



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



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In the framework of the **Research Infrastructures (RIs)**, scientific drilling represents a **globally ranging, distributed RI** that generates a wide variety of subsurface data. The ongoing project “**Italian Integrated Environmental Research Infrastructures System (ITINERIS)**”, coordinated by CNR, aims at building the **Italian Hub of RIs** in the environmental domain by coordinating a **network of national nodes from 22 RIs**, including the Italian participation in the European Consortium for Ocean Research Drilling (**ECORD**) and in the International Continental Scientific Drilling Program (**ICDP**). The main goal of ITINERIS is to promote **cross-disciplinary research** in environmental sciences through the **use and re-use of existing (or pre-operational) data and services** and new observations, and to address scientifically and societally relevant issues.

WP 7
Geosphere/
land surface

WP7: Geosphere and Landsurface

The aim of the WP, coordinated by OGS, is to enhance accessibility for the scientific community, the public, and decision-makers of a **rich multi-disciplinary set of open digital data on environmental observations of the Geosphere/Landsurface**. In particular:

- Building an **open archive** of digital data that recovers and integrates multidisciplinary data sets from past researches and from currently active research infrastructures.
- **Integrating Research Infrastructures** operating in different domains (such as **SMINO, ATLaS, part of EUFAR, ECORD-ICDP**);
- Testing **cutting-edge technologies** in **three pilot sites (Friuli Venezia Giulia region, Tito and Potenza in Basilicata region)**.

OGS-CRS
OGS-GEO

WP7: Main participant infrastructures

SMINO

<https://www.ogs.it/en/northeast-italy-monitoring-system-smino>

ATLaS

<https://fore.unifi.it/handle/2158/110316?mode=full.1254>

ECORD

<http://www.iodp-italia.cnr.it/index.php/it/>

and contributing to EUFAR

WP7: Objectives

Obj. 1-2 - FAIR data from the RIs

Objective 1: harmonize the data, following the international standard

Objective 2: concur to make the data FAIR (Findable, Accessible, Interoperable, and Reusable)

Obj. 3-5 - Specific for the different realms

Objective 3: focus on deep earth-drilling experiments (**ECORD, IODP, ICDP**)

Objective 4: focus on a holistic observation of the near-surface processes, integrating geochemical, geophysical, geological and seismological data (**SMINO, ATLaS**)

Objective 5: improve the multi-parameter observation of surface processes, with space-borne and airborne SAR infrastructures (**SMINO, ATLaS, EUFAR**)

The impact of ITINERIS–ECORD on the Italian geoscientists involved in scientific drilling is twofold

- 1) It will **improve access to both the ECORD and the ICDP infrastructures**. This will result in increasing national participation in terms of proposal writing, drilling expeditions/projects, initiatives to use legacy samples/data, and training activities.
- 2) It will allow the community to **collect and systematize the great amount of data** produced by Italian scientists in **past scientific drilling programs (DSDP-ODP-IODP), starting from pilot studies**. This will facilitate the **data handling and interoperability approach**.

As a result, a **thematic digital archive of ECORD/ICDP-related data** will be settled within the following thematic areas:

- ✓ micropaleontology and stratigraphy/lithology
- ✓ petrology, elemental, and isotope geochemistry
- ✓ structural geology and paleomagnetism
- ✓ borehole geophysics and site survey

The expectation is that digital data and physical samples resting in Italian laboratories having served in previous research, are archived and made available for further scientific use.

ECORD Research Infrastructure: activity with ITINERIS

- Improving access to the **ECORD infrastructure and enabling scientific drilling micro-analysis, geochemical and site survey data sharing**;
- Improving access to the **ICDP infrastructure and enabling the sharing of paleomagnetic data from scientific drilling**;
- Improving access to **IODP (and IODP³ in the future): scientific borehole geophysics, subsurface structural data, and stratigraphic/lithologic samples-data sharing**.

Selected tool for field, laboratory, and sampling data entry

The **mobile Drilling Information System (mDIS)*** developed for ICDP and now employed by ECORD

*Behrends, K., Heeschen, K., Kunkel, C., and Conze, R.: The mobile Drilling Information System (mDIS) for core repositories, EGU General Assembly 2020, Online, 4–8 May 2020, EGU2020-13663, <https://doi.org/10.5194/egusphere.egu2020-13663> (EGU2020, 2020)

Most relevant expected outcomes: potential implications for the national and international community

1. **Cutting-edge equipment** will transform national capabilities enabling enhanced sample analysis and geophysical logging for scientific drilling
2. **Next-generation and FAIR data access:** the opening of the existing and scientific drilling data will provide a unique opportunity to develop and test innovative approaches and re-evaluate scientific results. This structured and accessible scientific dataset will represent a milestone for further implementation following FAIR data principles and best practices for ongoing and future drilling projects
3. **Further developments of this digital archive** might also serve as an additional tool to be integrated within the SPARCS initiative of IODP³