

The services and products provided by ICOS

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ICOS is the European Integrated Carbon Observing System that performs standardized, long term, high precision and high quality observations on the Carbon Cycle and Greenhouse Gas budgets and their perturbations. All services and products of ICOS revolve around this primary objective. Since its conception around 2006 and its legal establishment as ICOS ERIC in 2015, ICOS has been working towards becoming an operational network that is extremely relevant to Climate Change science and policies. The three domains Atmosphere, Ocean and Ecosystem consist of networks of currently total 131 highly standardized stations, organised as 12 national networks. Central facilities for each of the 3 domains and the Central Calibration Laboratories provide services that ensure the quality of the observations and process the observational data from the raw data towards quality controlled Near Real-Time and final data products, working in close cooperation with the assemblies of the station managers. All ICOS data products are made available through the central ICOS data portal, the Carbon Portal, that together with ICOS Head Office forms the ICOS ERIC.

This presentation will inform you of the progress of the operational network, and the current and planned services and data products that ICOS delivers to its users. Users are of course ICOS station managers and technicians, scientific users from inside and outside the ICOS community; but also citizen scientists, students, the general public and policy makers are important target users. We foresee that ICOS data will play an important role to inform society on the progress in mitigation of Climate Change due to emission reductions of greenhouse gases, for example in the framework of the Paris agreement. Also ICOS data will provide important insights in the development of the natural and managed land related GHG fluxes under the influence of ongoing climate change that feeds into the Earth System. International efforts like WMO, GEO, UNFCCC and IPCC are important channels for the ICOS data and services.

The Carbon Portal has been designed as FAIR data system *avant la lettre*. This to ensure that all ICOS data is made available for open access, can be found easily, is fully traceable and complete with all relevant associated descriptive metadata that adheres to the community standards. This will ensure that the data can be re-used for all possible applications any time in the future and is interoperable with other (environmental) data and services. The Carbon Portal is also built as community platform for working on elaborated data products that use the ICOS data together with other data, using sophisticated computer models, and again publishing these scientific results with high added value to an ever increasing user base. Some initial examples of this kind of elaborated data and services will be shown as well.