WP4 Atmosphere

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ITINERIS Italian Integrated Environmental Research Infrastructures System

WP4: Atmosphere

5 Research Infrastructures: **2** developed in the **ESFRI context** and therefore strongly linked to the European context but also cooperating with international and global initiatives +….

ACTRiS

Produces high-quality data and information on short-lived atmospheric constituents and on the processes leading to the variability of these constituents in natural and controlled atmospheres.

www.actris.eu

ICOS Integrated Carbon Observation System

Produces standardised, high-precision and long-term observations and facilitate research to understand the carbon cycle and to provide necessary information on greenhouse gases.

www.icos-cp.eu

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5 Research Infrastructures: …+ 2 EU RIs + 1 National RI

EUFAR

Facilitate and promote transnational access to national research aircraft and instruments.

www.eufar.net

SIOS

Supports long-term measurements in and around the Norwegian archipelago of Svalbard addressing Earth System Science questions.

https://sios-svalbard.org

Develops advanced analytical methods and produces high-quality data for identification, quantitative determination and micro-to-nano scale imaging of trace and ultra-trace chemical species in environmental matrices

https://www.unive.it/pag/42456

WP4: Participants in the WP

- CNR-IMAA
- CNR-ISAC-Bologna
- CNR-ISAC-Lecce
- CNR-ISAC-Lamezia Terme
- CNR-ISMAR-Roma
- CNR-ISP-Bologna
- INFN-Firenze
- INFN-Genova
- Università Ca' Foscari Venezia

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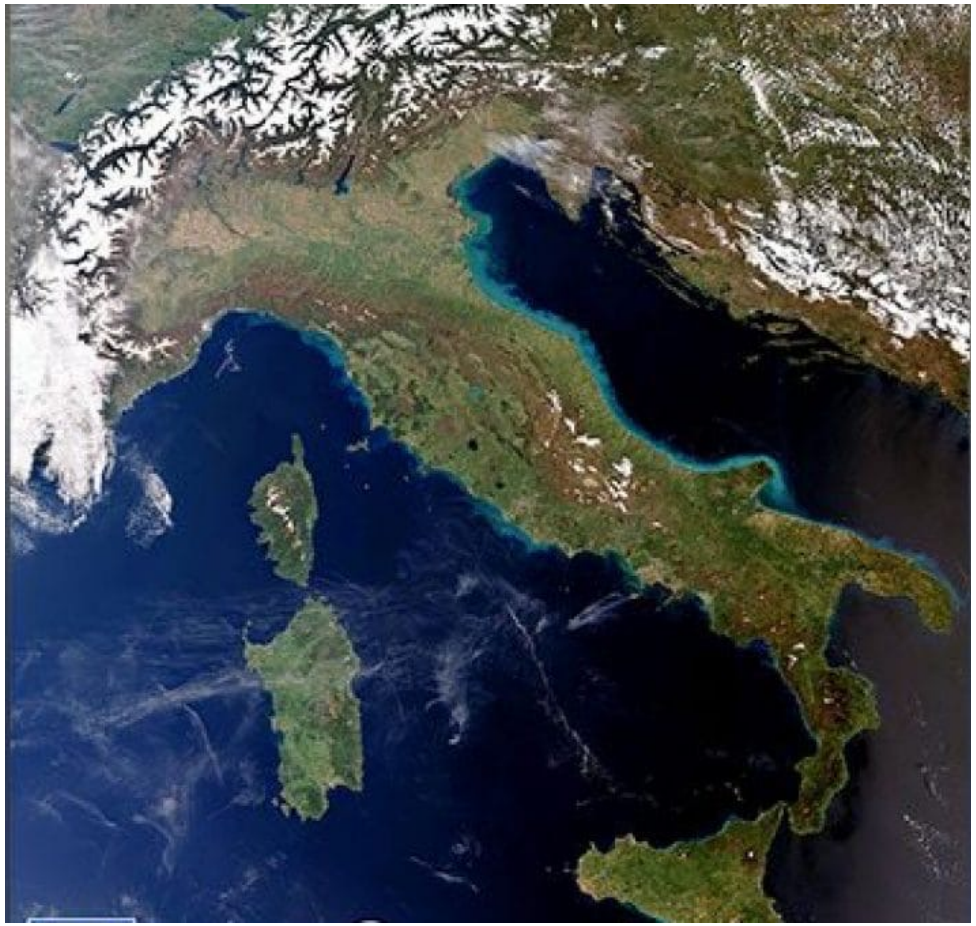

Italy is particularly interesting for atmospheric investigations and conditions, among other reasons because:

- ❑ located in a hot spot for climate change : the Mediterranan Region
- ❑ is a thin stripe of land in the Sea
- ❑ one of the highest populated areas in Europe
- ❑ Po Valley is an hot spot for air pollution

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Italian scientific community replied to these needs and interests being really active and relevant at international level, among the other activities, but not only limited to, through EU projects participation.

Role in the Central Facilities

- ❑ Head Office
- ❑ Data Center for aerosol remote sensing
- ❑ Aerosol remote sensing Central Facility
- ❑ Aerosol in situ Central Facility

Role in the ICOS Monitoring Station Assembly for Atmosphere stations

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ATMO ACCESS
Access to Atmospheric Research Facilities

Relevant roles in EU H2020 projects like:

Access to Observatories + services for satellite vaidation

RI Implementation

ACTRiS IMP

e-shape

Pilot service for volcanic ash

FAIRness of data

ENVRI FAIR

ARCTIC PASSION

INFRA Pilot service for Arctic wildfires

Pilot services for air quality

RI URBANS

Contracts and collaborations with for example:

Atmosphere Monitoring Service
atmosphere.copernicus.eu

Climate Change Service
climate.copernicus.eu

EUMETSAT

esa

NASA

WMO

This is the perfect «environment» for sustainable developments and networking at national level and boosting the Italian leadership role in the field of Atmospheric investigation through the ITINERIS project

WP4: Summary of the activities

The goal

establishment of a national integrated system for atmospheric observations to address the current national and international open topics on atmospheric characterization and impacts on several sectors from climate change to human health, from agriculture to renewable energy production

Through:

- **integration of RIs** in the atmospheric domain through synergistic approaches and cross boundaries developments
- **reinforcing data** collection and provision of Italian atmospheric RIs
- **linkages with extra-RI** atmospheric data and services
- **Pilot service** developments in **hot topics** as demo of added value of synergistic approach

WP4: Objective 1

Integration and harmonization within the Italian Network of Environment Ris

Final goal: develop potentialities for a synergistic approach between the different RIs.

How?

- ❑ Providing data which complement the different Ris
- ❑ Portable instruments for test cases, campaigns and users applications
- ❑ Back-up for instruments and main components for supporting efficient data provision at RI sites
- ❑ Complementing instruments at observational sites for synergistic approaches and advanced data products provision
- ❑ Enhanced distributed system for atmospheric data availability, data stream and data provision

WP4: Objective 2 Pilot service on Aerosol types and sources

Final goal: provide advanced and robust information on the aerosol types and sources (e.g. desert dust, carbon-related aerosols, anthropogenic and secondary particles, marine and bioaerosol) based on the integration of different components (remote sensing, near surface and chamber techniques) distributed over the ITINERIS sites.

How?

- ❑ Enhancing existing methodologies
- ❑ Using advanced statistical methods
- ❑ Acquiring relevant observations in different atmospheric and controlled environments
- ❑ Exploring synergistic and complementary approaches transversal to RI and observational components

WP4: Objective 3 Pilot service on Planetary Boundary Layer height and its impact on aerosol and trace gases concentration at ground

Final goal: providing a tool for the determination of atmospheric boundary layer height and describing the impact of ABLH on aerosol and trace gases concentration near the surface

How?

- ❑ Optimizing methods based on Artifical Intelligence techniques for the ABLH determination
- ❑ Using advanced observational capability at ITINERIS sites
- ❑ Collecting data related to greenhouse gases, reactive gases and atmospheric aerosol provided by the environmental RIs
- ❑ Evaluating the optimal strategy for developing specific tools to connect dynamics of the atmosphere and air quality

WP4: Objective 4 Pilot service on impact of natural and anthropic fires on atmospheric composition

Final goal: provide a tool for the determination of the impact of natural and anthropogenic fires on atmospheric composition (aerosol and gases) and structure

How?

- ❑ detecting the occurrence of open fire plumes
- ❑ combining observations carried out at ground-based sites of the RI
- ❑ making use of enhanced observational capability achieved at National level in ITINERIS
- ❑ providing impact assessment of the emissions

WP4: Most relevant expected outcomes

Enhancement of the provision of atmospheric **synergistic products** and **provision** of the **resources for addressing open issues** about atmospheric state, processes and knowledge about related risks and impacts

- Digital resources and systems for NRT data monitoring and provision
- Improved observational capability of the Italian atmospheric component
- Provision of advanced data products related to hot topics in atmospheric science:
  - Aerosol Typing
  - Boundary Layer characterization
  - Fires emissions
- Build on a young- researcher community in the atmospheric field

WP4: Inter-relation with other WPs

WP4 is linked to:

- ❑ WP2, for improving FAIRness and making data and products accessible in the ITINERIS hub
- ❑ WP2 for accessing Atmospheric RI resources
- ❑ WP3 for training activities.
- ❑ WP8 for exploring and making WP4 data interactively exploitable through VRE tools

Links are expected with WP5 and WP6 for the natural exchange processes between the atmosphere and marine and terrestrial ecosystems.