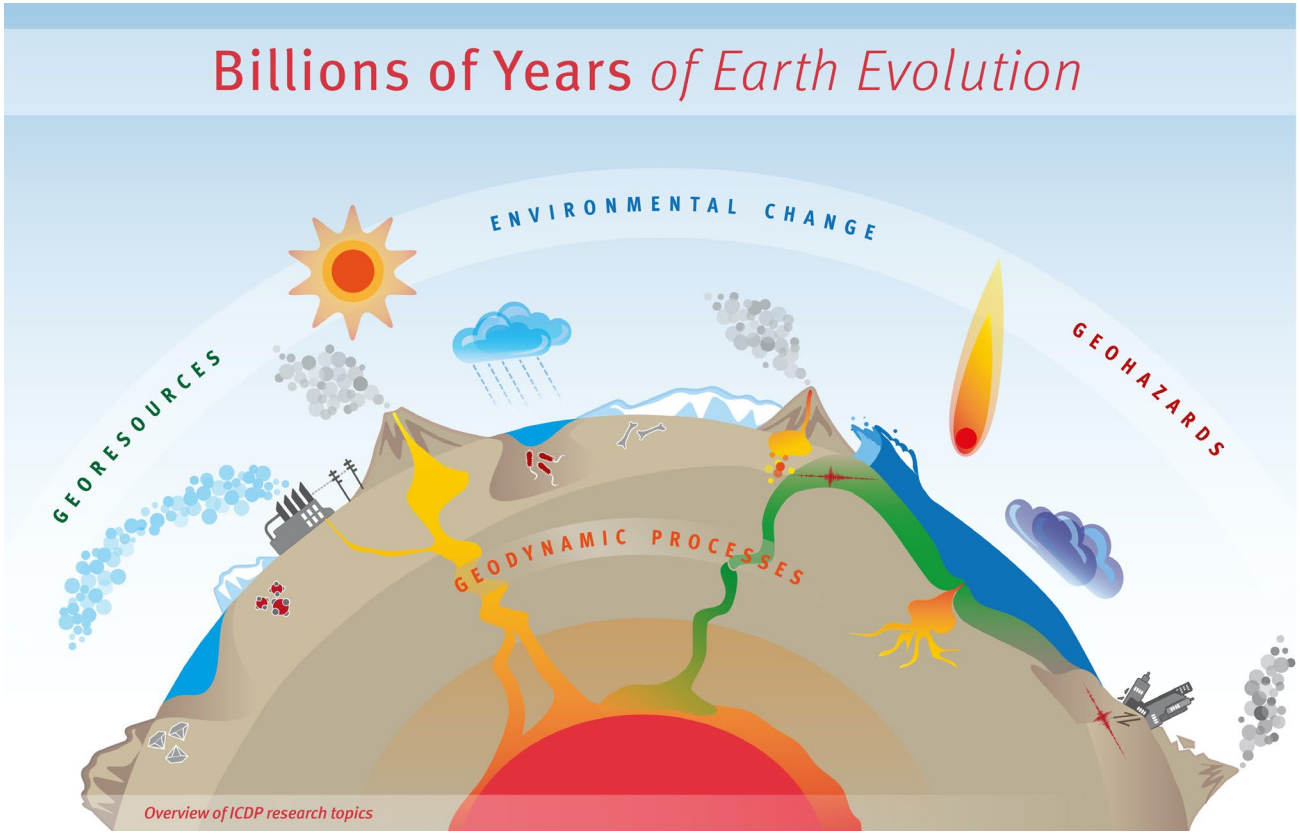
Achivements in 27 years



Worldmap of ICDP drilled and planned drillsites 2020

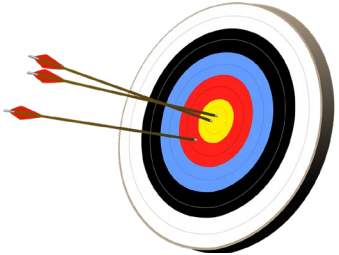
ICDP Science

The most unique and important point of ICDP is that the continents provide access to a record of the Earth's history that stretches back about 4 billion years



Database management system for hierarchical data

ICDP needed (and needs) a database management system that

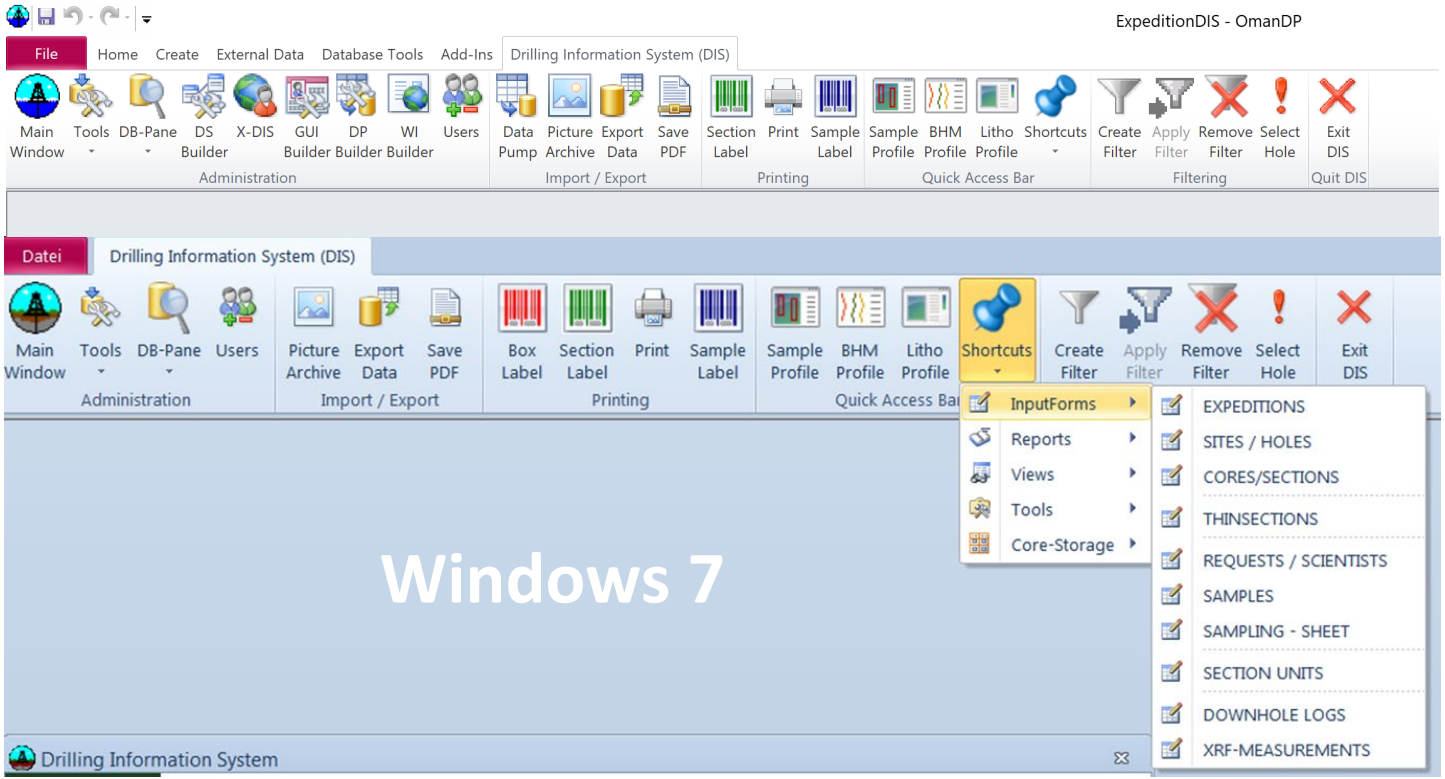


- is easy to handle and adaptable
- can archive and manage all data & images/files of the basic data set of an ICDP drilling
- produces exports, reports, labels and IGSNs.. and can be shared
- can be used on drilling expeditions and in core repositories (sample curation)
- has a user management system

Database Management in ICDP – until 2019

Drilling Information System (DIS)

Developed and used for 20 years in the framework of ICDP



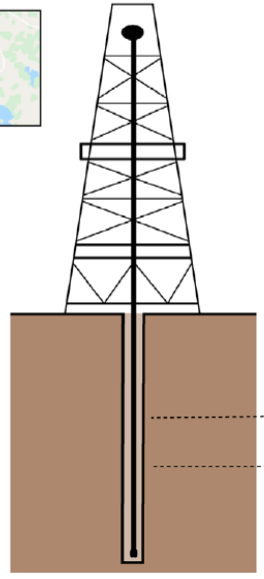
mobile Drilling Information System

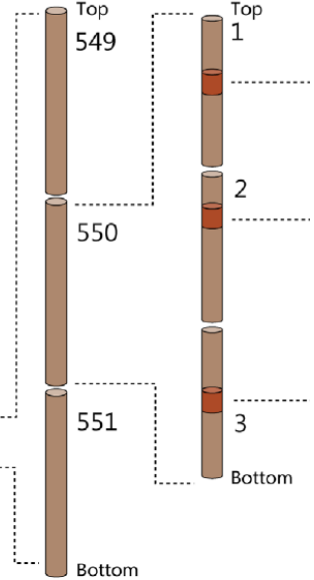
- is easy to handle, adapt, and runs on different digital devices
- can archive and manage all data & images/files of the basic data set of an ICDP drilling
- produces exports, reports, labels and IGSNs
- can be used on drilling expeditions and in core repositories (sample requests & curation & storage)
- can be shared
- has a user management system

Drilling Data - Hierarchical data

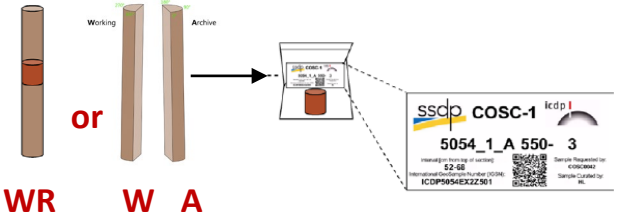
Example **0007** _ **1** _ **A** _ **550** _ **3** _ **WR/ W/ A:** **52 - 68**

Drilled: Program Expedition Site Hole Core run Section Split Sample





Combined ID



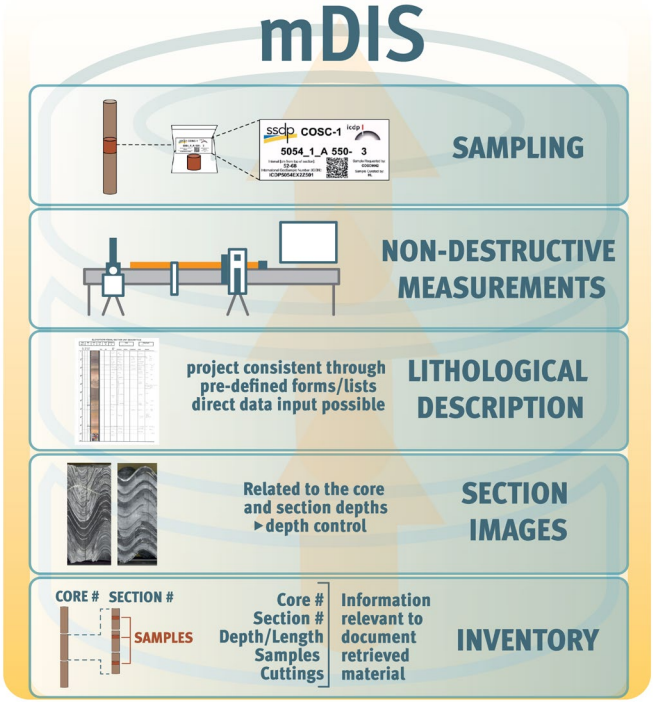
Mobile Drilling Information System

The main purpose is data acquisition for documentation, archiving and administration of:

- primary data
- initial measurements and reports
- sample requests, sample curation and sample distribution

mDIS contains:

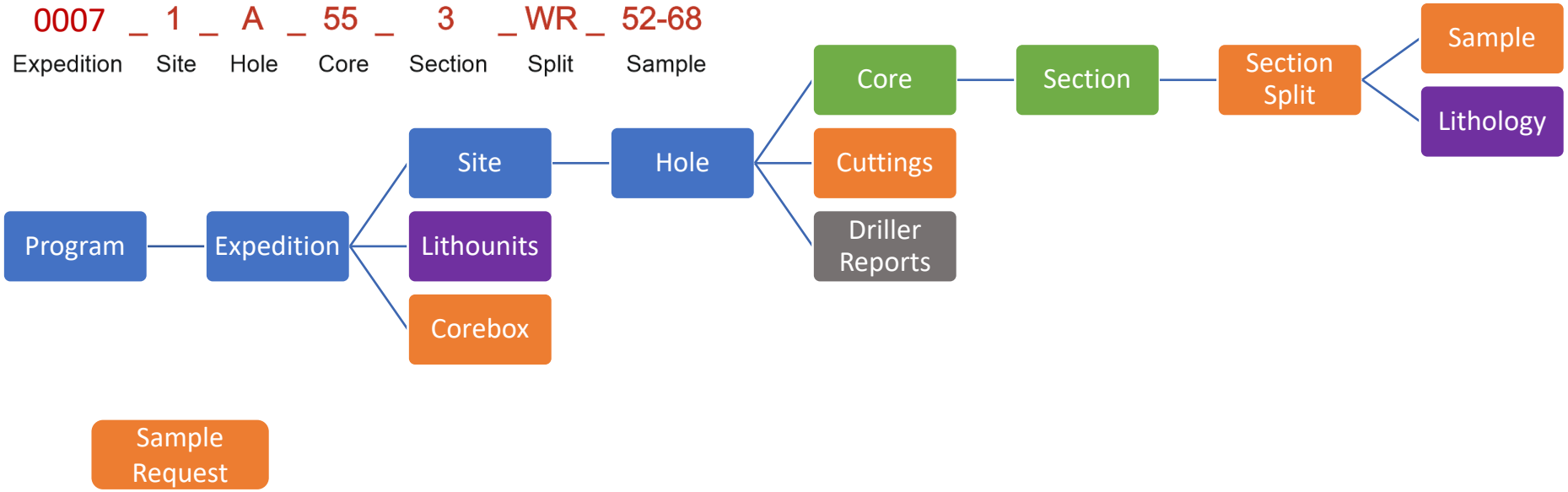
- Relational database
- Hierarchical data structure and naming conventions
- unique identifier



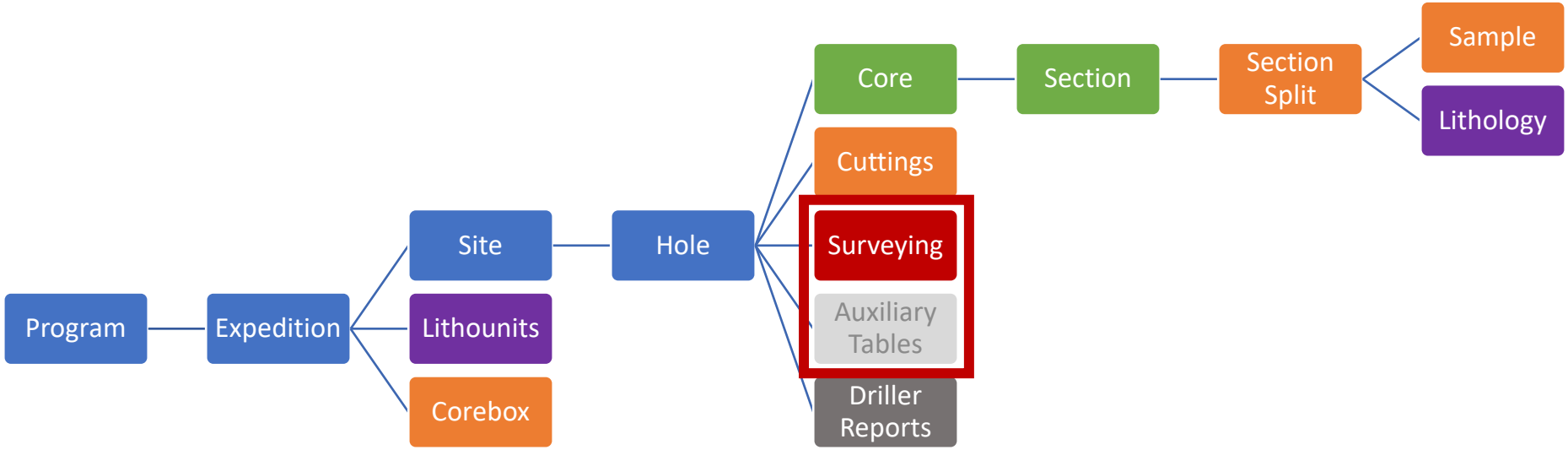
Basic hierarchy in mDIS

0007 _ 1 _ A _ 55 _ 3 _ WR _ 52-68

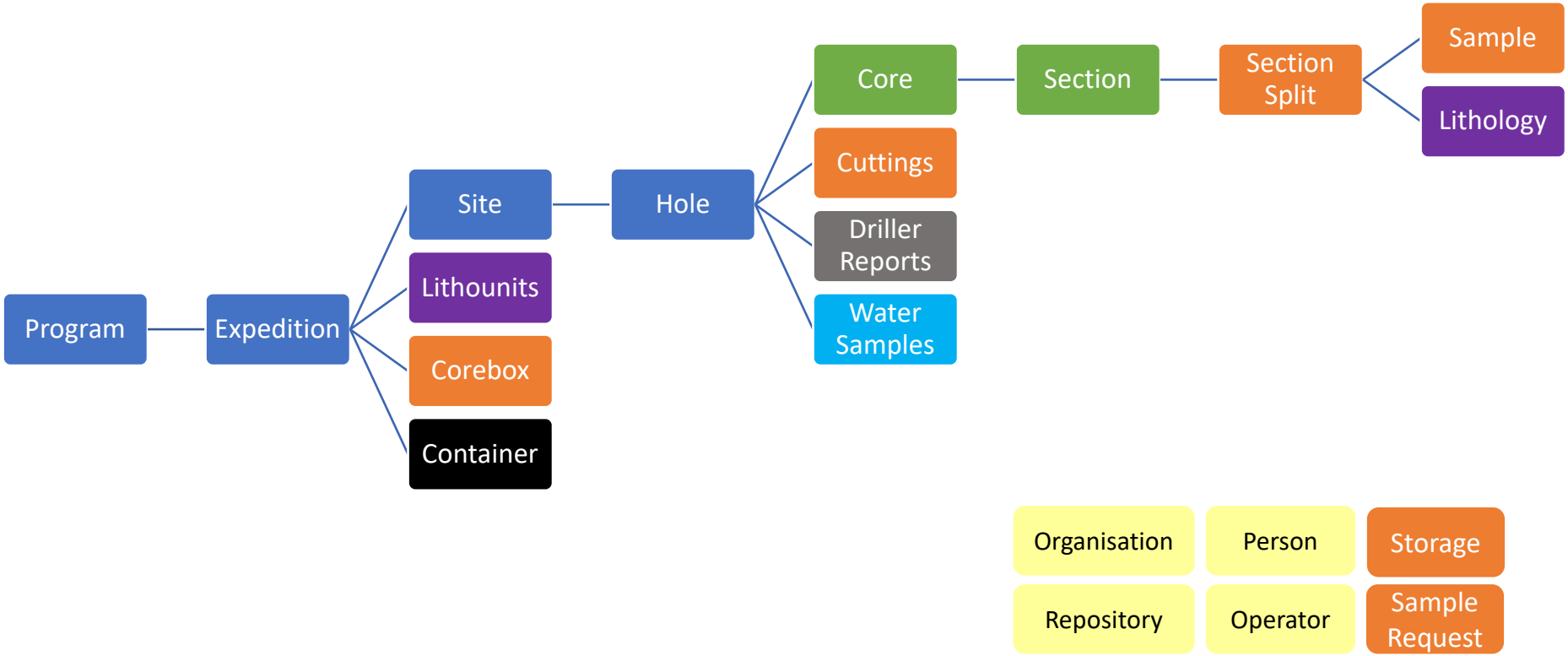
Expedition Site Hole Core Section Split Sample



and for borehole logging/monitoring



Additional tools for usage in core repositories

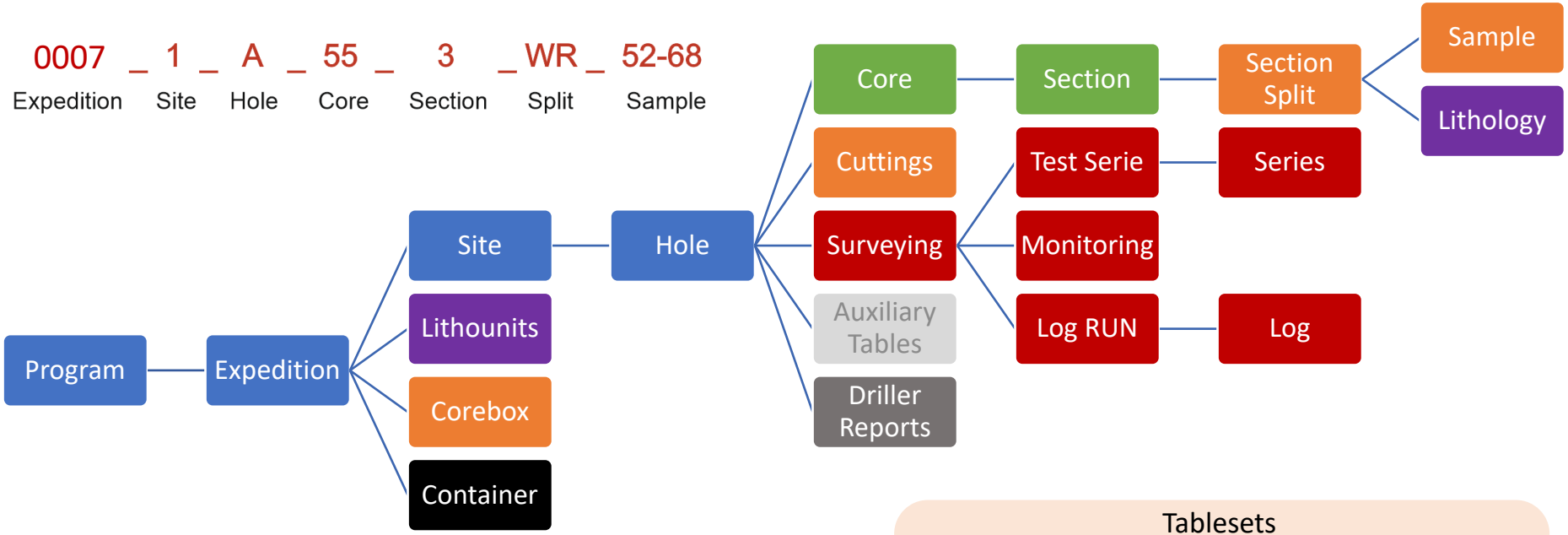


Basic hierarchy in mDIS

04 Feb 2025

0007 _ 1 _ A _ 55 _ 3 _ WR _ 52-68

Expedition Site Hole Core Section Split Sample



Organisation | Person | Storage

Repository | Operator | Sample Request

Tablesets

Project | Core | Curation | Contact

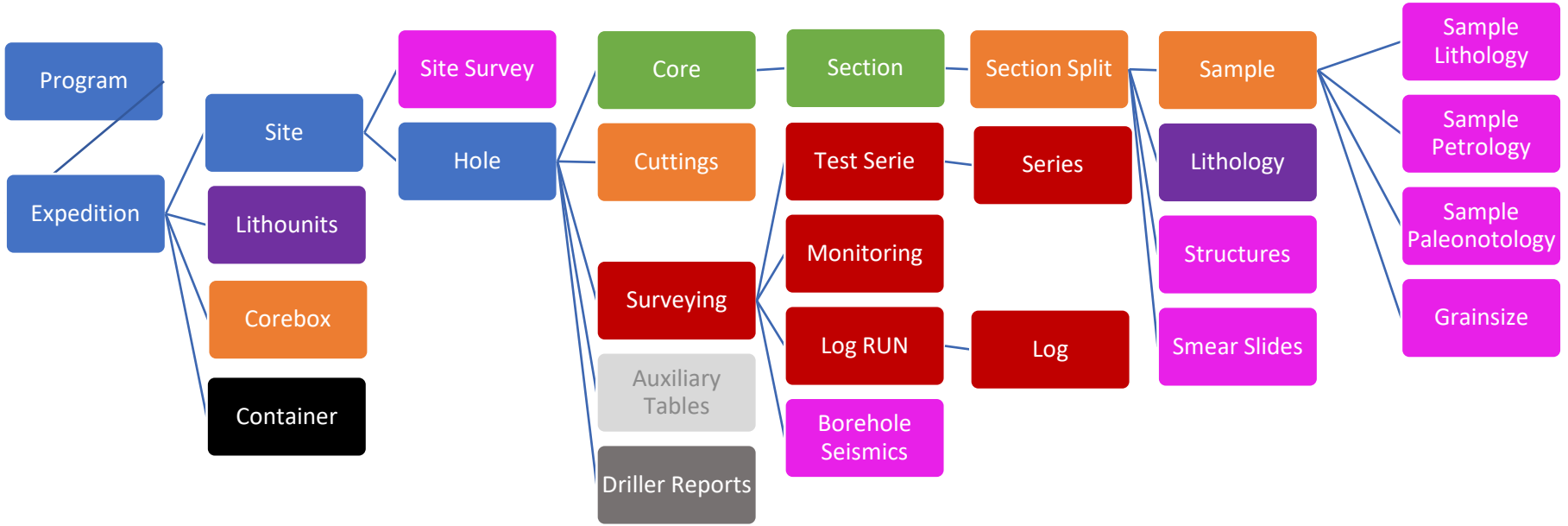
Drilling | Surveying | Geology | Auxiliary Tables

ITINERIS

Pavia, 04 Feb 2025

Basic hierarchy in mDIS Itineris

05 Feb 2025



Organisation | Person | Storage

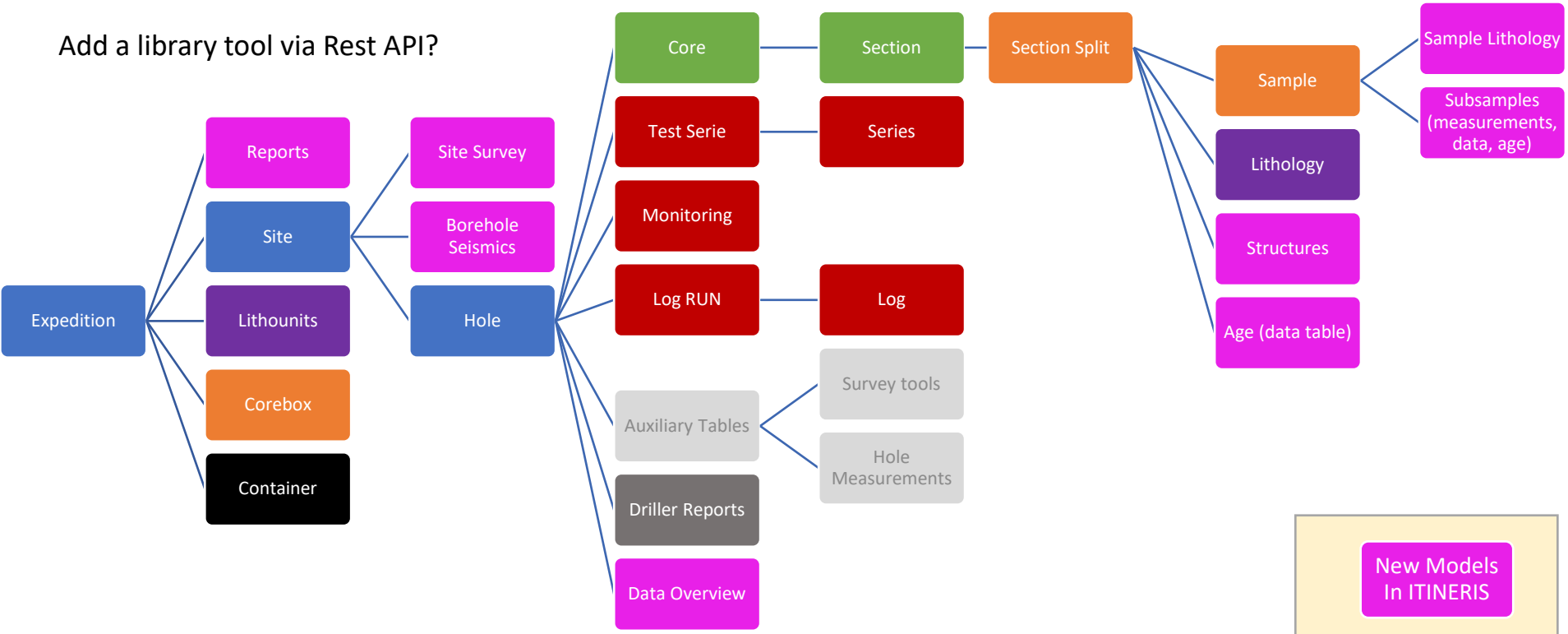
Repository | Operator | Sample Request

New Models In ITINERIS

Basic hierarchy in mDIS Itineris

07 Feb 2025

Add a library tool via Rest API?



Suggestion on Timeline mDIS ITINERIS

TIME_LINE – until October meet once a month with OSG – needs preparation

Who coordinates communication an sets up the meeting and agenda? Julia – thank you so much!

Deliverable: Software ready for us to use …. Hierarchy -> Models ready

With some (what is some?) data included

- Set up a model and form on paper – to then implement in mDIS (first goal: Beginning of March – set up a doodle)
- Set up a input csv file with data from your excel files that now contain the metadata of your samples
- Look at images that should be uploaded with your record (section images; sample images)
- Site survey examples
- Borehole logging examples

Trieste, Milano, Bologna, Roma, Florence , Pavia,

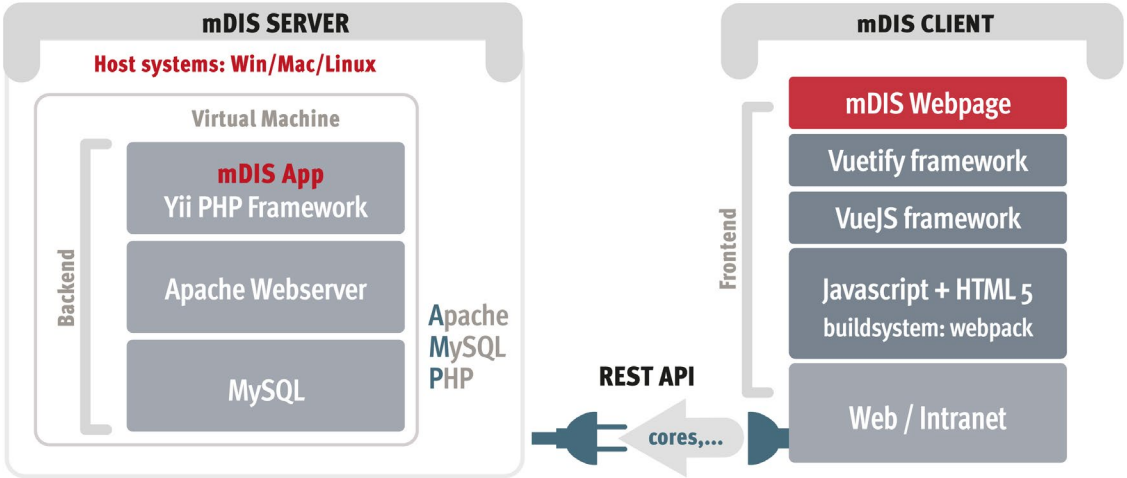
Doodle and Preparation needed (you might need to meet within your working group in the meantime to create a common mDIS model – or work on a shared document) please plan in the time

mDIS Walkthrough

Compatibility through…

- Platform independent application
- Open Source Software (GPL 2.0)
- User friendly
- Responsive

- as Webapp and software-as-a-service
  -> server installation
- as Desktop App if no internet is available
  -> individual PC installation



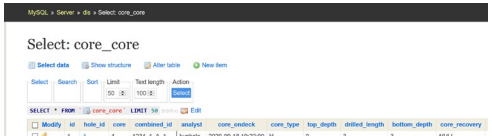
die InformationsGesellschaft

Live On-site and off-site data entry, support and data accessebility

mDIS Server

Host system: Win(>8.1)/Mac/ Linux

backend



Apache
MySQL
PHP

Virtual Box ca. 10 - 40 GB

Docker Container

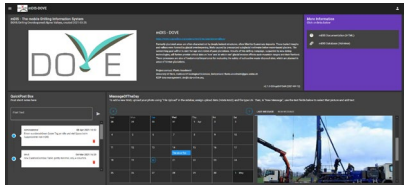
REST API

cores,...

mDIS Client

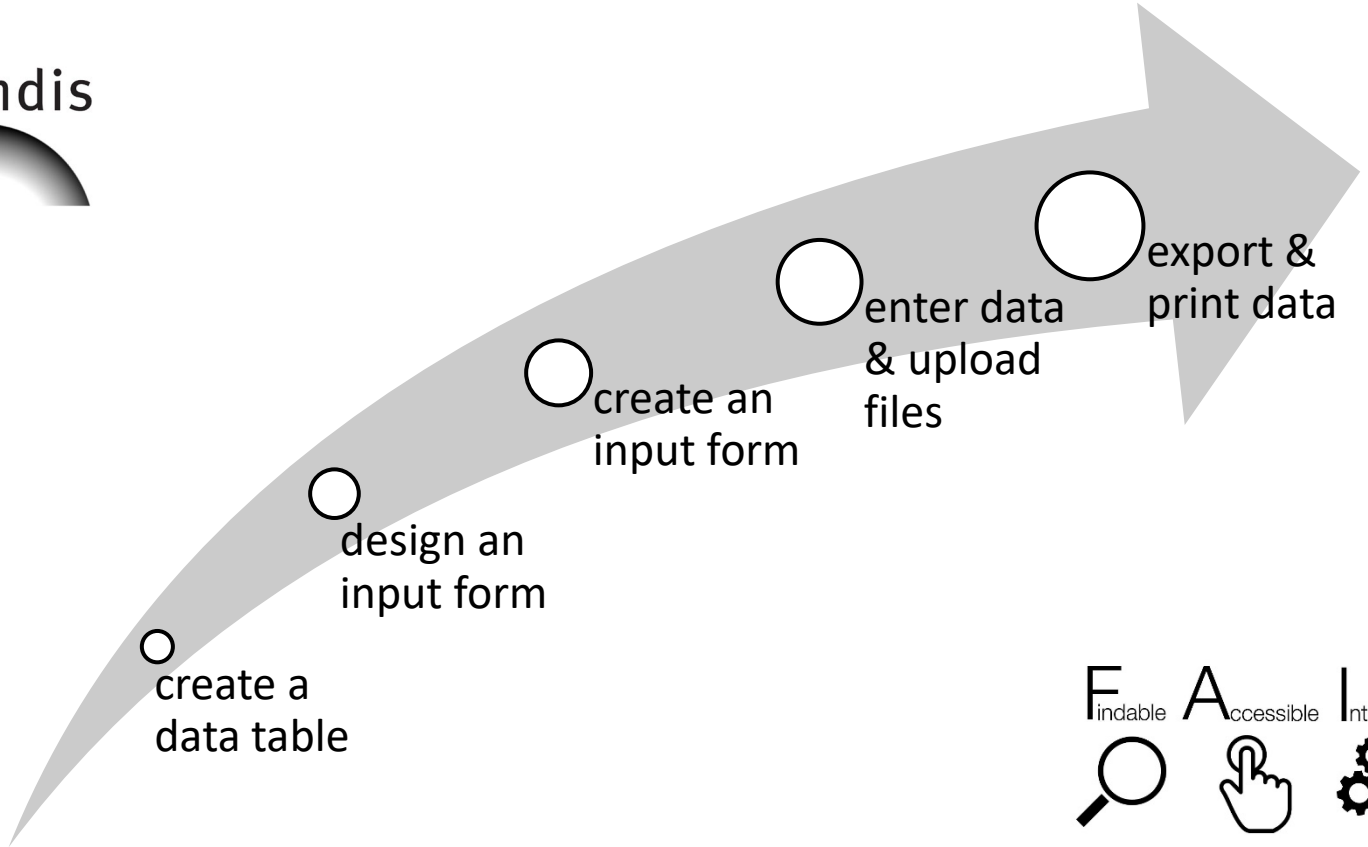
Platform independent

frontend/
application



standard web
browser (HTML 5)

mDIS setup



Findable Accessible Interoperable Reusable

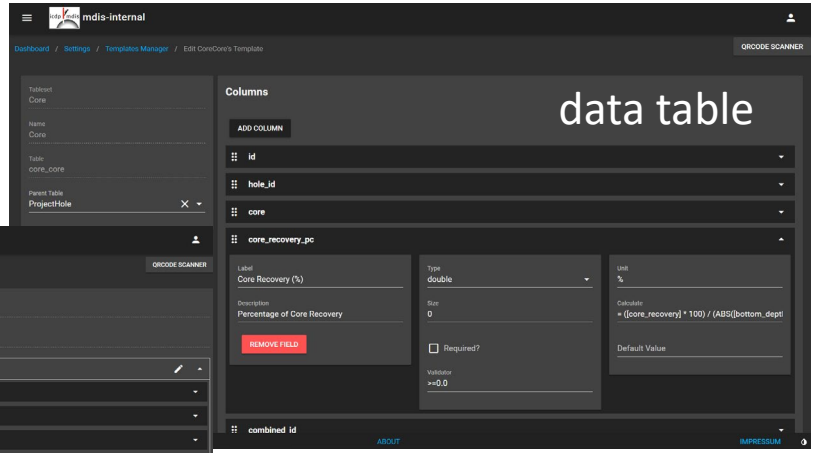
ITINERIS

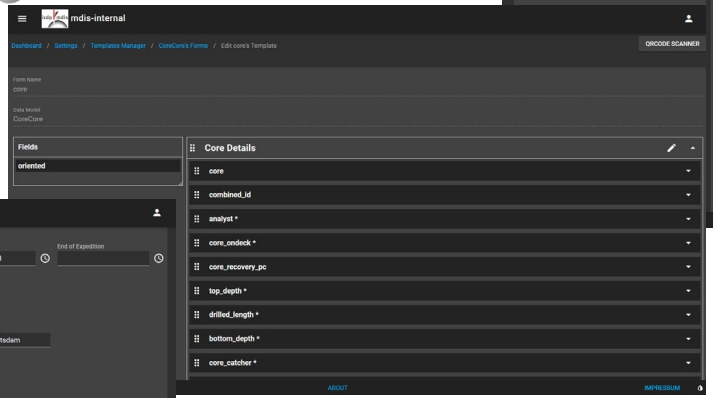
Pavia, 04 Feb 2025

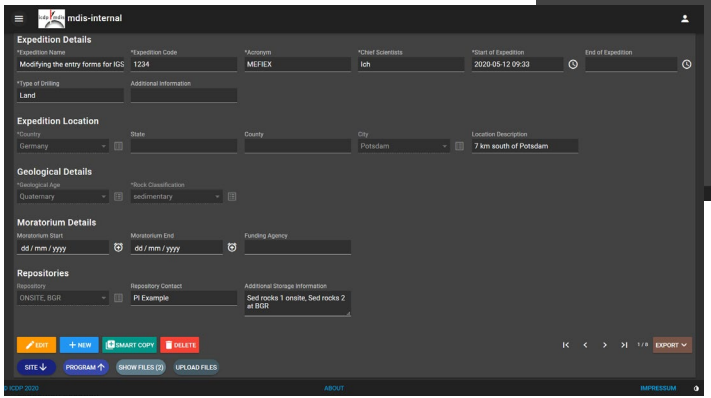
icdp mdis

Setup of database without programming skills

Work flow





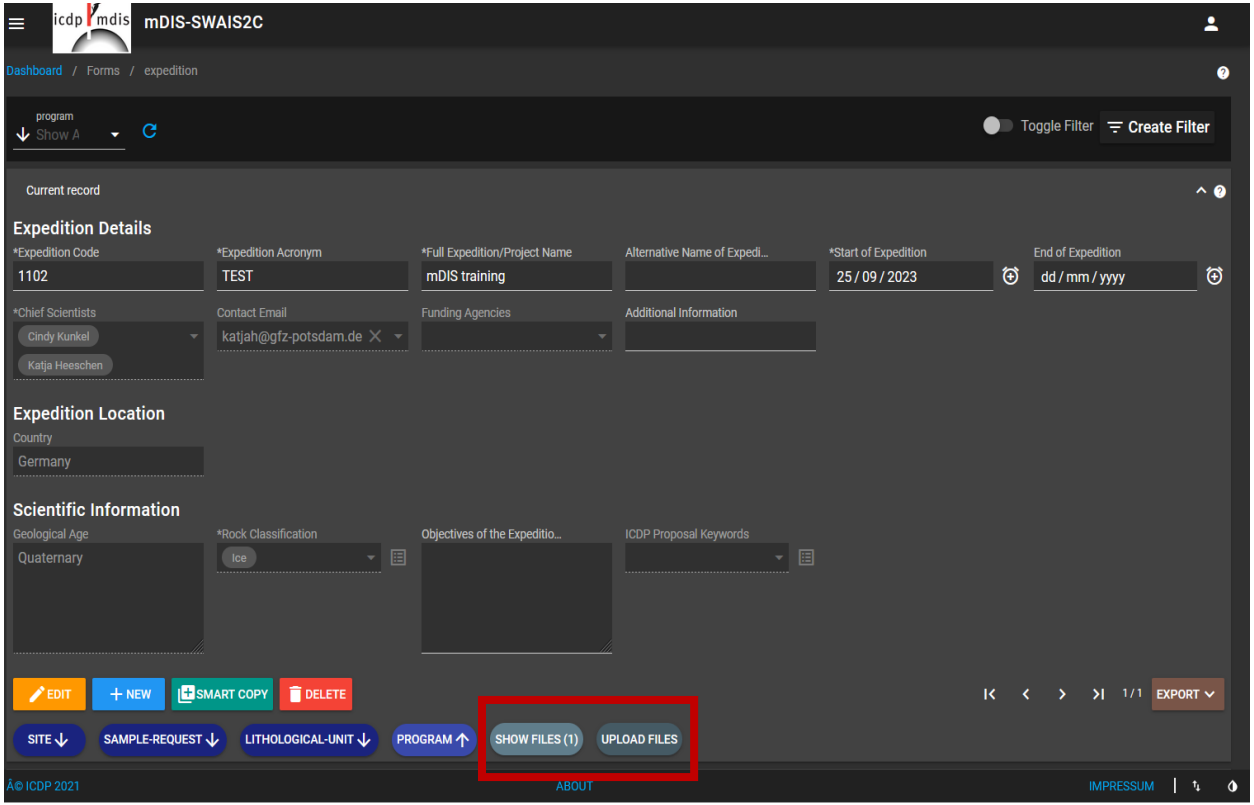


Create & define the columns of your database

Set-up your input mask by drag and drop

Pavia, 04 Feb 2025

Enter data - upload & assign files



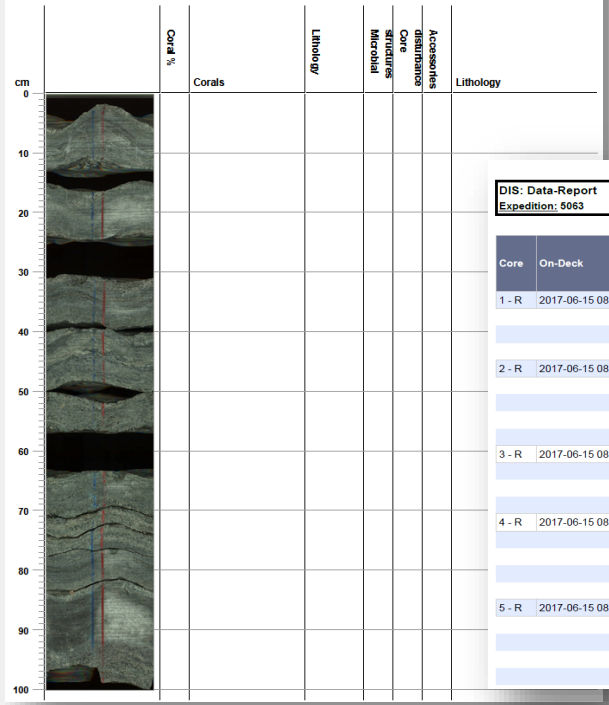
Tools & Export & print data reports

MEFIEX Logo | Modifying the entry forms for IGSN export

Visual core description

Expedition	Site	Hole	Core	Section	Top depth	Bottom depth
1234	1	A	1 H	1	0 m	1 m

Curator: | Date:



ssdp

COSC-2

Hole A - Core sample

icdp

5054_2_A_249-Z_3-WR

IGSN:

ICDP5054EXTJ001

Top: 70 cm Request: COSC0048 A

Bottom: 93 cm Curated by: Henning Lorenz

⇦ IGSN QR-Code. Scan to mDIS for full data record.

Expedition 5063

DIS: Data-Report — CORE / SECTION SUMMARY

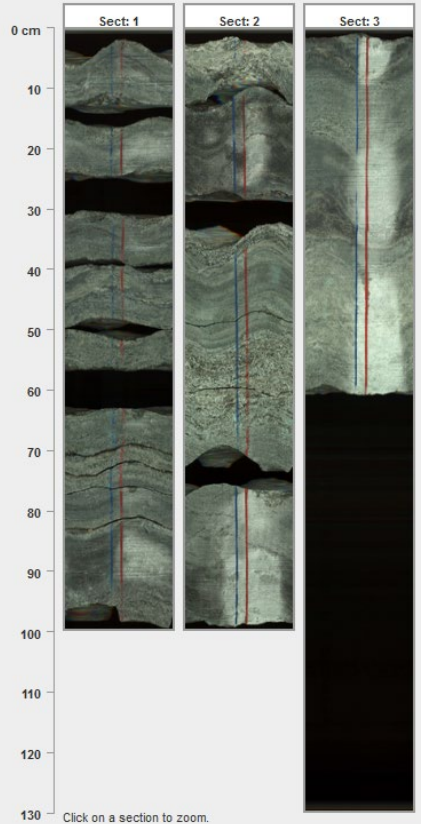
Expedition: 5063 Site: 1 Hole: A total drilled length:824.65 m core recovery:808.81 m 98% Cores:276 Sections:745

Core	On-Deck	Core Top Depth (m)	Core Bottom Depth (m)	Length Cored (m)	Length Recovered (m)	Core Recovered (%)	Section Num	Liner Length	Curated Length	Top Depth	Bottom Depth	Section Remark
1 - R	2017-06-15 08:00:00	0	3	3	2.9	96.67	2 Section/s					
							1	1.52	1.52	0	1.52	
							2	1.36	1.36	1.52	2.88	
2 - R	2017-06-15 08:00:00	3	6	3	2.7	90.00	3 Section/s					
							1	0.1	0.1	3	3.1	
							2	1.31	1.31	3.1	4.41	
							3	1.45	1.45	4.41	5.86	
3 - R	2017-06-15 08:00:00	6	9	3	3	100.00	2 Section/s					
							1	1.43	1.43	6	7.43	
							2	0.8	0.8	7.43	8.23	
4 - R	2017-06-15 08:00:00	9	12	3	3	100.00	3 Section/s					
							1	0.63	0.63	9	9.63	
							2	1.5	1.5	9.63	11.13	
							3	0.91	0.91	11.13	12.04	
5 - R	2017-06-15 08:00:00	12	15	3	3	100.00	3 Section/s					
							1	0.58	0.58	12	12.58	
							2	1.51	1.51	12.58	14.09	
							3	0.86	0.86	14.09	14.95	

Modifying the entry forms for IGSN export

Core Overview

Expedition	Site	Hole	Core	Top depth	Bottom depth
1234	1	A	1 H	0 m	3 m



IGSN – International Generic Sample Number

- IGSN is a globally unique persistent identifier for physical samples
- Equivalent to DOI for publications
- Registered through designated offices (e.g. at the GFZ Potsdam)
- Sample & associated metadata findable digitally worldwide via the IGSN number

GFZ Helmholtz Centre Potsdam

IGSN Physical Sample

Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences

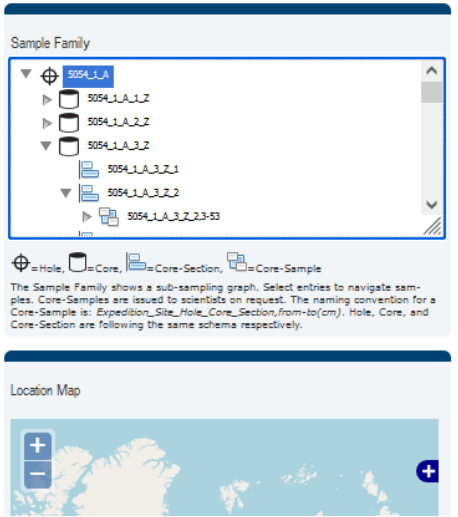
General Identifiers

Program:	ICDP
Expedition:	ICDP 5054
Type:	Hole
Name:	5054_1_A
IGSN:	ICDP5054EHW1001 (Open)
Comment:	valid alias: ICDP5054EEW1001
Parent IGSN:	N/A
Release Date:	2017-3-1

Sampling Location

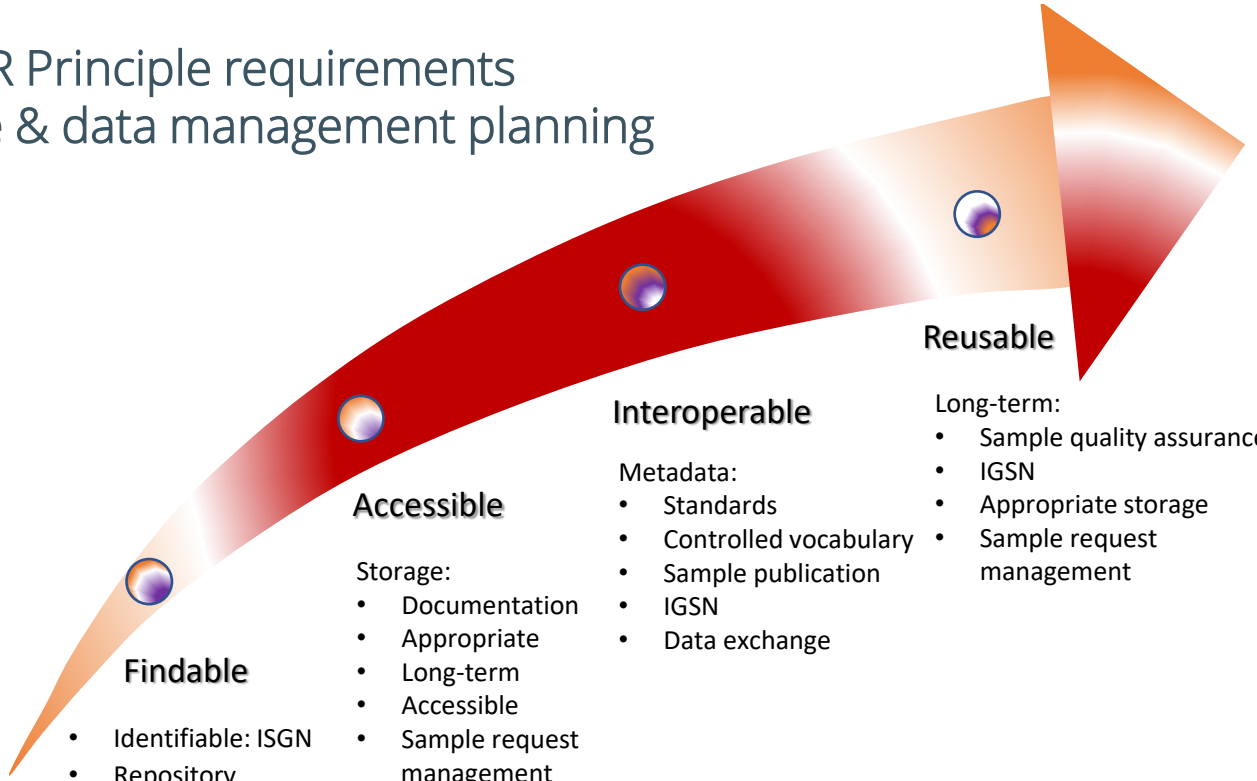
Latitude:	63.40163
Longitude:	13.202917
Coordinate System:	WGS84
Elevation:	522.51
Final Depth:	-1980.29
Location Type:	N/A
Location Name:	Åre, Jämtlands län, Sweden
Location Description:	COSC-1 is located in the vicinity of the abandoned Fröå mine
Country:	Sweden
Province:	Jämtlands län
County:	N/A
City:	Åre

Geology



https://datacite.org/igsn/

FAIR Principle requirements in sample & data management planning



Findable

- Identifiable: ISGN
- Repository
- Metadata
- Sample request

Accessible

Storage:
- Documentation
- Appropriate
- Long-term
- Accessible
- Sample request management

Interoperable

Metadata:
- Standards
- Controlled vocabulary
- Sample publication
- IGSN
- Data exchange

Reusable

Long-term:
- Sample quality assurance
- IGSN
- Appropriate storage
- Sample request management

User Management

Role	Permissions
User	view data
Operator	view and edit data
Developer	create and modify forms
System Administrator	manage user

It is also possible to define new roles and restrict permissions via custom rules

Sample Sheet – for fast data entry and label printing

Continuous Development

icdp mdis

Sample Sheet

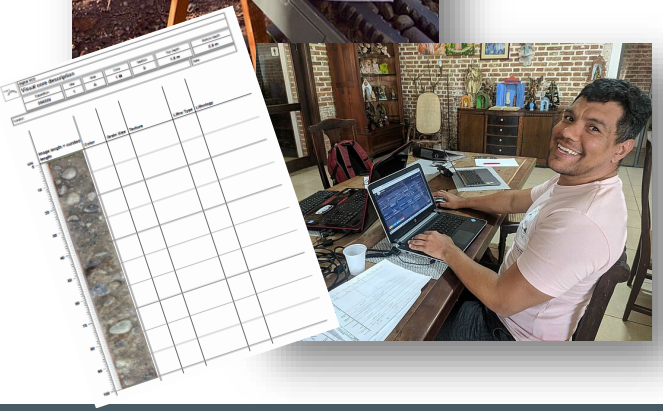
Interval (cm) | Printer | Auto Print

	Loc	Obs.	Request	Purpose	Expedition	Site	Hole	Core	Section	Half	Top	Sample Length	Bottom	Vol(%)	Comment	MBFS(m)	Sample
	DuPlo	KaHe	230223_SR-001-A CiKu	DNA	230223	1	A	2	1	WR	15	5	20	20	hungry	3.15	8
	DuPlo	Select..	230223_SR-001-A CiKu	Select..	230223	1	A	Select..	Select..	Select..			0				
		required		required				required									

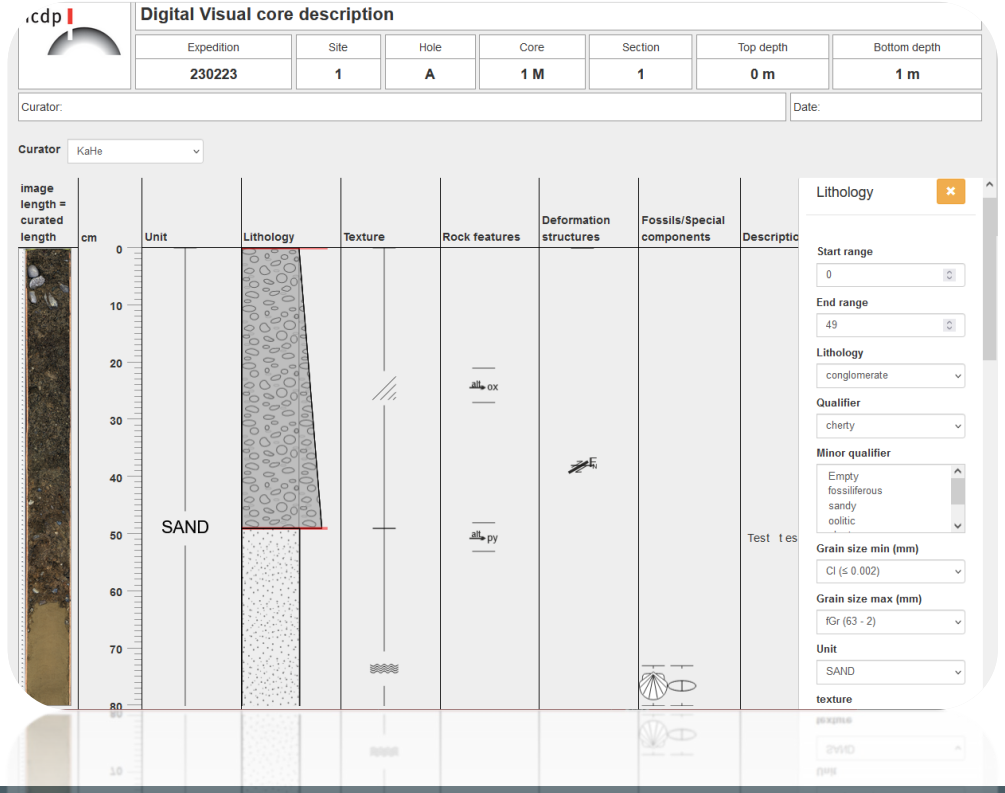
Actions

Add | Duplicate

Digital Visual Core Description (dVCD)



While you describe your core sections you simultaneously fill your data base (mDIS) and produce a sketch of your lithology. Changes are immediately applied to data, depths and the sketch.



mDIS key features and summary

- Manage all data in one database
- Modification of tables and forms without programming skills
- Upload and assign photos and documents directly to the data
- Export all data in csv-format
- Automatically generate International Geo Sample Numbers (IGSN)
- Different reports for displaying and printing data
- Print labels including a QR code for easy access and findability
- Multi-user rights management
- Integrated storage functionality

mDIS deployment and support

ICDP Expeditions

TRANS AMAZON DRILLING PROJECT
BVDP
DOVE
SWAIS2C
EGER
STAR STRAIN METER ARRAY
GRIND
icdp Nam Co Drilling Project
JET
DIVE Drilling the Ivrea-Verbano zonE
ssdp
BASE Barberton Archaean Surface Environments
DSEIS
Fennoscandian Arctic Russia Drilling Early Earth Project DEEP
oman drilling project

Repositories & cooperation

GFZ Helmholtz Centre for Geosciences
marum
BGR Bundesanstalt für Geowissenschaften und Rohstoffe
IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM
CSD Facility Continental Scientific Drilling
ECORD European Consortium for Ocean Research Drilling
universität innsbruck
AWI ALFRED-WEGENER-INSTITUT HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG