



D7.1 (B9, Activities 1-3)

- ***New components of the Scientific drilling infrastructure ECORD-ICDP;***
- ***New access to:***
 - ***analytical facilities on rock samples collected in future ECORD and ICDP drilling***
 - ***structural data from cores, logging images and discrete samples.***



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Table of contents

1.	INTRODUCTION	4
2.	NEW COMPONENTS OF THE SCIENTIFIC DRILLING INFRASTRUCTURE ECORD-ICDP	4
4.	NEW ACCESS TO ANALYTICAL FACILITIES ON ROCK SAMPLES COLLECTED IN FUTURE ECORD AND ICDP DRILLING, TO STRUCTURAL DATA FROM CORES, LOGGING IMAGES AND DISCRETE SAMPLES.....	6
5.	IMPROVED ACCESS TO THE INFRASTRUCTURE	8
6.	REFERENCES	10

1. INTRODUCTION

Activities have progressed according to schedule as far as the new components of the infrastructure and the access to the infrastructure are concerned. The implementation of laboratories to guarantee the access to analytical facilities, samples and data in Italy have been slowed down by the lengthy procedures to activate and manage calls for recruitment of personnel and purchase of equipment.

2. NEW COMPONENTS OF THE SCIENTIFIC DRILLING INFRASTRUCTURE ECORD-ICDP

2.1 European Petrophysics Consortium (EPC)

The ECORD Science Operator (ESO) is the Implementing Organisation for mission-specific platform (MSP) expeditions. ESO is a consortium of European scientific institutions formed to undertake MSP expeditions for ECORD on behalf of the Integrated Ocean Drilling Program (2003-2013) and the International Ocean Discovery Program launched in October 2013.

ESO comprises the British Geological Survey (BGS), the MARUM, University of Bremen and the European Petrophysics Consortium (EPC). The EPC is contracted to carry out logging and petrophysical activities.

The European Petrophysics Consortium (EPC) consists of the European universities of Leicester (UK) and Montpellier (France), managed from a central office located at the University of Leicester.

The EPC team provides high-level scientific and technical support to the International Ocean Discovery Program (IODP) and the European Consortium for Ocean Research Drilling (ECORD) across a range of highly diverse environments drilled by mission-specific platforms (MSPs). The EPC is responsible for the acquisition of downhole logging data and core petrophysical measurements and data interpretation for all MSP expeditions, and the development of associated research programmes. The Consortium also links into the International Logging Consortium to make its combined petrophysical expertise available to all scientists in IODP.

The EPC provides:

- Petrophysics Staff Scientists and Petrophysicists;
- Expertise for development of tailored downhole logging and core petrophysics programmes.
- Dedicated equipment to acquire downhole logging data, including a suite of slimline geophysical borehole tools (now including Quick-link combinable tools)

In the current revision of the ECORD members Memorandum of Understanding, the EPC has been expanded to incorporate a new component of expertise in seismic downhole logging and petrophysical modelling that will be provided by the National Institute of Oceanography and Applied Geophysics - OGS. The expertise provided is from the research Section of Geophysics of OGS and in particular the borehole geophysics group:

Well geophysics

The well geophysics test site (PITOP) was designed and developed by OGS with the aim of providing a facility for the study and testing of innovative geophysical methods, technologies, and well / surface tools under realistic conditions, due to the presence of 4 wells between 150 and 420 m deep, instrumented with accelerometers, geophones, and optical fibres (DAS). In addition, there are two sensor lines (geophones and DAS), buried about 50 cm deep. The facility has permanent laboratories equipped with instrumentation for recording and processing data in real-time. The site

is a resource for seismic and seismological studies, and acoustic well methodologies for the national and international scientific community.

Modelling and petrophysics

- Rock physics theory and modelling
- Fluid flow modelling
- Numerical simulation of physical phenomena
- Synthetic data

2.2 Mobile Data Information System (mDIS)

Contacts have been established with the data management of the International Continental Scientific Drilling Program (ICDP) at DFG, Potsdam (Germany), in order to set up a mechanism for the creation of a customized ITINERIS version of the Mobile Data Information System (mDIS) developed at GFZ and currently in use for sample and data logging and archiving within ICDP and ECORD (Behrends et al., 2019, Heeschen et al., 2023).

Meetings have been held with Drs Cindy Kunkel, Katja Heeschen, Knut Behrends (Data and Information Management, Geomechanics and Scientific Drilling (OSG/ICDP), International Continental Scientific, concluding that the m-DIS can be used for the purpose of ITINERIS activities 7.1, 7.2 and 7.3 and once all the contracts will be active a training course under Activity 3.6 on Digital collection and archiving of drilling data with mDIS will be offered in Italy with the purpose to present the mDIS system, and discuss with the developers the specific needs of the Italian ITINERIS scientific community for the delivery of a ITINERIS-mDIS version of the software. The training objectives will be to deepen the knowledge of scientists, technicians, and students on the parametrization of drilling sample metadata and samples across three main thematic sectors: Litho-Bio-Stratigraphy, Petrography, and Structural Geology.

2.3 Legacy Assets in scientific drilling

The JOIDES Resolution Facility Board established a Working Group on ‘Virtual Expeditions’ with the task to define the minimum requirements for a research effort to be considered a ‘virtual expedition’ and to develop recommendations for procedures related to the evaluation, endorsement, and scientific outcomes/scientific legacy of a ‘virtual expedition’.

Several partners of IODP had already established procedure to stimulate the scientific use of legacy data and samples obtained throughout the history of scientific ocean drilling:

The NSF promotes research that supports collaborations of diverse scientists and disciplines and provides training opportunities for the next generation of ocean scientists “Advancing Research in the Geosciences Using Legacy Scientific Ocean Drilling Cores”.

The Australian-New Zealand Consortium (ANZIC) has established the legacy analytical Funding (AILAF) for which grants of up to \$25,000 to researchers from our Australian & New Zealand Member institutions can be obtained to support the study of previously collected ocean drilling samples or data.

J-DESC and the Kochi Core Centre (KCC) have launched the Repository Core Re-Discovery Program (ReCoRD), aiming to generate new results by reanalysing core samples, not by individuals or small groups, but by research teams similar to science parties on drilling expeditions.

The Working Group has replaced the term “Virtual Expeditions” with Legacy Asset Projects (LeAPs), that are defined inclusively as all material, data, and infrastructure left by the previous scientific ocean drilling programs (e.g., samples, data, open drillholes, and downhole

observatories). The Working Group has recommended IODP to implement 2 Pilot Calls before the end of the current program.

The ECORD – Japan Working group for IODP³ has further considered the reasons for including legacy assets:

- expand the shore-based participation of scientists in scientific ocean drilling
- increase the value of scientific ocean drilling legacy data beyond the existing mechanisms of sample requests to core repositories
- generate data that can provide crucial information for the development of future drilling proposals
- contribute to the implementation of the FAIR data in scientific ocean drilling
- generate particularly attractive research opportunities for ECRs: from training to leadership
- reinforce the bottom-up, proposal driven, international character of scientific ocean drilling
- potential for rapid assessment

Therefore, with the fundamental contribution of the Italian scientific community triggered by the ITINERIS project, a new component of scientific drilling has been included post -2024, renamed **Scientific Projects using Ocean Drilling Archives – SPARCs**.

SPARCs are defined as Large-scale, ambitious research projects that address globally significant processes/problems using innovative, creative, and multidisciplinary approaches and collaboration related to any aspect of the 2050 Science Framework. They may contribute to the implementation of the Flagship Initiatives

The scientific ambition of SPARCs should far exceed that of standard samples requests as they are intended to provide a new avenue to facilitate collaboration at scales larger than conventional single or multi-proponent research projects.

In this context, the activities of ITINERIS have been presented in poster form in two scientific drilling scientific sessions of the two largest conferences in the field of Earth Science: American Geophysical Union Conference 2023 (San Francisco) and the European Geoscience Union (EGU) General Assembly 2024 (Camerlenghi et al., 2023 and Iadanza et al., 2024).

3. NEW ACCESS TO ANALYTICAL FACILITIES ON ROCK SAMPLES COLLECTED IN FUTURE ECORD AND ICDP DRILLING, TO STRUCTURAL DATA FROM CORES, LOGGING IMAGES AND DISCRETE SAMPLES

The activity to the date has been concentrated almost exclusively to the management of the calls for personnel to be employed on this activity and to the purchase of equipment.

3.1 Calls management

5 calls were managed (prepared jointly with the scientific reference researchers), announced, and concluded by CNR and OGS for the following positions:

Activity 7.1

The CNR Institute of Marine Science contributes to the activity of WP 7.1 and also coordinates the activities of two other CNR institutes: IGG of Pisa and IGAG of Rome. Within the activity the hiring of three fixed-term (TD) staff units was planned. A call was published on December 2022, describing the required profiles, as below:

BANDO N. 400.11 ISMAR PNRR - Selezione per titoli e colloquio ai sensi dell'art. 8 del "Disciplinare concernente le assunzioni di personale con contratto di lavoro a tempo determinato",

per l'assunzione, ai sensi dell'art. 83 del CCNL del Comparto "Istruzione e Ricerca" 2016-2018, sottoscritto in data 19 aprile 2018, di 3 unità di personale con profilo professionale di Tecnologo - III livello, presso la sede di Bologna dell'Istituto di Scienze Marine (ISMAR) del Consiglio Nazionale delle Ricerche.

The appointed Commission completed the examination work in June 2023, formulating a ranking of the applicants. The three TD staff units have been hired in September-October 2022, and after completing the month of probation two of them have been assigned to the institutions where they are supposed to carry out their research: IGG of Pisa and IGAG Roma.

Activity 7.3

Bando 33/2023 - Concorso pubblico per titoli ed esami per il reclutamento con contratto di lavoro a tempo pieno e determinato di n. 3 Collaboratori Tecnici E.R., VI livello professionale, per la Sezione di Geofisica - PNRR "ITINERIS"

Call open: 26/03/2024

Submission Deadline: 14/09/2023

3 professional qualifications:

Profilo 1 (to be located at the Dipartimento di Scienze della Terra "Ardito Desio" dell'Università di Milano): Micropaleontologia e litologia di pozzo – l'attività, che si svolgerà presso il Dipartimento di Scienze della Terra dell'Università degli Studi di Milano, consisterà nel supporto tecnico alla raccolta e archiviazione digitale di dati di micropaleontologia e litologia di pozzo ottenuti da perforazioni e campionamenti del sottosuolo a scopo scientifico. L'obiettivo è l'identificazione di dati esistenti derivati da analisi di rocce sedimentarie e campioni in riferimento al contenuto micropaleontologico, stratigrafico e litologico derivante da perforazione scientifica.

Profilo 2 (to be located at the Dipartimento di Scienze della Terra e dell'Ambiente dell'Università di Pavia): Petrografia, petrologia e geochimica di pozzo – l'attività, che si svolgerà presso l'Università degli Studi di Pavia, consisterà nel supporto tecnico alla raccolta e archiviazione digitale di dati di petrografia, petrologia e geochimica di pozzo ottenuti da perforazioni e campionamenti del sottosuolo a scopo scientifico. L'obiettivo è l'identificazione di dati esistenti derivati da analisi di rocce ignee, metamorfiche e di mantello, in riferimento alle loro caratteristiche petrografiche, petrologiche e geochimiche.

Profilo 3 (to be located at the Dipartimento di Scienze della Terra dell'Università di Firenze): Geologia strutturale – l'attività, che si svolgerà presso l'Università degli Studi di Firenze, consisterà nel supporto tecnico alla raccolta e archiviazione digitale di dati di geologia strutturale di pozzo, ottenuti da perforazioni e campionamenti del sottosuolo a scopo scientifico. L'obiettivo è l'identificazione di dati esistenti in Italia derivanti da analisi strutturale in pozzo che comprendano la descrizione e la distribuzione delle caratteristiche geometriche, l'analisi degli sforzi in-situ e dei paleo-sforzi, i parametri di perforazione e gli esperimenti di laboratorio effettuati.

The winners of the calls for Profiles 1 and 2 have started their contract on April 1st, 2024. The winner of Profile 3 is waiting for the result of the declaration of 'equipollenza' of her High School degree obtained in Brasil (in spite of having obtained a Doctoral degree in Italy).

Bando 03/2024 - Concorso pubblico per titoli ed esami per l'assunzione con contratto di lavoro a tempo pieno e determinato di n. 2 unità di personale nel profilo di Tecnologo - III livello professionale per la Sezione di Geofisica dell'Istituto Nazionale di Oceanografia e di Geofisica Sperimentale – OGS.

Call open: 29/01/2024

Submission Deadline: 28/02/2024

One of the two positions called was to serve Activity 7.3:

È richiesta una capacità comprovata da elementi oggettivi nell'acquisizione e gestione di dati e metadati geofisici, stratigrafici ed ambientali oppure nella gestione e sviluppo di hardware e software di sistemi di acquisizione o distribuiti su diversi sistemi operativi.

This call was issued after a preceding call, issued in 2023, did not receive applicants.

The evaluation of the application is in progress at the time of writing of this report.

3.2 Purchase of equipment

Activity 7.1

The ISMAR purchasing department is also in charge of purchasing the instruments for the IGG Pisa and IGAG Rome Institutes. The purchase of a QNAS, a Workstation, and a dedicated software has been accomplished in July 2023, whereas the purchase of a container dedicated to store cores has been accomplished in October 2023; for these purchases direct negotiation was adopted. The procedure for the acquisition of the remaining instruments is still underway. Although the cost and performance survey has been completed, the process is experiencing a delay due to an overload of the purchasing department because of the large number of NextGenEU (PNRR) purchase requests submitted. The delay could be quantified in about 2-3 months, but it seems it will be possible to make the purchases in direct negotiation.

Activity 7.3

Most of the equipment planned for Activity 7.3 has been purchased by OGS for laboratories sites in OGS, University of Milano, University of Pavia, and University of Florence. There is a residual need to purchase non-IT material for universities of Pavia and Milano for which the procedures are in progress.

- Borehole geophone and 3 km optic fibre cable (OGS)
- Portable and fixed digital workstations supporting data management and entry (University of Pavia)
- Digital workstation supporting data management and entry (University of Milano)
- Visors, video camera 360 degrees, large monitor supporting data visualization (University of Florence)

4. IMPROVED ACCESS TO THE INFRASTRUCTURE

Intense activity has been performed in the reporting period to increase the participation of Italian scientists, early career researchers and students in the activities of IODP, through ECORD and ICDP.

2024 has been an exceptional year in the Italian participation in scientific ocean drilling, with two Italian scientists invited to lead as co-chief scientists two IODP expeditions:

Exp. 402 Tyrrhenian Continent–Ocean Transition (9 February–8 April 2024)
Co-chief Scientist: Dr. Nevio Zitellini (CNR ISMAR Bologna).

Exp. 403 Eastern Fram Strait Paleo-Archive (4 June–2 August 2024)
Co-chief Scientist: Renata Giulia Lucchi (OGS Trieste)

In addition to the two co-chief scientists, in 2024 an exceptional number of Italian scientists have been invited to participate in the science parties of IODP expeditions:

Expedition 402 (JOIDES Resolution)

- Maria Filomena Loreto, CNR ISMAR Bologna
- Agata Di Stefano, University of Catania
- Ricardo Tribuzio (Shore based Scientist), University of Pavia
- Alessio Sanfilippo, University of Pavia
- Paola Vannucchi, University of Florence
- + 3 shore based scientists

Expedition 403 (JOIDES Resolution)

- + tbn: at least one shore based scientists

Expedition 405 (Chikyu)

- Paola Vannucchi, University of Florence
- Jonathan Ford, OGS Trieste
- Sara Satolli, University of Chieti

Expedition 406 (Mission Specific Platform, postponed to 2025)

- Valentina Rossi, (CNR IGG Pavia)

This increased access to the IODP scientific ocean drilling infrastructure has been complemented by 17 Early Career Researchers and PhD Students who benefitted from ECORD travel grants, research grants and scholarships.

In addition, Laura DeSantis (OGS Trieste) has been selected as ECORD Distinguished Lecturer in 2023-2024.

This outstanding participation has justified an increased ECORD annual fee for 2024 of 1 Million Euros, resulting from the co-participation of the MUR-CNR and the ITINERIS-CNR components.

From the ECORD/IODP project management point of view the following are the roles of Italian researchers in 2024:

- ECORD Council Chair: Annalisa Iadanza (CNR DSSTTA, Rome)
- ESSAC Office Chair: Angelo Camerlenghi (OGS, Trieste)
- ECORD Facility Board Member: Michele Rebesco (OGS Trieste)
- IODP Science Evaluation Panel: Laura DeSantis (OGS), Maria Filomena Loreto (CNR ISMAR, Bologna), Alessio Sanfilippo (University of Pavia)

The participation of Italian Scientists as PI in ICDP has seen four active projects located in Italy:

- Campi Flegrei Caldera Deep Drilling Project (CFDDP), PI Giuseppe De Natale – INGV Osservatorio Vesuviano
- Fucino sedimentary succession: longest and continuous terrestrial archive in the Mediterranean area recording the last 5 million years of Earth history (MEME), PI Biagio Giaccio, CNR IGAG
- Drilling The Ivrea-Verbano Zone (DIVE), PI (among others) Luca Ziberna, Università degli Studi di Trieste and Alberto Zanetti, CNR IGG.

- Strainmeter Array Along the Alto Tiberina Fault System (STAR), PI (among others) Lauro Chiaraluce INGV and Massimiliano Barchi, Università degli Studi di Perugia.
- Drilling Overdeepened Alpine Valleys (DOVE), PI (among others) Cesare Ravazzi, CNR-IGAG

5. REFERENCES

- Behrends, K., Conze, R., Hörner, T., Alali, O., Reckert, R., Lorenz, H. (2019): ICDP's Drilling Information System Goes Mobile (mDIS), (Geophysical Research Abstracts, Vol. 21, EGU2019-8910, 2019), General Assembly European Geosciences Union (Vienna 2019). https://gfzpublic.gfz-potsdam.de/pubman/item/item_4432894
- Camerlenghi, A., Argnani, A., Boschi, C., Casalena, G., Erba, E., Florindo, F., Giaccio, B., Kinkel, H., Iadanza, A., Sacchi, M., Schleifer, A., Tribuzio, T. and Vannucchi, P., 2023. Improving the access of Italian geoscientists to the scientific drilling infrastructures and building a database of DSDP-ODP-IODP samples-data in Italy. IN13C-0583, AGU Fall Meeting, San Francisco. <https://agu.confex.com/agu/fm23/meetingapp.cgi/Paper/1417346>
- Heeschen, K., Kunkel, C., Lorenz, H., Bender, V.B., Kuhlmann, H., and Behrends, K., 2023. News on ICDP's data management system mDIS: experiences, adaptations, and extensions after three years of field application and core repository installation. EGU23-13942, General Assembly European Geosciences Union (Vienna 2023). <https://doi.org/10.5194/egusphere-egu23-13942>
- Iadanza, A., Argnani, A., Boschi, C., Camerlenghi, A., Casalena, G., Erba, E., Florindo, F., Giaccio, B., Kinkel, H., Sacchi, M., Schleifer, A., Tribuzio, T. and Vannucchi, P., 2024. A legacy plan and an innovative access framework for the next decades of Italian geoscientists involved in scientific drilling: the role of ECORD/IODP-Italy in the ITINERIS project. EGU24-12110, General Assembly European Geosciences Union (Vienna 2024). <https://meetingorganizer.copernicus.org/EGU24/EGU24-12110>