



# ICOS

  
INTEGRATED  
CARBON  
OBSERVATION  
SYSTEM

## ICOS RI presentation

Jouni Heiskanen

Scientific Integration and Liaison Officer

Helsinki 23 May 2018

# Introduction and background

Climate changes caused by the increase of greenhouse gases represent a major challenge to mankind.



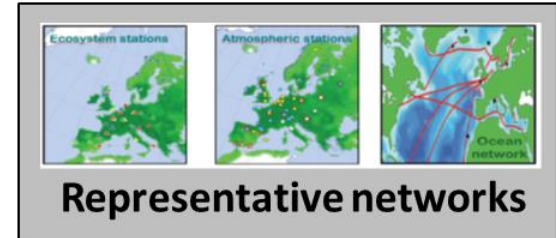
# Integrated Carbon Observation System (ICOS)

## –Scientific mission

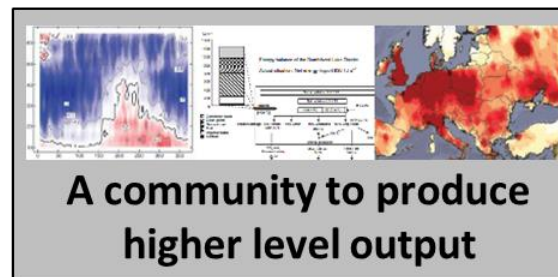
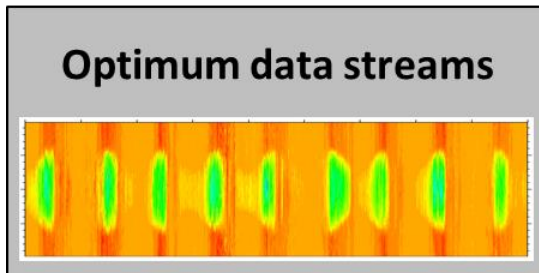
- Increase fundamental understanding of carbon cycle, greenhouse gas budgets and perturbations, and underlying processes,
- Increase ability to predict future changes,
- Verify the effectiveness of policies aiming to reduce greenhouse gas emissions,
- Foster technical and scientific innovation,
- Contribute in education and capacity building.

**To provide harmonized and high precision scientific data on carbon cycle and greenhouse gas budget and perturbations. ICOS data is openly available at the Carbon Portal, a one-stop shop for all ICOS data products.**

# The Vision of ICOS



## Relevant data products



# The ICOS station network

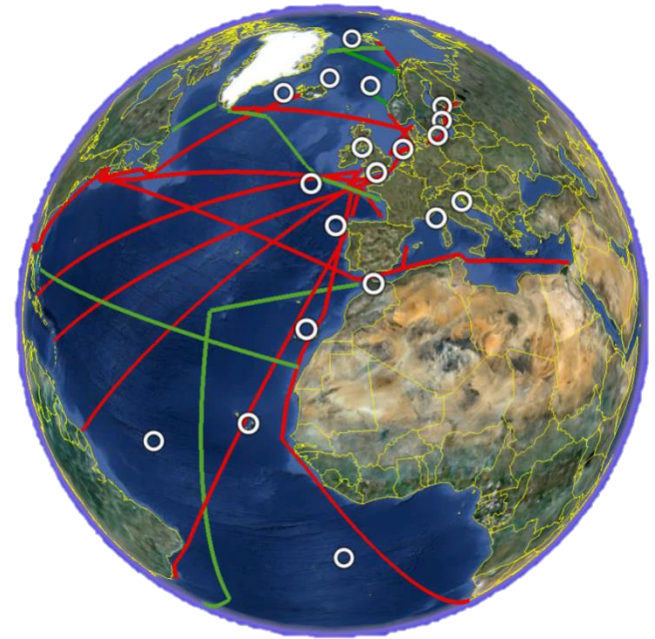
Atmosphere



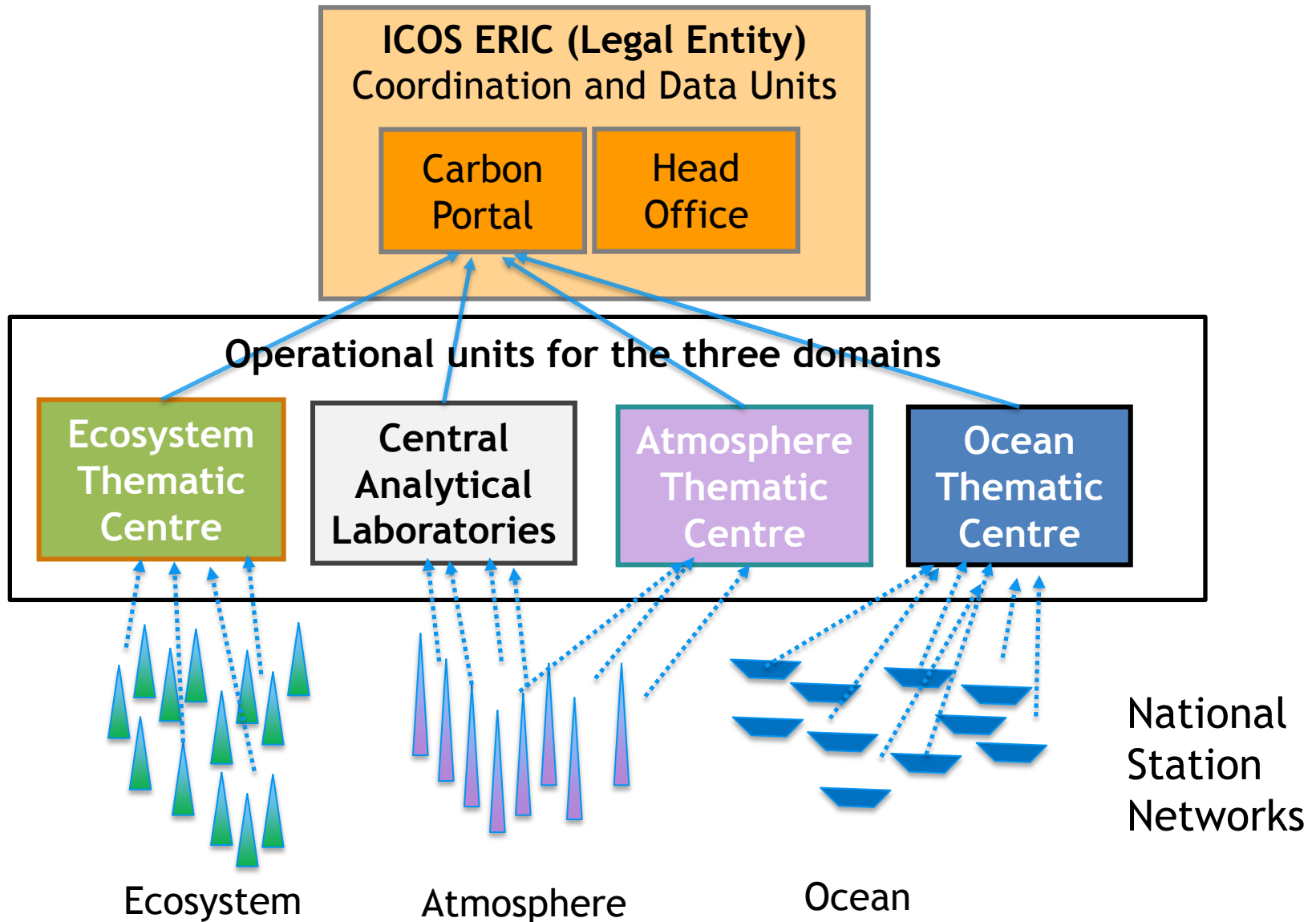
Ecosystems



Oceans



# Operational Structure of ICOS



# ICOS Carbon Portal – ICOS data center

A website offering users

- Open and free of charge access to ICOS data products
- Search, visualisation, download service for data and products
- Statistics and comparison tools
- Synthesis reports and educational materials
- Community platform for elaborated products

Technical aspects:

- Automated data storage (long-term archive)
- Digital PID minting (EPIC, DOI)
- Semantic web & ontology-based metadata storage
- Scalable and open solutions, building on open standards

... Continuously under development ...

# ICOS RI -Distributed infrastructure



- ✓ ERIC established November 2015
- ✓ ESFRI Landmark status 2016
- ✓ 11 Member countries, 1 Observer country
- ✓ 9-12 countries that have expressed interest to join
- ✓ Joint Research Centre as a partner
- ✓ 7 countries hosting specific Central Facilities



# RIs can advocate benefits of standardisation and open data distribution

## Scientists & providers

- More reliable and comparable data
- More users for the data
- More visibility and sustainable funding
- Less workload on data processing
- Recognition through dynamic PID citation



## Data users, society

- Reliable results and comparable data
- Easily accessible data in a re-usable format
- Easily findable data
- Interoperability of different data sources and formats
- Trustworthiness and long-term availability fosters innovation



# ENVRIplus community exercise: -Integration and cooperation needs in terrestrial RIs



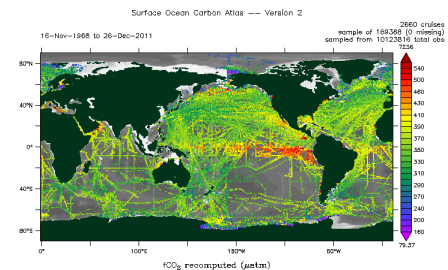
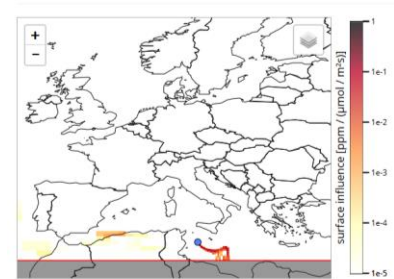
- Many Research Infrastructures
- Fragmentation
- Low level of cooperation
- Low level of inter-operability
- Island solutions in data life cycles
- Competition for resources

due to relatively weak top-down steering



# Full geographical coverage is important!

- More reliable results on greenhouse gas balance in Europe and on the sources of emissions
- Joining efforts, finding synergies
- Growing more strong as European scientific community
- Providing benefits and support to all EU countries



# Towards global coordination: *GEO-C*



## *Examples of actions*

- Support the ocean flux calculations built out of SOCAT (input to Global Carbon Project)
- Support the transition from “residual” land sink to independent model/observation-based approaches
  - easing data finding and access (GEOSS metadata approach), supporting stable model data connections, and model result services
- Look for resources (e.g. from H2020 or GEO member states)

Joint forum for discussions, promote easy access to data, support climate change mitigation



SBSTA

Framework Convention on Climate Change

Observations

Services

Knowledge

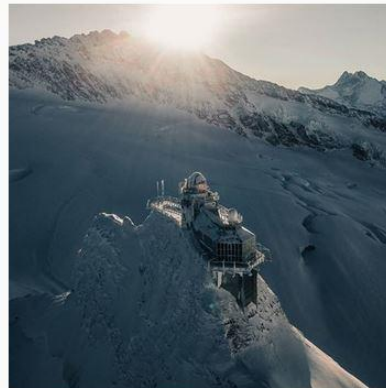
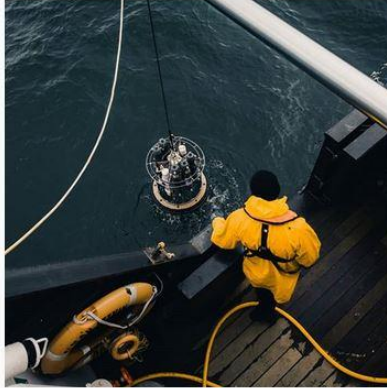
Decisions



# Summary and take home messages

- ICOS is responds to a *grand challenge*,
- ICOS Carbon Portal is one-stop-shop for users,
- ICOS develops a very high data quality standard

# Thank you!



## ***3<sup>rd</sup> ICOS Science Conference for Greenhouse Gases and Biogeochemical Cycles***