



## D 3.11 Report:

**Second activity report of Activity 3.1,  
3.2, 3.3, 3.4, 3.5**



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## 1. INTRODUCTION

The deliverable 3.11 was planned to be released within the framework of the ITINERIS project and it is part of the activities of the Work Package (WP)3 concerning the training activities organized in the second year of the project by all the OUs involved.

This deliverable was expected to be released in Bimester 12 and to be included into the Intermediate Objective 3.8 of bimester 12; it is produced under the responsibility of the Operative Unit (OU) of the National Research Council, Research Institute on Terrestrial Ecosystems (CNR-IRET).

This document provides a detailed account of the training activities conducted during the second year of the ITINERIS project. The main aim of these activities is to provide a general overview of details on the organization and contents of the actions organized in the second year by the OUs involved in activities 3.1, 3.2, 3.3, 3.4 and 3.5. For each activity, the document illustrates the progress in the various actions and provides an exhaustive list of the training courses delivered and those planned with activity updates as of B13. It highlights the specific objectives, educational content, involved instructors, and target audience (IR staff, PhD students and IR staff involved in science communication). Details on evaluation methods (tests and certifications) and participant feedback are also included, demonstrating the effectiveness and quality of ITINERIS's training programme.

The document is structured in 7 chapters, including this chapter. Chapter 2 of the report describes the activities carried out by the OU CNR-IRETLE in the second year of the project with particular focus on the coordination of the WP3 activities, including updates on the progress of PhD students, who were awarded the ITINERIS Ph.D. fellowship for the XXXVIII and XXXIX PhD cycles at the five Italian universities involved in WP3, and to the ITINERIS training programme. Chapters 3-6 are dedicated to the specific activities carried out with other OUs within the different activities of the project, namely: Chapter 3 describes the actions of Activity 3.2, Chapter 4 describes the actions of Activity 3.3, Chapter 5 describes the actions of Activity 3.4 and Chapter 6 describes the actions of Activity 3.5. Finally, Chapter 7 presents the list of acronyms used in the report.

## 2. SECOND ACTIVITY REPORT OF ACTIVITY 3.1

During the second year of the project, all the activities were carried out by the OU CNR-IRETLE responsible for the activity 3.1 are reported in this chapter; these are briefly summarized in the following points:

- RTD recruitment and allocation
- Support and coordination for WP3 PhD students of the XXXVIII and XXXIX cycles
- Coordination of the Training Programme
- ITINERIS training platform and relative training catalogue

### 2.1 RTD recruitment and allocation

Regarding the fixed term staff employed in the project there are no changes in this activity compared to what was reported in the previous deliverables and reports; the same N.2 III-level technologists are currently employed in the activity: Dr. Ciotti Mario and Dr. Coli Paola. They are still allocated into the ITINERIS Training Centre in order to coordinate all the training activities, to co-organize every training events, to handle the administrative management of WP reports, and to monitor ITINERIS Training Platforms with the associated Training Resource Catalogue, accessible via the ITINERIS HUB, with the aim of provide access to the training digital object developed in ITINERIS training programme to the all users of the European Research Infrastructure (ERI).

### 2.2 Support and coordination for WP3 PhD students of the XXXVIII and XXXIX cycles

All 20 ITINERIS-funded PhD students have continued their studies and research full-time within the five Italian universities involved in WP3. They are actively engaged in their research, collecting data both in the lab and in the field. As noted in their bimonthly activity reports, they have participated in and presented at several conferences.

The Ph.D. students for the XXXVIII cycle are as follows:

- University of Napoli Federico II: Matteo Manzo, Alessia Pignatelli, and Ali Zeeshan.
- University of Pisa: Marco Chimenti, Matteo Salvadori, and Amedeo Martella.
- University of Salento: Marco Elia, Ludovico Lezzi, and Zeinab Arianpouya.
- University of Tuscia: Lucrezia Luciani, Deborah Eko Omobola, and Claudia Fiorella Huamani Cahuas.

For the XXXIX cycle, the Ph.D. students are:

- University of Salento: Alessandro Fiore, Francesco Giangrande, and Grazia Bramato.
- University of Tuscia: Laura Rubriante, Daria Ferraris, and Nour Zaher.
- University of Napoli Parthenope: Matteo Sabatini and Elena Calvo.

It should be emphasized that, Dr. Claudia Fiorella Huamani Cahuas, a PhD student enrolled in the XXXVIII cycle at the University of Tuscia, took maternity leave from March 16, 2024, to August 16, 2024. Subsequently, she resumed her PhD activities until March 2, 2025.

#### *Participation to 2nd General Meeting ITINERIS*

During this period, the WP3 Training Centre supported the ITINERIS Coordination office in management and organization of all the 20 ITINERIS PhD students' participation and their poster presentation to the 2nd General Meeting ITINERIS hold in Rome on July 9-10 2024. The support includes collecting registrations, gathering and checking the templates of posters, and sending out logistics information.

### *Participation to the ITINERIS training courses*

The main goal of the ITINERIS WP3 training program dedicated to the Ph.D students is to provide high-quality, specialized courses tailored to the specific needs of each of the five university. One of the program's key objectives is to maximize student participation by carefully scheduling courses to avoid conflicts with other academic commitments, such as scheduled classes, fieldwork, or conferences. This approach allows PhD students to balance their research and educational activities effectively.

### 2.3 Coordination of the Training Programme

The OU CNR-IRETLE has been responsible for the planning and coordination of the training activities dedicated to technical and scientific personnel of RIs, students of XXXVIII and XXXIX PhD cycles, and RIs employees focused to science communication.

This work was primarily conducted through the organization of WP3 meetings. These meetings required the participation of WP3 RTD personnel to discuss the scientific and organizational aspects of the course topics, as well as all related reporting and lateral activities.

During this period, the UO CNR-IRET also initiated an EU-level public procurement procedure to award a contract for specialized training services. This service was for the technical and scientific staff of ITINERIS infrastructures, ITINERIS PhD students, and personnel involved in science communication. The tender was divided into three functional lots and was awarded based on the Most Economically Advantageous Tender (MEAT) criteria, considering the best quality-to-price ratio within the framework of the National Recovery and Resilience Plan (PNRR).

A dedicated management system, coordinated by the UO CNR-IRETLE, was established between the WP3 RTDs and FormaLab S.R.L., the company that won the tender. This close collaboration between the RTDs and FormaLab S.R.L. was essential for:

- Lectures contracts: The lecturers identified by the RTDs were contracted through FormaLab;
- Site selection: Identifying suitable locations for the courses, taking into account both educational and logistical needs.
- Catering services: Choosing and organizing catering services, such as coffee breaks and lunches, for participants.
- Training and support materials: Producing and distributing all necessary educational materials, including gadgets, documents, slides, and other training resources provided by the lecturers.
- Logistical aspects: General coordination of all operational activities to ensure the courses run smoothly and efficiently.

This approach ensured that every logistical aspect of the training, from the venue to the materials, was handled by professionals. This allowed the scientific team to focus entirely on the quality and content of the educational programs.

### *Course Design and Methodology*

We designed all courses to meet two fundamental needs: first, to strengthen the technical, scientific, and methodological skills of staff involved in the management and development of the ITINERIS project's research infrastructures; and second, to train young and future researchers on tools and practices that are increasingly central to open and collaborative science.

Additionally, we designed flexible course formats—including online, in-person, and hybrid modalities (with both synchronous and asynchronous options)—as well as a varied methodological

approach. This included direct instruction, cooperative learning, and research/field-based projects with both individual and group work. This structure was developed to maximize accessibility and quality for all participants.

### *Evaluation and Certification*

All courses within the WP3 training program require participants to meet two criteria for completion: attending at least 80% of the lessons and successfully passing a final exam.

Participants are also required to complete a training activity evaluation questionnaire. This questionnaire is structured into six main modules with 37 questions, including 24 multiple-choice and 13 open-ended questions (Figure 2.1). The sections are organized as follows:

- Section 1: Course Objectives and General Evaluation - Evaluates overall satisfaction, achievement of objectives, relevance of content, increase in professional knowledge, innovation of topics, and usefulness for professional networking.
- Section 2: Quality of Teaching - Focuses on the clarity of presentations, instructor availability, lesson interactivity, management of group dynamics, and encouragement of discussion.
- Section 3: Educational Materials and Resources - Assesses the quality of learning materials, use of tools and technologies, and adequacy of resources like classrooms and equipment.
- Section 4: Organizational Aspects - Questions about the clarity of information provided, time management, the enrollment process, and logistics.
- Section 5: Further Course Feedback - Dedicated to suggestions on topics for deeper exploration and other observations or issues.
- Section 6: Perceived Economic Value - Asks participants to estimate the economic value of the course and their willingness to cover travel costs.

*Figure 2.1. View of the first question from the evaluation questionnaire for the FAIR Awareness Course.*

The standard final exam, with few exceptions, consists of a series of at least 10 multiple-choice questions administered directly on the ITINERIS training platform (Figure 2.2). At the discretion of the lecturers, the exam could be modular or completed on the last day of the course. All participants took the exam simultaneously (except in special cases or for asynchronous courses) and were monitored by the lecturers, the responsible WP3 RTD, and classroom tutors from FormaLab.

Participants were allowed only one attempt, and the minimum passing score was set at 70% correct answers.

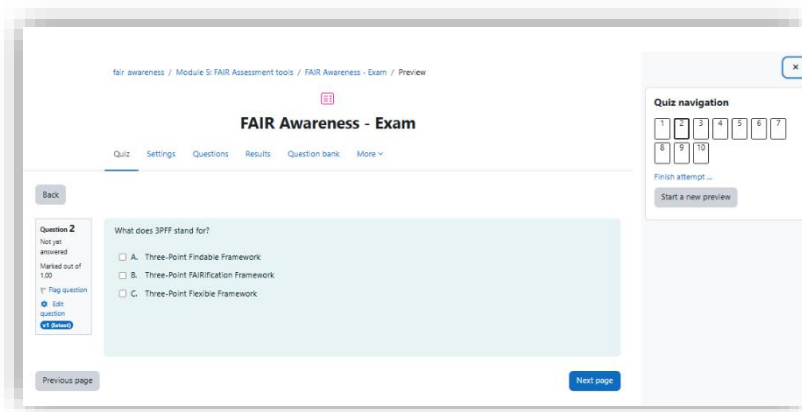


Figure 2.2. A typical exam question's structure on the platform.

Upon completion of these activities, participants who attended the course could access a Certificate of Participation, while those who also passed the final exam could download a Certificate of Achievement (Figure 2,3). Subsequently, the RTDs responsible for the courses collected the certificates and sent them to the WP3 coordinator for signature.



Figure 2.3. Example of certificates downloadable from the ITINERIS training platform

More detailed information regarding the number of participants and the results of the feedback surveys will be presented in Deliverables D3.12, D3.13, and D3.14, as well as in the final project deliverables.

## 2.4 ITINERIS training platform and relative training catalogue

The ITINERIS training platform, accessible via the ITINERIS HUB (<https://training.itineris.cnr.it/en/>), is a fundamental component of the ITINERIS project, far from being a simple e-learning portal, it represents the primary educational arm of a large-scale, nationally significant research project funded by the National Recovery and Resilience Plan (PNRR) (Figure 2.4a). Its main mission is to provide the specialized skills and knowledge necessary to enable the Italian scientific community to operate effectively within the federated system of 22 environmental Research Infrastructures (RI).

The curriculum offered by the ITINERIS platform is strategically designed to cultivate a new kind of researcher, one who combines deep scientific knowledge in a specific domain with advanced data management and computational analysis skills. The training courses are primarily categorized into two main groups: “Researchers and Technicians” and “PhD and Masters” (Figure 2.4b). The first category includes courses from activities 3.6 and 3.8, while the second encompasses those from activity 3.7. Users can visualize all the course list in the content map (Figure 2.4c) or search for courses based on their scientific domain (Figure 2.4d), and they can also find individual modules or materials by using specific keywords from their user profile or directly from the platform's content maps.

Both the WP3 RTDs and the course lecturers are able to upload and modify digital training materials and manage access for registered participants, while the CNR-IRETLE UO’s role is to regularly monitor the platform's performance, collect user feedback, and report any issues to the development company for resolution. Currently, the digital training materials on the platform are only accessible to RI personnel or PhD students who have regularly enrolled in the WP3 training courses. In the future, however, should conditions permit, the materials will be made available to a wider community of users and shared with the European nodes of the Research Infrastructures.

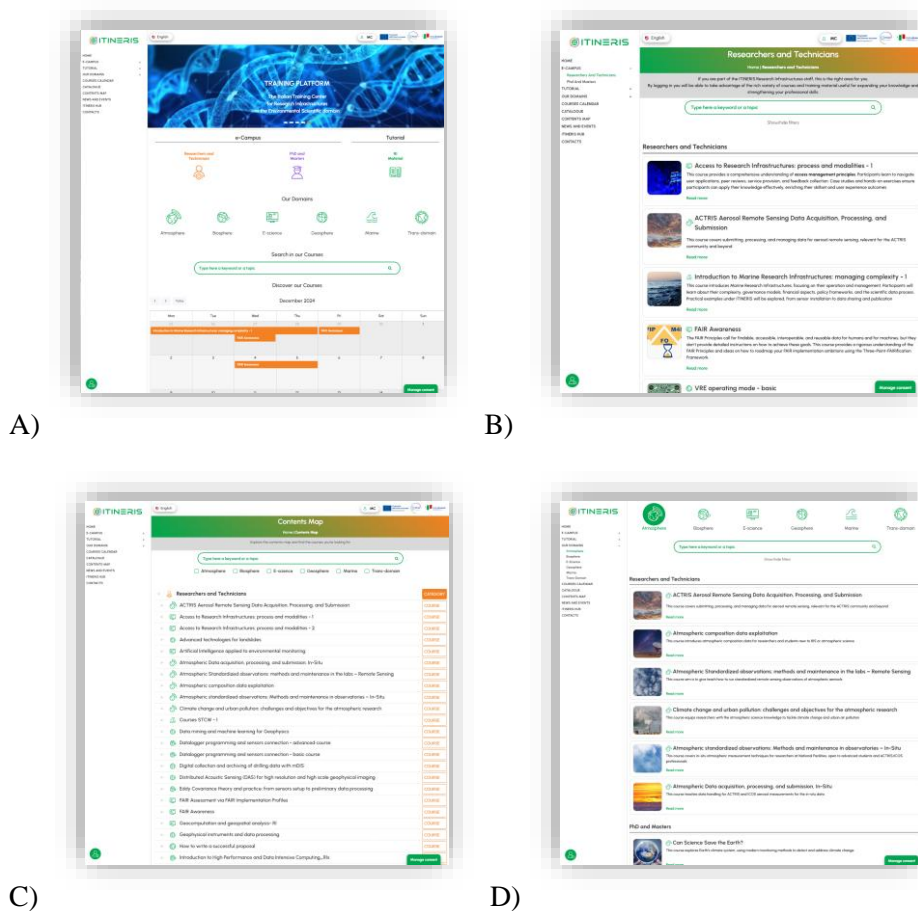


Figure 2.4. Examples of sections of the ITINERIS Training Platform, A) Homepage, B) Researchers and Technicians Area, C) Content Map, D) Atmosphere Domain section.

More information about the technical specifications and economic conditions has been reported in the previous deliverables (i.e., D3.1 and D3.8) and will be updated in future deliverables.

### 3. FIRST ACTIVITY REPORT OF ACTIVITY 3.2

Activity 3.2 focused on the co-organization and management of the training courses planned on access (WP2), as well as in the atmospheric (WP4) and solid Earth (WP7) domains. To this end, two TD units of personnel were hired at CNR-IMAA Potenza, who worked on issues related to organization of the training activities.

#### 3.1 RTD recruitment and allocation

A technologist was hired through the hiring procedure 400.1 IMAA prot. 2375, published on the 23/12/2022 for hiring 7 technologists at IMAA, one of which will be working on the WP3 activities. The selected units of personnel did not accept the position and communicated it on the 28/04/2023 and 01/05/2023. Another TD has been selected (Dr. Quinzia Palazzo) from the eligible candidates list. The new TD started the activities from the 01/12/2023.

A second unit of personnel has been hired as a researcher supporting the activities of the WP3. Dr. Alessandro Mauceri was hired through the hiring procedure 400.8 IMAA prot. 2383, published on the 23/12/2022. Dott. Mauceri started his activities on the 01/05/2023 unfortunately he quit the position and ended the working activities on the 31/08/2023. Since it was not possible to recruit personnel from the list, a new hiring procedure 400.21 IMAA prot. 0252257, was published on the 29/08/2023. The new hired personnel unit is Dr. Francesco Cardellicchio who started his activity from the 15/12/2024.

#### 3.2 Training Programme

During the second year of activity, the permanent staff of CNR-IMAA has been working to guarantee the advancement of activity 3.2 with the organization of training activities, for RI operators and future RIs research staff, on WP2, WP4 and on the solid Earth domain (in collaboration with WP7).

##### **Access and Management Courses (WP2)**

The first training related to the activity 3.2 focused on the organization and implementation of the training related to access titled: "Access to Research Infrastructures: Process and Modalities," held in Rome from October 23-25, 2025 (24 hours). To ensure high-quality training, WP2 members engaged in a detailed analysis of training needs, discussing specific topics during internal meetings. These discussions led to the identification of key challenges in access management and the structuring of hands-on sessions tailored to support RI staff in developing and optimizing their access strategies. The agenda was enriched by real-world case studies and practical exercises to reinforce the theoretical concepts. Therefore, the course was specifically designed to provide RIs staff with essential knowledge and practical skills for access management, ensuring they could effectively serve and support users while aligning with best practices. The training was delivered by two highly experienced experts in international research infrastructure access management Dr. Rosa Maria Petracca Altieri, a research technologist at CNR and Dr. Sabine Philippin, a research manager at CNRS-LAMP. The course aimed at strengthening the competencies of RI personnel about RIs access process and modalities, through examples designed to improve user experience and long-term sustainability of RI services. Furthermore, the course provided an opportunity for participants to interact with leading experts in the field, exchange experiences, and

collaborate on real-world scenarios, contributing to the strengthening of RIs access managements and policies.

A second edition of the course “Access to Research Infrastructures: Process and Modalities” is planned to take place from 18<sup>th</sup> March to 20<sup>th</sup> March 2025.

### Atmospheric Domain Courses

A second training has been organized related to the Atmospheric Domain (WP4). This training was focused on ACTRIS Aerosol Remote Sensing Data Acquisition, Processing and Submission and was held from the 11<sup>th</sup> to the 13<sup>th</sup> of November. The course provided information on modalities of data submission, processing and curation for the ACTRIS aerosol remote sensing component. The course was mainly addressed to people dealing with aerosol remote sensing observations, even outside ACTRIS. This course objective was to provide the scientific and technical background needed to be part of the Aerosol Remote Sensing component of ACTRIS. This includes being able to deal with standard operative procedures to maintain high quality, accessible, well documented, and traceable Aerosol Remote Sensing data products, including digital tools for data submission, data processing, and quality control. The course involved the expertise of six experts from the ACTRIS community, Giuseppe D'Amico (CNR-IMAA), Ina Mattis (DWD), Nikolaos Siomos (LMU), Pilar Gumà Claramut (CNR-IMAA), Claudio Dema (CNR-IMAA), Lucia Mona (CNR-IMAA). The teacher presented the theory behind the data acquisition and the operative actions to process and submit Aerosol Remote Sensing Data. Thirteen students were coming from the Operating Units involved in the WP4 activities participated (CNR ISAC and CNR IMAA) and Ph.D. students from “Università degli Studi di Napoli Federico II”. The students were involved in the atmospheric research infrastructures involved in ITINERIS (ACTRIS and ICOS). The students positively evaluate the course in the feedback survey (Figure 3.1).



Figure 3.1: images from the training course ACTRIS Aerosol Remote Sensing Data Acquisition, Processing and Submission

Other 5 training activities related to the Atmospheric domain have been planned. Here is a short list of the upcoming trainings:

- *Atmospheric composition data exploitation.* 28-30 of January
- *Atmospheric Standardized observations: methods and maintenance in the labs – In Situ.* 26-28 of May.

- *Atmospheric Data acquisition, processing and submission - In Situ.* 28-30 of May.
- *Atmospheric Standardized observations: methods and maintenance in the labs – Remote Sensing.* June 2025.
- *Climate change and urban pollution: challenges and objectives for the atmospheric research.* July 2025.

As regard the training courses designed for the Ph.D. students at the University of Naples “Federico II”, are enlisted n.2 course as reported below:

- *Can Science Save the Earth? (Optical advanced instruments for atmospheric monitoring design and operation)* – Naples, March 2025.
- *Anthropogenic activities and effects on the living environment and human health.* Naples, 2025.

### **Geosphere/Landsurface Domain Courses**

A third training was organised in relation to the Geosphere/Landsurface. (WP7).

The training courses planned for the RI staff, consist of N.5 courses that will be provided as reported below:

- *Advanced technologies for landslides.* Pisa, January 2025.
- *Digital collection and archiving of drilling data with mDIS.* Pavia, February 2025.
- *Distributed Acoustic Sensing (DAS) for high resolution and high scale geophysical imaging.* Trieste, February 2025.
- *Geophysical instruments and data processing.* Tito Scalo, the course will be activated in June, the exact starting date of the course has not yet been determined.
- *Data mining and machine learning for Geophysics.* University of Salerno (SA), the course will be activated in June, the exact starting date of the course has not yet been determined.

As regard the training programmed dedicated to the Ph.D. students of University of Pisa, the first training was titled: "*Advanced technologies for monitoring and prediction of ground instabilities*" held in Pisa from 09 to 12 December 2024 (24 hours). The course was addressed to ITINERIS Ph.D. students and attended the participants by ITINERIS Ph.D. students from UniPisa, UniBasilicata and UniFirenze. The course provides an introduction to the different landslide types and to the main characterization and numerical modelling methods of the triggering and runout mechanisms. Theoretical principles, data acquisition methodologies and application examples of the main surveying and monitoring technologies for ground displacements. Landslide Early Warning Systems on a local and regional scale, with particular reference to their temporal and spatial forecasting concerns. The course was structured around four modules:

1. Geohazards and hydrogeological risk; landslides
2. Traditional and advanced systems for landslide surveying and monitoring
3. Satellite radar interferometry
4. Landslide forecasting and warning at slope scale using displacement monitoring

The course involved the expertise of University of Florence: Veronica Tofani, Giovanni Gigli, Pierluigi Confuorto, Tommaso Carlà, Matteo Del Soldato, Federico Raspini, Emanuele Intrieri, Samuele Segoni and Tommaso Beni. Students learnt the main detection and monitoring techniques to be used for different types of ground deformation, with a focus on the rapid definition of risk scenarios in emergency situations and early warning systems. All students received a Certificate of Achievement. Student feedback on: the quality of teaching, Teaching materials and resources, Organisational aspects, Perceived economic value, Additional course feedback is very good (4.5/5).

Other 2 training activities related to the Geosphere/Landsurface domain have been planned.

- *Geophysical methods in geoscience and near surface geophysics.* University of Pisa, January 2025.
- *Geophysics and natural risks: instruments and principles of data analysis.* University of Pisa, January 2025.

## 4. FIRST ACTIVITY REPORT OF ACTIVITY 3.3

During this period, activities aimed at organizing courses for the infrastructures involved for the eScience and Terrestrial Domains were carried out. Multiple coordination meetings were held between WP3 technologists to harmonize the management of the training platform between the different domains, and the ITINERIS training platform has been updated with information on the scheduled courses.

During this period coordination meetings were held with the training support company Formalab s.r.l. for the organization and management of all the planned courses.

### 4.1 RTD recruitment and allocation

Regarding the fixed term staff employed in the project there are no changes compared to what was reported in the previous deliverables, in fact all the same third-level technologists are currently employed in the project.

### 4.2 Training Programme

#### **Terrestrial Biosphere Domain**

Regarding the training of the Research Infrastructures personnel, for all the courses the teachers, the dates and the method of delivery have been identified, and the final program of the courses is as indicated below:

- Datalogger programming and sensors connection – basic course
- Use of Isotopes in environmental investigations
- Introduction in python programming
- Introduction to High Performance and Data Intensive Computing - RIs
- Datalogger programming and sensors connection advanced
- Eddy Covariance theory and practice: from sensor setup to preliminary data processing - RIs

The course “Datalogger programming and sensors connection -base” started in December 2024, all other courses are scheduled before September 2025.

Regarding the training for Ph.D. students, courses have been defined and for half of them the delivery dates have been identified. Scheduled courses are as follows:

- Introduction to High Performance and Data Intensive Computing
- Python for Data Sciences
- Computer Vision and Machine Learning Techniques for Environment
- Eddy Covariance processing and data use
- Programming with R
- Build a project proposal

The first three courses on the list have already been included in the program for summer 2025, the remaining three courses have yet to be included in the calendar.

## FAIRness Domain (WP2)

As regard the training programmed dedicated to ITINERIS RIs personnel, the first course provided was entitled: "*FAIR Awareness*", it was held Online on November 27, 29 2024 and December 4, 5 and 11 2024 (20 Hours).

The advanced course provides a rigorous understanding of the FAIR Principles and ideas on how to roadmap your FAIR implementation ambitions using the Three-Point-FAIRification Framework. After completion of the course the trainees have been knowledgeable about the origins and history of FAIR, the problems that FAIR solves (Why do we need FAIR?), the costs/benefits of implementing FAIR, be aware of good implementation examples and of "Fake FAIR", be aware of qualitative and quantitative FAIR assessment tools, be knowledgeable on how FAIR fits into data management and data stewardship, and understand how to prioritize FAIR implementations in project proposals and roadmapping.

The course was structured around five modules:

- History and Origins of FAIR (4 hours)
- FAIR Principles (4 hours)
- FAIR Data Stewardship (4 hours)
- Good FAIR Practices (4 hours)
- FAIR Assessment tools (4 hours)

The agenda was enriched by case studies and practical exercises to reinforce the theoretical concepts. The training was delivered by 2 tutors with assistance from qualified facilitators: Dr. Erik Schultes, Senior Researcher at the Leiden Academic Center for Drug Research and Scientific Director at partners in FAIR, and Barbara Magagna, a FAIR Development and Fellowship Coordinator at GFF with a background in landscape ecology, GIS and semantics. She is trainer of the 3-Point FAIRification Framework, for which she developed core components. Thirty-two participants were following the course from most of the ITINERIS RI (ACTRIS, ANAEE, ATLAS, CeTrA, DANUBIUS, DiSSCo, eLTER, EMPHASIS, EMSO, EUFAR, IBISBA, ICOS, JERICO, LIFEWATCH, LNS, N/R Laura Bassi, SIOS, SMINO). In particular, twenty-five participant will have the opportunity to be examined by the trainers of GO FAIR Foundation for the opportunity to obtain the Certification of FIP implementers. Most of the participants received the Certificates of Achievement and Attendance. The participants feedback survey on: the quality of teaching, teaching materials and resources, organisational aspects, perceived economic value, is very good (4.2/5).

Listed below are the five additional eScience training courses to provide to RIs personnel and planned for the upcoming months:

- *FAIR Assessment via FAIR Implementation Profiles*. University of Salento,
- *Geocomputation and geospatial modelling analysis (RI)*. University of Salento, April 2025, the exact start date of the course has not yet been determined.
- *Open Science on Cloud using Jupyter Notebooks*. University of Salento, March 2025, the exact start date of the course has not yet been determined.
- *Semantic tools and Datalabs: an Integrated approach to data analysis*. University of Salento, the exact start date of the course has not yet been determined.

- *Artificial Intelligence applied to environmental monitoring.* University of Salento, the exact start date of the course has not yet been determined.

Presented below are the six eScience training courses scheduled for Ph.D. students at the University of Salento in the upcoming months:

- *Introduction to MatLab.* University of Salento, March 2025.
- *Geocomputation and geospatial modelling analysys (PhD).* University of Salento, April 2025.
- *Developing research projects in Virtual Research Environments.* University of Salento, the exact start date of the course has not yet been determined.
- *Exploring the World of Metabolomics and Metagenomics.* University of Salento, the exact start date of the course has not yet been determined.
- *Data mining and machine learning.* University of Salento, the exact start date of the course has not yet been determined.
- *Data harmonization and integration.* University of Salento, the exact start date of the course has not yet been determined.

## 5. FIRST ACTIVITY REPORT OF ACTIVITY 3.4

In the Marine Sciences Domain, the WP5 worked for the definition, organization and implementation of the training programs devoted to enhancing the skills of personnel involved in RIs, as well as the education of ITINERIS Ph.D. students (XXXIX Cycle).

### 5.1 RTD recruitment and allocation

Regarding temporary personnel with the level III Technologist profile, no changes took place in comparison to the information given in the Deliverable 3.3.

### 5.2 Training Programme

Regarding the training of the Research Infrastructures personnel, the programme was developed through the following courses:

- *Introduction to Marine Research Infrastructures: managing complexity;*
- *Marine data management and data quality control;*
- *Ship-based training initiatives in marine-related sciences;*
- *Structure of the Marine Data access at the European Level;*
- *Introduction to Marine Research Infrastructures: managing complexity (2<sup>nd</sup> edition);*
- *Marine data management and data quality control (2<sup>nd</sup> edition).*

The courses “Introduction to Marine Research Infrastructures: managing complexity” and “Marine data management and data quality control” were organized in the autumn of 2024, while all the others are planned for the summer of 2025.

Regarding the training of the ITINERIS Ph.D. students in marine sciences, the programme was developed, in collaboration with the supervisor of the XXXIX Cycle, through the following courses:

- *Autonomous instruments in oceanography;*
- *Advanced data analysis and processing techniques;*
- *Oceanographic observational and modelling products available for marine research;*
- *Software for processing meteorological and oceanographic data;*
- *Oceans and climate;*
- *Applications of dynamic systems theory in oceanography.*

“Autonomous instruments in oceanography”, “Advanced data analysis and processing techniques”, “Oceanographic observational and modelling products available for marine research” are scheduled in the winter of 2025, while the all the others are planned for the summer of 2025.

## 6. FIRST ACTIVITY REPORT OF ACTIVITY 3.5

The units of personnel of WP3 dedicated to the training programme of WP8, worked for the definition, organization and implementation of the Tran-Domains training programs devoted to enhancing the skills of personnel involved in all the RIs, as well as the education of ITINERIS Ph.D. students; a series of interdisciplinary courses have been planned for them, which will be accessible to Ph.D. students from the five universities involved in WP3.

### 6.1 RTD recruitment and allocation

Regarding temporary personnel with the Level III Technologist profile, no changes took place in comparison to the information given in Deliverable 3.3, ensuring consistency in our project's human components.

### 6.2 Training Programme

During the second year of activity, the CNR-IGG has been working to guarantee the advancement of activity 3.5 with the organization of training activities, for RI operators and future RIs research staff, on Virtual Research Environments and Cross-disciplinary Activities (WP8).

The first training related to the activity 3.5 focused on the organization and implementation of the training related to access titled: "*VRE operating mode - BASIC*" held in Pisa from December 09-12, 2025 (24 hours). The course was addressed to RI staff and user communities.

The trainers provided concepts on digital objects, FAIR principles for research products and scientific data repositories, VRE usability (from data collection to data analysis to publication of results), practical sessions on data analysis, cloud storage principles and addressed possible needs of the ITINERIS VREs. The course involved the expertise of CNR-ISTI (Massimiliano Assante, Luca Frosini, Lucio Lelii, Francesco Mangiacrapa, Alfredo Oliviero, Marco Procaccini, Gian Luca Vannini) and CNR-IGG (Eugenio Trumpy). During the course, the teachers propose "hands-on" sessions, which are appreciated by the participants. The eighteen participants, from eLTER, EMSO, CeTrA, SIOS, ATLaS, EuroArgo, SMINO, ECORD, DiSSCo, received a Certificate of Achievement; their feedback on: the quality of teaching, Teaching materials and resources, Organisational aspects, Perceived economic value, Additional course is very good (4.5/5).

Other 4 training course related to the VRE domain have been planned for RI personnel. Here is presented the list of the upcoming trainings:

- *Safety in the field work related to RIs (towers climbing and hiking principles)*– Pisa. 04-07-23 of March.
- *How to write a successful proposal*- Pisa. March 2025.
- *Use open scientific infrastructure facilities and VRE* - Pisa. April 2025..
- *Safety in the field work related to RIs (fire risk and sea activities)* Pisa – 26 -30 April.

As regard the advanced training courses in trans-domain dedicated to all the ITINERIS Ph.D students, the list of the incoming training is presented below:

- *How to present your activities and results (i.e. how to prepare a poster, a presentation etc.)* – Lecce, 19-21 March 2025
- *How to present your activities and results (i.e. how to prepare a poster, a presentation etc.)* – *In Situ*. The exact start date of the course has not yet been determined.
- *Use open scientific infrastructure facilities and VRE – Basic*. Pisa. April 2025..

- *Use open scientific infrastructure facilities and VRE – Advanced. Pisa. April 2025..*
- *Safety in lab and field work related to RIs. Pisa. 14 -17 January 2025*
- *Safety in lab and field work related to RIs. Pisa. 12 -15 May 2025*

## 7. LIST OF ACRONYMS

ERI: European Research Infrastructure

FAIR: Findable, Accessible, Interoperable and Reusable

GFF: GO FAIR Foundation

GIS: Geographic Information System

OU: Operative Unit

RI: Research Infrastructure

VRE: Virtual Research Environments

WP: Work Package