

INTEGRATED CARBON OBSERVATION

Integrated Carbon Observation System in Belgium

www.icos-belgium.be





ICOS Objectives

ICOS, the Integrated Carbon Observation System, is a European Research Infrastructure that provides long-term observations for better understanding the carbon cycle and greenhouse gas emissions above Europe. ICOS enables prediction of the future climate and the evaluation of activities aimed at the mitigation of climate change.

ICOS Research Infrastructure

An extensive network of standardized and integrated atmosphere, ecosystem and ocean monitoring stations forms the backbone of the ICOS Research Infrastructure.

- Atmosphere Network: more than 30 atmospheric tall towers measuring greenhouse gas concentrations.
- Ecosystem Network: more than 60 monitoring stations measuring exchanges of greenhouse gases and energy between terrestrial ecosystems and atmosphere, and ecosystem variables.
- Ocean Network: more than 20 observation platforms measuring carbon exchange between sea surface and atmosphere, and water characteristics.

networks are available via the Carbon Portal ICOS data.

∧ ES Dori

Each network is coordinated by its **Thematic Centre** responsible for data collection and processing, standardization of measurement protocols and support and training of the ICOS community.

ICOS is coordinated centrally by the **Head Office** in Finland

the ecosystem network. It forms the **Ecosystem Thematic Centre** together with the University of **Focal Point**, representing and coordinating the



 $\bullet \bullet \bullet$ INTEGRATED CARBON OBSERVATION SYSTEM

A central role for the University of Antwerp

ICOS Belgium Partners



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ICOS Belgium

is involved in all three ICOS observation networks: the Ecosystem, the Ocean and the Atmospheric Network

K ES Brasschaat

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The Ecosystem Network

The Ecosystem Network monitors the exchange of greenhouse gases and energy between ecosystems and the atmosphere. Fluxes are measured using the eddy covariance technique (flux towers) and automated chambers. Meteorological data are recorded at high frequency and complemented with soil climate and additional vegetation information.

Ecosystem Stations (ES)

UAntwerp : ES Brasschaat, a Scots pine forest and since **1997** ES Vielsalm, a mature mixed forest, are two of the ULG since **1996** longest running and most complete flux monitoring stations in the world. In Brasschaat air pollution is additionally monitored in collaboration with INBO. In Vielsalm VOC fluxes are additionally monitored.

ULG ES Lonzée is a four year rotation agricultural since 2004 cropland typical for central Belgium with one of the longest and most complete data series on cropland in Europe.

ES Lochristi is an 11 hectares short-rotation coppice UAntwerp since **2010** plantation of fast-growing poplar trees. The trees are harvested every 2-3 years for the production of electricity or heat. It is the only bioenergy plantation in the ICOS network.

ULG **ES Dorinne** is an intensive grassland grazed by Belsince **2010** gian Blue cows. Experiments are being conducted to better understand the management impact on carbon dioxide (CO_2) and methane (CH_4) fluxes.

ES Maasmechelen is located in Belgium's only UAntwerp since 2015 national park 'Hoge Kempen' and covers a heather vegetation ecosystem, unique within the ICOS network. Together with the cutting edge UHasselt Ecotron infrastructure, ES Maasmechelen makes up the Field Research Centre.



The Ocean Network

The Ocean Network monitors the carbon exchange between the sea surface and the atmosphere as well as surface temperature, salinity, dissolved carbon dioxide (CO₂) and chlorophyll-a.

Ocean Stations (OS)

- VLIZ OS RV Simon Stevin is a research vessel that operates in the Belgian part of the North Sea and adjacent seas, measuring CO₂ fluxes between the sea and atmosphere.
- OS VLIZ Thornton buoy is a time series marine VLIZ since 2014 station located at the C-Power Thornton wind turbine farm. Its aim is to collect data that will help describe the biogeochemical status of the Belgian coastal waters.

OS RV Belgica is a multidisciplinary oceano-RBINS since 1984 graphic research and monitoring ship with a main focus on the North Sea environment that continuously registers seawater and meteorological parameters.



The Atmospheric Network

The Atmospheric Network measures the concentrations of CO₂, CH₄, CO and radiocarbon-CO₂ in the atmosphere due to regional and global fluxes.

Atmospheric stations (AS)

BIRA **AS Ile de la Réunion is an**

atmospheric observatory in the Indian Ocean performing both total column and in situ ground measurements of greenhouse



gases. The station is hosted by the Belgian Institute for Space Aeronomy (BIRA) together with French partners LSCE and Université de La Réunion.



The ICOS monitoring stations are open to researchers from outside the ICOS community who would like to conduct complementary research on-site and/or use the ICOS data for free. Contact us via info@icos-belgium.eu.