ATMO ACCESS
Access to Atmospheric Research Facilities

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Introduction

This document is prepared under the ATMO-ACCESS project (Solutions for Sustainable Access to Atmospheric Research Facilities) in WP6, task 3 entitled "New access modalities for innovators in technology". The goal of this task is to develop synergy and enhance innovation services, especially for users from the private sector. The key research areas identified include the development and testing of instruments, sensor technologies, calibrations and benchmarking and metrology.

Assessment and analysis of private sector access in ATMO-ACCESS

The description of the application, review and selection process for Trans National Access TNA to ATMO-ACCESS facilities is described in the project document Milestone 9.1. The specific process for private sector users is accessible here: Trans-National Access for Private Sector – ATMO-ACCESS. Private sector access follows similar workflow than the regular one for application and review. However, the selection is done offline and as application come in. This differs from the regular calls where selection is done during meeting with fixed dates. For

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private sector access, there is no deadline to the call to allow more flexibility. Users can submit their project proposals without following any specific call schedule.

Application

Once a call is identified the first major task for the user is to fill in the application form with information on: name, nationality, home institution of the users; a description of the work to be performed during the access; dissemination plans; description of users' estimated travel & subsistence costs.

The application form is integrated and submitted via PASS, the access management platform of the project. The candidate user is encouraged to contact directly the TNA provider before finalizing his application. It, then, goes through phases of eligibility, feasibility (confirmed by TNA provider) and review steps. Concerning the review, a specific criterion has been put in place when access involves users from the private sector. In this case, the innovation potential of TNA proposals, possible technological developments as well as market developments and impacts on the economy are principally considered.

The private sector call benefits from a shorten evaluation process. Proposals are processed as they come, an independent review will be conducted as rapidly as possible (foreseen decision time: ~2-3 weeks).

Post access requirements

After the completion of the access, some post-access requirements need to be accomplished by the user and the provider to consent to adequate access reporting and monitoring:

- a Confirmation of Access, which is to be signed by the TNA Provider, within 2 weeks after the access,
- an attestation of the performed TNA activity, within a maximum of 8 weeks. Depending on the type of service: activity report, calibration document, attestation for training:
- a User feedback questionnaire to enable evaluating and recommending improvements of TNA operations and the access process, within 3 weeks after the access,
- information on access results (scientific publications and data),
- the User TNA carbon footprint assessment.

Specifics to the private sector include the handling of proprietary research for which the private sector is exempted from the obligation to provide data and results (and publications), but are still asked to provide on a voluntary basis.

Access statistics to ATMO-ACCESS from the private sector

46 TNA projects have been requested by private sector users during ATMO-ACCESS. 42 TNA activities have been completed by the private sector as of July 2025 (see annex 1), 2 projects

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have been cancelled, 2 are being finalised. These were performed by SMEs and led by expert scientists 90% of the time (the rest being led by Engineers, technician or post-doc). The private sector users were from 14 different countries and took place in 14 countries (see table 1 below). Nine countries (Austria, France, Germany, Greece, Finland, Italy, The Netherlands, UK and Switzerland) are both countries of origin and destination of private user TNAs.

Origin of private sector users	**Countries were private sector TNA took place**
Austria	France (ACMCC SIRTA: CL)
Belgium	Switzerland (PACS-C2: ASC)
Finland	Cyprus (CAO: OBS) France (SIRTA: OBS). UK (MAC: ASC)
France	Cyprus (USRL: MOB). Germany (WCCAP: CL) Spain (ISAF IZO: OBS + AGORA: OBS). Poland (WOS: OBS + AMP : MOB)
Germany	Austria (SBO: OBS) Finland (PAL-SOB: OBS). Italy (CIAO: OBS). Netherlands (CESAR: OBS) Poland (WOS: OBS)
Greece	Cyprus (USRL: MOB) Romania (RADO : OBS) Poland (AMP: MOB)
Italy	Germany (WCCAP: CL) Greece (ATMOS: OBS)
Latvia / Lithuania	Poland (WOS: OBS)
Slovenia	Finland (SMEAR II: OBS). France (SIRTA: OBS). Germany (WCCAP: CL). Greece (ATMOS: OBS). Spain (EUPHORE: ASC). Spain (BCN: OBS)
Sweden	France (ICOS ATC: CL)
Switzerland	France (SIRTA: OBS). Germany (QUAREC: ASC). Greece (ATMOS: OBS)
The Netherlands	France (COPDD: OBS) Greece (ATMOS: OBS+ PANGEA: OBS). Ireland (IASC: ASC). Poland (WOPAS: OBS). Spain (BCN: OBS)

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UK	Finland (PAL-SOD: OBS). Italy (CMV-PT: OBS). Netherlands (CESAR: OBS)
USA	France (COPDD: OBS). Poland (WOS: OBS)

Table 1: Countries of origin and destination of private sector accesses including accessed facilities in parenthesis. OBS is for observational site; MOB stands for mobile platform laboratory; CL for central laboratory and ASC for atmospheric simulation chamber.

The main field of activity for private sector TNA is the atmospheric domain in Earth and Environmental science (85%), with the remainder being from engineering technology, eco-biosphere and chemistry). Notably, 67% of the applicants are new users. The type of services requested was Research/innovation (70%) , technical (28%) and training services (2%).

Most TNA activities were carried out at observational sites (35), six took place at central laboratories, six in atmospheric simulation chambers and four at mobile platform laboratories. Some projects used a combination of facility types (for ex: observatory platform and mobile facility, observatory platform and central laboratories). The modality or type of the private sector TNA was almost evenly split between a combination of physical and remote access and physical access (hands-on access of user at facility), Figure 1.

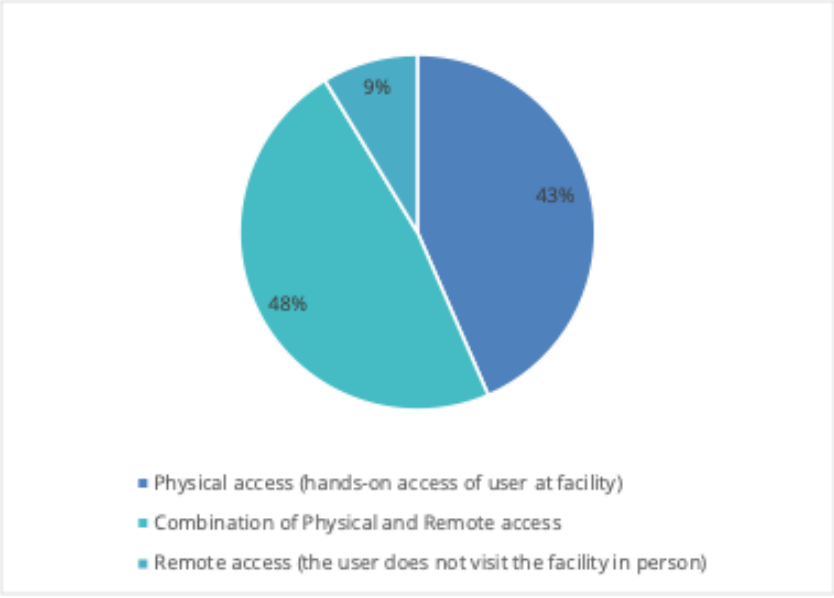

Figure 1: Type of accesses requested by private sector users within ATMO-ACCESS

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Private user feedback and recommendation to improve/increase access

25 private access user feedback were acquired directly via the user feedback questionnaire. The overall appreciation of the ATMO-ACCESS services is of 4,4 out of 5. Further details can be found in Deliverable D6.5 " .

The feedback received can be split in two categories:

Very positive points:

- Practical information provided on how to apply (documentation, FAQs, etc.)
- Interaction with and support by the TNA Team
- Duration of the selection process
- Scientific and technical support to conduct research and interpret the results
- Technical support for instruments (calibrations)
- Logistic support at the facility (space, computing, libraries, accommodation)
- Overall appreciation of the services accessed and their flexibility.

The private sector user appreciates the closer relations between the company and the research facility, emphasizing the very useful sharing of competences[1]. Also, some TNA would not have been possible without the ATMO-ACCESS financial support for travel and subsistence according to 72% of respondents.

Points for improvement:

- Publicity and information about the access
- Length, information required and easiness of the application form
- The quantity of post access work required is judged too much
- Support for organizing the access is sometimes lacking.
- Administrative support (including the reimbursement of travel & subsistence expenses)

The following section lists a number of recommendations for improving/increasing private sector access to the research infrastructures. It is compiled from direct interaction with the private sector either during meetings or bilateral exchanges.

[1] Notable is the access by a spin-off of the University of Namur that allowed a deeper understanding of a catalyst that will improve its use efficiency under an already deposited patent.

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1. Improve communication of the RI access opportunities towards the private sector: Participation in exhibitions/fairs dedicated to gas measurement (CEM, Sensor expo, etc.) could be considered. Also better liaising with National Metrology Institutes (Euramet) could be useful. Organize open house events at access providers sites. Create dedicated mailing lists.
2. Reimbursement process is still complicated. Advancing the funds is sometimes a problem. A simplification based on a fixed rate for accommodation/subsidy + transport reimbursement with proof could be envisaged. The access provider could advance some of the expenses.
3. Continuously ongoing call (open ended) is seen as a good thing. It allows flexibility that is appreciated by users from the private sector.
4. Carbon footprint should not be on the user burden to complete the information.
5. Need of a simple Legal framework inc confidentiality, insurance that would be prepared with the private sector.
6. The transnational aspect of the access is seen as limiting sometimes because of language issues.
7. The inter RI access is not effective even though no request was made so far.
8. For repeated access, the application process could be simplified.

In terms of the research topics that could be further developed through TNA, a private sector survey gave the following results:

1. Testing new aerosol lidars.
2. Isotope intercalibration project with instrument manufacturers
3. Organic species produced in chamber experiments: detection and calibration with advanced Mass Spec techniques.
4. New atmospheric measurement, e.g. oxidative potential of particles, bioaerosols, ions..
5. Focus on mobile platform
6. Atmospheric processing for VOC
7. Miniature and low cost sensors

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8. QA/QC, caractérisation of instrument
9. Telecommunication: transmission via satellite, big data; different optical bands 1064 nanometers, using lasers but need to provide info on the atmosphere (atm cloud radar) to characterise transmission speed.
10. Numerical modeling

Some of the above items (6,10) could be covered by WP10 dealing with virtual access and services offered within the Virtual Access Portal within ATMO-ACCESS. Considering low cost sensors and instrument characterisation, a new type of service was developed. It is described in the following section.

Strategy to attract more private users towards our RIs in Atmosphere for the Environment

Private sector access in ATMO-ACCESS is on the order of 14%. Engagement of our RIs with the private sector probably remains underdeveloped. Some strategies were implemented in ATMO-ACCESS notably with the creation of specific success stories from private sector users.(see work from the WP2 dedicated to communications).

This section describes further actions that could be implemented to increase attractiveness of our RIs prom the private sector, going beyond but including access services. They are listed starting with very concrete and short-term actions to finish with more strategic type of planning. They are organized along the following 4 sections:

- Technical solutions to better attract the private sector
- Develop targeted Expert services
- Communication and Outreach
- Develop strategic partnership

Technical solutions to better attract the private sector

- **Create an "Industry" Menu Tab:** Add a dedicated section for private/industry users within the RI websites, providing easy access to service offers including accesses, training opportunities, and case studies.
- **Design Service/Access Landing Pages:** Develop landing pages associated to the services tailored to private sector users, highlighting services, tools, and benefits specific to industry applications. Incorporate intuitive navigation and detailed service descriptions.

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- **Augment the ENVRI Catalogue[2]:** Add services specifically targeting private sector to the ENVRI catalogue for increased exposure.
- Implement a **Quality Charter for Access**, ensuring transparency and reliability in industrial collaborations.
- Expand **remote access and virtual platforms** to enable industry engagement without physical constraints

Develop targeted expert services

- **Leverage RI Expert Knowledge:** Build a portfolio of expert consulting services tailored to private sector needs, offering actionable insights into environmental monitoring, sustainability, and compliance.
- **Dedicated Training Programs:** Develop training modules and workshops for industry professionals on advanced technologies, environmental data interpretation, and regulatory compliance.

Communication and Outreach

Effective communication is essential for raising awareness of RIs capabilities:

- **Industry-Focused Newsletter:** Publish a quarterly newsletter featuring success stories, upcoming services, and training opportunities tailored to the private sector.
- **Market Analysis:** Perform detailed market segmentation to identify and target specific industrial sectors most likely to benefit from RI services.
- **Showcase Success Stories:** Actively promote examples of successful collaborations between ERIs and industry, demonstrating tangible value. Share these through newsletters, webinars, and social media campaign.
- **Feedback Mechanisms:** Implement robust feedback systems to continuously refine and improve services based on industry user input.
- **Cost-Effective Solutions:** Highlight how RI services can reduce costs, improve efficiency, and ensure compliance with environmental regulations.

Develop strategic partnership

- **Synergies with ENVRI:** Strengthen partnerships with the ENVRI community to leverage shared expertise and broaden outreach to industry stakeholders.

[2] https://envrihub.vm.fedcloud.eu/cservicesmain

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- **Innovation and Industry Support Hub:** Establish a centralized hub for innovation services, streamlining communication and support for private sector users, including pricing models and intellectual property right (IPR) conditions (cf current ENVRINNOV EU project[3])
- **Collaborative Projects:** Actively seek partnerships with industry for joint research and innovation projects that align with both environmental and business goals. Especially making use of EU Horizon programs.
- Create **Industry Advisory Boards** in RIs, composed of experts from relevant industrial sectors to provide strategic guidance.
- **Integrate into Strategic Plans:** Explicitly include private sector engagement in the strategic agendas of RIs. systematically including socio-economic impact as an integral component.
- **Dedicated Liaison Personnel:** Hire industry liaison officers to serve as the primary point of contact, facilitating communication and understanding between ERIs and private companies. This personnel shall :
    - institutionalize the private sector collaborations.
    - Encourage the development of **customized services for industry**, including feasibility studies, prototyping, and testing services.
    - Strengthen **intellectual property management** by creating structured licensing frameworks to encourage commercialization.
- **Sustainability Frameworks:** Align RI services with corporate sustainability goals, including ESG (Environmental, Social, Governance) metrics.
- **Innovation Platforms:** Create platforms for co-developing innovative technologies and solutions that address emerging environmental challenges.

Presentation of a new TNA pilot for innovators in technology: the Atmobox

This section describes a new service enabling two modes of access:

1. for testing sensor elements against reference instruments
2. use the modular Atmobox that can simultaneously measure Greenhouse Gases (GHG) and air quality parameters on a campaign base.

The first mode of access of this Atmobox is especially suited for the private sector where companies developing new sensors can benchmark them with established procedures against

[3] https://envri.eu/envrinnov/

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reference instrumentation. This new service is inter RI and is supported by the ATC (Atmoshere Thematic Center) in ICOS and CiGas-IMT (Center of Reative Trace Gases In Situ Measuements in Institut Mines Telecom) in ACTRIS.

The service was made available to users during March 2024 via the Private sector call and the last general call for access. One TNA proposal requested access but couldn't be realised in the end. The ATMO_BOX was sent to EMPA in the frame of the Hybrid school on sensors and drones.

Description of the services

SERVICE 1 - Testing sensor elements against reference instruments	
TYPE OF SERVICE	Research and Technical service
SERVICE DESCRIPTION	The Atmobox provides a modular platform to integrate mid and low-cost sensor elements allowing benchmarking and performance assessment including comparison with reference instruments. The platform can incorporate up to 8 sensors mounted at once in 1 or 2 "exposing cells". The cells are designed for reactive and non-reactive gas and allow sensors to be exposed to gas with monitored and controlled (externally currently) environmental parameters: P, T and %RH. It has a versatile datalogger with automatic data transfer (4G, Wifi) to FTP/SFTP server. Sensors require an interface electronic board to integrate the Atmobox system. The board handles the power supply and the interface with the versatile data logger. Standard analog output sensors may use a generic interface board whereas specific digital output sensors may require a specific one. Several interface boards are currently available for different brands/models. The service includes: - Administrative support to comply with internal procedures for accessing facilities (physical). - Administrative and technical support for providing a workspace for visitors during physical access. - Administrative support and advice for transportation and storage of equipment. - Technical support to fulfill visitor needs and constraints related to installation, deployment and operation of equipment: power

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	connections, remote access, storage, security constraints, internet network. - Testing/intercomparisons of sensor elements. - Sensor characterization under controlled conditions according to ”standard” procedures. - Scientific support for supervision and analysis of collected data.
ATMOSPHERE TYPE	Ambient, partially controlled (e.g. targeted gas). Monitored and/or controlled environmental parameters are P,T,%RH
TYPE OF ACCESS	Physical and Remote or a combination of both
TARGET USERS	Private sector and innovators of technology in other sectors
SERVICE STATUS	The service is available (operational and ready to be offered in 2024 for GHG, in 2025 for other parameters)
AVAILABILITY PERIOD	All year round
TIME CONSTRAINTS	None
CONTACT	Leonard Rivier, Olivier Laurent, Stéphane Sauvage
SERVICE 2 –Access to Atmobox as a transportable resource	
TYPE OF SERVICE	Research service
SERVICE DESCRIPTION	The Atmobox (see description above under Service 1) can be deployed in the field on a campaign basis mode. The Atmobox allows for up to 8 sensors to be mounted at once. Potential atmospheric concentration to be measured are CO_2, CH_4, CO, NO_2, O3, VOC, NH_3, PM . It has a versatile datalogger at 1 Hz for atmospheric compounds (see above), GPS position and meteorological parameters, with an automatic data transfer (4G, Wifi) and remote control. It allows concomitant measurement of both GHG gases and air quality related gases. It allows automatic quality control and calibration in field (depending to the atmospheric species). Atmo Box includes target gases to automatically perform regular quality controls. The service includes: - Shipment of the Atmobox on the way out - Remote sci/tech support for installation. - Remote sci/tech support for operation - Training

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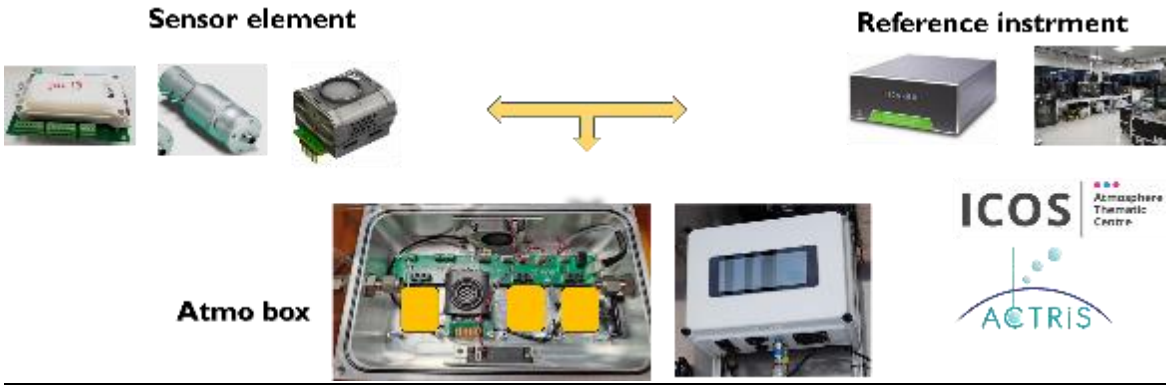
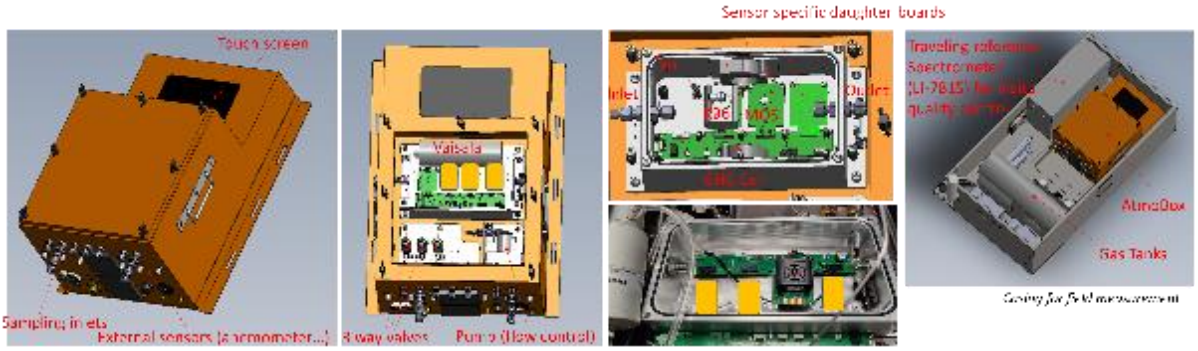
CONTACT	Leonard Rivier, Olivier Laurent, Stéphane Sauvage
ATMOSPHERE TYPE	Ambient
TYPE OF ACCESS	Physical to a mobile platform
TARGET USERS	Researchers
SERVICE STATUS	The service is available (operational and ready to be offered from 2024 for CO_2, 2025 onwards for other compounds)
AVAILABILITY PERIOD	All year round
TIME CONSTRAINTS	Max duration of a campaign is three months

Testing sensors against reference instruments:



Atmobox design and example of deployment



Atmo Box and reference instrument side by side

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Demonstration test bed: example of deployed Atmoboxes

Deployment on top of the LSCE (Laboratoire des Sciences du Climat et de l'Environnement) lab building in Saclay near Paris, for comparison with reference instruments. Figure on the right shows double casing which includes target gases for automatic quality control.

Description of the central facilities involved

The ATC Metrology Lab: Mlab of ICOS

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The main tasks of the ATC Metrology Laboratory are:

- Testing of greenhouse gases (GHG) instruments, producing a test report and a certificate of compliance. Development of meaningful tests (see annex 2 for a detailed description of the tests)).
- Carrying out a technology watch.
- Elaborating the measurement/calibration protocols.
- Studying the possible artifacts (sampling system, analyzer…).
- Providing network support and spare instruments when necessary.
- Development of new sensors through R&D programs at national and international level.
- Participating at the European training centre for ICOS atmospheric measurements with the Data Unit.

CIGAS IMT : Center of Reative Trace Gases In Situ Measuements in Institut Mines Telecom

CIGAS is not at present an ATMO-ACCESS facility but could provide the service to future users.

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As from 2025, Atmoboxes will be also available at CiGAS. The key-mission of CiGas is to offer current state-of-the art operational support to ACTRIS National Facilities (NFs), operational and exploratory platforms, which are operating instrumentation for continuous long-term measurements of volatile organic compounds (VOCs), condensable vapors and nitrogen oxides (NOx) as well as ammonia (NH_3) in the atmosphere. That includes activities to guide research and service development in the field of reactive trace gases and to develop towards future user needs, utilizing innovative methodologies. The operational support to ACTRIS NFs is supplemented by tailored services for users from the Global Atmospheric Watch Network (GAW) and other atmospheric observation networks, academia, business, industry, and public services depending on the respective resources. CiGas is composed is composed of 6 units sharing expertise and related activities.

What CiGas offers

CiGas operates and supports instrumentation and observations for the insitu measurement of reactive trace gases. The core activities of CiGas are to ensure sustainable and traceable high-quality data and data products of in-situ measured atmospheric reactive trace gases with known uncertainty. These activities include

- development, testing and implementing advanced measurement technologies and data evaluation algorithms,
- testing prototypes of gas analytical devices
- Auditing measurement sites, and consultancy
- Performing intercomparison (round robin or side-by-side)
- enhancing the competence of the operative personnel by training.

More detail can be found on the website: https://www.actris.eu/topical-centre/cigas

Conclusion and next steps

Private sector accesses represent so far already 14% of all accesses in the project. These accesses take place across European countries (and not within a single country) stimulating international collaboration, in line with the philosophy of TNAs.

With these accesses, the private sector benefits from the scientific credibility of the RIs, a label they obtain in working with RIs that can have market value in the private sector. RIs are encouraged to better value this scientific branding. It can attract more private sector accesses.

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The private sector appreciates the flexibility in working with RIs. It was shown that co-design of accesses can lead to very efficient results. Several times, the idea of accessing expertise in the RIs ie directly the competence of the people in the RIs as consultant was put forward.

The ATMO-BOX pilot developed during the project will be further enriched within the future months with the air quality part and will be accessible to users from the private sector, academics and public authorities.

Further elements of recommendation to improve/increase access for the private sector are found in the corresponding section of the document above. It includes propositions to further reduce administrative burden but also improve communication towards the private sector and create simple legal frameworks when involving the private sector (confidentiality, intellectual property rights, insurance, ...). A tailored service offer (focusing on services that are matures in our RIs eg Quality Control) rather than a catalogue of services would have better chance of success. Also, a concise packaging of the offer is easier to promote.

Due to the diversity of private sector actors, it is also recommended that a dedicated person would be appointed for RIs to act as liaison officer towards the private sector to clearly understand their needs and constraints and ensure a continuous monitoring.

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Annex 1: Summary of private accesses

#	ATMO CALL	Status	Institution Name	Institution status	Institution Country	Lead User profile	Field of activity	New user?	Type of services requested	Facility	Type of access	Title & Acronym of the project
1	**ATMO 1st TNA call**	Complete	schnaiTEC GmbH	Small Medium Enterprise (SME)	Germany	Expert scientist	ENV-ATMO - Earth and en	Yes	Research/innovation services (i.e. fo	FMI PAL-SOD, FI (OBS)	Combination of Physi	Source apportionment of Arctic carbonaceous aerosol using the Angström exponent (SUPPOSE)
2	ATMO 1st TNA call	Complete	Aerosol d.o.o.	Small Medium Enterprise (SME)	Slovenia	Expert scientist	ENV-ATMO - Earth and en	No	Technical services	WCCAP, DE (CL)	Physical access (hand	Intercomparison of optical absorption measurements using newly developed portable Aethalometer AE43 and Aethalometer prototype with extended wavelength range (Inter-AE)
3	ATMO 1st TNA call	Complete	Kansa Oy	Small Medium Enterprise (SME)	FINLAND	Engineer, Techr	ENV-ATMO - Earth and en	Yes	Research/innovation services (i.e. fo	CAO, CY (OBS)	Physical access (hand	Thermo Desorption – Multischeme chemical IONization inlet – Mass Spectrometer (TD-MION-MS) for atmospheric aerosol precursor and security research – proof of concept
4	ATMO 1st TNA call	Complete	Aerosol d.o.o.	Small Medium Enterprise (SME)	Slovenia	Expert scientist	ENV-ATMO - Earth and en	No	Research/innovation services (i.e. fo	SMEAR II, FI (OBS), EUPHORE, ES (ASC)	Combination of Physi	Advanced carbonaceous aerosol apportionment using Total Carbon Analyzer and newly developed Aethalometer prototype with extended wavelength range (ACAA:TC-BC 9k)
5	ATMO 1st TNA call	Complete	Terra Modus Consultants Limited	Small Medium Enterprise (SME)	United Kingdom	Expert scientist	ENV-ATMO - Earth and en	Yes	Research/innovation services (i.e. fo	CMN-PV, IT (OBS)	Physical access (hand	Medusa Enhanced Volatile Organic Compounds (MEVOC)
6	**ATMO 2nd TNA call**	Complete	Vaisala Oyj	Other industrial and/or profit private organization	Finland	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Research/innovation services (i.e. fo	SIRTA, FR (OBS)	Remote access (the u	CL61-4UrbanABL: testing the added-value of novel CL61 automatic ceilometer measurements for atmospheric boundary layer profiling in an urban environment.
7	ATMO 2nd TNA call	Complete	Sunset Laboratory BV	Small Medium Enterprise (SME)	The Netherlands	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	No	Research/innovation services (i.e. fo	BCN, ES (OBS)	Physical access (hand	Prototype field analyzer application for simultaneous real-time measurements of Organic Elemental, Black and Brown Carbon fractions using a dual-wavelength laser set-up. DUal Carbon Analyzer with Thermal Optical method (DUCATO)
8	ATMO 2nd TNA call	Complete	Aerosol d.o.o.	Small Medium Enterprise (SME)	Slovenia	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	No	Research/innovation services (i.e. fo	BCN, ES (OBS)	Combination of Physi	Long-term and high-time-resolution validation of advanced total carbon–black carbon (TC-BC(λ)) method for apportionment of primary and secondary carbonaceous aerosols in the western Mediterranean basin (WMB: TC-BC(λ))
9	ATMO 2nd TNA call	Complete	Palas GmbH	Small Medium Enterprise (SME)	Germany	Expert scientist	ENG-TECH - Engineering and technology	Yes	Research/innovation services (i.e. fo	SBO, AT (OBS)	Combination of Physi	Cloud Droplet Analyzer (CDA)
10	ATMO 2nd TNA call	Complete	Senseair	Other industrial and/or profit private organization	Sweden	Engineer, Technician	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Technical services (i.e., calibrations, (	ICOS-ATC, FR (CL)	Combination of Physi	Evaluation of a new low-cost, small-size multi-channel NDIR sensing platform for GHG concentration measurement with sub-ppm resolution
11	ATMO 2nd TNA call	Complete	CIMEL	Small Medium Enterprise (SME)	France	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Technical services (i.e., calibrations, (	ISAF - IZO, ES (OBS)	Physical access (hand	Characterization Of AerosoLs In The subtropical nOrth atlaNtic (CDALITION)
12	**ATMO 3rd TNA call**	Complete	CIMEL	Small Medium Enterprise (SME)	France	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	No	Research/innovation services (i.e. fo	ISAF - IZO, ES (OBS)	Remote access (the u	EValuation of aerOsol LUnar measuremets at the saTellite cOmmunication chaNnels
13	ATMO 3rd TNA call	Complete	TOFWERK AG	Other industrial and/or profit private organization	Switzerland	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Research/innovation services (i.e. fo	CUAREC, DE (ASC)	Physical access (hand	TEsting of a Dual Ionization-MS prototype by coupling with an Atmospheric Simulation Chamber
14	ATMO 3rd TNA call	Complete	JB Hyperspectral Devices GmbH	Small Medium Enterprise (SME)	Germany	Expert scientist	ENV-ECOBIO - Earth and environmental sciences/Eco-biosphere	No	Technical services (i.e., calibrations, (	CESAR, NL (OBS)	Combination of Physi	Hyperspectral Assessment of Vertical Atmospheric Reabsorption of Sun Induced CHlorophyll Fluorescence
15	ATMO 3rd TNA call	Complete	Menapia Ltd.	Small Medium Enterprise (SME)	UK	Other, not specified	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Technical services (i.e., calibrations, (	CESAR, NL (OBS)	Physical access (hand	MetSprite Tower Verification
16	ATMO 3rd TNA call	Complete	Stöv S.A. and University of Namur	Small Medium Enterprise (SME)	Belgium	Post-graduate	CHEM - Chemistry	Yes	Research/innovation services (i.e. fo	PACS-C2, CH (ASC)	Combination of Physi	Catalytic solutions for the cleansing of wood stove emissions: a physico chemical characterization of effluents generated by wood combustion and their maturation in the atmosphere
17	ATMO 3rd TNA call	Complete at 1 Facility (WCCAP)	GRASP SAS	Small Medium Enterprise (SME)	France	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Research/innovation services (i.e. fo	AGORA, ES (OBS), ISAF - IZO, ES (OBS) , WCCAP, DE (CL)	Combination of Physi	Interaction assessment between atmosphere's composition and low-cost gas sensor system responses
18	ATMO 3rd TNA call	Cancelled	Origins.earth	Other industrial and/or profit private organization	France	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Research/innovation services (i.e. fo	USRL, CY (MOB)	Combination of Physi	Unmanned Aerial System – GreenHouse Gas Tracker
19	ATMO 3rd TNA call	Complete	Eurac Research	Other industrial and/or profit private organization	Italy	Expert scientist	ENG-TECH - Engineering and technology	Yes	Research/innovation services (i.e. fo	ATMOS, GR (OBS)	Physical access (hand	AQUINAS
20	**ATMO 5th TNA call**	Complete	Sunset Laboratory BV	Small Medium Enterprise (SME)	The Netherlands	Expert scientist	ENV-ATMO - Earth and en	Yes	Research/innovation services (i.e. fo	ATMOS, GR (OBS), PANGEA, GR (OBS)	Physical access (hand	DETONATE (DetErminaTion of brown carboN using a dual wavelength laser slit-up)
21	ATMO 5th TNA call	Complete	Code Academy Berlin	Small Medium Enterprise (SME)	Germany	Post-graduate	ENV-ATMO - Earth and en	Yes	Training services only (i.e., summer/	CIAO, IT (OBS)	Physical access (hand	Training in Instrumentation and Data analysis for Aerosol at CIAO observatory
22	**ATMO 7th TNA call**	Complete	TOFWERK AG	Other industrial and/or profit private organization	Switzerland	Expert scientist	ENV-ATMO - Earth and environmental	Yes	Research/innovation services (i.e. fo	CUAREC, DE (ASC)	Combination of Physi	Resolving the formation and fate of atmospheric organic peroxy radicals
23	**ATMO TNA Call for private sector**	Complete	AeroSpec	SME	Switzerland	Expert scientist	ENV-ATMO - Earth and en	No	Research/innovation services (i.e. fo	ATMOS, GR (OBS)	Combination of Physi	Monitoring of Aerosol Chemical Composition with Infrared Spectroscopy
24	ATMO TNA Call for private sector	Complete	LEN s.r.l.	Small Medium Enterprise (SME)	Italy	Other, not specified	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Technical services (i.e., calibrations, (	WCCAP, DE (CL)	Physical access (hand	Evaluation of Dual Beam Absorption Photometer
25	ATMO TNA Call for private sector	Complete	Licel GmbH	Small Medium Enterprise (SME)	Germany	Engineer, Technician	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Research/innovation services (i.e. fo	WOS, PL (OBS)	Physical access (hand	APD Ground Loop Prevention
26	ATMO TNA Call for private sector	Complete	Aerosol d.o.o.	Small Medium Enterprise (SME)	Slovenia	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	No	Technical services (i.e., calibrations, (	WCCAP, DE (CL)	Physical access (hand	Intercomparison of optical absorption measurements using newly developed Aethalometer AE36 and AE36s with extended wavelength range (9-wavelengths)
27	ATMO TNA Call for private sector	Complete	Aerosol d.o.o.	Small Medium Enterprise (SME)	Slovene	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	No	Research/innovation services (i.e. fo	ATMOS, GR (OBS)	Combination of Physi	Advanced Carbonaceous Aerosol Speciation using the combination of the new Total Carbon Analyzer prototype (TCAx) and new 9 wavelength Aethalometer (AE36x).
28	ATMO TNA Call for private sector	Complete	Eventech	Small Medium Enterprise (SME)	Latvia, Lithuania	Other, not specified	ENG-TECH - Engineering and technology	Yes	Research/innovation services (i.e. fo	WOS, PL (OBS)	Combination of Physi	Eventech Time-Tagger Testing for Lidar Applications.
29	ATMO TNA Call for private sector	Complete	GRASP SAS	Small Medium Enterprise (SME)	France	Expert scientist	MATH - Mathematics	Yes	Research/innovation services (i.e. fo	WOS, PL (OBS), AMP, PL (MOB)	Combination of Physi	Air Quality in Urban Environment: A Focused Study on Pollution Behavior in Warsaw's Canopy Layer
30	ATMO TNA Call for private sector	Complete	Droplet Measurement Technologies, LLC	Small Medium Enterprise (SME)	USA	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Research/innovation services (i.e. fo	CO-PDD, FR (OBS)	Combination of Physi	Cloud Aerosol Bioaerosol and Dust Interactions Experiment
31	ATMO TNA Call for private sector	Complete	Picarro Inc	Small Medium Enterprise (SME)	The Netherland	Engineer, Technician	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	No	Research/innovation services (i.e. fo	CO-PDD, FR (OBS)	Combination of Physi	In Situ Measurement of Formaldehyde in a Cloudy Environnement Using CRDS-Picarro
32	ATMO TNA Call for private sector	Complete	RAYMETRICS SA	Small Medium Enterprise (SME)	Greece	Sales Manager	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Research/innovation services (i.e. fo	AMP, PL (MOB)	Combination of Physi	Mobile system solution Development using Scanning Lidar system capabilities.
33	ATMO TNA Call for private sector	Complete	Raymetrics	Small Medium Enterprise (SME)	Greece	Expert scientist	ENG-TECH - Engineering and technology	Yes	Technical services (i.e., calibrations, (	USRL,CY (MOB)	Physical access (hand	Remote sensing of Particulate Matter (PM) Concentrations
34	ATMO TNA Call for private sector	Complete	European Sensor Systems S.A.	Other industrial and/or profit private organization	Greece	Post-graduate	PHY - Physics astronomy, astrophysics	Yes	Research/innovation services (i.e. fo	RADO, RO (OBS)	Combination of Physi	Atmospheric Lidar Data Acquisition Transient Digitizer
35	ATMO TNA Call for private sector	Complete	Raymetrics	Small Medium Enterprise (SME)	Greece	Private Sector Employee	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Technical services (i.e., calibrations, (	RADO, RO (OBS)	Physical access (hand	Inter comparison campaign
36	ATMO TNA Call for private sector	Information missing	TENUM	Small Medium Enterprise (SME)	FRANCE	Engineer, Technician	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Technical services (i.e., calibrations, (	ISAF - IZO), ES (OBS)	Physical access (hand	Caltoo educational sunphotometer calibration campaign
37	ATMO TNA Call for private sector	Complete	Luper Technologies B.V.	Small Medium Enterprise (SME)	The Netherlands	Chief Executive Officer	ENG-TECH - Engineering and technology	Yes	Research/innovation services (i.e. fo	IASC, IE (ASC)	Combination of Physi	Atmospheric fate and impact of emissions from asphalt mixing plants: reactivity, oxidation products and SOA formation.
38	ATMO TNA Call for private sector	Complete	Menapia Ltd.	Small Medium Enterprise (SME)	UK	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	No	Technical services (i.e., calibrations, (	CESAR, NL (OBS)	Physical access (hand	MetSprite Tower Verification 2
39	ATMO TNA Call for private sector	Complete	Menapia Ltd.	Small Medium Enterprise (SME)	UK	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	No	Research/innovation services (i.e. fo	FMI PAL-SOD, FI (OBS)	Physical access (hand	IMPACT+
40	ATMO TNA Call for private sector	Complete	GRASP Earth	Small Medium Enterprise (SME)	France	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	No	Technical services (i.e., calibrations, (	WCCAP, DE (CL)	Remote access (the u	IN-Neph certification for ACTRIS
41	ATMO TNA Call for private sector	Complete	Dekati Ltd.	Small Medium Enterprise (SME)	FINLAND	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Research/innovation services (i.e. fo	MAC, UK (ASC)	Combination of Physi	Unravelling the capability of the DEKATI Oxidation Flow Reactor to explore the toxicity and composition of secondary organic aerosol from indoor emission sources.
42	ATMO TNA Call for private sector	Complete	Aerospec SA	Small Medium Enterprise (SME)	Switzerland	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	No	Research/innovation services (i.e. fo	SIRTA. FR (OBS)	Physical access (hand	enhancing Pm chemical composition analysis with the AIR monitor: leveraging real-time ftir Spectroscopy for air quality monitoring
43	ATMO TNA Call for private sector	Cancelled	IONICON Analytik GmbH	Small Medium Enterprise (SME)	Austria	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Research/innovation services (i.e. fo	SIRTA. FR (OBS)	Combination of Physi	Evaluation of the chemical composition of organic aerosol via CHARON PTR-TOFMS
44	ATMO TNA Call for private sector	Complete	BJE Environmental Optics	Small Medium Enterprise (SME)	United States of America	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Research/innovation services (i.e. fo	WOS, PL (OBS)	Remote access (the u	Camera lidar evaluation for air quality
45	ATMO TNA Call for private sector	Complete	Aerosol d.o.o.	Small Medium Enterprise (SME)	Slovenia	Expert scientist	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	Yes	Research/innovation services (i.e. fo	SIRTA, FR (OBS)	Combination of Physi	Intercomparison of TC-BC method with CAS5 (TCA08-AE33) instruments and the new prototype TCA09-AE36system.
46	ATMO TNA Call for private sector	Complete	Observator Instruments	Small Medium Enterprise (SME)	The Netherlands	Post-graduate	ENV-ATMO - Earth and environmental sciences/Atmospheric domain	No	Technical services (i.e., calibrations, (	WOPAS, PL (OBS)	Physical access (hand	Comparison of Sentinel Air Quality System with reference standard station.

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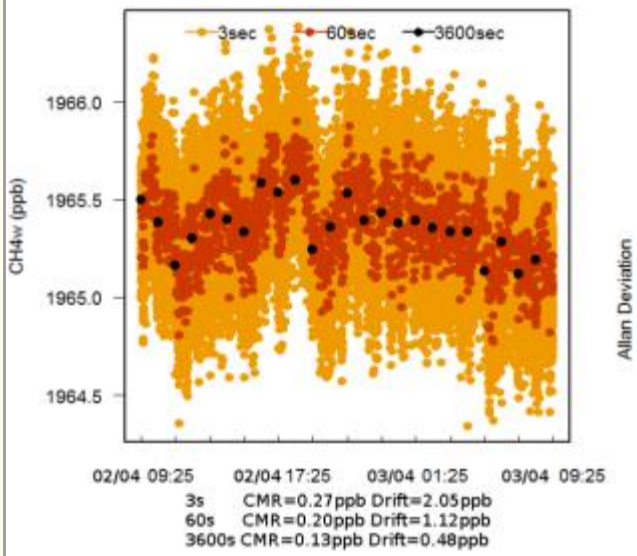
Annex 2: Detailed description of the instrument test performed at the ATC Malb

Testing descriptions:

Continuous Measurement Repeatability and Short-term drift: The continuous measurement repeatability (CMR) is evaluated with the SD of the continuous measurements of a cylinder over 24 h. The short-term drift is defined as the peak-to-peak amplitude of the same measurements. These two metrics are evaluated for different integration times (typically, raw data, 1 min and 1 h). Usually, in the synthesis report, we provide values for 1 min and 1 h averages. Allan deviation: The Allan deviation, which shows the stability as a function of the integration time and informs about the optimal integration time, is also calculated and provided in the synthesis report.	 Figure 1. CH_4continuous measurement repeatability. First panel: measurements averaged over different time intervals. Second panel: Allan deviation.

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Short-term repeatability: The short-term repeatability (STR) is defined as the repeated measure of a sample over a short period of time (about 3 h). In the laboratory, a target gas is measured 10 times in 15 min sequences bracketed by 5 min of wet ambient air measurements. For each measure, only the last 9 min are averaged. The repeatability is then expressed through the mean and SD of these averaged measures.

Long-term repeatability: The long-term repeatability (LTR) is comparable to the short-term repeatability but on a longer timescale (3 days). In the laboratory, a target gas is measured for 30 min bracketed by around 5 h of wet ambient air over 72 h of total measurements. For each measure, only the last 10 min are averaged. The long-term repeatability is then expressed through the SD of these averaged measures. Typically, several 3-day exercises are performed and the results compared and aggregated at the end of the 1-month duration of the instrument test period. In Fig. 2 shows an example of short-term and long-term repeatability. For each species the mean, the SD and the drift are calculated.

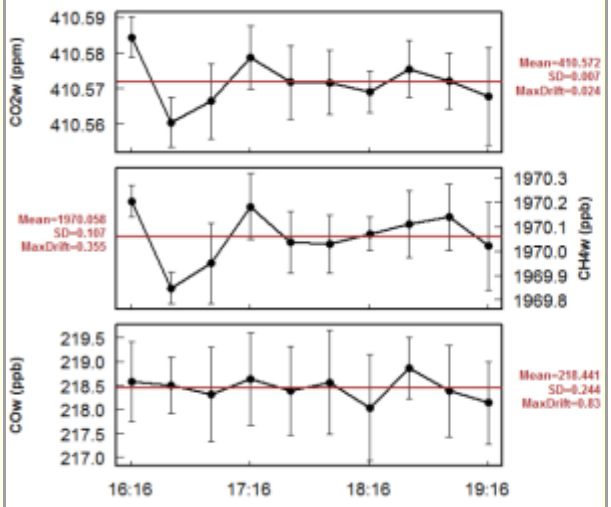

Figure 2. Short-term and long-term repeatability for the three species. First panel: short-term repeatability. Second panel: long-term repeatability.

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Ambient temperature and pressure dependence: For the pressure, we plot the target gas measurements realized during the long-term repeatability test against the atmospheric pressure over several days and evaluate the correlation between the two. For the temperature dependence, the room temperature was until now varied using the room air conditioning system and we plot the target gas measurements against this varying temperature. Plans have been made to acquire a temperature-controlled chamber. As for the pressure, the correlation between the two is calculated. Two examples are shown in Fig. 3 with for each case, the linear regression and the correlation coefficients calculated.

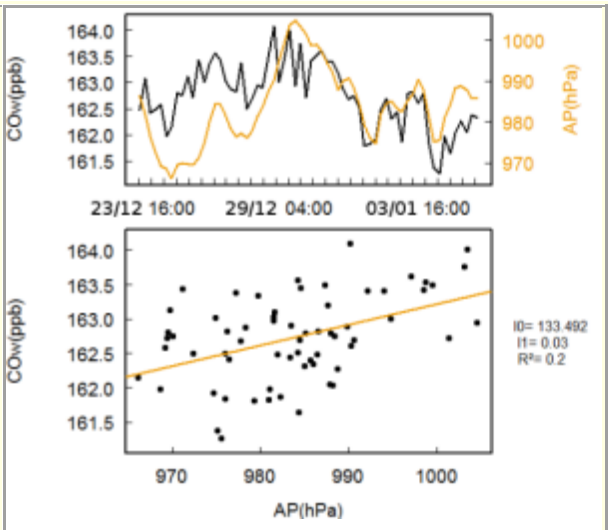

Figure 3. CO pressure and temperature dependency. First panel: pressure dependency. Second panel: temperature dependency. On the right of the lower plot, the slope (I1), intercept (I0) and the coefficient of correlation (R2) are indicated.

Linearity: The linearity of the instrument is also evaluated. For the first instruments, the same cylinders as for calibration (four cylinders) were used. Then, two cylinders (low and high concentrated cylinders; see Fig. 5) were added to the set. The residuals from the fit are calculated, and their concentrations along with the correlation coefficient allow us to judge of the linearity of the instrument against the calibration scale. It is important to note that the validity of this test depends strongly on the proper assignation of the concentrations from each calibration cylinders, hence the importance of the linto internationals scales and the regular recalibrations of the MLab calibration cylinders

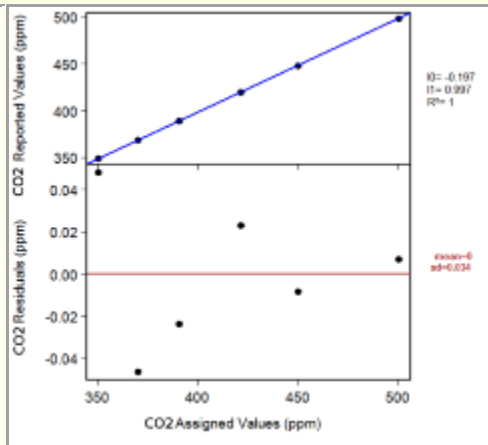

Figure 5. Linearity test for CO2. On the top panel, the measured values vs. the assigned values. On the right of this panel, the slope (I1), intercept (I0) and the coefficient of correlation (R2) are

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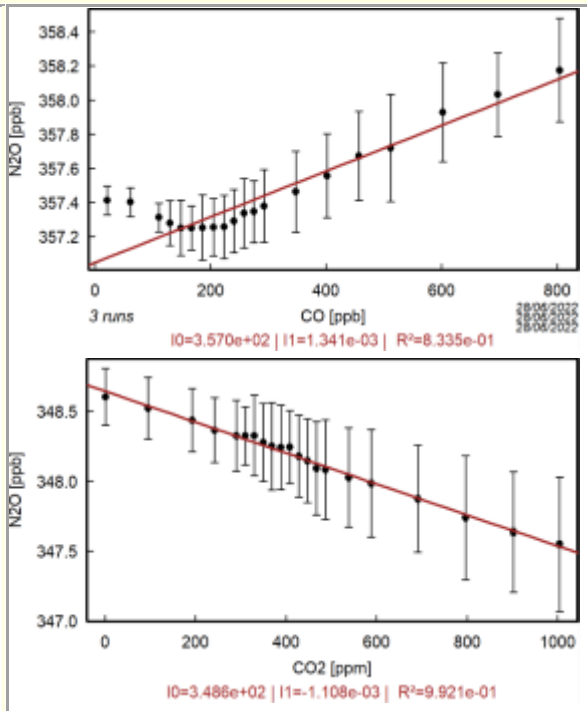
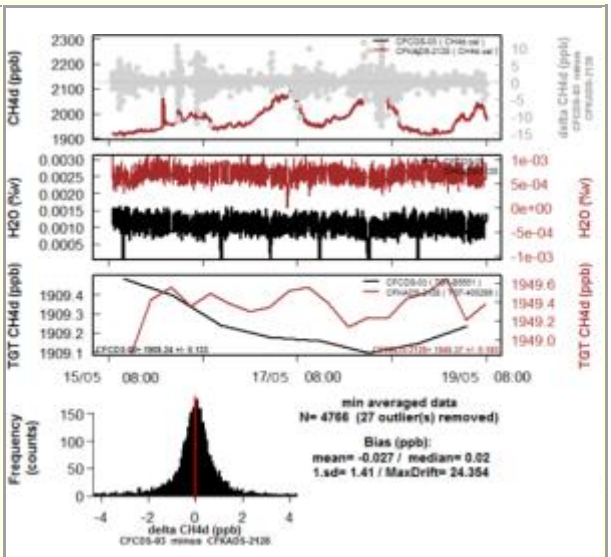
against a "master" set of cylinders provided by the central calibration laboratories.	indicated. On the lower panel, the residuals, i.e., the difference between the assigned values and the values calculated using the linear equation, are shown.

Cross sensitivity: For N_2O /CO analyzers, we evaluate the correlation between N_2O and CO measurements by measuring a tank filled with a high CO concentration and diluted by step with the same gas passing through a sofnocat trap. Same test is carried out with a tank filled with a high CO_2 concentration and diluted thanks to an ascarite/magnesium perchlorate trap to evaluate the correlation with COv for N_2O and CO measurements.



Comparison with reference instruments: Finally, ambient air measurements from each instrument are compared with other reference instruments maintained by the MLab. The MLab is located in Gif-sur-Yvette, about 50 km southwest of Paris. We are thus sampling suburban air with large variability as we are looking at 1 min averages. Initially, the CRDS analyzers were compared to the gas chromatograph system and if available to another CRDS analyzer in test. Since the end of 2011, most of the instruments have been tested against the same CRDS reference instrument for



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CO_2 and CH_4 (CFCDS03). For CO, since the end of 2013, a CRDS reference instrument (G2401) has also been chosen. And since mid 2017, a CRDS reference instrument for N_2O /CO (G5310) is also available. The tested instrument measures wet and dry air and is compared to the MLab reference instrument which measures ambient air dried through a cryogenic water trap. This allows the checking of the factory and MLab water vapor correction and the estimation of the biases. In Fig. 6, the comparison for CH_4 is shown. The H_2O and target gas measurements allow a quality check of the tests. The histogram can point out outliers if the distribution is strongly not Gaussian. The difference between the wet corrected air and the dry air in the left panel (about 1.2 ppb on average compared to -0.03 ppb for both instruments measuring dryair) is due to the automatic H_2O correction, which is here not sufficient to correct all the bias introduced by H_2O.	Figure 6. Comparison with the reference instrument for CH_4. First panel: dry air vs. dry air. Second panel: wet air corrected for H_2O vs. dry air. From top to bottom, the concentrations for both instruments and the difference of the two are plotted, then the water vapor concentrations for both instruments, then the evolution of the target for both instruments and finally a histogram of the distribution of the differences along with statistics.

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