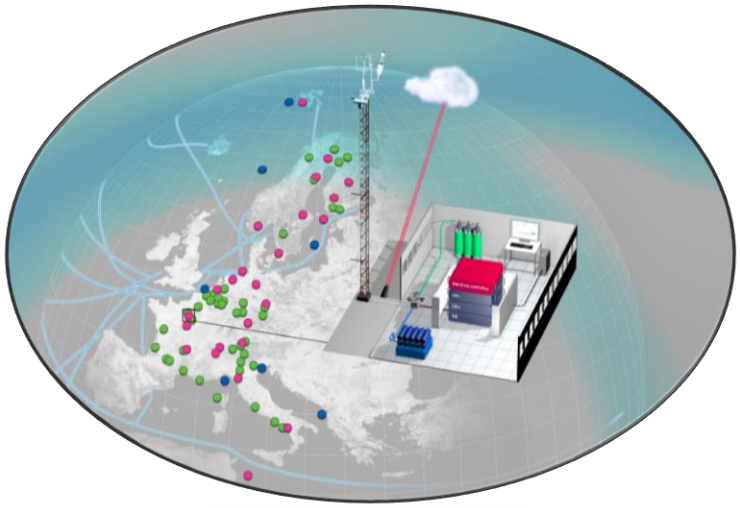
ICOS Atmosphere Thematic Centre

Document reference: ATC-GN-LA-PR-1.1_STEP2info

ICOS ATC, Oct 2016

ICOS ATMOSPHERIC STATION LABELLING STEP2



Contact Information:

ICOS ATC
Laboratoire des Sciences du Climat et de l'Environnement (LSCE)
CEA – Orme des Merisiers
91191 Gif sur Yvette, France

Instruments and measurement protocols

- Olivier LAURENT <olivier.laurent@lsce.ipsl.fr>

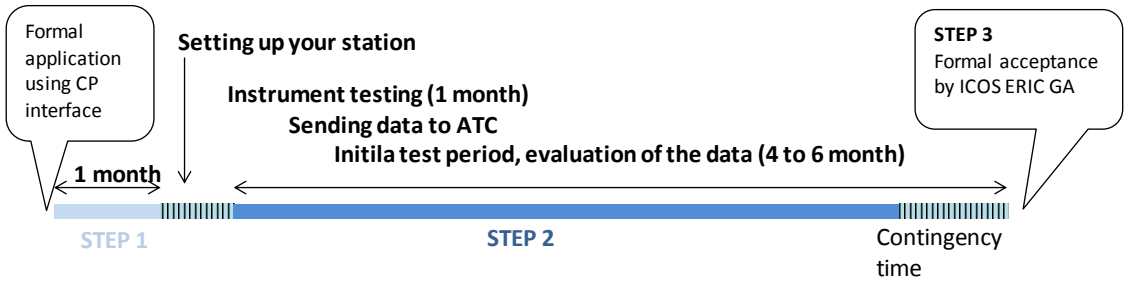
Database, Data process:

- HAZAN Lynn <lynn.hazan@lsce.ipsl.fr>

Table of Content

1. ICOS Station Labelling: a 3 step process

- Formal Application and site location assessment
- Station construction
- Initial test period, evaluation, optimisation
- Formal decision of the station integration by the ICOS ERIC General Assembly



2. Labeling STEP 2: the process in one page (12 actions)

Setting up the station prior to sending data to ATC:

- ❑ Participate to ATC training
  - See **Erreur ! Source du renvoi introuvable.** for an example of training agenda
- ❑ Equip your station with the appropriate instrumentation according to the station class[1]
  - *section 2.2 ATC-GN-GN-SP-1.2_ICOS AS spec (13 pages)*
- ❑ Get you calibration cylinders from the ICOS CAL
  - *section 4.1.2, 4.1.3 of ATC-GN-GN-SP-1.2_ICOS AS spec (2 pages)*
- ❑ Send your greenhouse gases analyzer to ATC for testing (testing duration: ~ one month)
  - For more information on this step see section Appendix
- ❑ Make sure the integration of all your instruments and sensors is compliant with the ICOS AS specifications
  - *section 2.3 and 2.4 of ATC-GN-GN-SP-1.2_ICOS AS spec (8 pages)*
- ❑ Set up calibration according to ICOS specifications
  - *section 4.1.1 and 4.2 of ATC-GN-GN-SP-1.2_ICOS AS spec (3 pages)*

Sending data to ATC (cf Figure 1 and also PDTA: “ProvidingDataToATC-1.6.7.pdf”)

- ❑ Open accounts at ATC and register your station at ATC
  - Section 2 and 3 of PDTA (5 pages)
  - Use ATC-ICOS-step2InstrumentRegistrationForm.xls
- ❑ Configure your analyzers for correct data format
  - Section 4 of PDTA: Instrument file format (7 pages)
- ❑ Provide metadata information
  - Section 7, 8 of PDTA (11 pages)
- ❑ Send your data to ATC for processing (NRT, daily basis)
  - Section 6 of PDTA: File transfer (1 page)
- ❑ Perform data flagging on all mandatory parameters using the ATCQC tool
  - This topic is covered in the ATC trainings
- ❑ Collaborate with ATC during the initial test period
  - For more information on this step see section 3 below

[1] See

Table 1: ICOS Atmospheric Station parameter set

3. Initial test period, evaluation of the data

Once the data flow from the station to the ATC is in place, a phase of measurement optimization starts, the so called initial test period. This is done in close collaboration between the station PI and the ATC. This period typically lasts 4 to 6 months to gather enough time-statistics. The period can be prolonged if need be.

Various measures, listed below, are used to assess the quality of the measurements:

- For gas measurements: Precision (CMR) / reproducibility (LTR) using target measurements (commensurate to ATC results)
- Temperature sensitivity of the gas instruments
- Bias assessment (based on WMO target provided by the CAL)
- Signal variability (spike, local contamination detection)
- Drying system efficiency
- Data availability summary
- Flask- In-situ comparison when available
- Dedicated tests following discussion with ATC (eg droplet test, …)

This period is important to start the QA/QC operations using tools prescribed by the ATC. Results of this initial test period are presented by the station PI at the MSA.

4. Assessment report

ATC prepares a final assessment report for the attention of the ICOS ERIC General Assembly which formally decides of the station integration and assigns the ICOS label (step 3).

5. Tables and Figures

Category	Gases, continuous	Gases, periodical	Meteorology, continuous	Eddy Fluxes
Class 1 Mandatory parameters	• **CO_2, CH_4, CO** : at each sampling height	• **CO_2, CH_4, N_2O, SF_6, CO, H_2, ^{13}C and ^{18}O in CO_2**: weekly sampled at highest sampling height† • **^{14}C** (radiocarbon integrated samples): at highest sampling height	• **Air temperature, relative humidity, wind direction, wind speed**: at highest and lowest sampling height* • **Atmospheric Pressure** • **Planetary Boundary Layer Height**** †	
Class 2 Mandatory parameters	• **CO_2, CH_4** : at each sampling height		• **Air temperature, relative humidity, wind direction, wind speed**: at highest and lowest sampling height* • **Atmospheric Pressure**	
Recommended parameters***	• **^{222}Rn, N_2O, O_2/N_2 ratio** • **CO** for Class 2 stations	• **CH_4 stable isotopes, O_2/N_2 ratio** for Class 1 stations: weekly sampled at highest sampling height		• **CO_2** : at one sampling height

* Atmospheric temperature and relative humidity recommended at all sampling heights

** Only required for continental stations.

*** Recommended for its scientific value but support from ATC in terms of protocols, data base, spare analyzer will not be ensured as long as the parameters are not mandatory.

Table 1: ICOS Atmospheric Station parameter set

ICOS Atmosphere Thematic Centre

ATC Training Agenda

June 29th – July 1st 2016, Gif-sur-Yvette, France

LSCE

	Wednesday 29,June	Thursday 30, June	Friday 1, July.
9h00		**Practical Work** • ATCconfig application (continuation)	**Practical Work** • Data Extraction
9h30	**Welcome (Coffee) – Introduction** **Attendee Self-introduction**		
	Lecture • Data flow • Automatic file transfer • Data Processing	**Lecture** • Logbook (Webobs presentation) • Data Products • Data QC • Data uncertainties	
10h30-11h00	Coffee Break	Coffee Break	Coffee Break
11h00-12h30	**Lecture** • GHG Data Processing (calibration & correction, filtering, automatic QC) • Metadata (optional and mandatory) • Diagnostic data	**Practical Work** • Presentation of the ATCqc application • Data Flagging	**Lecture:** • Water vapor correction **Practical Work** • Water droplet test
12h30-14h00	Lunch (sponsored)	Lunch (sponsored)	11h30-12h00 **Debriefing** **12h00 End of the training**
14h00-16h00	**Lecture** • ATC Configuration for a station • ICOS ATC accounts **Practical Work** • Access to ATC server • ATCconfig application	**Practical Work** • Data Flagging (continuation)	
16h00-16h30	Coffee Break	Coffee Break	
16h30-18h00	**Practical Work** • ATCconfig application (continuation)	**Practical Work:** • Data Flagging (continuation)	

Training location: LSCE, CEA – Orme des Merisiers, Gif-sur-Yvette, France

Release 1

Erreur ! Source du renvoi introuvable.**: Example of an ATC training agenda**

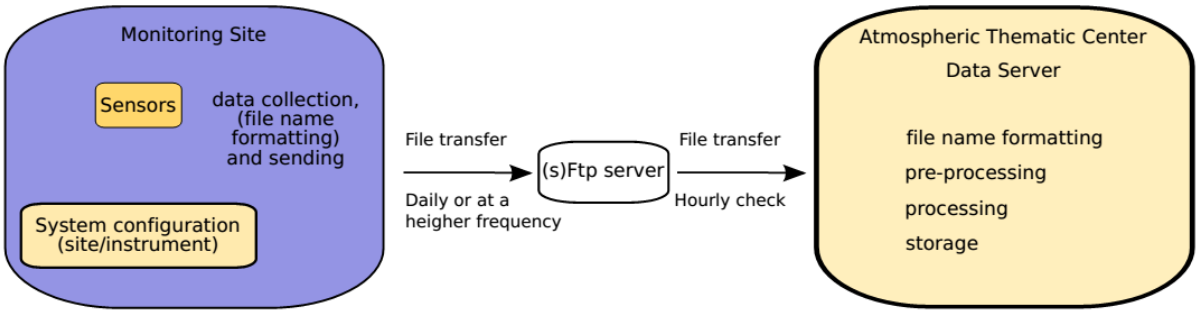


Figure 1 Data transfer

6. Appendix: GHG instrument testing at ATC

Sending your GHG analyzer to the ATC for testing is required to ensure that the analyzer is compliant with ICOS specifications. The analyzer is thoroughly tested by the ATC that performs assessments on:

- Leakage
- Precision
- Calibration linearity and drift
- Repeatability short term test (RST)
- Repeatability long term test (LTR)
- Extended range linearity

- Sensitivity to inlet pressure
- H2O correction
- Temperature sensitivity
- Atmospheric pressure sensitivity
- Cold start stabilization time
- Cross talk measurements

At the end of the test, a certificate of compliance is delivered by the ATC together with the test report.

7. References

1. ATC-GN-GN-SP-1.2_ICOS AS spec: ICOS Atmospheric Station Specifications, version 1.2 edited by O. Laurent et al. (August 2016)
   https://icos-atc.lsce.ipsl.fr/?q=doc_public

2. PDTA: ProvidingDataToATC-1.6.8.pdf; https://icos-atc.lsce.ipsl.fr/?q=doc_public