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ICOS RI Highlights

- » Providing harmonised European-wide measurements on carbon cycle, on greenhouse gas emissions and on atmospheric concentrations of greenhouse gases
- » Integrating pan-European networks of high-precision atmosphere, ecosystem and ocean observations
- » State-of-the-art infrastructure for the European research community, policy makers and public
- » Central Facilities for data processing, quality control, calibration, instrument development and training
- » Reliable data curation and open data access through the Carbon Portal



Contact us

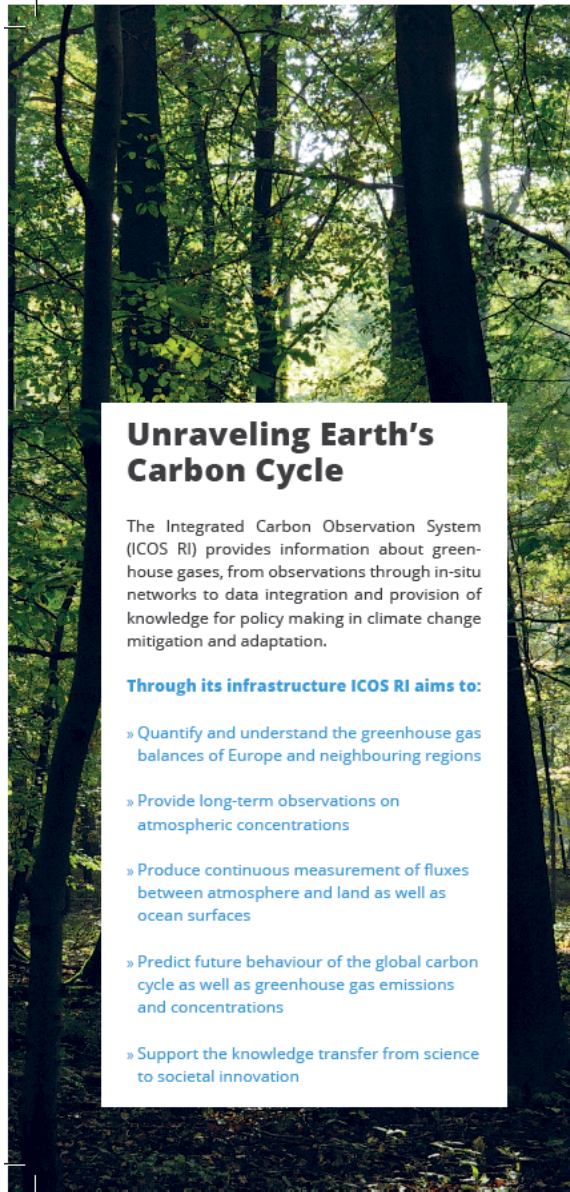
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More information on ICOS RI data
can be found at www.icos-cp.eu.

Knowledge Through Observations





Unraveling Earth's Carbon Cycle

The Integrated Carbon Observation System (ICOS RI) provides information about greenhouse gases, from observations through in-situ networks to data integration and provision of knowledge for policy making in climate change mitigation and adaptation.

Through its infrastructure ICOS RI aims to:

- » Quantify and understand the greenhouse gas balances of Europe and neighbouring regions
- » Provide long-term observations on atmospheric concentrations
- » Produce continuous measurement of fluxes between atmosphere and land as well as ocean surfaces
- » Predict future behaviour of the global carbon cycle as well as greenhouse gas emissions and concentrations
- » Support the knowledge transfer from science to societal innovation

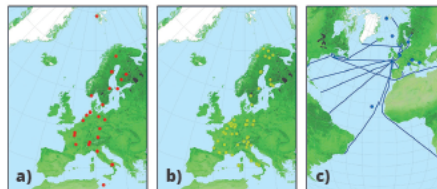
Why we monitor greenhouse gases

The global cycles of carbon and greenhouse gases have been disturbed by human emissions, leading to more greenhouse gases in the atmosphere and to climate change. This will feed back to the natural carbon sources and sinks in the biosphere. In order to support accurate and informed policy decisions long-term integrated observations on natural processes and human emissions are essential.

Why we need reliable data

In the past, measurements of greenhouse gases in Europe have suffered from heterogeneity, discontinuity and lack of sustainability in the long term. Continuously providing standardized and automated high precision measurements is therefore a key focus of the ICOS RI. Comparability of data is obtained through the use of measurement protocols and standardized instrumentation.

ICOS National Networks for atmosphere (a), ecosystem (b) and ocean (c) measurements



ICOS

INTEGRATED
CARBON
OBSERVATION
SYSTEM

Pan-European measurements

ICOS RI integrates atmosphere, ecosystem and ocean greenhouse gas observational networks in order to provide the data for a full European carbon balance and its trends. Standardized measurements are carried out throughout Europe - at tall atmospheric towers and ecosystem sites from the Arctic to the Mediterranean, as well as on ocean platforms and vessels covering the North Atlantic, the Mediterranean Sea and the Baltic Sea.

Pan-European facilities

Each network is coordinated by its Thematic Centre responsible for data integration and processing, centralized quality control, network training and data transmission. **ATC - Atmosphere Thematic Centre** is based in France and Finland, **ETC - Ecosystem Thematic Centre** is based in Italy, Belgium and France and **OTC - Ocean Thematic Centre** is based in Norway.

The **CAL - ICOS Central Analytical Laboratories** are based in Germany and provide accurate reference gases to the networks and perform high precision analyses of air samples.

The **Carbon Portal** is ICOS RI's central data portal based in Sweden, which makes all ICOS data freely available and produces higher-integrated knowledge products.



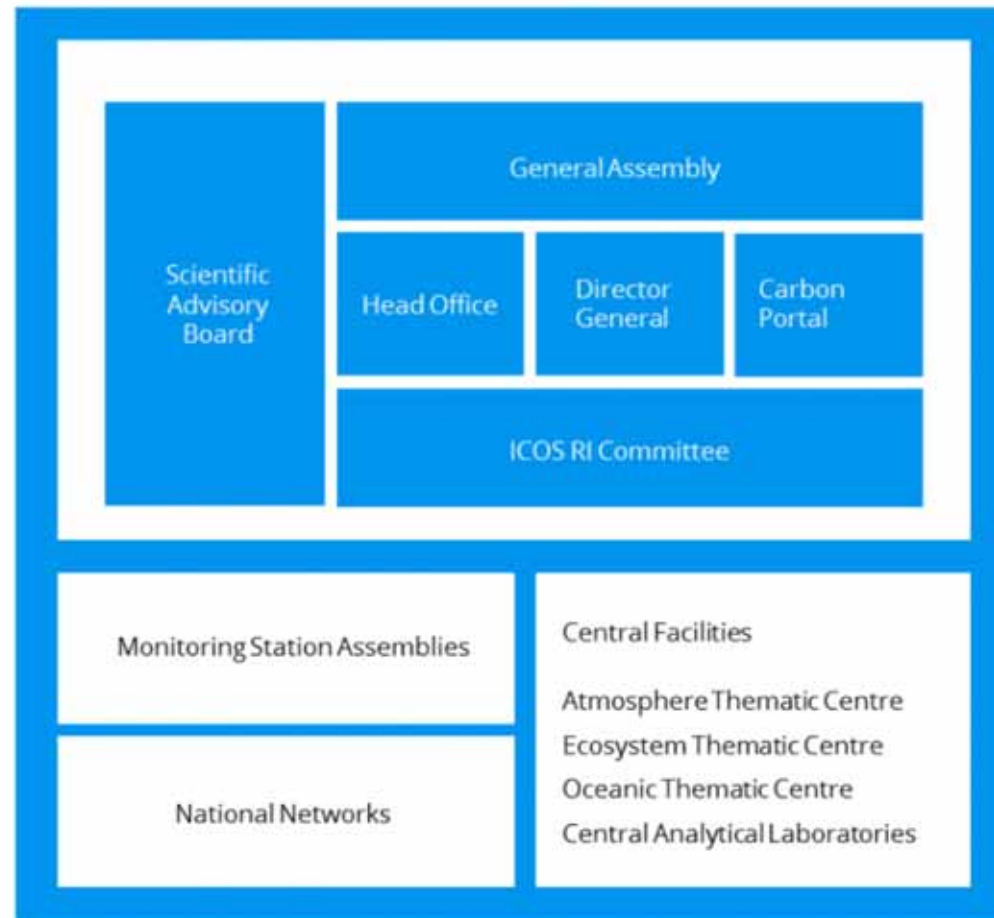
ICOS has received the official ERIC status on 20 November 2015
Involved Countries so far



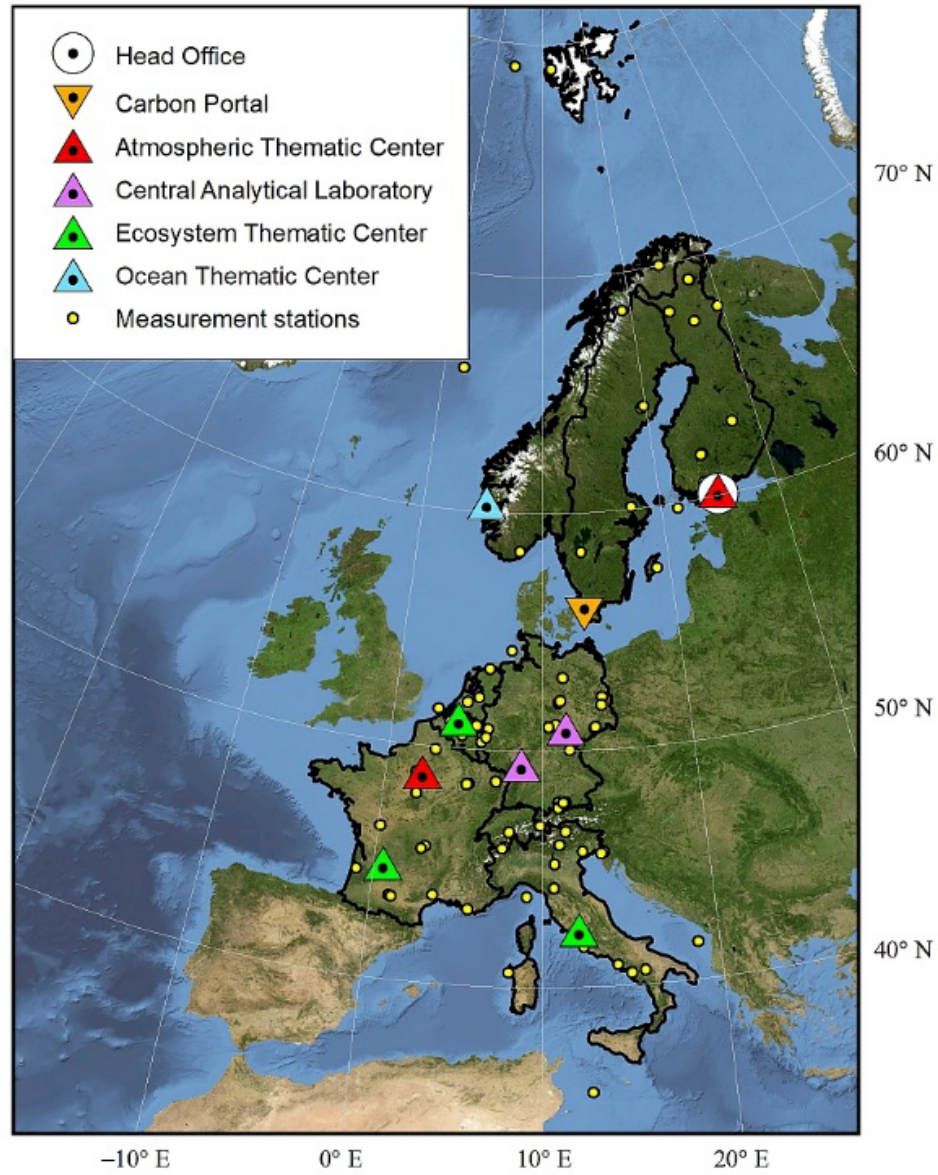
ICOS – Integrated Carbon Observation System

General Organisation of ICOS: 1° pillar → ICOS ERIC (top); 2° pillar → ICOS Research and Measurements (bottom)

In the 2° pillar, the CFs collect and process the data measured at the Network stations, providing technical support. The Ecosystem Thematic Centre (ETC) is one of the CFs



ICOS RI Nodes



ICOS NATIONAL NETWORKS

ICOS NATIONAL NETWORKS ARE COORDINATED BY THE FOCAL POINTS.



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ICOS NATIONAL NETWORKS

IN ICOS RESEARCH INFRASTRUCTURE AN EXTENSIVE NETWORK OF STANDARDIZED AND INTEGRATED NATIONAL ATMOSPHERIC, ECOSYSTEM AND MARINE STATIONS, SUPPORTED BY ICOS CENTRAL FACILITIES AND ICOS CARBON PORTAL, FORM THE BASIS FOR ADVANCED CARBON CYCLE RESEARCH IN EUROPE.



The backbone of ICOS RI are the national networks consisting of atmospheric and ecosystem stations across Europe and marine stations covering North Atlantic and European marginal seas. At the moment there are more than 100 ICOS RI stations. The ICOS National Networks will gradually expand as more stations are integrated into ICOS RI.

[FIND CONTACT FOR YOUR ICOS NATIONAL NETWORK](#)

Atmospheric stations measure continuously the greenhouse gas concentrations of CO₂, CH₄, CO and isotopocarbon-CO₂ in the atmosphere due to regional and global fluxes.

Ecosystem stations measure fluxes of CO₂, CH₄, H₂O, and heat together with ecosystem variables needed to understand the processes behind the exchange of energy and greenhouse gases between the ecosystems and the atmosphere.

Marine stations consist of a network of ships and fixed stations monitoring the carbon exchange between the surface ocean and the atmosphere, acidification of oceans, surface temperature, salinity and other variables.

[ICOS STATION NETWORKS](#)

[ICOS RI MEMBER COUNTRIES](#)

ICOS Station Networks



ICOS RI has more than 100 measurement stations in twelve European countries. These stations measure greenhouse gas concentrations in the atmosphere and fluxes over the terrestrial and marine ecosystems. The ICOS stations are run and funded by the national funding agencies, institutes and universities, demonstrating an impressive joint effort to enable research for climate change.

The map shows the current ICOS stations for atmospheric, ecosystem and ocean measurements in the initial phase.

[JOIN US](#)

Find out more about ICOS National Networks

[▶ ICOS BELGIUM](#)

[▶ ICOS NETHERLANDS](#)

[▶ ICOS FINLAND](#)

[▶ ICOS SWEDEN](#)

[▶ ICOS FRANCE](#)

[▶ ICOS SWITZERLAND](#)

[▶ ICOS GERMANY](#)

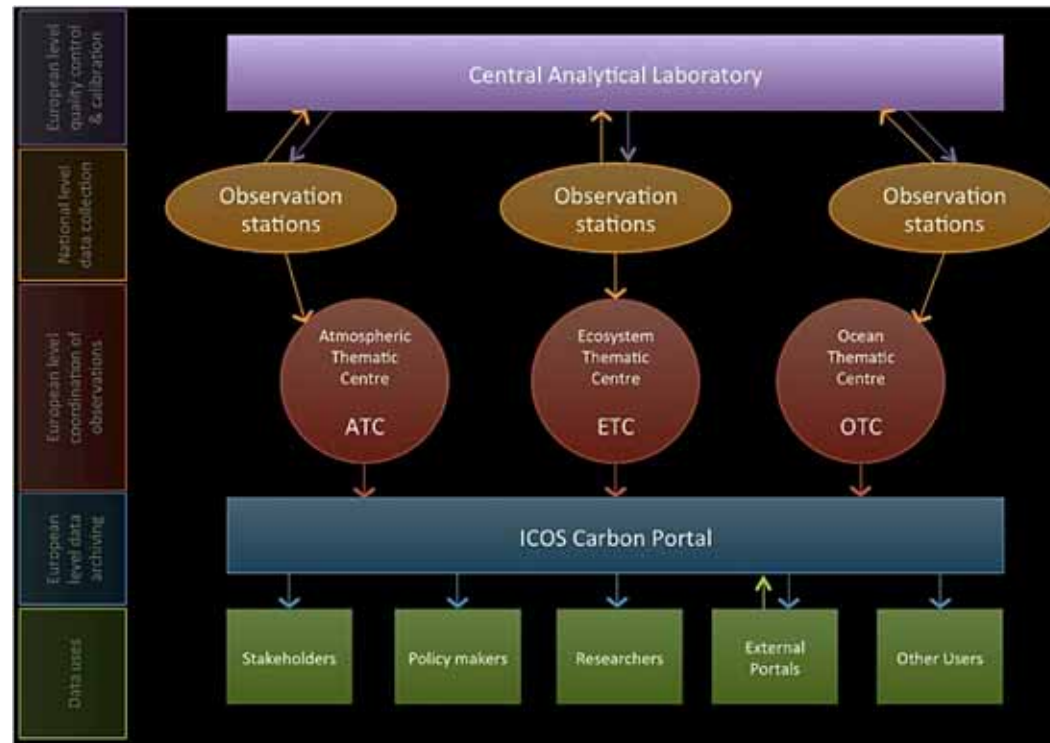
[▶ ICOS UNITED KINGDOM](#)

ICOS Ecosystem Thematic Center (ETC)

Director: Dario Papale

[slide alternativa]

The Ecosystem Thematic Center (ETC) gives technical support, coordinates the data collection and protocols standardisation, and is in charge of data processing.



ICOS Ecosystem Thematic Center (ETC)

- Standardization = compatibility of observational data.
- The ICOS National Networks → monitoring the functioning of land ecosystems and the exchange of energy and greenhouse gases between the ecosystems and the atmosphere.
- They are coordinated by the ETC, responsible for:
 - on-line processing of data;
 - instrument development;
 - data processing, including metadata, vegetation and soil characteristics, disturbances, etc. → different data levels.
- The ETC is coordinated and operated by the [University of Tuscia](#) and the [euro-Mediterranean Center on Climate Change](#) in Viterbo, Italy, the University of Antwerp ([Research Centre of Excellence on Plant and Vegetation Ecology](#)) in Belgium and the [National Institute for Agricultural Research](#) in Bordeaux, France.



ICOS Italia (JRU)

Consiglio Nazionale delle Ricerche (CNR)

Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC)

Università degli Studi della Toscana

Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA)

Agenzia Nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (ENEA)

Agenzia Regionale per la Protezione Ambientale (ARPA) della Val d'Aosta

Università degli Studi di Udine

Fondazione Edmund Mach (FEM)

Università Cattolica di Brescia

Università Libera Di Bolzano

Università degli Studi di Sassari

Università degli Studi di Padova

Università degli Studi di Genova

Istituto Nazionale Oceanografia (OGS)

Provincia Autonoma di Bolzano

Ricerca Sul Sistema Energetico (RSE)





ICOS Italia (Key people)

Coordinator JRU: Enrico Brugnoli (CNR)

Vice-coordinator JRU: Carlo Calfapietra (CNR) also Italian

FOCAL POINT

Administrative Responsible JRU: Isabella Vitali (CNR)

Dario Papale: Director ETC

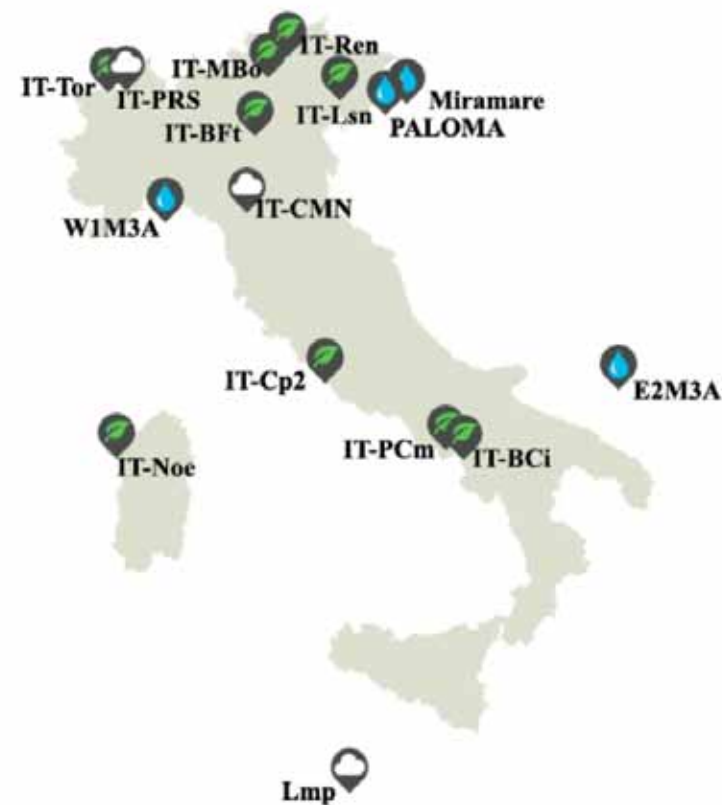
Members General Assembly: Salvatore LaRosa (MIUR),
Gelsomina Pappalardo (CNR), Antonio Bombelli (CMCC)

www.icos-italy.it/

ICOS Italia (stations)



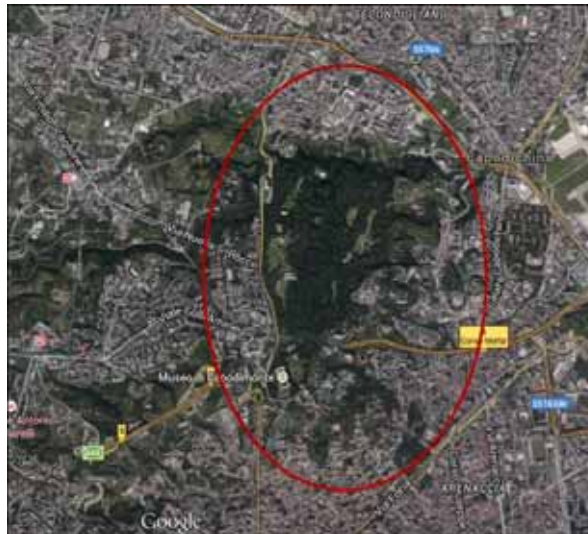
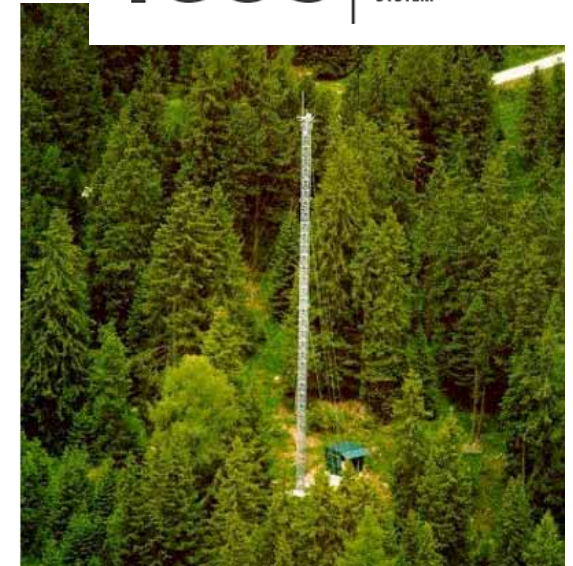
STATION	TYPE	CLASS	PI
Castelporziano2	ECO	Class 1	Silvano Fares
Borgo Cioffi	ECO	Class 1	Enzo Magliulo
Renon	ECO	Class 2	Leonardo Montagnani
Pramaggiore	ECO	Class 2	Andrea Pitacco
Monte Bondone	ECO	Class 2	Damiano Giannelle
Capodimonte	ECO	Associated	Carlo Calfapietra
Arca di Noè	ECO	Associated	Donatella Spano
Bosco Fontana	ECO	Associated	Giacomo Gerosa
Torgnon	ECO	Associated	Edoardo Cremonese
Collelongo	ECO	Associated	Giorgio Matteucci
Bonis	ECO	Associated	Giorgio Matteucci
Beano	ECO	Associated	Alessandro Peressotti
Monte Cimone	ATM	Class 1	Paolo Cristofanelli
Lampedusa	ATM	Class 1	Giorgio di Sarra
Plateau Rosa	ATM	Class 2	Francesco Apadula
Potenza	ATM	Class 1	Lucia Mona
Lamezia terme	ATM	Associated	Claudia Calidonna
Lecce	ATM	Associated	Daniele Contini
Monte Curcio	ATM	Associated	Francesca Sprovieri
Capo Granitola	ATM	Associated	Angela Marinoni
Ny Alesund	ATM	Associated	Vito Vitale
Miramare	OCE	Class	Michele Giani
Paloma	OCE	Class	Anna Luchetta
E2M3A	OCE	Class	Vanessa Cardin
W1M3A	OCE	Class	Roberto Bozzano
Lampedusa	OCE	Associated	da definire



More sites hopefully implemented with the 14M€ project PROICOS_MED

Ecosystem Stations

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CARBON
OBSERVATION
SYSTEM



Capodimonte Park eddy covariance station, Naples

GHG concentrations and fluxes at the end of the summer 2015 in ICOS site of Capodimonte
(net CO₂ uptake by urban ecosystem)

