

**Deliverable D7.1: *Intermediate report on physical access to
EUROCHAMP simulation chambers***

Author(s): *Peter Wiesen, Iulia Patroescu-Klotz*

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Table of content

1. Objectives of the work package 7 – Physical access to the chambers	3
2. Milestones for the work package 7 and their achievement in the reported period	8
3. Outcomes of the TNA activities performed in the EUROCHAMP-2020 project until November 2018.....	10
4. Scientific and user reports.....	12

1. Objectives of the work package 7 – Physical access to the chambers

Three specific objectives were established within the work package 7 in the EUROCHAMP-2020 project.

1. Maintain and enhance the level and quality of physical access to Europe’s world-class simulation chamber facilities.

Through the work package 7, the EUROCHAMP infrastructure offers hands-on experience and training in sixteen world-class atmospheric simulation chamber facilities across Europe, 3 more than previously within the FP6 and FP7 funded Integrating Activities projects EUROCHAMP (2004-2009) and EUROCHAMP-2 (2009-2013).

Starting with the beginning of the project the potential users of the infrastructure were provided with detailed information on the particular research possibilities for each chamber accessible via TNA services. The information can be found at <https://www.eurochamp.org/Facilities/SimulationChambers.aspx> is continuously up-dated according with the development of the infrastructure itself.

Up to date, roughly 30 % of the minimum access to be provided as units of access (days) was spent in the EUROCHAMP-2020 project. Over the same period in EUROCHAMP-2 the TNAs amounted up to 63% of the minimum access.

This should not be seen as a regress as the structure of the old TNAs' was different, there were larger activities by means of participants and access days than individual mobility or training. Also the minimum access and the number of simulation chambers was lower in EUROCHAMP-2.

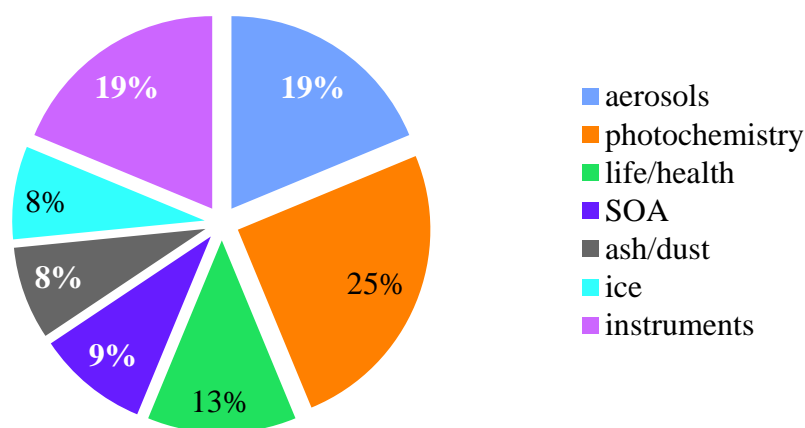


Fig. 1.1. Research fields covered by the transnational access activities performed within the EUROCHAMP2020 project until November 2018.

2. Provide the research community with access to a diverse range of atmospheric simulation chambers that are unique experimental facilities and enable innovative studies across a broad range of research topics in air quality, climate, and related areas.

Up to date, the Project Office received a number of 38 applications for transnational access to the EUROCHAMP infrastructure. 4 proposals were rejected on technical (non-compliance with the application rules) criteria or received a low score following the TUSP (TNA User Selection Panel) evaluation. Two applications are currently being evaluated by the TUSP.

Details on the application process and TUSP formation are given below in the section “Milestones for the work package 7 and their achievement in the reported period”.

The various research fields covered by the TNA applications (s. figure 7.1) confirm the broad interest within the scientific community worldwide. Beside "traditional" topics as aerosols formation and photochemistry, the users acknowledge the potential of simulation chambers for cross-border studies such as impact of air quality on health and instrumental developments.

Since the beginning of the project, 31 activities were performed at 13 facilities within the EUROCHAMP infrastructure (s. Table 7.1). One activity at the HELIOS chamber had to be rescheduled due to organisational problems of the guest research group.

Statistic data on these activities are shown in figures 7.1 to 7.7.

The visibility of the EUROCHAMP infrastructures for the scientific community worldwide is confirmed through the numerous TNA applications received from European and non-European researchers. They come with various scientific background and interests, building interdisciplinary research teams. Moreover, most of the users are “new” to the infrastructure and/or installations (s. figure 7.2). Figure 7.7 ascertains that this is not only the result of natural “development” of a scientific career (i.e. students graduate and are replaced by new students), as only some 34 % of the TNA activities included training activities for graduate students.

The EUROCHAMP-2020 TNA program has received a very significant attention worldwide and hence many proposal were submitted from outside the European Union. Most of the non-EU applications come from the USA. This number is defined by the country of the institute that the majority of users come from. It must be noticed that even when these users are employed by US institutions, not all of them are US citizens. Therefore, many of them would most probably act like multipliers in advertising the infrastructure when back in their home countries/institutions. This is one of the reasons that contradict somehow the limitation of 25% of non-EU projects imposed by EU. Anyhow, the coordination of the project together with the WP7 leader has implemented within the TNA evaluation process a procedure to enforce the 25% limit.

The apportionment of origin of the users accessing the infrastructure until November 2018, with respect to their relationship with the EUROCHAMP-2020 project is shown in figure 7.4: most of the users work in institutions which are external to the project’s consortium.

The gender apportionment of the users accessing the infrastructure until November 2018 shows a slight imbalance. This reflects a reality in the state of the scientific community in the field of

environmental research: the imbalance is relatively low, compared to other surveys' results in the US and even in the EU.¹ Those surveys regarded the whole scientific community. Nevertheless, even if we consider that our activity is already contributing to improve the gender balance of our community, we plan to implement proactive actions and positive feedback to applicants to improve these statistics toward the gender parity.

The outcomes of the TNA campaigns are disseminated through scientific meetings and publications (s. <https://www.eurochamp.org/Communication/Publications/Publications.aspx>).

Table 1.1 Statistical information related to the transnational activities performed within the EUROCHAMP infrastructure up to November 2018 (month 24):

Beneficiary		Chamber	Nos. of TNA activities	Access days spent (%)
N°	name			
1	CNRS	CESAM	3	18
2	CNRS	HELIOS	1	31
3	CNRS	ISAC	1	25
4	BUW	QUAREC	2	18
5	KIT	AIDA	5	62
6	FZJ	SAPHIR	3	91
7	PSI	PACS-C3	3	28
8	CEAM	EUPHORE	4	48
9	TROPOS	LEAK-LACIS	2	25
10	UCC	IASC	1	12
11	UEF	ILMARI	1	28
12	FORTH	FORTH-SC	2	29
13	UAIC	CERNESIM	0	0
14	NCAS	MAC-MICC	0	0

¹ http://ec.europa.eu/research/science-society/document_library/pdf_06/mapping-the-maze-getting-more-women-to-the-top-in-research_en.pdf

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15	NCAS	CASC	0	0
16	NCAS	RvG-ASIC	3	47

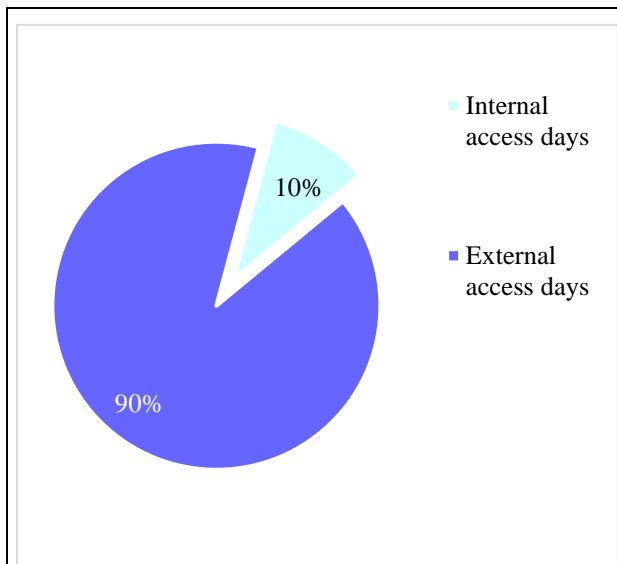


Fig. 1.2. Apportionment of new and old users accessing the infrastructure during the 1st half time of the project, counted as access days.

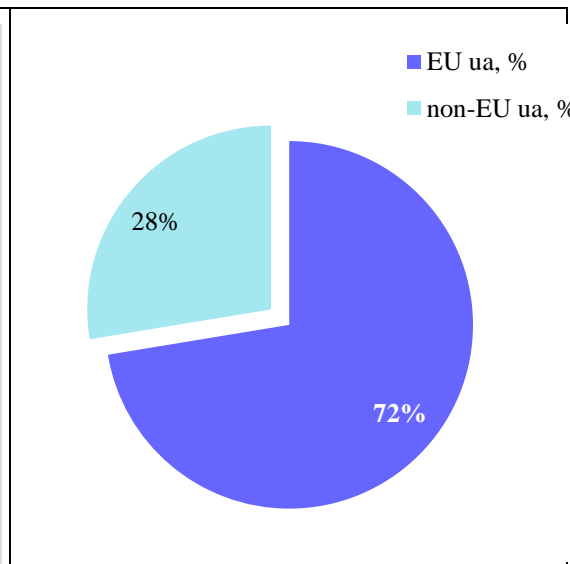


Fig. 1.3. Apportionment of origin of the users accessing the infrastructure during the 1st half time of the project, counted as access days.

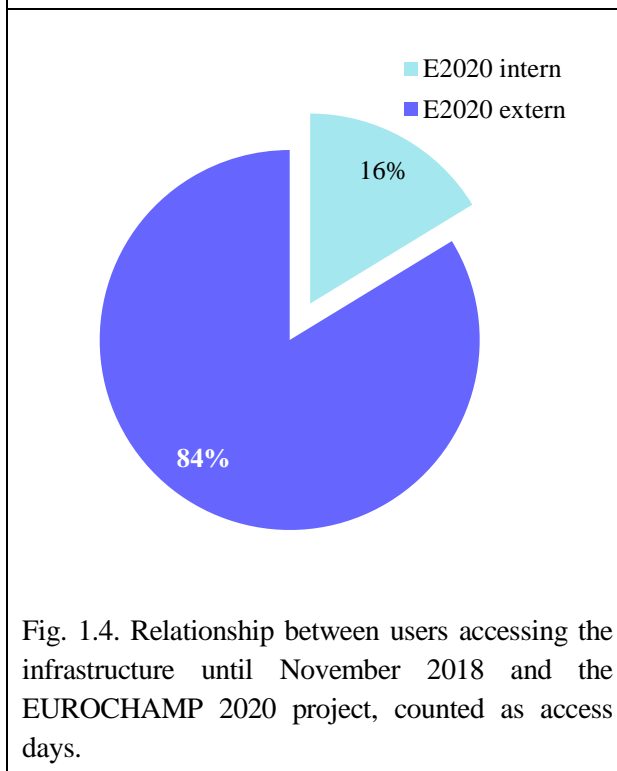


Fig. 1.4. Relationship between users accessing the infrastructure until November 2018 and the EUROCHAMP 2020 project, counted as access days.

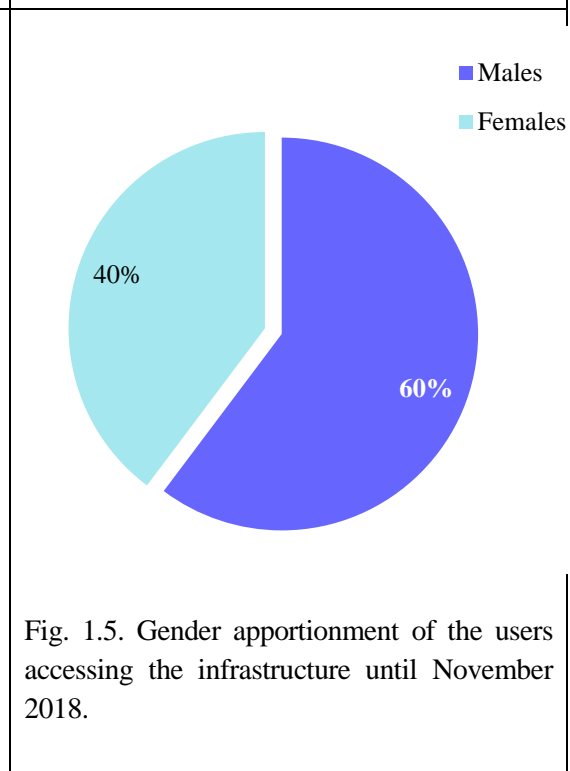
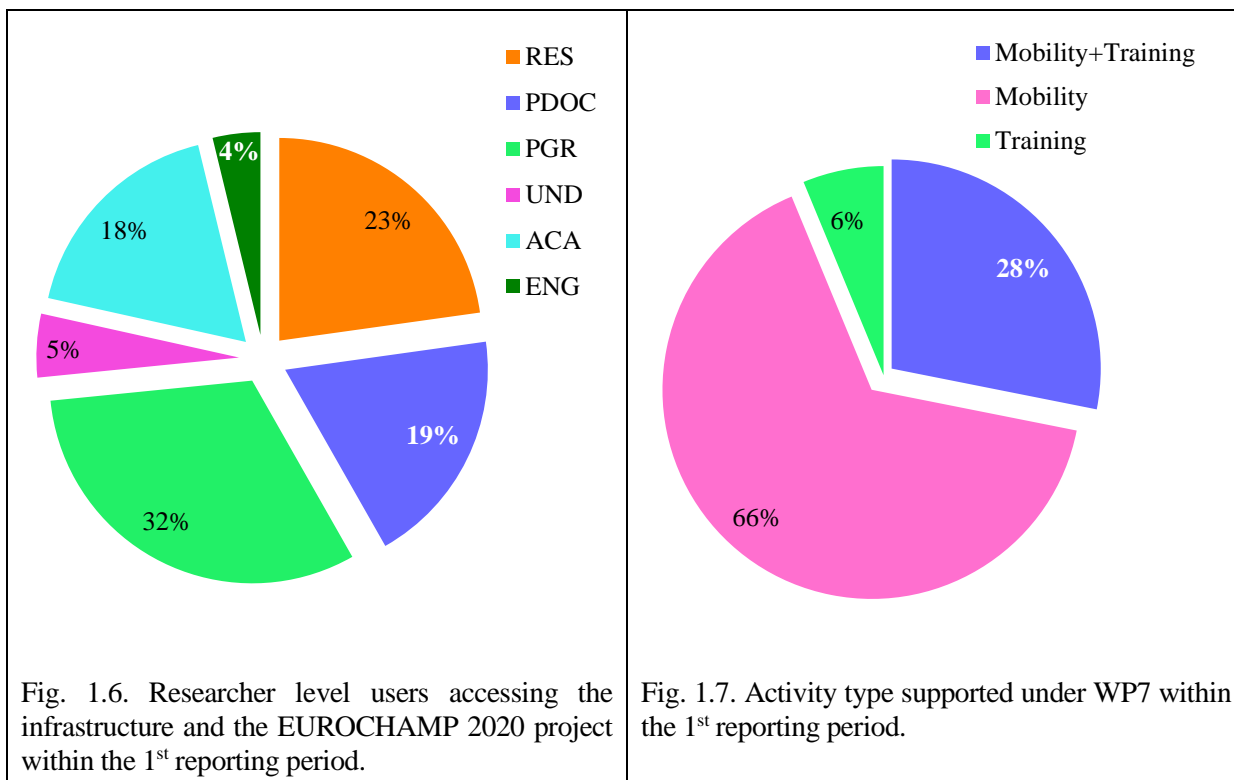


Fig. 1.5. Gender apportionment of the users accessing the infrastructure until November 2018.



The experience achieved through TNAs – practices, technical procedures and theory – does not only improve the skills of established scientists, but it also contributes to the education of young researchers, especially as input to PhD theses. These outcomes are collected by the host PIs and reported to the Project Office in due time. All reports are publicly available on the project’s website: <https://www.eurochamp.org/Project/Documentation/TNAdocuments.aspx>

An updated overview of these outcomes, publications and degrees, is given below in section D7.1.3.

3. Provide the private sector with access to unique facilities and thereby give European companies and SMEs an advantage, especially those operating in competitive industrial sectors.

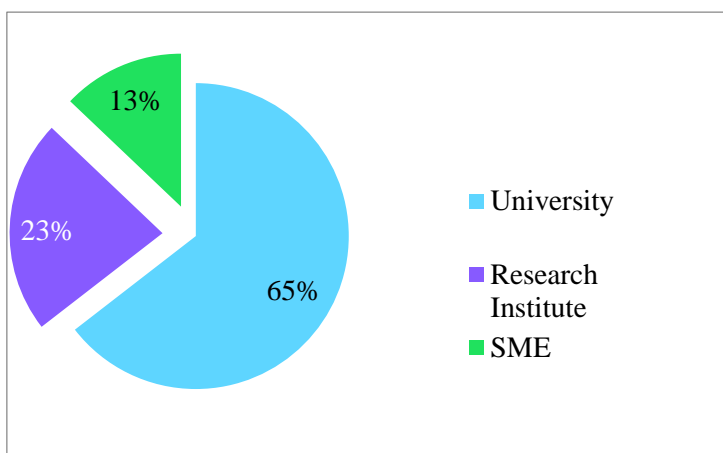


Fig. 1.8. Distribution of the activity domains of the applicants requesting transnational access to the EUROCHAMP infrastructure within the 1st reporting period.

Within the first half of the EUROCHAMP2020 project time three TNA applications concerned

development and validation of commercial instruments by SME. All three received positive evaluations and were already successfully performed. This is near to the expected 10 % threshold of industry making use of the infrastructure (s. Fig. 7.2). In order to improve this aspect more effort will be allocated during the coming two project years to advertise the advantages TNA offers for the industry.

2. Milestones for the work package 7 and their achievement in the reported period

For work package 7, in the EUROCHAMP-2020 project technical description, were defined three milestones, scheduled to be achieved in month 2, 3 and 22 respectively.

M7.1 Definition of application and selection procedure for physical access to the EUROCHAMP simulation chambers (M2)

The application procedure, including an application form, reporting form, eligibility criteria and criteria for attribution of the user support were established and published in January 2017 on the EUROCHAMP2020 website: (<https://www.eurochamp.org/Services/AccessToSimulationChambers/ApplyforTNA.aspx>).

Accordingly, the procedure establishes that the potential users must fill in and send an application to the Project Office. The Project Office verifies the eligibility of the application with respect to the EU regulations on TNA provision. With a positive result, the applicant receives a reception acknowledgement. The application is then forwarded to four evaluators chosen by the leader of the WP7 from the TUSP pool.

The selection of the evaluators is made based on the research field of the application, the evaluator's field of expertise and the number of proposals already reviewed. In case of controversy, the final decision is discussed with the leader of WP7 and the project Coordinator.

The Project Office collects the results of the evaluation and informs the applicant. At any stage where there is a negative feedback, the Project Office will inform the applicant, and if possible, offer assistance in correcting and improving the quality of the application.

The composition of the TNA User Selection Panel (TUSP) was established initially during the kick-off meeting, held in Paris. (January 18th to 20th, 2017).

Since the application received during the first 10 months were so diverse in terms of research fields it occurred that more experts were needed in order to evaluate them properly. Therefore the TUSP was enlarged in November 2017 to the actual board of 34 experts. Up to date it comprises 24 scientists from European, American and Asian institutions external to the EUROCHAMP project. Each expert external to Consortium was informed and her/his acknowledgement ensured shortly thereafter.

M7.2 Advertisement of TNA opportunities and launch of continuous call for TNA (M3)

The TNA call was launched in January 2017, shortly after establishing the application and selection rules.

The transnational access to the EUROCHAMP infrastructure is continuously advertised via various social media (LinkedIn, Twitter), individual partner websites (e.g. <https://www.psi.ch/lac/smog-chamber> and <http://www.ceam.es/WWEUPHORE/home.htm>), and through dissemination activities within work package 6, such as the scientific meetings and business fairs attended by members of the EUROCHAMP consortium.

The users themselves also act as multipliers through their own publications and scientific or commercial visibility.

M7.3 Intermediate assessment of EUROCHAMP simulation chambers access provision and outreach (M22)

An intermediate assessment was presented at the 2nd annual project meeting held in Patras, Greece, (September 10th to 15th, 2018). A second assessment, updated, was presented at the Mid-term Review meeting held in Brussels, Belgium, on November 20th, 2018.

3. Outcomes of the TNA activities performed in the EUROCHAMP-2020 project until November 2018

Chamber/TNA no.	Type / Event	Authors/Title
<u>EUPHORE-001-2017</u>	Oral presentation <i>Colloque Francophone Combustion et Pollution Atmosphérique</i> , April, 23 rd - 26 th , 2018 Ouarzazate (Morroco)	A. Tomas, L. Aslan, A. Munoz, M. Rodenas, T. Vera, C. Fittschen, P. Coddeville Photolyse de composés multifonctionnels carbonylés sous irradiation naturelle au photoréacteur européen Euphore (ES)
	L'Universite de Lille 1, PhD thesis defended on November, 6 th 2017	Lina Aslan Atmospheric degradation of multifunctional organic compounds: <i>Hydroxy ketones and unsaturated Aldehydes</i> (Dégradation atmosphérique de composés organiques multifonction-nels: Les hydroxycétones et les aldéhydes insaturés).
<u>HELIOS-002-2017</u>	Poster <i>AGU Fall meeting</i> , December 11 th -15 th , 2017, New Orleans (US)	J. Brewer, A. R. Ravishankara, A., E. V. Fischer, A. Kukui, V. Daële, W. Ait-helal, J. Leglise, Y. Ren New Measurements of Methyl Ethyl Ketone (MEK) Photolysis Rates and Their Relevance to Global Oxidative Capacity
<u>QUAREC-001-2017</u>	Posters <i>Colloque Francophone Combustion et Pollution Atmosphérique</i> , April, 23 rd - 26 th , 2018 Ouarzazate (Morroco) <i>25th International Symposium on Gas Kinetics</i> , July 22 nd - 26 th , 2018, Lille (FR)	A. Grira, A. Tomas, P. Coddeville, G. El Dib, A. Canosa, C. Kalalian, E. Roth, A. Chakir, P. Wiesen, I Patroescu-Klotz Gas-phase ozonolysis of some unsaturated aldehydes: Kinetics, products, and SOA formation
<u>QUAREC-002-2017</u>	Posters <i>25th International Symposium on Gas Kinetics</i> , July 22 nd - 26 th , 2018, Lille (FR)	C.B. Rivela, C.M. Tovar, M.B. Blanco, R. Gibilisco, I. Barnes, P. Wiesen, M.A. Teruel. Products and Mechanisms of the Reactions of a Series of Hydrofluoroalkenes initiated by OH Radicals
<u>SAPHIR-001-2017</u>	Scientific paper Atmos. Chem. Phys., 18, 8001-80016, 2018.	H. Fuchs, S. Albrecht, I.-H. Acir, B. Bohn, M. Breitenlechner, H.-P. Dorn, G. I. Gkatzelis, A. Hofzumahaus, F. Holland, M. Kaminski, F. N. Keutsch, A. Novelli, D. Reimer, F. Rohrer, R.

Integration of European Simulation Chambers for Investigating Atmospheric Processes. Towards 2020 and beyond

	https://doi.org/10.5194/acp-2018-265	Tillmann, L. Vereecken, R. Wegener, A. Zaytsev, A. Kiendler-Scharr, and A. Wahner. Investigation of the oxidation of methyl vinyl ketone (MVK) by OH radicals in the atmospheric simulation chamber SAPHIR
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4. Scientific and user reports

The established procedure for the TNA activities requires that the users provide a scientific report about the activity held at the chamber within two months from the end of their project and submit it to the Project Office. Most of the guest researchers sent these reports in due time. In certain cases delays were caused by the large amount of experimental data produced and the analysis time necessary to provide even preliminary results.

Detailed scientific reports are publicly available and can be downloaded from the project website (<https://www.eurochamp.org/Project/Documentation/TNAdocuments.aspx>).

A short overview upon the TNA activities performed within the EUROCHAMP infrastructure up to date is given below.

Access granted to CESAM (CNRS)

In the first 24 month since the EUROCHAMP2020 project started, CESAM did host three TNAs, with a total duration of 23 access days. Both activities made use of the special design of the CESAM installation to study multi-phase chemical systems and characterize particulate matters.

CESAM-001-2017 was dealing with the aqueous Formation of Brown Carbon in aerosols being a combined training and mobility activity. The scientific report shows that the goals of the TNA at CESAM were fulfilled, further processing of the results being needed before these can be published.

CESAM-002-2018 was a mobility activity that aims at characterizing African dust for its isotopic fingerprint and geochemical properties. Thus the users hope to answer the question if Namibia is a source for the dust found on the Antarctic coastal regions. Another issue was to determine the amount of bioavailable iron in the dust generated from Namibian soil samples. The results would be used to identify their contribution to the phytoplankton growing observed in the Southern Ocean after dust storms.

For these reason several soil samples collected from the region Huab in Namibia were investigated concerning their dusting potential at the CESAM chamber that is uniquely suitable for generating dust from solid samples. The subsequent chemical analyses are presently performed at the guests' group laboratories.

The users report that although the generation of dust was not entirely successful due to technical reasons, a satisfying number of samples was obtained. Based on the positive experience, it was decided that the collaboration between the guest and host groups will be continued beyond the current research subject.

Within *CESAM-003-2018* an instrument for the measurements of aerosol absorption coefficients, developed by Enviromental Physics Bologna (IT), was tested against established techniques and instruments available at the CESAM chamber. The activity took place in the early autumn, the report has yet to be sent.

A fourth proposal was submitted for CESAM in November 2018 and is currently with the TUSP for evaluation.

Access granted to HELIOS (CNRS)

Two TNA proposals were positively rated by the TUSP at HELIOS up to date, *HELIOS-002-2017* and *HELIOS-003-2018*. The activity *HELIOS-003-2018* did not take place yet due to organizational problems of the guest PI. The project is now scheduled for spring 2019.

HELIOS-002-2017, a combined training and mobility activity, made use of a particular feature of this chamber that allows experiments to be conducted under true solar light conditions. Various experiments were performed over 25 days. The large range of analytical instruments present at HELIOS provided comprehensive data on the atmospheric fate of Methyl Ethyl Ketone and facilitated training on use of state-of-the art instrumentation.

The results of the campaign were presented at the AGU Fall meeting 2017 ([A13B-2060 New Measurements of Methyl Ethyl Ketone \(MEK\) Photolysis Rates and Their Relevance to Global Oxidative Capacity](#)). Details are given in the section D7.1.3 above.

Access granted to ISAC (CNRS)

The activity *ISAC-001-2018* aimed at the characterisation of the sea surface microlayer as a source of abiotic VOCs and, further, of aerosols.

The sea surface micro layer was simulated in a Quartz cell by using salt water and phytoplankton solutions or hexane lipid extract of phytoplankton organic matter. The mixtures were irradiated in conditions that mimic the solar light on the Earth's surface. Over 10 days, various air samples were obtained by collecting the emitted VOCs via a flow of compressed, filtered and purified air circulated through the Quartz cell.

Both air and aqueous samples were analysed at the host's laboratory. Some more investigations will be performed on aqueous samples at the users' laboratories.

The ISAC chamber was used to study the aerosol formation from air samples, photochemically and by interacting with ozone.

The preliminary results included in the scientific report prove that the photochemical processing of organic matter produced by marine diatom *Chaetoceros pseudocurvisetus* results in abiotic VOCs production and further aerosol particle formation and growth. Based on the promising results obtained from this project, a joined *COGITO* project proposal on above issue has been submitted in June 2018 by Christian George and Sanja Frka Milosavljević within the French-Croatian scientific research programme *Hubert Curien*.

Access granted to QUAREC (BUW)

Up to date QUAREC did host two TNA activities, of combined training and mobility type, with a total duration of 25 days. Both research projects concerns kinetic and product studies those results should be included in photochemical mechanisms and models. And in both graduate and postgraduate students were trained in using the simulation chamber and interpretation of experimental data.

The gas-phase chemistry of organic compounds known to be released from plants into the atmosphere was studied within *QUAREC-001-2017*. The study included both use of instruments provided by the host and collecting samples of the reaction mixtures to be analysed at the guests' laboratory. The user report includes preliminary result indicating that the experimental goals of the activity were achieved. However, the analysis of the samples is on going. Some results were presented at scientific meetings in France and Morocco. Details are given in section D7.1.3 above. A paper should be prepared before the end of the year including the results obtained in the guests' laboratory.

QUAREC-002-2017 investigated the photooxidation of halogenated substances emitted from various industrial processes and waste disposals. Kinetics and product analyses were performed at different temperatures. The final results will be included in a PhD thesis and also published.

During June-May 2018 the environmental chamber QUAREC was disassembled and relocated within the University of Wuppertal in a new building. There it was subject to maintenance and upgrading work. Technical and personnel reasons did slow down the progress toward reopening the chamber. Therefore QUAREC is closed for TNA activities until January 2019.

Transnational Access granted to AIDA (KIT)

Until November 2018 AIDA did host five TNA within the first reporting period, accounting for 81 access days. All activities addressed issues related to cloud formation and their radiative effects, a subject of major interest for climate prediction models.

Within *AIDA-001-2017* an experience exchange occurred between the guests' expertise in generating proxy sea spray aerosol and the unique opportunities to study aerosol-cloud interactions at the AIDA facility, thus a mixed training-mobility activity that benefited both parties.

The users reported that the planned experiments to determine the ice nucleating efficiency of seawater/phytoplankton culture samples were performed successfully over 20 access days. After extensive analysis the final results will allow to derive a parameterisation framework to describe the CCN and IN ability of local sources of aerosol particles in the high Arctic, which can be used in small scale and climate models to improve the representation of Arctic mixed-phase clouds.

AIDA-002-2017 was a mobility activity that ran for 14 days at the AIDA chamber parallel to the INUIT 09 campaign "Ice nucleation of mineral dust". This TNA did support the participation of a guest LAAP-TOF instrument in the campaign. It was used to evaluate the single particle

composition of several natural desert dust samples from Africa in order to assess the role of mineralogy in the ice nucleating (IN) efficiency of natural desert dust samples.

The campaign *AIDA-003-2017* addressed the SOA² formation from anthropogenic and biogenic precursors. It was a combined mobility and training activity that took advantage of the manifold investigation possibilities at AIDA to investigate chemical kinetics, aerosol chemistry, aerosol physics, and cloud microphysics in a wide range of atmospheric conditions, crucial for the scientific objectives of the study, e.g. pressure (1 to 1000 hPa), temperature (40 °C to -90 °C), and relative humidity (from extremely dry to super saturations).

AIDA-004-2018 was an interdisciplinary campaign focusing on improving knowledge of the role of volcanic ash as ice nuclei (IN) in the atmosphere. The campaign was performed without difficulties or delays. The results will be made public in the December 2018.

During *AIDA-005-2018* the ice nucleation potential of dust particles emitted from feedlots (cattle) in Texas, US, was investigated using guest samples and the large array of instruments available at KIT. Since this combined training-mobility activity just finished end of October 2018 no user report was yet produced.

Transnational Access granted to SAPHIR (FZJ)

Up to date a number of four TNA activities took place at SAPHIR, accounting for over 90 % of the access budget. All activities included training guest researcher in performing experiments at the SAPHIR chamber.

The *SAPHIR-001-2017* activity investigated over 18 access days detailed aspects in the photochemistry of forest emitted isoprene. These chemical processes can be investigated at SAPHIR under realistic conditions with respect to both VOC concentration ranges and oxidant levels.

Time series of trace gases and radicals were measured during the campaign by a PTR brought from Harvard and instrumentation provided by the host.

The users report that the experiments were conducted successfully. The analysis of the experiments provides new insights into the details of the overall oxidation mechanism of isoprene.

From this activity and other research work done at SAPHIR emerged a joint publication that was submitted to Atmospheric Chemistry and Physics in 2018 and published. Details are given in the section D7.1.3 above.

Within *SAPHIR-002-2017* the chemistry of isoprene with NO₃ was studied under various conditions and long reaction times by multi-instrumental approach using state of the art high resolution CIMS with different ionization schemes and state of the art measurement of NO₃, HO₂, and RO₂ radicals. The instruments were provided by guest researchers and by the host facility.

² Secondary Organic Aerosols

During *SAPHIR-003-2017* an instrument developed at Peking University (PKU) for determination of Glyoxal and Methylglyoxal was tested and characterized under controlled conditions simulating the real atmosphere.

For both activities the results are still under investigation. Therefore no user report was yet submitted.

Transnational Access granted to PACS-C3 (PSI)

Three transnational access activities took place at PSI during this reporting period over 33 access days.

Through *PACS-C3-001-2018* an interdisciplinary investigation was conducted upon characterization of VOC emission from cell cultures as a diagnostic tool for metabolic processes. During a 10 days campaign a PTR-TOF 8000 instrument from the University of Oslo was successfully coupled to a cell exposure chamber at PSI to study emissions from bronchial cell cultures subjected to oxidative stress and SOA.

Apart from the unique features of the PACS-C3 installation, the study benefited also from the well-established research collaboration between host and an air toxicology group at the University of Bern (http://www.ana.unibe.ch/research/group_geiser/index_eng.html) which is a necessary prerequisite for conducting front-end-research at the interface between atmospheric chemistry and life sciences.

PACS-C3-002-2018 focuses on understanding SOA formation from biomass burning and coal combustion and comparing the results with studies of a model VOC, namely cresol.

The study was performed with ultra-high performance investigative techniques as UHPLC coupled to electrospray ionization ultra-high resolution mass spectrometry. Through this activity undergraduate and postgraduate students from both guest and host research groups were trained in the use of state-of-the-art analytical techniques.

The users report that the experimental tasks of the study were completed and the preliminary results are promising. However, the use of several MS instruments issued a large amount of raw data that is still analysed.

Within *PACS-C3-003-2018* an advanced mass spectrometric method developed by the Ionicon Analytik GmbH, a SME located in Innsbruck, Austria was used together with two state-of-the-art instruments developed at PSI to study the chemical composition of SOA. A set of SOA experiments with α -pinene (O₃ and HONO as oxidants) as well as toluene and cresol (with HONO) were conducted using PSI's PACS-C3 facility. The objectives were to reduce the gaps of knowledge on the chemical composition and photochemical transformation of complex systems and to test the instruments.

The users report that the experiments were successfully performed. The final aim of this work is to produce a methodological manuscript to be submitted in December 2018, and drafts of further scientific papers in the same time period.

Transnational Access granted to EUPHORE (CEAM)

Over the first 24 month of the EUROCHAMP2020 project, EUPHORE did host four TNA activities, with a total duration of 38 access days, roughly half of the total access budget.

EUPHORE-001-2017 took advantage of the natural solar irradiation combined with a manifold of analytical techniques provided at CEAM to investigate the photolysis of oxygenated compounds under natural irradiation. The study aims at providing accurate photolysis frequencies for atmospheric chemistry models like MCM or GECKO-A, in order to improve the consistency and robustness of atmospheric chemistry models.

The scientific report acknowledges that the campaign was successful in achieving new data on the significance of atmospheric photolysis for multifunctional oxygenated compounds.

Results from this activity were presented at *Colloque Francophone Combustion et Pollution Atmosphérique*, Ouarzazate (Morocco), April 23rd - 26th, 2018. They were also included in a PhD thesis, defended 2017 in Lille. Details are given in the section D7.1.3 above.

The **EUPHORE-002-2018** activity investigated the effect of the size and structure of the carbonyl co-product on the stabilisation of two Crigee intermediates in the reaction of ozone with 18 different alkenes aiming to foster the development of the current ozonolysis SARs. The users reported that the campaign was successful with all of the planned experiments achieved during a 13 days period.

The host group did process the raw measurement data while the final analysis and modelling is still under work at the guest laboratory. Both groups plan a joint publication but it is not possible to give a final deadline.

EUPHORE-003-2018 was a mobility activity granting access to a guest SIFT instrument to take part in the EUROCHAMP2020 “Intercomparison of instruments for measurements of small oxygenated organics”. The activity aims at evaluating the performance of the SIFT-MS technique against recognized technologies (PTR-MS and FTIR) for VOC concentration determination under controlled conditions in a large environmental chamber.

The EUPHORE chamber was chosen to conduct this research due to the wide range of certified gas calibration standards, gas phase reference measurements and the high level of analytical expertise available within the facility. In addition, it uses natural light, which the users considered advantageous for their research.

The users report a successful 10 days campaign, the preliminary results encouraging further involvement with different intercomparison exercises within the EUROCHAMP infrastructure.

Within **EUPHORE-004-2018** the Blue X-FLR9 gas analyser developed by Blue Industry and Science (FR) was tested and the technique validated against a reference method (GCMS analysis after sampling on TENAX cartridges) and also other technologies (FTIR and PTRMS) in real conditions for various target compounds.

The EUPHORE chamber was chosen for its ability to generate “on-demand atmospheres”, the possibility to perform sampling and pre-concentration for subsequent GCMS analysis (reference method) and to provide additional real-time measurements with 2 high-performance instruments (FTIR and PTRMS).

The users reported good agreement between their instrument and the other technologies, some difficulties being encountered with HCl measurements.

Transnational Access granted to LEAK-LACIS (TROPOS)

Two TNA activities were granted at LEAK-LACIS, *LEAK-LACIS-001-2017* covering 10 access days and *LEAK-LACIS-002-2017* covering 18 access days.

The *LEAK-LACIS-001-2017* activity aimed at exploring the limits of the holographic system “HoloPi” developed at the Michigan Technological University, USA, when applied to the investigation of cloud droplets and ice particles. Apart from testing the instrument, both guest and host researchers benefited from hands-on training on operating the cloud simulation chamber and a new technology respectively.

The scientific report concludes that this campaign have provided a very valuable data set concerning the detection limit of HoloPi, as well as the activation of cloud droplets under well-defined turbulent and thermodynamic conditions. Based on the promising results shown here, a future study might deal with distinction between liquid droplets and ice crystals.

Within *LEAK-LACIS-002-2017* the possibility of aerosol growing due to oxidation chemistry within the aqueous droplets was investigated. The behaviour of model droplets containing various amounts of organic compounds and Fe(II) or Fe(III) has been studied in the simulation chamber LEAK with respect to particle growth and chemical composition. The raw data are still under investigation. Therefore no user report was yet submitted.

Transnational Access granted to IASC (UCC)

Up to date there was only one TNA request for the IASC simulation chamber, namely *IASC-001-2018* which supported the HALOXCAMP campaign. This was an inter-comparison of instruments for the detection of NO₂, IO and BrO that took place at the IASC environmental chamber over 12 access days. The activity, that involved participants from four countries (three supported by EUROCHAMP2020), aims particularly to quantify the transport of the halogen oxide radicals into the measurement cell.

A second objective was to perform kinetics experiments relevant for the polluted marine atmosphere, namely the reaction of I₂ + NO₃ in the dark, as well as I + NO_x reaction in the presence of light.

The facility was chosen over their experience in working with cavity technologies and preparation of reactive halogen species. The user reports that the HALOXCAMP campaign was a success with

respect to both instrumental developments and kinetic results. Therefore it is expected that, after completion of data analysis, several publications will emerge from this activity. In addition, the future collaboration between the host and guest groups is strongly supported by all parts.

Transnational Access granted to ILMARI (UEF)

Through *ILMARI-003-2017* 25 access days were granted to a multidisciplinary research project concerning the variations in the health impact of mixtures of pollutants when aging. Lung cells were exposed to emissions from logwood fire and from a gasoline generator (gas and particulate matters).

The ILMARI facility was chosen due to its experimental set-up allowing installing the combustion sources and exposure units in the direct vicinity of the simulation chamber.

The scientific report shows that the first results are very promising with regard to toxicity assessment in vitro. The users intend to continue the collaboration work in order to investigate the effect of aged emissions from a combustion engine (e.g. gasoline car, diesel engine) in combination with aged wood combustion emissions, and also other emerging types of biofuels, such as wood briquettes and/or different types of pellets on lung cells.

Transnational Access granted to FORTH-SC (FORTH)

Two TNA activities were granted at FORTH within the first half-time of the EUROCHAMP2020 project, accounting for 35 access days.

FORTH-ASC-002-2017 is a combined training and mobility activity aiming at understanding the atmospheric relevance of aerosol formation in the photooxidation of α -pinene aged products.

The scientific report identifies three different tasks performed over 20 access days, in two visits. Thus norpinic acid, terpenylic acid, terebic acid and diaterpenylic acid acetate were synthesised (aged products of α -pinene) and subsequently the formation of aerosol particles in their oxidation via OH radicals (HONO, sulfate seeds) investigated.

Further, the properties of fresh α -pinene SOA aged products aerosol, including the product volatility as well as gas phase and aerosol mass concentrations were determined.

The achieved data are still under evaluation. There is no deadline for a publication at this time.

Within *FORTH-ASC-003-2017*, a mobility activity, was investigated the chemical aging of ambient organic aerosol (OA) as it is exposed to OH. The FORTH-SC facility offers the unique possibility to use 2 identical chambers simultaneously, one as reference and one in which a perturbation factor is added.

The innovative aspect of the study was using ambient air to conduct smog chamber experiments, i.e. complex and realistic systems. The behaviour of the organic aerosols present in the ambient air was studied while an oxidant was added to the “sample” chamber.

The preliminary results in the scientific report indicate new mass formation as OA following oxidation. In order to better understand the results a further evaluation of the VOC (Volatile Organic Compounds) and IVOC (Intermediate Volatility Organic Compounds) potential to produce this extra mass is needed.

Transnational Access granted to RvG-ASIC (NCAS)

NCAS offered in this reporting period a number of 47 access days at the RvG-ASIC facility for three research projects.

RvG-ASIC-001-2017 addresses the issue of so-called Arctic amplification of global warming (i.e., warming feeds warming). In the Arctic, temperature changes may quickly enhance methane emissions, due to large natural sources.

The user reports that all experiments were performed according to the work schedule. The study investigates the methane pathways during sea ice formation and melts under laboratory conditions under special consideration of the kinetic isotopic fractionation effect on the $\delta^{13}\text{C}$ signature of methane along these pathways, i.e. into, within and out of sea ice in both directions from sea water to sea ice and from sea ice back into sea water or into air. It supplies a first data set about the effect of kinetic fractionation on methane along pathways coupled to various sea ice formation conditions.

The Roland von Glasow Air-Sea-Ice Chamber (RvG-ASIC) at the University East Anglia (UEA) was selected, as this chamber disposes the facilities simulating an enclosed ocean-sea ice-atmosphere system.

Through *RvG-ASIC-002-2017* the guest researchers made use of the RvG-ASIC unique features – being the only large-scale chamber of its kind - to study biological and chemical air-sea-ice-frost flower interactions.

In this interdisciplinary study unfiltered seawater from the North Sea, was used to grow sea-ice and frost flowers at $-30\text{ }^{\circ}\text{C}$ for 1 week. Salinity and light measurements were carried out throughout. The study aims to provide novel quantitative data on poorly characterized ecosystems with global significance (help model climate change), and also a mechanistic understanding of colonization processes through various stages of sea-ice.

The scientific report states that while the data analysis has yet to be completed, the preliminary results suggests that the different environments sampled represent unique habitats with specific constraints that the microbial community must adapt to.

RvG-ASIC-003-2017 addresses the issue of retreating Arctic sea-ice and its impact on the Earth's energy balance. The project aims to gain important insights into the physics of radiation transfer within young sea ice and to test newly developed instruments for light measurements in sea ice for their potential use in the field. The guest researcher received support and training on using the installation from the experienced facility staff.

Integration of European Simulation Chambers for Investigating Atmospheric Processes. Towards 2020 and beyond

The facility was used to grow artificial sea-ice under controlled condition. The user reports that despite minor technical difficulties the raw data gives valuable information about the light field and the optical properties within an artificial ice pack. However, further processing of data and a second set of experiments are needed before the achieved results can be used in characterization of real ice.