

International Network Activity ICOS: Long-Term Observation System for Carbon Cycle and Greenhouse Gas Emissions

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- ICOS is a new European Research Infrastructure for quantifying and understanding the greenhouse balance of the European continent and of adjacent regions.
- Coordination: Philippe Ciais, CNRS, France
- Core Team (National Points of Contact):
 -  **Finland**, Timo Vesala, University of Helsinki
 -  **Germany**, Martin Heimann, Max-Planck-Gesellschaft & Ingeborg Levin, University of Heidelberg
 -  **Italy**, Riccardo Valentini, University of Tuscia
 -  **Netherlands**, Han Dolman, Vrije University
 -  **United Kingdom**, John Grace, University of Edinburgh
 -  **Belgium**, Reinhart Ceulemans, Universiteit Antwerpen & Ramon Garcia-Gallardo, SJ Berwin LLP
 -  **Czech Republic**, Michal Marek, Ústav systémové biologie a ekologie AV CR, v.v.i.
 -  **Ireland**, Frank McGovern and Philip O'Brien, Environmental Protection Agency EPA
 -  **Denmark**, Kim Pilgaard, Forskningscenter Risø, Danmarks Tekniske Universitet
 -  **Norway**, Daniel Rasse, Norwegian Institute for Agricultural and Environmental Research BIOFORSK
 -  **Portugal**, Joao S. Pereira, Instituto Superior de Agronomia, Universidade Técnica de Lisboa
 -  **Spain**, Maria José Sanz, Fundación Centro de Estudios Ambientales del Mediterraneo
 -  **Sweden**, Anders Lindroth, Lunds universitet
 -  **Switzerland**, Nina Buchmann, Eidgenoessische Technische Hochschule





- Collaborative European proposal and concerted research plan
- Support through ESFRI, the European Strategy Forum on Research Infrastructures (approved: Oct. 2006)



each participating group must seek funding from its own national research funding agencies



ICOS-D Germany:

- Martin Heimann (MPI, Jena): EU-Contact
- Ingeborg Levin (U. Göttingen): Atmosphere
- Arne Körtzinger (IFM-GEOMAR): Ocean
- Werner Kutsch (vTI): Ecosystems





Mission statement

TERENO
TERRESTRIAL ENVIRONMENTAL OBSERVATORIES

- To provide the long-term observations required to understand the present state and predict future behavior of the global carbon cycle and greenhouse gas emissions.
- To monitor and assess the effectiveness of carbon sequestration and/or greenhouse gases emission reduction activities on global atmospheric composition levels, including attribution of sources and sinks by region and sector.

source: <http://www.icos-infrastructure.eu>



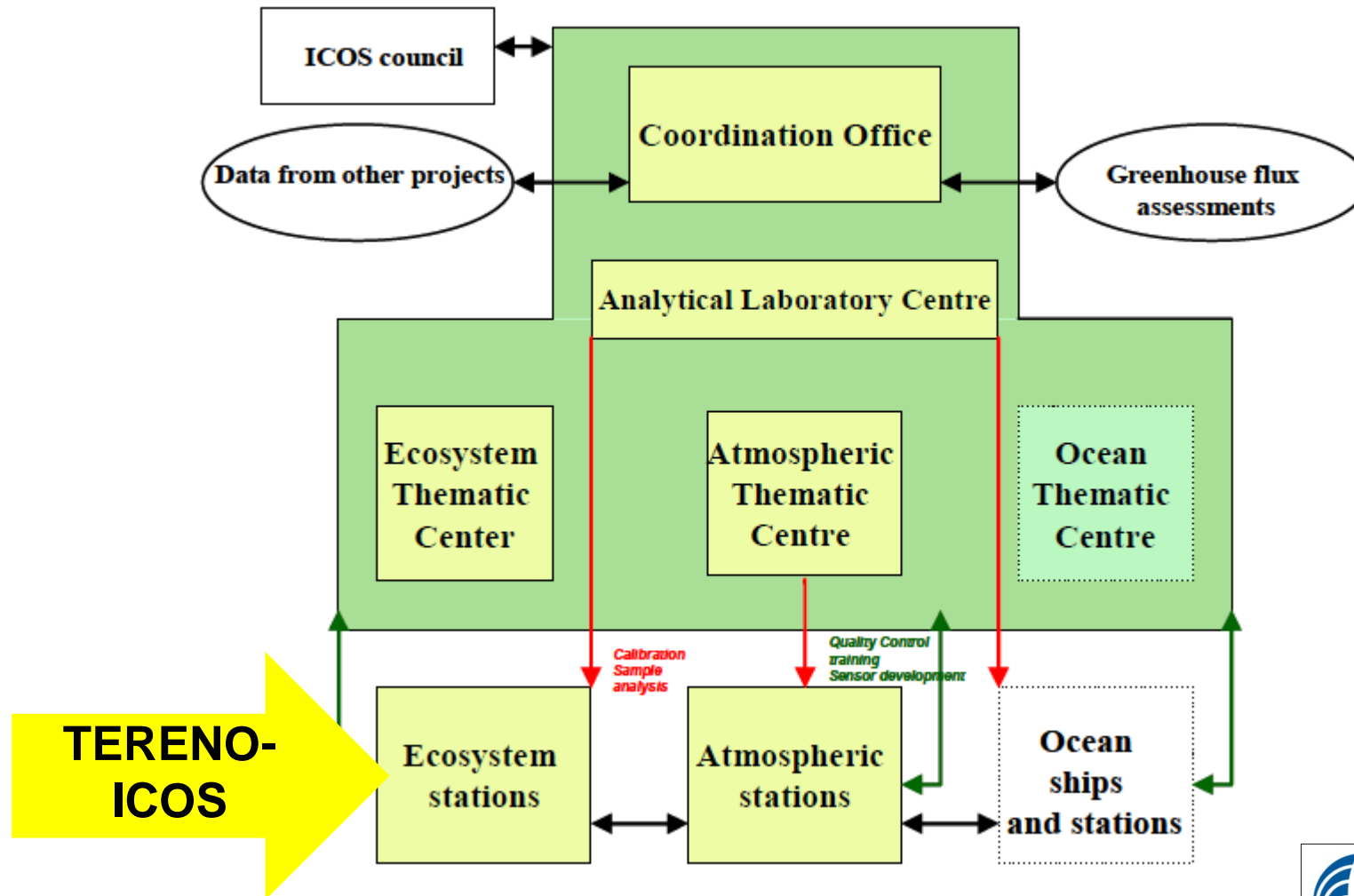


Why is ICOS needed?

- The **data provided by ICOS are highly valuable for integrative scientific studies.** The fluxnet initiative, for example, has shown that regional and global integrations of flux data can provide completely new insights into ecosystem functioning.
- **ICOS data and related products** will also have important implications for climate change policy. **Ecosystem data will help to improve the methods of GHG inventories that have to be reported to UNFCCC** the understanding and developing the capacity for GHG management in ecosystems. Atmospheric data, particularly the ^{14}C data will be an important independent tool to confirm reductions of anthropogenic GHG emissions.
- Public stakeholders will have **free access to all ICOS data and products**, e.g., for educational purposes.
- The **research facilities of ICOS will be open for other research groups** that conduct field research on GHG observations and fluxes. Thus, the different platforms of ICOS-D can serve as condensation cores for further and deeper research on processes underlying the global carbon cycle.

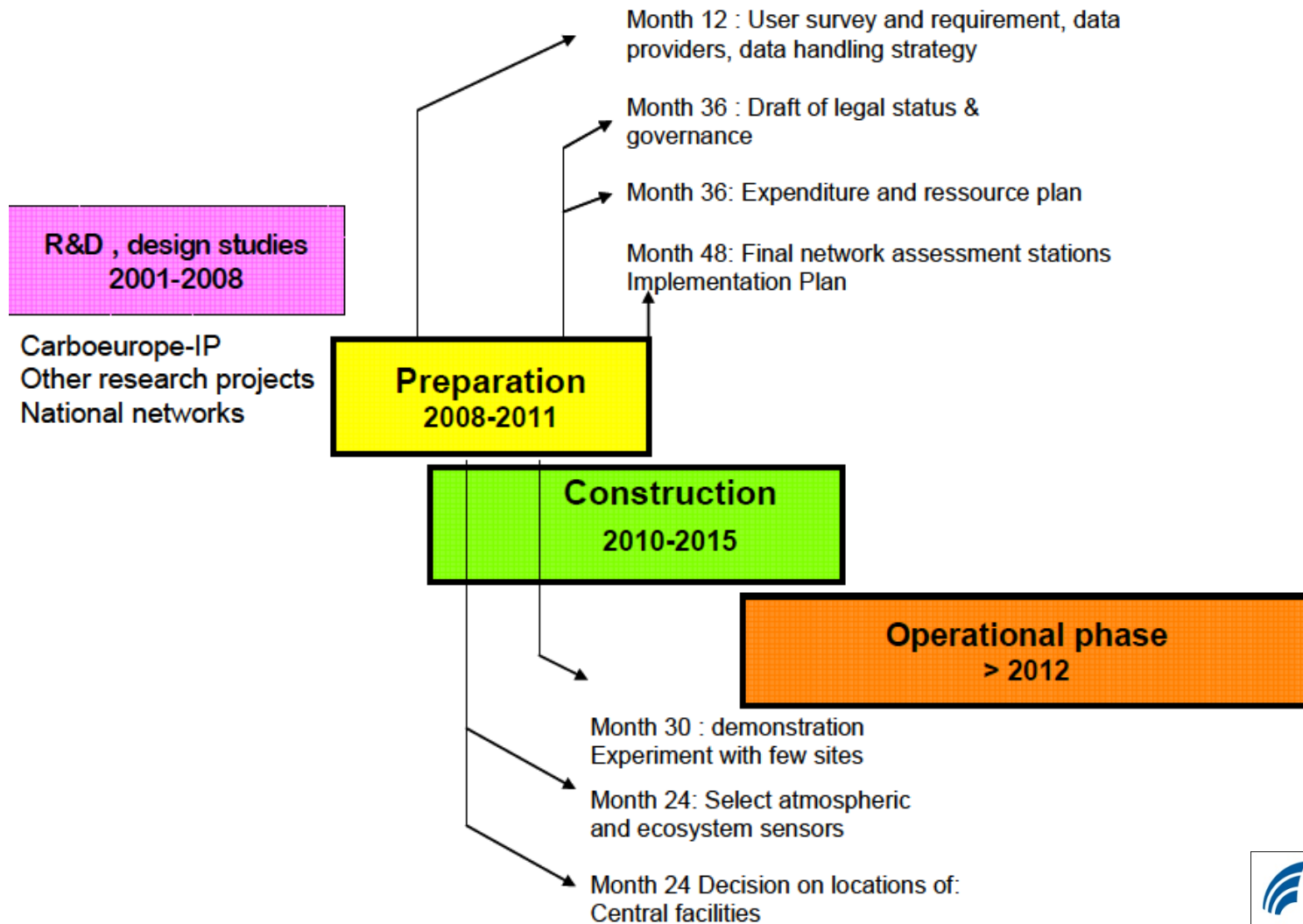


ICOS Building Blocks





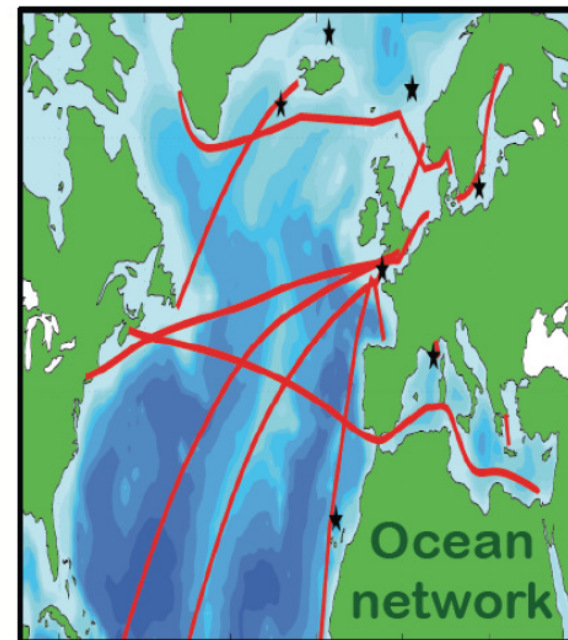
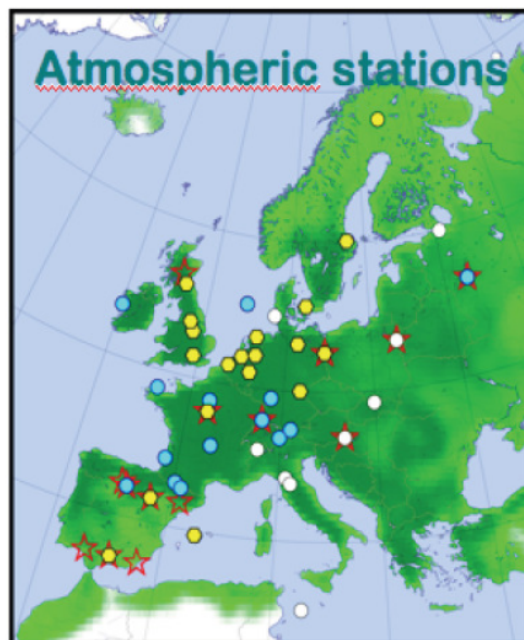
ICOS Time Line





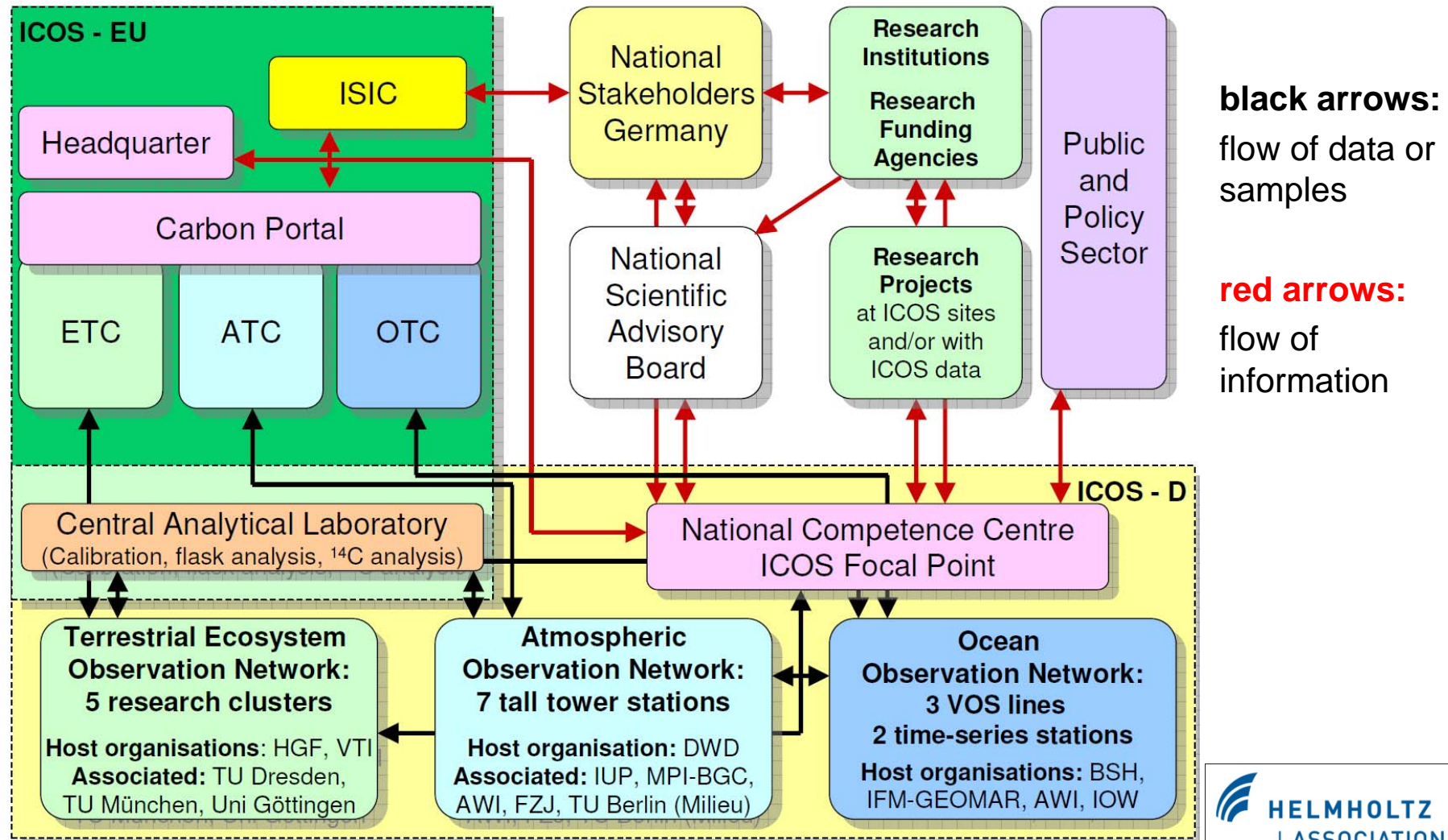
ICOS-EU Observation Network

Provisional maps of the level-1 networks



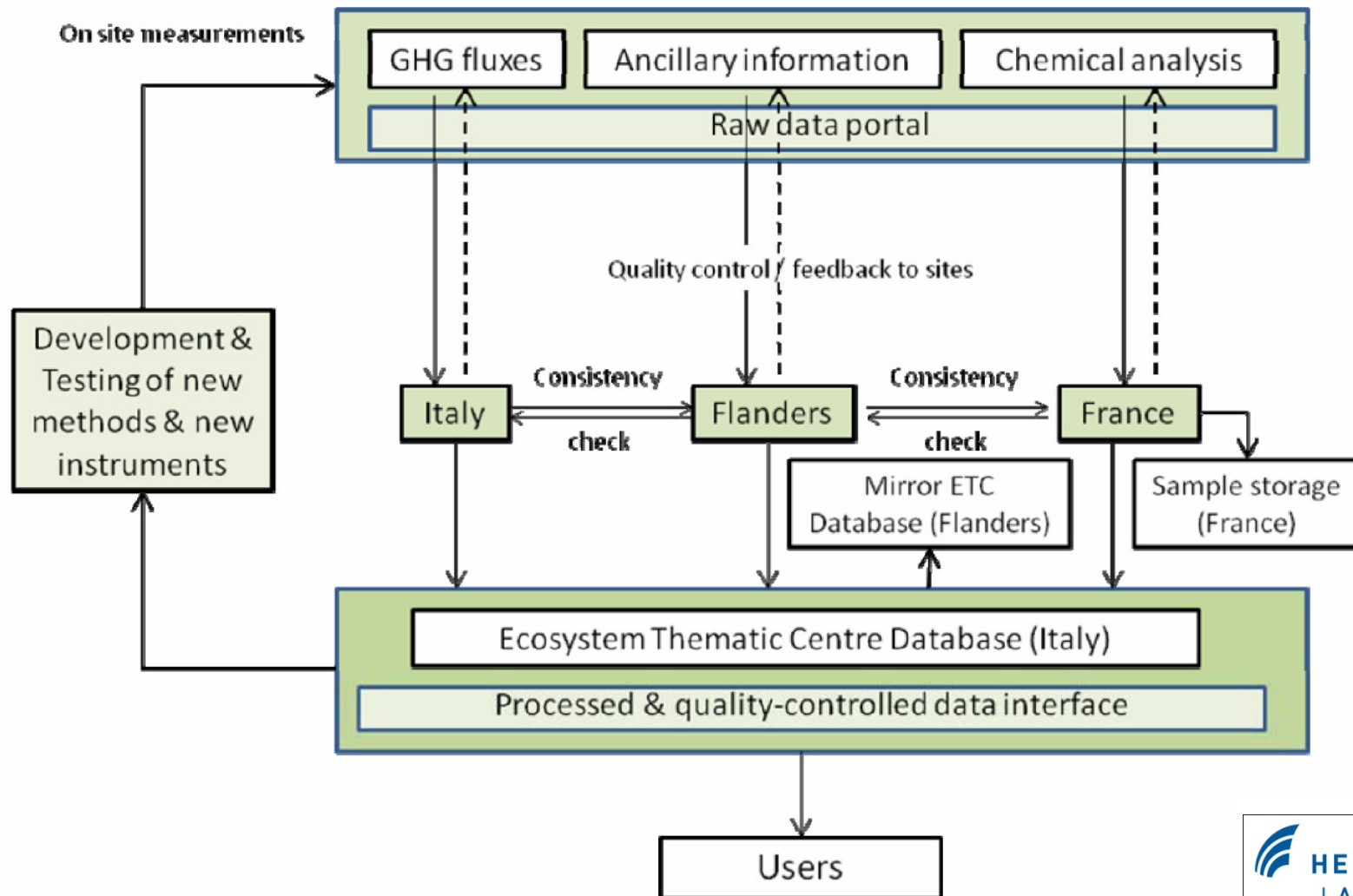


ICOS-D within ICOS-EU





ICOS Ecosystems Structure (proposed)





Ecosystem Thematic Centre (ETC)

@ Univ. of Tuscia, Viterbo (I)

The ETC is the central facility for the ecosystem programme and partly financed by the national programmes. The ETC will have 5 major objectives:

- 1) **Coordination, training and technical assistance** for the Ecosystem network
- 2) **Data calculation, quality control and processing**
- 3) **Ancillary information and central laboratory**

Data needed to verify measured gas fluxes and to understand interannual variation or potential trends. Ancillary information will be quality controlled by specialists working within the ETC in France and Flanders.

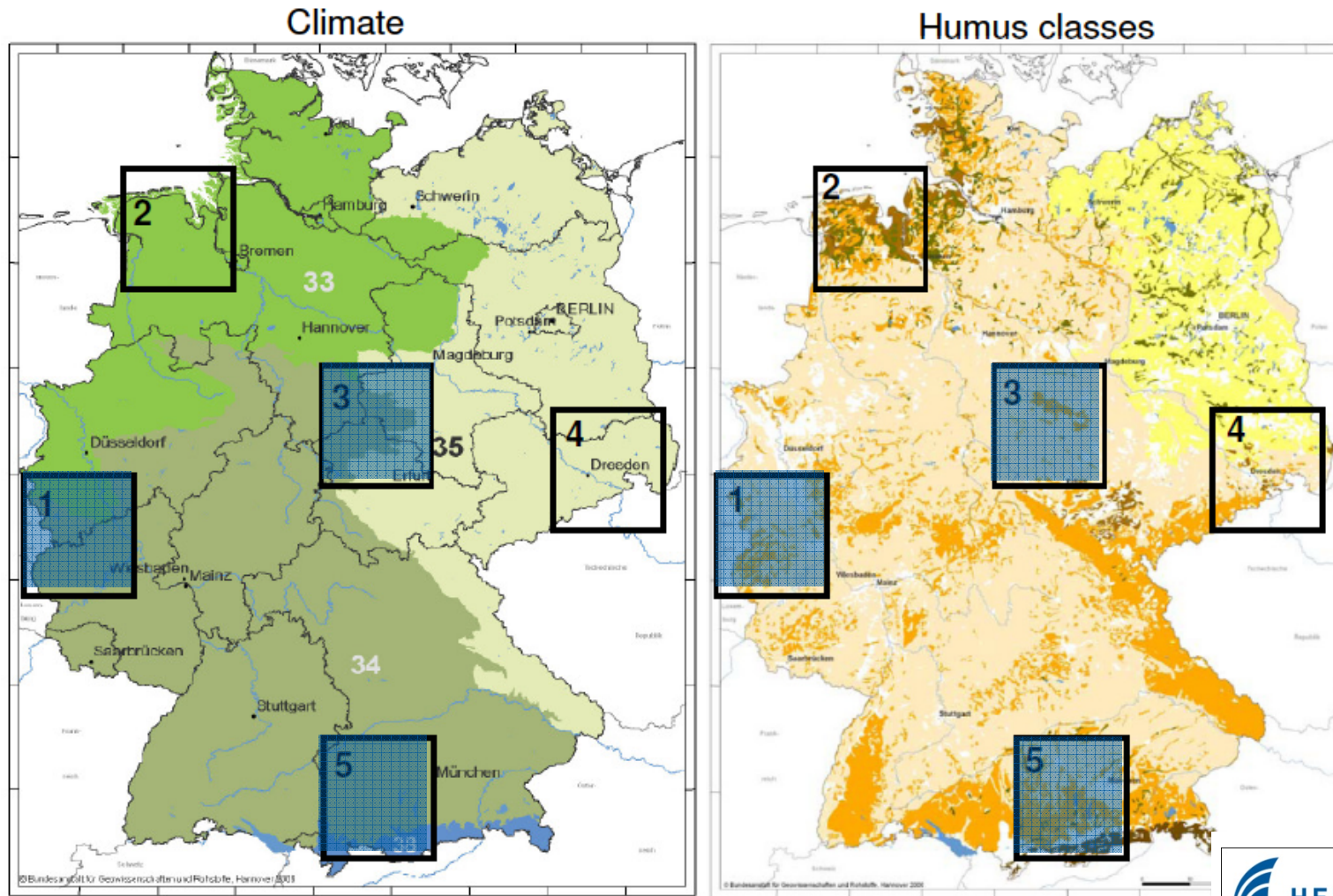
- 4) **Database**

ETC will ensure a database for all data, track all changes in data and processing, provide all meta information about sites, variables, instruments and processing, maintain a direct link between site PIs and users.

- 5) **Development and test of new measurement methods, instruments and data processing schemes**



ICOS-D Ecosystem Clusters





ICOS-D National Competence Centre

Objectives

- (1) Coordination of the national ICOS-D networks and support for integration in ICOS-EU;
- (2) Routine operation of a national data assimilation system (see 2.3.1) for the generation of operational fluxmaps for Europe with a special focus on Germany for policy makers;
- (3) Scientific integration of ICOS data;
- (4) Coordination of national research activities at and around the ICOS-D core network sites and with ICOS data;
- (5) Provision of a national German data archive of ICOS core data and data products;
- (6) Dissemination of the ICOS data streams to German scientific users;
- (7) Dissemination of the higher level ICOS data products to German stakeholders from the public and policy sector.



ICOS-D National Competence Centre

Services

Services to the scientific community are

- central access to German ICOS data, quality-checked,
- aggregated data with quantified uncertainty / sensitivity information, which go beyond the routine processing of ICOS-EU thematic centres (important for error propagation and quantification in models, critical for projections!),
- coordination of access to site facilities for additional research projects and measurements,
- coordination and integration with other environmental and research observations, e.g. of reactive nitrogen deposition, biodiversity, etc,
- integrated data analyses.

Anticipated products for policy and public include

- maps of monthly and annual German GHG budget derived from measurements,
- near-real-time data time series of GHG fluxes and atmospheric concentrations at the observation network,
- trend analysis and attribution,
- calibration data for Tier 3 GHG reporting under UNFCCC,
- verification of effectiveness of GHG mitigation in German regions.



ICOS-D Cost Plan (construction phase)

	Investments	Running Costs	Personnel Costs	Total
Atmosphere	1,524,000.00 €	1,085,000.00 €	914,000.06 €	3,523,000.06 €
Ecosystems	3,035,910.00 €	258,000.00 €	1,637,792.50 €	4,931,702.50 €
Ocean	917,500.00 €	166,000.00 €	1,063,605.00 €	2,147,105.00 €
CAL	3,332,000.00 €	652,000.00 €	1,680,498.94 €	5,664,498.94 €
CRL	460,200.00 €	284,100.00 €	806,702.78 €	1,551,002.78 €
Competence Centre	20,000.00 €	30,000.00 €	405,705.00 €	455,705.00 €
Total	9,289,610.00 €	2,475,100.00 €	6,508,304.27 €	18,273,014.27 €

Personnel:

1 Scientist + 1 Technician (per TERENO cluster)





iCOS-D Ecosystems

Current Status

- Pre-Proposal submitted to BMBF, December 2010