

ICOS Research Infrastructure

Timo Vesala, University of Helsinki



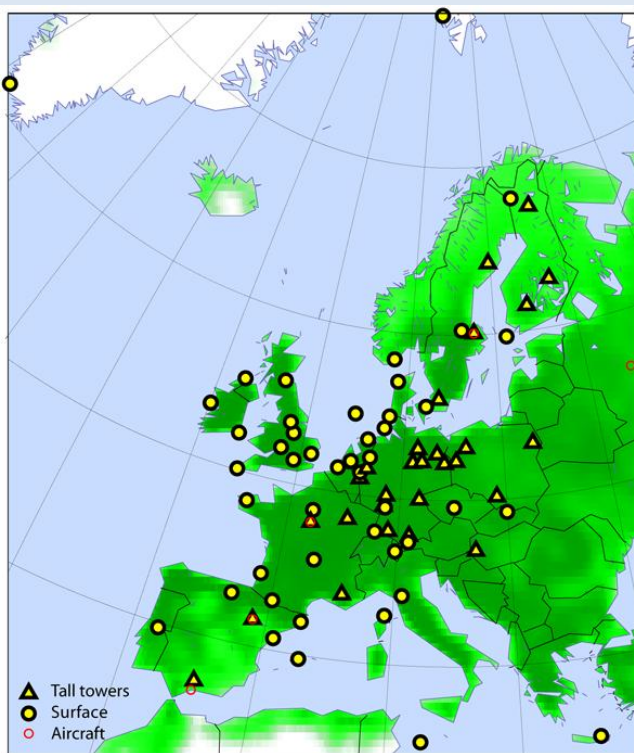
11.3.2013 EUDAT, London

Towards ICOS ERIC

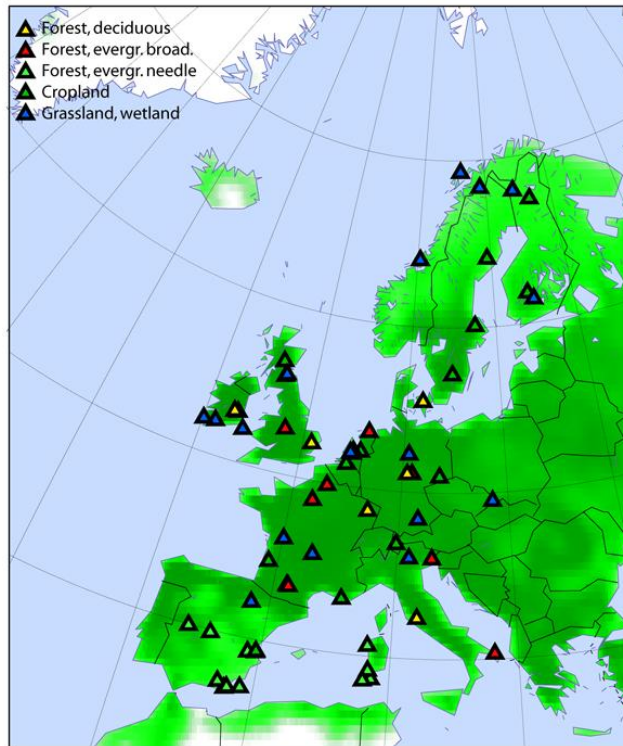
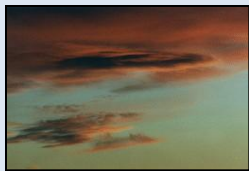
- ✓ **Preparatory phase project** (EC funded, 2008- 2013; constructions started; co-ordinated by Philippe Ciais, LSCE)
- ✓ **Transition phase** (constructions continue, negotiations)
- ✓ **ICOS ERIC established** (operational 2014)

Distributed infra

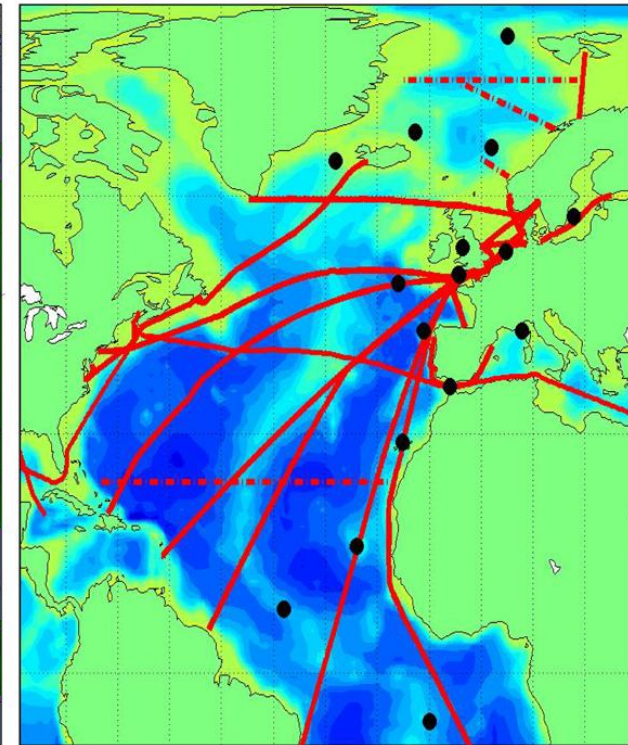
- ✓ A distributed network of stations
- ✓ Wall-to-wall European + North Atlantic coverage
- ✓ to quantify regional greenhouse gas fluxes (up to 10km/daily scale)



Atmospheric network



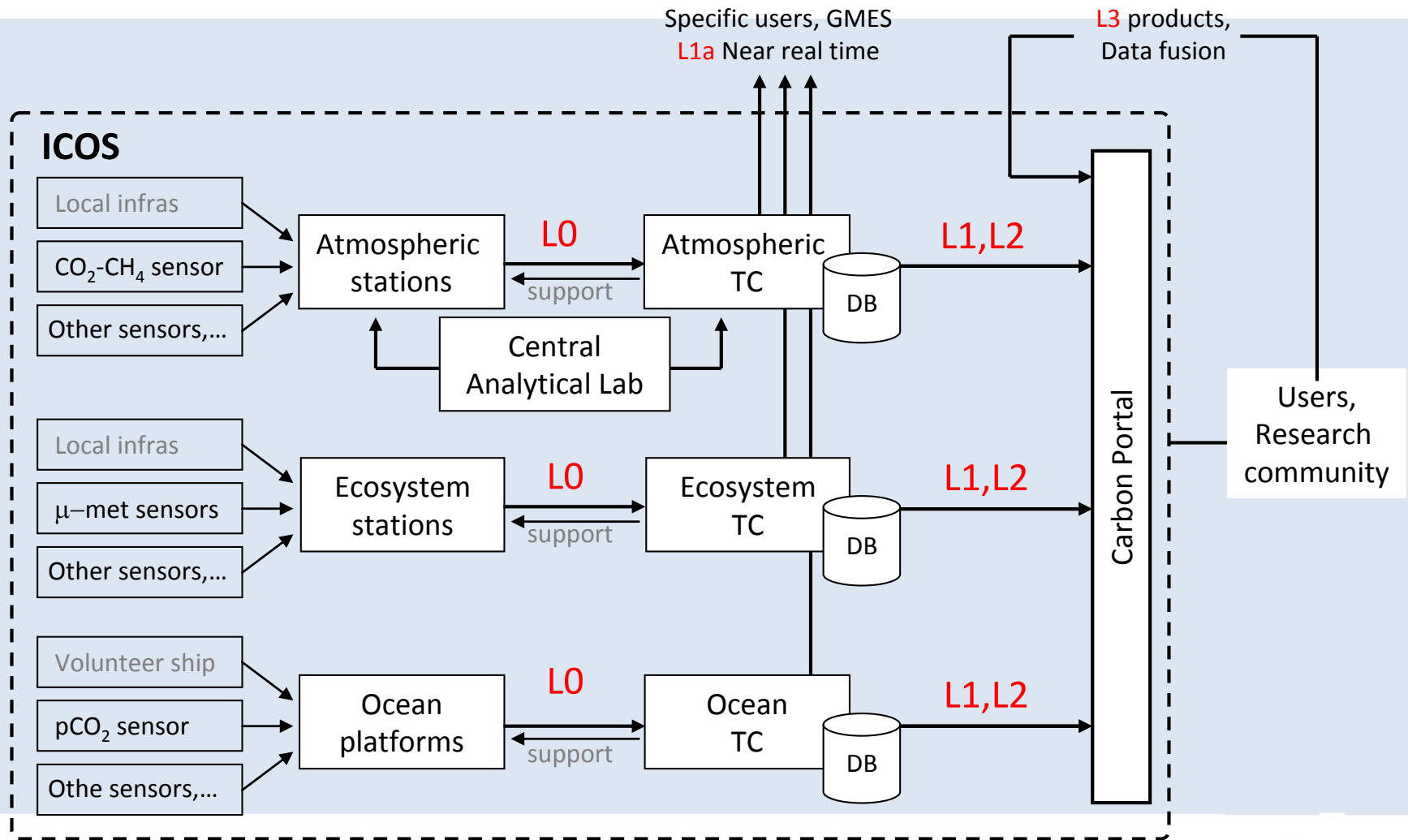
Ecosystem network



Marine network



ICOS technical architecture



ICOS ETC (ecosystem) database

- European Flux Database
- Web interface for manual uploading and retrieval of data
<http://gaia.agraria.unitus.it>
- Automated NRT data upload via FTP
- SQL database, metadata stored in xml format

Example of meteorological data

```
date,time,Ta_1_1_1,Ta_1_2_1,Ta_1_3_1,Ta_1_4_1,Ta_1_5_1,Ta_1_6_1,CO2_1_1_1,CO2_1_2_1,CO2_1_3_1,CO2_1_4_1,CO2_1_5_1,
,deg C,deg C,deg C,deg C,deg C,deg C,ppm,ppm,ppm,ppm,ppm,ppm,ppth,ppth,ppth,ppth,ppth,ppth,hPa,mm,mm,W m-2,W m-2,W
05/03/2013,00:30,-9.0200,-9.0700,-9.1800,-9.5700,-9.4400,-9.7400,405.2600,405.1900,405.0900,405.0700,-9999.0000,404
05/03/2013,01:00,-8.9700,-9.0100,-9.1200,-9.5200,-9.3900,-9.6900,404.2300,404.1000,404.0000,403.8800,-9999.0000,403
05/03/2013,01:30,-8.9000,-8.9500,-9.0700,-9.4900,-9.3300,-9.6200,-9999.0000,-9999.0000,-9999.0000,-9999.0000,-9999.
05/03/2013,02:00,-8.9200,-8.9500,-9.0800,-9.4900,-9.3200,-9.6100,404.1400,403.9900,403.9600,403.9700,-9999.0000,403
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ICOS ETC metadata

- Only parameter names and units in datafile headers
- Ancillary data (site descriptions etc.) and metadata (instruments, contact information etc.) are uploaded in Excel spreadsheet(s)
- Proprietary metadata format (BADM)
 - originally developed for storing biological measurements and submitting them to databases
 - ICOS version also includes instrument information
 - not yet strict compatibility with common metadata standards or directives

ETC instrument metadata upload sheet - example

[illegible]

ICOS ATC (atmosphere) database

- Temporary web interface for retrieval and visualisation of data at <https://icos-atc-demo.lsce.ipsl.fr/>
- Automated NRT data upload via FTP

ICOS ATC data and metadata

- One file per day, instrument and measuring height. The filename format is
siteId_InstrumentId_samplingId_yyyymmdd_hhmm.env
- Part of metadata associated with the data files (column in ascii data file, NetCDF file format) or in separate files
- More in-depth instrument information (logbooks etc.) than in ETC submitted to the database
- Station information and basic instrument metadata updated periodically or when needed
- Final format of metadata not yet decided
 - Planned to follow INSPIRE directive although it is not finalized yet for air quality data

Example of atmospheric data

Site;Year;Month;Day;Hour;Minute;Second;DecimalDate;co2 concentration;Stdev;NB;Flag;InstId
MLH;2010;09;17;00;00;00;2010.70958904;-999.990;-9.990;0;N;40;47

...

Current ATC metadata

- Institute/laboratory information
 - name, institute code, website address, postal address, contacts (name, phone, email), ...
- Station information
 - station identifier (GAWSIS), name, owner, address, geo-location, sampling level heights, ...
- Instrument information
 - unique identifier (provided by ATC upon instrument registration), category, model, owner, serial number, ...
- Additional documents
 - e.g. calibration procedure

EUDAT questions

-Stable schema and infra: more or less yes, 15-y long history behind

-Interdisciplinary catalog: yes, aerosols and other trace gases (IAGOS, ACTRIS), ecosystem (ANAEE), biology (LIFEWATCH)....

-Browsing dimensions and facets: generally, high time resolution, free access with clear trace to data producer; for metadata, the history and for example any changes in sensors should be known