Deliverable D7.2: *Final report on physical and remote access to EUROCHAMP simulation chambers*

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

Three specific objectives were established, in the EUROCHAMP-2020 project, for Work Package 7.

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

The purpose of Work Package 7 is to offer hands-on experience and training in sixteen world-class atmospheric simulation chamber facilities across Europe. The available services are advertised for potential users via the websites of the infrastructure, individual chambers and social media. By allotting a number of 20 access units to the ChAMBRe installation, located in the Istituto Nazionale di Fisica Nucleare (INFN), Genoa, Italy[1], the infrastructure was able to provide the potential TNA users with a novel ability, namely to investigate the behaviour of bio-aerosol systems. The particular research possibilities and the services offered at each chamber accessible via TNA scheme, up-dated regularly, can be found at http://www.eurochamp.org/simulation-chambers.

Work Package 7 was affected by the pandemic since both trans-frontier travelling and access to the facilities were constricted by quarantine rules. Therefore, physical access could not be sustained for all chambers and TNA projects. In order to preserve the service offering though, the Executive Board decided to offer the users the possibility, where practicable, of performing these activities remotely. The decision was by the E.C. in November 2020. Most users did accept the continuation of research partly or entirely in a remote mode. Subsequently, this influenced some training activities which had to be held via on-line tutorials (e.g., *AIDA-009-2021* and *QUAREC-005-2019*). Nevertheless, several activities had to be cancelled, due to impracticability reasons, when the transport of guest instruments inherent to fulfil the scope of research could not be arranged.

From the beginning of the project up to date, a number of 107 TNA proposals were submitted for evaluation by the TUSP, 99 were accepted, but 4 had to be cancelled due to the pandemic. Until the date this report was issued, 95 activities were supported under the TNA scheme. One activity is still undergoing, to be completed by the end of the project. A summary is given in Table 1.1.

The diversity of the users, with respect to geographical origin (fig. 1.1 and 1.2), research field (fig. 1.3), expertise (fig. 1.4), affiliation to public or private sector (fig. 1.8), etc. benefiting of the infrastructure between December 2018 (see deliverable 7.1) and August 2021 proves its visibility and the interest raised by the services offered under the TNA scheme.

[1] 2nd EUROCHAMP-2020 annual meeting, 1st – 4th October 2019, hosted by the University of Eastern Finland in Kuopio, FI.

Table 1.1: Summary of access provided under the transnational access scheme in the EUROCHAMP-2020 project in the period covered by DEL7.2.

Beneficiary		Chamber	Nos. of TNA activities		Units of access	
N°	name		*DEL7.1*	*DEL7.2*	*completed up to date*	*to be completed to the end of the project*
1	CNRS	CESAM	3	8	121	
2	CNRS	HELIOS	1	6	110,5	
3	CNRS	ISAC	1	1	20	
4	BUW	QUAREC	2	5	145	
5	KIT	AIDA	5	5	144	
6	FZJ	SAPHIR	3	3	59	
7	PSI	PACS-C3	3	5	130	
8	CEAM	EUPHORE	4	2	80	
9	TROPOS	LEAK-LACIS	2	5	95	
10	UCC	IASC	1	2	78	22
11	UEF	ILMARI	1	2	47	
12	FORTH	FORTH-SC	2	4	123	
13	UAIC	CERNESIM	0	5	50	
14	NCAS	RvG-ASIC	3	4	109	
15	NCAS	MAC-MICC	0	4	67 [a]	33
16	INFN	ChAMBre	0	2	40	

[a] One activity had to be interrupted due to the pandemic. The amount of access will be adjusted in the final report.

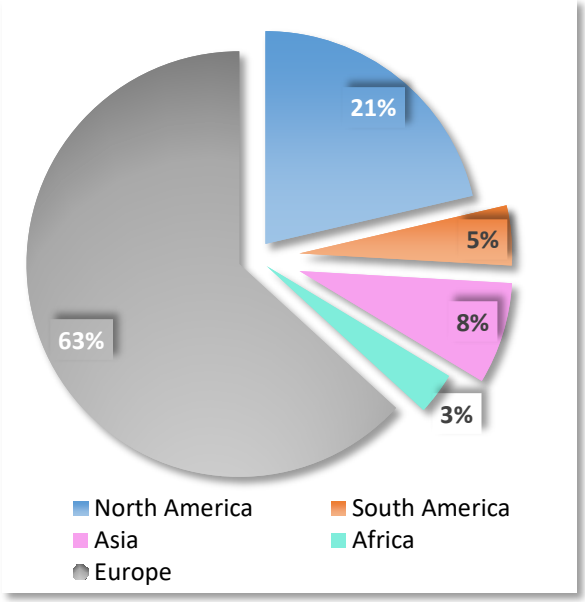

Fig. 1.1.: Affiliation's geographical origin of the users who were granted access in the EUROCHAMP-2020 project.

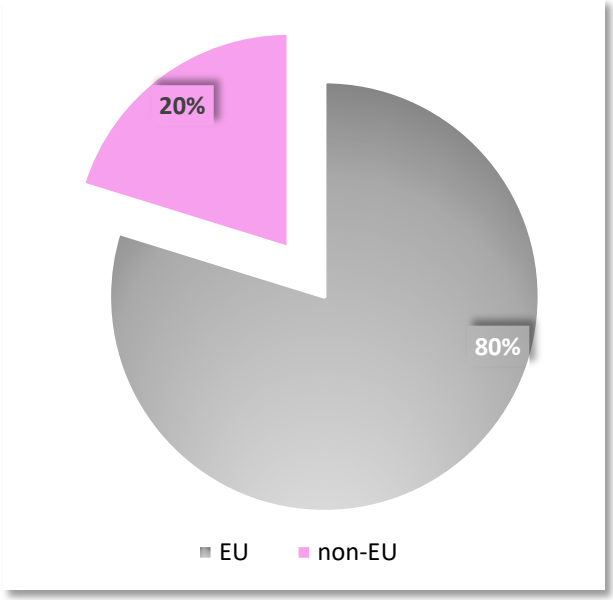

Fig. 1.2.: Relationship between the home institution of the TNA users (PI) and EU.

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.

The TNA applications, granted up to date in the EUROCHAMP-2020 project, cover a large spectrum of research fields (see figure 1.3). Moreover, many applications were submitted by multidisciplinary teams of researchers from different institutions and countries. This proves on one hand, the continuous interest that the scientific community worldwide shows to our infrastructure. On the other hand, it confirms the role of former users as multiplicators in advertising the infrastructure worldwide.

The apportionment of the various research fields changed slightly during the project time, some TNA projects aiming to produce results relevant for climate change predictions. Notable is also one activity aiming to assess the impact of short-term air pollution exposure on cognitive function in adults (MAC-MICC-003-2019, see details in Section 4, below). Preliminary results indicate the choice of the MAC-MICC installation to be indeed adequate for this kind of interdisciplinary study.

The distribution in figure 1.3 should be regarded qualitatively, as many activities included cross-border investigations that addresses simultaneously several topics.

The majority of the users requesting access were established scientists and academics (fig. 1.4). However, many students were also taking advantage of the practical and theoretical knowledge offered at the partner facilities.

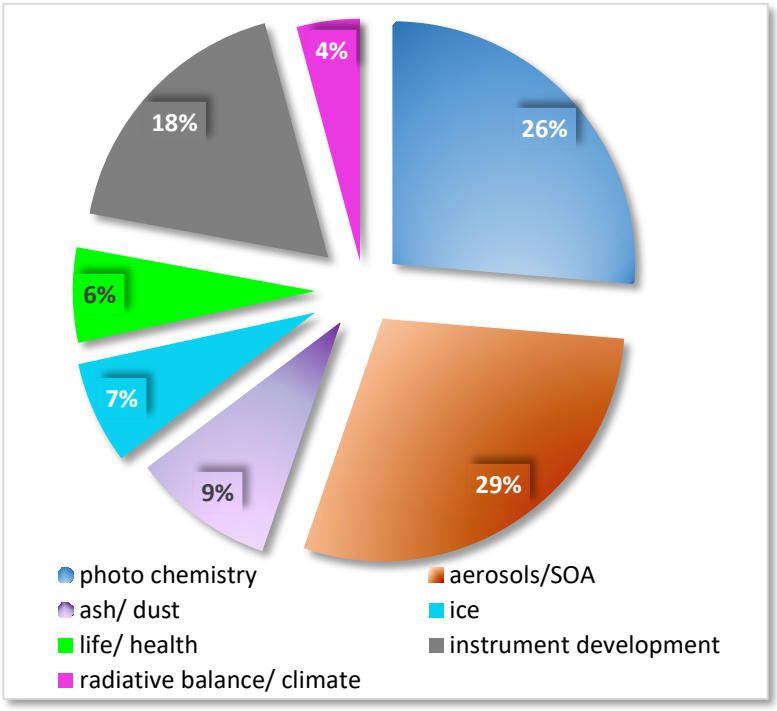

Fig. 1.3.: Research fields covered by the transnational access activities performed within the EUROCHAMP-2020 project period up to date.

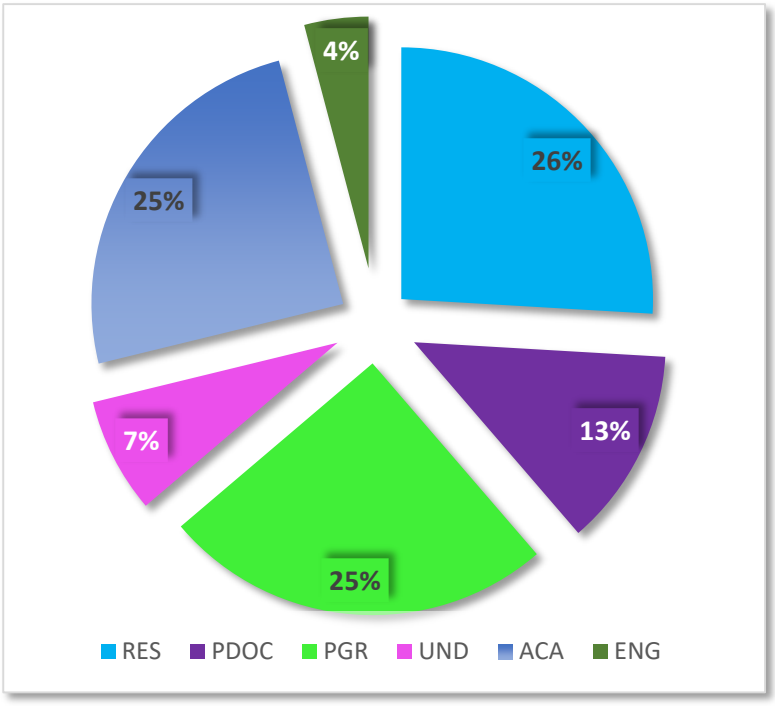

Fig. 1.4.: Level of professional expertise of the TNA users accessing the EUROCHAMP infrastructure up to date.[2]

The experience achieved through the TNA activities benefits both the users and the guest teams. The first ones by gaining hands on experience in employing state-of-the-art instrumentation, the

[2] RES= Researcher; PDOC= Post-doctoral researcher; PGR= Post graduate; UND= Undergraduate; ACA= Academic; ENG= Engineer.

last ones by being presented with new challenges. The results of the investigations supported under the TNA scheme were included in several thesis for obtaining B.Sc., M.Sc. and Ph.D. degrees.

The fact that the research activities at the host installations amounted between 1 and 4 weeks is not directly related to the amount or quality of data produced. The simultaneously employment of different instrumentation and experimental conditions yield large data sets those evaluation needed extended time periods. However, considering the delays and hindrances caused by the pandemic, the number of outcomes emerging form TNA activities is a success. More so, considering that this works as an advertising channel of the usefulness of the services offered within the infrastructure.

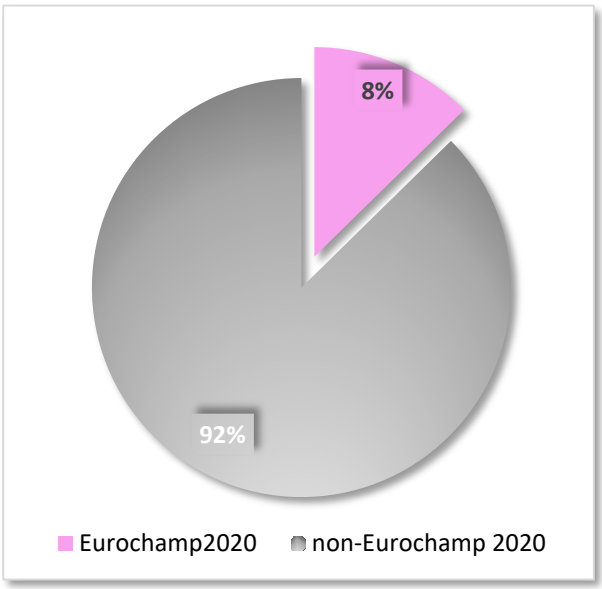

Fig. 1.5.: Percentage of access days coming from on one side external users, and users who are part of the EUROCHAMP-2020 consortium.

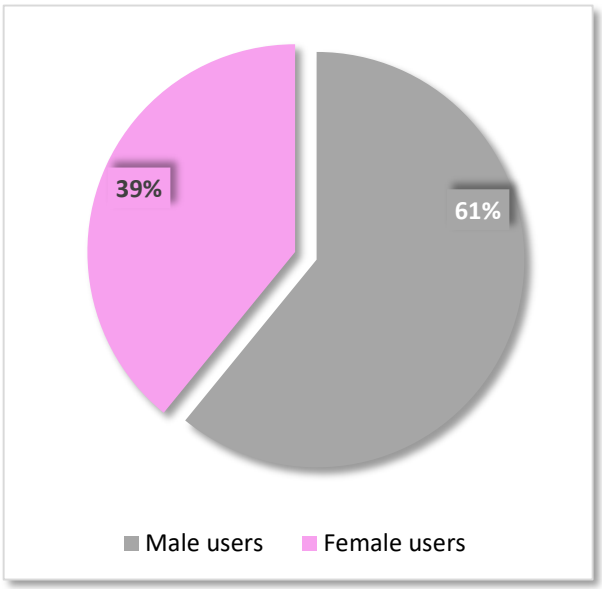

Fig. 1.6.: Gender apportionment of the users who were granted access to the infrastructure up to date.

Although facilities to simulate atmospheric processes are developed worldwide, it appears that the knowledge and experience present in the EUROCHAMP infrastructure is considered as highly valuable. As it can be seen in figure 1.2, 20% of the granted research originates outside the European Union. From the total users, up to date only 13% came from institutions that are partners in the project (figure 1.5).

The slight imbalance in the gender apportionment of the users accessing the infrastructure remains unchanged compared to the numbers provided in DEL7.1.

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.

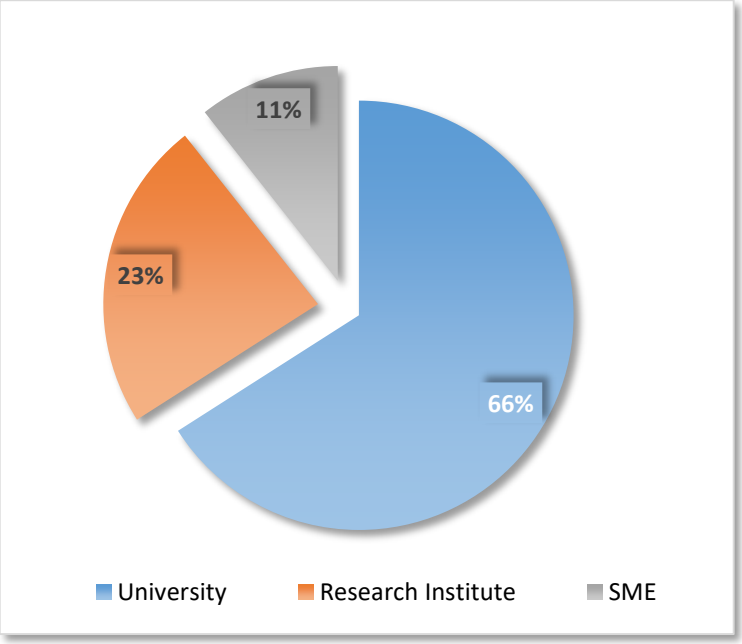

Fig. 1.7.: Distribution of the activity domains (public, private) for the TNA applications granted in the EUROCHAMP-2020 project up to date.

Up to date several TNA activities subjected the development and validation of methods or instruments of commercial interest (see figure 1.7). Although there was an increasing interest, the travel difficulties induced by the pandemic had a negative influence on the number of applications submitted, both from the academic and the private sectors. Nevertheless, the effective use of the TNA opportunity by the private sector (11%) is close to what was initially planned (15%). It is even closer if we take into account that a major national oil company (ENI) decided to take advantage from EUROCHAMP-2020 TNA offer through an academic user (University of Napoli, Italy).

2. WP7 milestones and their achievement in the reported period

In the period covered by the present report, for Work Package 7, one milestone was foreseen, initially to be achieved in month 46. Due to the no-cost extension granted to the project, it was rescheduled in month 55.

M7.4 Final assessment of EUROCHAMP simulation chambers access provision and outreach (M55)

The final assessment on the activities developed within WP7 was presented at the final project meeting held on-line, from June 22nd to 24th, 2021.

The application procedure, including an application form, reporting form, eligibility criteria and

criteria for attribution of the user support, first established and published in January 2017 on the EUROCHAMP-2020 website, were revised in 2020. The revision included a modified application form to accommodate projects which could be carried out remotely. The details concerning the application for transnational access were published on the new project site: https://www.eurochamp.org/ services/access-simulation-chambers.

The application procedure, over the hereby reported period, suffered no changes comparative to the methodology presented in DEL7.1. The composition of the TNA User Selection Panel (TUSP) was updated, to include the right expertise on bioaerosols, linked to the addition of the new chamber ChAMBRe (see Section 1).

Although the number of TNA projects granted up to date to the 16 facilities comprised in WP7 is lower than initially estimated, to the date when this document was issued, 96 % of the estimated access to be provided, as units of access (days), was spent in the EUROCHAMP-2020 project. Few activities are ongoing, to be completed until the end of the project. The final amount of access offered within the EUROCHAMP infrastructure, suffered some set-backs due to pandemic, being slightly lower than the minimum envisaged at the beginning of the project.

After the completion of each TNA project, the Project Office collected a brief user and scientific report. These reports are publicly available on the project's website: https://www.eurochamp.org/tna-documents. A brief description of the projects performed from December 1st 2018 up to August 31st 2021 is given in Section 4.

The results of the research supported under the TNA scheme in the EUROCHAMP-2020 project were made public via oral presentations and posters at workshops and scientific meetings and articles in scientific journals. A summary of the actual outcomes is given below in Section 3.

Many students used the gained experience and knowledge to attain academic degrees. The experience achieved by the hosting institutions is flowing in envisaging future collaborative work and access schemes such as the ATMO-ACCESS project (Horizon 2020) and will serve as a basis to develop the ACTRIS ERIC access scheme.

3. Outcomes of the TNA activities performed in the EUROCHAMP-2020 up to August 31st, 2021

Chamber/TNA no.	Type / Event	Authors/Title
CESAM-001-2017	Oral presentations *Chemistry Seminar, Smith College, Northampton, MA, US, Oct. 15th, 2018.* *Physical & Analytical Chemistry Seminar, University of California, San Diego, CA, US, Oct. 23rd 2018.*	D. De Haan : Cloud chemistry in the lab: Chemistry of Clouds: Aldehydes, amines, & sources of brown aerosol.
	Oral presentation *International Aerosol Conference, St. Louis, MO, US, Sep. 3rd 2018.*	D. De Haan et. al. : Not Fade Away: Photolytic Brown Carbon Formation in Aqueous Aerosol
	Oral presentation *Joint Seminar of the Geology, Geophysics, and Marine Chemistry Depts., Scripps Institution of Oceanography, San Diego, CA, US, Apr. 8th 2019.*	D. De Haan : Cloud chemistry in the lab: Tracking brown carbon formation pathways
	Oral presentations *American Chemical Society Fall National Meeting, San Diego, CA, US, 25-29 Aug. 2019.*	C. Carmona et al. : Effects of long-wave UV irradiation on the optical properties of methylamine – aldehyde – ammonium sulfate aerosol particles D. Ugland et al. : Effects of sunlight on the optical properties of methylamine – aldehyde brown carbon aerosol particles
	Oral presentation *Gordon Res. Conference in Atmospheric Chemistry, Sunday River, ME, US, Jul. 28th – Aug. 2nd 2019.*	D. De Haan et al. : Physical and chemical effects of exposure of aerosol particles to methylamine gas in a cloud chamber

CESAM-004-2019	COST Action: CA16202; *hosted by LISA, Creteil, Paris, FR; STSM start and end date: 2019-09-30 and 2019-11-17.*	C. Baldo: Optical properties of Icelandic dust: Implication for the radiative balance
	Poster presentation *UK Arctic Science Conference 2019; Loughborough University, Loughborough, UK, 11-13 Sep. 2019.*	Baldo, C., Shi, Z., Formenti, P., Di Biagio, C., Nowak, S., MacKenzie, R. : Chemical and Mineralogical Composition of Icelandic Dust: Implication for the Radiative Balance
CESAM-004-2019	Oral presentation *IASC-2019 Workshop on Effects and Extrems of High Latitude Dust, Reykjavik, IS, 13-14 Feb. 2019.*	Shi, Z., Baldo, C. : Dust mineralogy: Impact on ocean biogeochemistry and the climate
	Atmos. Chem. Phys., 20, 13521-13539, 2020, https://doi.org/10.5194/acp-20-13521-2020.	Baldo, C., Formenti, P., Nowak, S., Chevaillier, S., Cazaunau, M., Pangui, E., Di Biagio, C., Doussin, J. F., Ignatyev, K., Dagsson-Waldhauserova, P., Arnalds, O., MacKenzie, A. R., and Shi, Z : Distinct chemical and mineralogical composition of Icelandic dust compared to northern African and Asian dust
	Oral presentation *AGU fall meeting 2020 (online), 1-17 Dec. 2020.*	Baldo, C., Formenti, P., Nowak, S., Chevaillier, S., Cazaunau, M., Pangui, E., Di Biagio, C., Doussin, J. F., Ignatyev, K., Dagsson-Waldhauserova, P., Arnalds, O., MacKenzie, A. R., and Shi, Z : Chemical and mineralogical composition of Icelandic dust: Implications for the climate
	Oral presentation *Goldschmidt conference 2021 (online), 4-9 July 2021.*	Baldo, C., Formenti, P., Nowak, S., Chevaillier, S., Cazaunau, M., Pangui, E., Di Biagio, C., Doussin, J. F., Ignatyev, K., Dagsson-Waldhauserova, P., Arnalds, O., MacKenzie, A. R., and Shi, Z : Chemical and mineralogical composition of Icelandic dust
	Oral presentation *IASC-2019 Workshop on Effects and Extrems of High Latitude Dust, Reykjavík, IC, 13-14 Feb. 2020.*	Baldo, C., Formenti, P., Nowak, S., Chevaillier, S., Cazaunau, M., Pangui, E., Di Biagio, C., Doussin, J. F., Ignatyev, K., Dagsson-Waldhauserova, P., Arnalds, O., MacKenzie, A. R., and Shi, Z. :

		Chemical and mineralogical properties of Icelandic dust: Implication for the radiative balance. Oral presentation at the Workshop on Effects and Extremes of High Latitude Dust
CESAM-005-2019	Oral presentation *105° National Congress of the Italian Physical Society, Gran Sasso Science Institute, L'Aquila, IT, 23-27 Sep. 2019.* Oral presentation *European Aerosol Conference EAC 2019, Gothenburg, SE, 25 - 30 Aug. 2019.*	Danelli S.G., Brunoldi M., Comite. A., Costa C., Gatta E., Massabò D., Parodi F., Vernocchi V., Prati P. : L'attività sperimentale presso ChAMBRe: Condizioni atmosferiche vs. bio-aerosol Danelli S.G., Brunoldi M., Comite. A., Costa C., Gatta E., Massabò D., Parodi F., Vernocchi V., Prati P. : Experimental Activity in ChAMBRe, an Atmospheric Simulation Chamber for Aerosol Modelling and Bio-aerosol Research
CESAM-005-2019	University of Genoa, IT, Ph.D. thesis, in progress University of Genoa, IT, Ph.D. thesis, in progress	S. Danelli: Assessment of the impact of atmospheric pollutants on bacteria viability by an atmospheric simulation chamber Vernocchi: Assessment of toxicity of particulate matter in the nanometric range by an atmospheric simulation chamber
HELIOS-002-2017	Poster presentation *AGU Fall meeting, December New Orleans, LA, US, 11 -15 Dec. 2017.* JGR Atmos. 124(11), 5906-5918, 2019. https://doi.org/10.1029/2019JD030391	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 J.F. Brewer, D.K. Papanastasiou, J.B. Burkholder, E.V. Fischer, Y. Ren, A. Mellouki, A. R. Ravishankara: Atmospheric Photolysis of Methyl Ethyl, Diethyl, and Propyl Ethyl Ketones: Temperature-Dependent UV Absorption Cross Sections
HELIOS-004-2018	Manuscript in preparation	V. Papapdimitriou et al.: Atmospheric Degradation and Climate Change and Air-Quality Impact of Furan-based Biomass Burning Emission Products: A Kinetic and Mechanistic Study (University of Crete - Department of Chemistry)

	Manuscript in preparation to be submitted to Phys. Chem. Chem. Phys	S. Blázquez, Y. Ren, M. McGillen, V. Daële, A. Mellouki, E. Jimenez: Study of the atmospheric degradation processes of hydrofluoroethers
HELIOS-005-2019	BUW, PhD thesis, in progress	C. Tovar : Experimental and theoretical study of the reactions of atmospheric relevant epoxides with OH radicals and chlorine atoms
HELIOS-006-2019	Manuscript in preparation to be submitted to Atm. Chem. Phys.	V. Michould et al. : Comparison of Proton Transfer Reaction Mass Spectrometer (PTR-MS) instruments in the atmospheric simulation chamber HELIOS,
HELIOS-008-2020	Manuscript in preparation to be submitted to Env. Sci. Tech.	Rabi Chhantyal Pun, M. McGillen, A. Mellouki: Total Hydroperoxide and Peroxide Yield from Isoprene Ozonolysis
HELIOS-010-2020	Manuscript in preparation to be submitted to Phys. Chem. Chem. Phys. Oral presentation *EGU General Assembly (online), 19-30 Apr. 2021.*	S. Blázquez, Y. Ren, M. McGillen, V. Daële, A. Mellouki, E. Jimenez: Study of the atmospheric degradation processes of hydrofluoroethers. S. BlázquezM. McGillen, Y. Ren, J. Albaladejo, V. Daële, A. Mellouki, E. Jimenez: Kinetics of CH2=CHCH2OCF2CHF2 with atmospheric oxidants
AIDA-001-2017	Atm. Chem. Phys., 20 (18), 11089–11117, 2020. https://doi.org/10.5194/acp-20-11089-2020 J. of Geophys. Res. /D, 125 (19), 2020. https://doi.org/10.1029/2020JD032808	Ickes, L.; Porter, G. C. E.; Wagner, R.; Adams, M. P.; Bierbauer, S.; Bertram, A. K.; Bilde, M.; Christiansen, S.; Ekman, A. M. L.; Gorokhova, E.; Höhler, K.; Kiselev, A. A.; Leck, C.; Möhler, O.; Murray, B. J.; Schiebel, T.; Ullrich, R.; Salter, M. E. : The ice-nucleating activity of Arctic sea surface microlayer samples and marine algal cultures. Christiansen, S.; Ickes, L.; Bulatovic, I.; Leck, C.; Murray, B. J.; Bertram, A. K.; Wagner, R.; Gorokhova, E.; Salter, M. E.; Ekman, A. M. L.; Bilde, M. : Influence of Arctic Microlayers and Algal Cultures on Sea Spray Hygroscopicity and the Possible Implications for Mixed-Phase Clouds

AIDA-002-2017	Atm. Chem. Phys. 19, 2259–2281, 2019. https://doi.org/10.5194/acp-19-2259-2019	Marsden, N. A., Ullrich, R., Möhler, O., Eriksen Hammer, S., Kandler, K., Cui, Z., Williams, P. I., Flynn, M. J., Liu, D., Allan, J. D., and Coe, H.: Mineralogy and mixing state of north African mineral dust by online single-particle mass spectrometry
QUAREC-001-2017	Posters presentation *Colloque Francophone Combustion et Pollution Atmosphérique, Ouarzazate MA, 23 -26 Apr. 2018.* *25th International Symposium on Gas Kinetics, Lille, FR, 22 - 26 July 2018.* *Atmos. Environ. 253, 118344, 2021. https://doi.org/10.1016/j.atmosenv.2021.118344* Manuscript in preparation to be submitted to Atmos. Environ. 2021	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 A.Grira, C. Kalalian, J.N.Illmann, I.Patroescu-Klotz, G. El Dib, P. Coddeville, A. Canosa, C. Coeur, P. Wiesen, E. Roth, A. Chakir, A. Tomas : Gas-phase ozonolysis of trans-2-hexenal: Kinetics, products, mechanism and SOA formation C. Kalalian et al. : Gas-phase ozonolysis of trans-2-pentenal: Kinetics, products, mechanism and SOA formation
QUAREC-002-2017	Poster presentation *25th International Symposium on Gas Kinetics, Lille, FR, 22 - 26 July, 2018.*	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
QUAREC-003-2019	Chem. Phys. Lett. 765, 16 February 2021, 138313. https://doi.org/10.1016/j.cplett.2020.138313	A. Baptista, R. G. Gibilisco, P. Wiesen, M. A. Teruel : FTIR kinetic study of the reactions of γ-caprolactone and γ-heptalactone initiated by Cl and OH radicals at 298 K and atmospheric pressure
QUAREC-004-2017	Oral presentation *QIAF 2020/2021, https://qui.una.py/qiaf2021/ (online), July 13th, 2021.*	P. L. Lugo Garcia, I. Patroescu-Klotz, N. Illmann, M. Teruel, P. Wiesen, M. B. Blanco: Fotooxidación atmosférica de fluoroacetato de etilo iniciada por radicales OH•

SAPHIR-001-2017	Atmos. Chem. Phys., 18, 8001-80016, 2018. https://doi.org/10.5194/acp-2018-265	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. 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
	Oral presentation *EGU General Assembly, Vienna (AT), 7-12 Apr. 2019.*	D. Reimer et al.: Photochemical oxidation of organic hydroperoxides and epoxides (ISOPOOH and IEPOX) in the atmospheric smulation chamber SAPHIR
	Oral presentation *14th Quadrennial iCACGP Symposium and 15th IGAC Science Conference on Atmospheric Chemistry, Takamatsu, JP, 25-29 Sep. 2018.*	H. Fuchs et al.: Investigation of the oxidation of methyl vinyl ketone (MVK) by OH radicals in the atmospheric simulation chamber SAPHIR
	Oral presentation *Atmospheric Chemical Mechanism Conference, Davis, CA, US, 5-7 Dec. 2018.*	H. Fuchs et al.: Investigation of MVK oxidation by OH in the atmosphere simulation chamber SAPHIR
	Oral presentation *EGU General Assembly, Vienna (AT), 23-28 Apr. 2017.*	H. Fuchs et al.: Investigation of MVK oxidation by OH in the atmosphere simulation chamber SAPHIR
SAPHIR-002-2018	Atmos. Chem. Phys., 20, 10459-10475, 2020. https://doi.org/10.5194/acp-20-10459-2020	P. Dewald et al.: Evolution of NO_3 reactivity during the oxidation of isoprene
	Earth Space Chem., 5, 785-800, 2021. https://doi.org/10.1021/acsearthspacechem.0c00311,	B. Brownwood et al.: Gas-particle partitioning and SOA yields of organonitrate products from NO3-initiated oxidation of isoprene under varied chemical regimes
	Phys. Chem. Chem. Phys., 23, 5496-5515, 2021. https://doi.org.10.1039/d0cp06267g	L. Vereecken et al.: Theoretical and experimental study of peroxy and alkoxy radicals in the NO3-initiated oxidation of isoprene

	Atmos. Chem. Phys., 21, 10799–10824, 2021. https://doi.org/10.5194/acp-21-10799-2021	R. Wu et al.: Molecular composition and volatility of multi-generation products formed from isoprene oxidation by nitrate radical
	Manuscript in preparation to be submitted to Geophys. Res. Lett.	E. Tsiligiannis et al.: $C_4H_7NO_5$ – a major organonitrate trace
	Manuscript in preparation to be submitted to Atmos. Chem. Phys.	P. Carlsson et al.: Investigation of the early stage of gas-phase oxidation of isoprene by the nitrate radical
	Oral presentation *EGU General Assembly (online), 19-30 Apr. 2021.*	P. Carlsson et al.: The importance of radical chemistry for the product formation from the gas-phase oxidation of isoprene by the nitrate radical
	Oral presentations *EGU General Assembly (online), 4-8 May 2020.*	P. Carlsson et al.: New insights into the gas-phase oxidation of isoprene by the nitrate radical from experiments in the atmospheric simulation chamber SAPHIR P. Dewald et al.: Chamber studies of NO3 reactivity during the oxidation of isoprene E. Tsiligiannis et al.: Nighttime to daytime transition of the oxidation products of isoprene by NO3 radicals
	Oral presentation *European Aerosol Conference (online), Aug. 31st-Sep. 4th 2020.*	T. Hohaus et al.: Aerosol chemical composition, molecular markers and SOA yield from nitrate oxidation of isoprene in the atmosphere simulation chamber SAPHIR
	Oral presentation *Gordon Res. Conference in Atmospheric Chemistry, Sunday River, ME, US, July 28th – Aug. 2nd 2019.*	J. Fry et al.: Yields and gas/aerosol partitioning of organonitrate products from NO3-initiated oxidation of isoprene in varied chemical regimes
	Oral presentation *AGU Fall meeting, December, San Francisco, CA, US, 11 -15 Dec. 2019.*	H. Fuchs et al.: Test of chemical mechanisms for the NO3 oxidation of isoprene in the atmospheric simulation chamber SAPHIR

	Oral presentation *European Aerosol Conference EAC 2019, Gothenburg, SE, 25 - 30 Aug. 2019.* Oral presentation *EGU General Assembly, Vienna (AT), 7-12 Apr. 2019.* Oral presentation *Atmospheric Chemical Mechanism Conference, Davis, CA, US, 5-7 Dec. 2018.*	E. Tsiligiannis et al.: Gas and particle phase products from the oxidation of isoprene by NO3 radicals R. Wu et al.: Measurement of HOMs from isoprene oxidation by NO3 using bromide chemical ionization mass spectrometry J. Fry et al.: Oxidation products and aerosol production from NO3 oxidation of isoprene: Preliminary results from the NO3ISOP 2018 campaign
SAPHIR-004-2018	Atmos. Meas. Tech. 12 (2), 891-902, 2019. https://doi.org/10.5194/amt-12-891-2019	Albrecht, S. R. et al.: Measurements of hydroperoxy radicals (HO2) at atmospheric concentrations using bromide chemical ionisation mass spectrometry
SAPHIR-005-2019	Manuscript in preparation to be submitted to Atmos. Chem. Phys. Manuscript in preparation to be submitted to Atmos. Chem. Phys. Oral presentation *EGU General Assembly (online), 19-30 Apr. 2021.*	Z. Tan et al.: ClNO2 concentrations during the JULIAC campaign C. Cho et al.: Experimental budgets of OH, HO2 and RO2 radicals during the JULIAC 2019 campaign C. Cho et al.: Experimental budgets of OH, HO_2 and RO_2 radicals during the JULIAC 2019 campaign
PACS-C3-001-2018	J. Breath Res. https://doi.org/10.1088/1752-7163/abc055	L.-E. Cassagnes et al. : Online monitoring of volatile organic compounds emitted from human bronchial cells as markers for oxidative stress
PACS-C3-002-2018	Poster *European Aerosol Conference EAC 2019, Gothenburg, SE, 25 - 30 Aug. 2019.*	A. Vogel, D. M. Bell, I. El Haddad, A. Betrand : A new approach to understand transformation processes of primary and secondary sources of organic aeroso

PACS-C3-006-2019	*Manuscript in preparation*	S. Haslett et al. : The composition of gas-phase and particle-phase oxidation products in a high chlorine environment.
EUPHORE-001-2017	Oral presentation *Colloque Francophone Combustion et Pollution Atmosphérique, Ouarzazate, MA, 23 -26 Apr. 2018.* L'Universite de Lille 1, PhD thesis defended on Nov. 6th 2017. Atmos. Environ., 253: 1-11, 2021. http://doi.org/10.1016/j.atmosenv.2021.118352	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) Lina Aslan Atmospheric degradation of multifunctional organic compounds: *Hydroxy ketones and unsaturated Aldehydes* (Dégradation atmosphérique de composés organiques multifonction-nels: Les hydroxycétones et les aldéhydes insaturés). A. Tomas, L. Aslan, A. Muñoz, M. Ródenas, T. Vera, E. Borrás, P. Coddeville, C. Fittschen: Photolysis of multifunctional carbonyl compounds under natural irradiation at EUPHORE
EUPHORE-002-2018	Atmospheric Chemistry and Physics, 18: 6095-6120, 2018. http://dx.doi.org/10.5194/acp-18-6095-2018 Oral presentation *Atmospheric Chemical Mechanism Conference, Davis, CA, US, 5-7 Dec. 2018.* Environ. Sci. & Technol., 54, 7798-7806, 2020. http://dx.doi.org/10.1021/acs.est.0c00526	M. J. Newland, A.R. Rickard, T. Sherwen, M.J. Evans, L. Vereecken, A. Muñoz, M. Ródenas, M. and W.J. Bloss, W. J.: The atmospheric impacts of monoterpene ozonolysis on global stabilised Criegee intermediate budgets and SO2 oxidation: experiment, theory and modelling. M.J. Newland, B. Nelson, A. Rickard, A. Muñoz, M. Ródenas, J. Tárrega, T. Vera, E. Borrás: Structural dependence of stabilised CH2OO yield in terminal alkene ozonolysis S. Wang, M.J. Newland, W. Deng, A.R. Rickard, J.F. Hamilton, A. Muñoz, M. Ródenas, M. Vázquez, L. Wang and X. Wang, X: Aromatic Photo-oxidation, A New Source of Atmospheric Acidity
EUPHORE-003-2018	Manuscript in preparation to be submitted to Atmos. Meas. Tech.	M. Ródenas, E. Kari, A. Mutzel, A. Gratien, S. Wedel, A. Brenan, J. Dellen, T. Gomez, H. Herrmann, V. Michoud, R. Olariu, P. Seakins, R. Tillmann, T. Vera, E. Borras, A. Viertanen and

		A. Muñoz: Intercomparison of techniques for the measurement of oxygenated volatile organic compounds (oVOCs) at the EUPHORE chambers
	Oral presentations *EGU General Assembly, Vienna (AT), 7-12 Apr. 2019.*	A. Muñoz, M. Ródenas, E. Borras, A. Brenan, J. Dellen, A. Gratien, T. Gomez, H. Herrmann, E. Kari, V. Michoud, A. Mutzel, R. Olariu, P. Seakins, R. Tillmann, T. Vera, A. Viertanen, and S. Wedel: Intercomparison of instruments to measure OVOCs: assessment of performance under different relevant controlled conditions (EUPHORE chambers)
		A. Bergé, S. Dyhia, V. Michoud, A. Gratien, C.M. Bret, C. Gaimoz, M. Cirtog, F. Maisonneuve, M. Rodenas, A. Munoz, E. Villenave, E. Perraudin, P.M Flaud, and J.F. Doussin: Molecular characterization of gaseous and particulate oxygenated compounds using offline gas chromatography mass spectrometry (GC/MS) techniques
	Atmos. Meas. Tech., 13: 5977-5991, 2020. http://doi.org/10.5194/amt-13-5977-2020	M. S. Alam, L. R. Crilley, J.D. Lee, L.J. Kramer, C. Pfrang, M. Vázquez-Moreno, M. Ródenas, A. Muñoz and W.J. Bloss: Interference from alkenes in chemiluminescent NOx measurements
	Atmos. Meas. Tech., 14, 1–11, 2021. https://doi.org/10.5194/amt-14-1-2021	E. Borrás, L. A. Tortajada-Genaro, M. Ródenas, T. Vera, T. Speak, P. Seakins, M. D. Shaw, A. C. Lewis, and A. Muñoz . On-line solid phase microextraction derivatization for the sensitive determination of multi-oxygenated volatile compounds in air
EUPHORE-005-2019	Phys. Chem. Chem. Phys., 22: 13698-13706, 2020. http://dx.doi.org/10.1039/d0cp00897d	M. J. Newland, B.S. Nelson, A. Muñoz, M. Ródenas, T. Vera, J. Tárrega, A.R. Rickard: Trends in stabilisation of Criegee intermediates from alkene ozonolysis
EUPHORE-006-2021	Oral presentations *EAC European Aerosol Conference (online). Aug. 30th – Sep. 3rd, 2021.*	A.W. Mayhew, E. Borrás, D.J. Bryant, S.H. Budisulistiorini, A. Muñoz, M.J. Newland, R. Soler, M. Ródenas, T. Vera, A.R. Rickard, P.M. Edwards, J.F. Hamilton: Investigating Isoprene Secondary Organic Aerosol in Polluted Megacities Using an Atmospheric Simulation Chamber
LEAK-LACIS-001-2017	Oral presentation	D. Niedermeier et al.:

	European Aerosol Conference (online), Aug. 31st-Sep. 4th, 2020.	Influence of turbulent temperature and saturation fluctuations on particle deliquescence, hygroscopic growth and droplet activation
LEAK-LACIS-003-2019	Oral presentation *15th Conference on Cloud Physics, Vancouver, BC, CA, 9 - 13 July, 2018.*	Z.H Zhang, S.S Steimer, A Mutzel, L Poulain, F Mothes, H Herrmann, M Kalberer: Comprehensive understanding the roles of reactive oxygen species (ROS) as a predictor of aerosol particle toxicity
LEAK-LACIS-004-2019	Oral presentation *EGU General Assembly (online), 19-30 Apr. 2021.* University of Warsaw, PL, M.Sc. thesis, 2020.	Grosz, R., Nowak, J., Niedermeier, D., Mijas, J., Frey, W., Ort, L., Malinowski, S., Schmalfuss, S., Stacewicz, T., and Voigtländer, J. : Contactless and high-frequency optical hygrometry in LACIS-T Grosz, R. : Humidity measurements in LACIS-T wind tunnel and their analysis
ILMARI-003-2017	Oral & poster presentation *European Aerosol Conference EAC 2019, Gothenburg, SE, 25 - 30 Aug. 2019.* Poster presentation *Society of Toxicology (SOT), Baltimore, MD, US, 10-14 March 2019.*	P. Tiitta et al. : Refractory Carbon Cluster Analysis of Logwood Combustion Emissions Using SP-AMS Soot Mass Spectra T. Ihantola et al. : Multiple Comparison of Combustion Emission Toxicity of Wood, Diesel and Aged Equivalents on Novel Thermophoretic Air-Liquid Interface Exposure System.
ILMARI-004-2019	Poster presentation *European Aerosol Conference (online), Aug. 31st-Sep. 4th, 2020.*	J. Orasche, P. Tiitta, G. Jakobi, P. Yli-Pirilä, M. Kortelainen, R. Zimmermann, P. Forbes, O. Sippula : Formation of Secondary Aerosols Related to Sugar Cane Harvesting Using Field Fires.
ILMARI-005-2019	Poster presentation *European Aerosol Conference (online), Aug. 31st-Sep. 4th, 2020.*	O. Sippula, M. Ihalainen, A.H. Hartikainen, M. Kortelainen, P. Yli-Pirilä, L. Hao, P. Miettinen, N. Kinnunen, S. Florio, C. Fittavolini, P. Scorletti, M. Sirignano, A. D'Anna : Comparison of secondary aerosol potential of vehicular exhausts from EURO6-level gasoline and diesel cars: Is banning of diesel vehicles a good strategy to improve urban air quality?

	Manuscript in preparation	A. Hartikainen, M. Ihalainen, P. Yli-Pirilä, L. Hao, M. Kortelainen, S. Pieber, M. Sirignano, C. Fittavolini, S. Florio, P. Scorletti, A. D'Anna, O. Sippula : Photochemical transformation and secondary aerosol formation potential of Euro6 -level gasoline and diesel passenger car exhausts Photochemical transformation and secondary aerosol formation potential of Euro6 -level gasoline and diesel passenger car exhausts.
FORTH-ASC-002-2017	Oral presentation *European Aerosol Conference EAC 2019, Gothenburg, SE, 25 - 30 Aug. 2019.*	Florou K. et al. : Physical and chemical properties of terebic acid aerosol. Kostenidou E. et al. : Physical and chemical properties of norpinic acid aerosol.
FORTH-ASC-003-2017	Poster presentation *International Aerosol Conference, St. Louis, MI, US, 2-7 Sep. 2018.*	Jorga S. et al. : Formation of secondary aerosol and growth of new particles in the ambient atmosphere: An experimental study using a dual smog chamber system Cain K. et al. : Improved estimation of organic aerosol volatility distributions by combining thermodenuder and isothermal dilution measurements
	Atmos. Meas. Tech., 12 (5), 2733–2743, 2019. https://doi.org/10.5194/amt-12-2733-2019	Kaltsonoudis C. et al. : A portable dual smog-chamber system for atmospheric aerosol field studies
	Poster presentation *American Association for Aerosol Research (AAAR) annual meeting, Portland, OR, US, 14-18 Oct. 2019.*	Jorga et al. Measurement of formation rate of secondary aerosols in the urban atmosphere using a dual chamber system.
	Poster presentation *American Association for Aerosol Research (AAAR)*	Liangou A. et al. : Chemical evolution of particulate and gas-

	annual meeting, Portland, OR, US, 14-18 Oct. 2019.	phase emissions from meat cooking
FORTH-ASC-004-2018	Inst. of Phys. Chem., Polish Academy of Sciences, PL, Ph.D. thesis, 2020.	Agata Kolodziejczyk
RvG-ASIC-001-2017	Universität Bremen, DE, PhD thesis in progress University of East Anglia, UK, M.Nat.Sc. thesis, May 2020.	Josefa Verdugo Rebecca Carver : The isotopic composition of N_2O in sea ice and the underlying surface water by continuous flow isotope ratio mass spectrometry.
RvG-ASIC-002-2017	École Centrale de Lyon, FR, PhD thesis in progress	Rose Layton
RvG-ASIC-003-2017	Universität Hamburg, DE, MIN-Fakultät, M.Sc. thesis 2019	Verena Hof: The influence of varying freezing temperature on light transfer in thin sea ice.
RvG-ASIC-004-2017	Atmos. Meas. Tech., 14, 1833–1849, 2021. https://doi.org/10.5194/amt-14-1833-2021 University of Cape Town, ZA, M.Sc. thesis, Dec. 2019	Thomas M., France J., Crabeck O., Hall B., Hof V., Notz D., Rampai T., Riemenschneider L., Tooth O. J., Tranter M., Kaiser J. : The Roland von Glasow Air-Sea-Ice Chamber (RvG-ASIC): an experimental facility for studying ocean–sea-ice–atmosphere interactions Benjamin Hall : Design of a small-scale system for the growth of artificial sea ice
RvG-ASIC-005-2019	Université Libre de Bruxelles, BE, Ph.D. thesis June 2021	Caroline Jacques : Methane at the ocean-atmosphere interface, from temperate to polar regions : an isotopic approach
RvG-ASIC-006-2019	Universität Hamburg, DE, M.Sc. thesis, in progress	Rui Shen
MAC-MICC-001-2019	Poster presentation *European Aerosol Conference EAC 2019, Gothenburg, SE, 25 - 30 Aug. 2019.*	Yu Wang et al. A chamber study of seed effects, water uptake, phase state and chemical composition of secondary organic aerosol formed from biogenic and anthropogenic VOC mixtures

	Oral and Poster presentation *The 5th international Workshop on Heterogeneous Kinetics Related to Atmospheric Aerosols, Beijing, CN, 17-22 Nov. 2019.* *Atmos. Chem. Phys., 21, 11303–11316, 2021* https://doi.org/10.5194/acp-21-11303-2021	Zhijun Wu et al. Urban Aerosol Phase State Yu Wang et al.: Secondary organic aerosol phase behaviour in chamber photo-oxidation of mixed precursors
MAC-MICC-002-2019	Atos. Chem. Phys. (discussions) https://doi.org/10.5194/acp-2021-351	Hu et al.: Physical and chemical properties of black carbon and organic matter from different sources using aerodynamic aerosol classification
ChAMBRe-001-2020 *ChAMBRe-003-2021* *ChAMBRe-004-2021*	ETH Zurich, CH, Ph.D. thesis, in progress University of Genoa, IT, Ph.D. thesis, in progress	Viktoria Tepper Silvia G. Danelli

4. Scientific and user reports

Since December 1st 2018 up to August 31st 2021 all simulation chambers hosted TNA activities within WP7. A short overview upon the TNA activities granted access in the time covered by the present deliverable is given below.

(1) Access granted to CESAM (CNRS)

Since the EUROCHAMP2020 project started, CESAM hosted 11 transnational access activities, with a total duration of 121 access days. One granted activity (*CESAM-012-2021*) was cancelled due to the pandemic. The reports below belong to activities hosted in the period covered by the actual report.

Within *CESAM-004-2018* the optical properties of mineral dust samples originated from Iceland were investigated in order to estimate its impact on the radiative Earth budget. The experimental work was performed on schedule. Subsequently, an extended data analysis took place at both host and guest laboratories. The user and scientific report was submitted in due time.

CESAM-005-2018 did support the characterization of the aerosol produced by a Blaumstein Atomizer system of the *PM_TEN srl*, an Italian SME. The results of the project are used to inform the potential customers on the correct and exhaustive use of the BLAM atomizer nebulization system.

In *CESAM-006-2019* was investigated the formation of Brown Carbon following the photo-oxidation of Pyrogallol and Syringol under controlled humidity conditions.

Beside the scientific research, the project did also aim to train students on advanced scientific methods in a multinational research environment. As reported, both objectives were successfully achieved.

CESAM-007-2019 was dealing with the characterization of Black Carbon aerosols with respect to their radiative properties, namely the influence of particle composition, morphology and aging on their direct radiative effect.

The results of this study provided data that climate models might use to constrain global and regional BC radiative effect and, therefore, reduce the uncertainties in climate change prediction.

CESAM-008-2020 is focusing on the multiphase brown carbon (BrC) formation in the photooxidation of resorcinol and guaiacol. It aims to quantify the uptake, BrC formation, and total aerosol formation of these 2 phenolic compounds in nanodroplets, which will lead to better understanding of the sources of atmospheric BrC. The results will be compared with earlier CESAM chamber experiments on the phenolic compounds pyrogallol and syringol to determine the generality of the BrC formation mechanisms discovered.

CESAM-010-2020 was performed remotely and studied the formation of metal-ligand complexes from atmospheric processing of mineral dusts. For this purpose, a model system in which authentic mineral dust of known mineralogy was used as seed aerosols for glyoxal photooxidation, to simulate uptake of organic compounds with the capability of acting as ligands (e.g., oxalic acid produced from the oxidation of volatile organic compounds). A detailed chemical characterisation of both the organic, inorganic and mixed organic-inorganic components of the aerosol particles was performed. The changes in both their optical and hygroscopic properties was analysed, to explore the capability of mineral dust to act as could condensation nuclei. The particle analysis will be complemented by a detailed gas phase characterisation of the glyoxal photooxidation system.

In *CESAM-011-2021* was investigated the impact of particle composition, morphology and aging on the direct radiative effect of Black Carbon aerosols. The aerosol was generated by using a commercial burner (miniCAST, model 6204C, JING) producing soots with defined and reproducible composition (EC/OC content) and size distribution. The BC particles were aged into CESAM under controlled conditions (BC only, adding H2O, O3, SO2 and light). Optical signals were continuously monitored combining different techniques working at multiple wavelengths, together with number size distribution, effective density and mass concentration. Detailed aerosol composition and morphology were measured combining SP2, TEM imaging, SUNSET and X-ray photoelectron spectroscopy. These measurements allow to derive the mass absorption, scattering, and extinction efficiencies (MAE/MSE/MEE) along experiments and the derivation of the spectral complex refractive index (CRI) by optical inversion.

CESAM-013-2020 focused on the correction factors for (AE31-AE33) as function of aerosol particle size, SSA and OC content in fresh emission and after aging in different controlled conditions. The scope is to provide the scientific community with a better understanding of the performance of these instruments, in support of services offered by in-situ national facilities included in the ACTRIS network. The results are under evaluation.

(2) Access granted to HELIOS (CNRS)

HELIOS provided during up to date 110.5 access days for seven transnational activities. One activity had to be renounced to on pandemic reasons. These are the reports corresponding to the timeframe of the present deliverable.

HELIOS-004-2018 was dealing with the atmospheric fate and possible environmental effects of an unsaturated fluorinated hydrocarbon ($CHF_2CH=CF_2$). Such substances are the most recently proposed substitutes for CFCs, believed to be responsible for ozone depletion in the stratosphere. The study indicates that while OH radicals and Cl atoms are possible sinks for this compound, its reaction with ozone is negligible.

The study is a major contribution to a PhD thesis. A publication is under preparation and will be submitted to PCCP in early 2020.

The atmospheric degradation of a series of epoxy compounds by OH radicals and Cl atoms made the subject of *HELIOS-005-2019*. The reactions of 1,2-epoxybutane, 1,2-epoxyhexane and cyclohexene oxide with chlorine atoms and OH radicals were studied under mechanistic aspects. All measurements were conducted at 296 ±2 K and at ambient pressure (P = 760 Torr). The product formation was analysed via IR- and mass spectrometry as complementary techniques. OH radicals and Cl atoms were produced via photolysis of methyl nitrite and oxalyl chloride, respectively. Additionally, the formation of particles in the system was monitored via SMPS. This combined mobility and training activity did contribute to the PhD thesis of C. Tovar.

HELIOS-006-2019 did support the participation of a Norwegian research group in the PTR-MS intercomparison campaign that was carried out at the HELIOS simulation chamber in Orléans (France) in the period from May 6 to May 24, 2019. The main scientific goal of the comparison exercise was to ensure the comparability of results generated by various PTR-MS instruments and by different instrument operators.

The two instrument teams installed and de-installed two PTR-MS analyzers and a calibration unit for common use. Alexander Håland, PhD student at the University of Oslo, operated and overlooked all three devices during the whole campaign. He participated in the on-site team discussions, was responsible for common calibrations and delivered preliminary data.

Within *HELIOS-008-2020*, conducted remotely, the yield of stabilized Criegee intermediate produced from isoprene ozonolysis was determined indirectly, through its adduct formed with various scavengers. The adducts were measured using proton transfer reaction mass spectrometry.

In *HELIOS-010-2020* the gas-phase rate coefficients of the reactions of allyl 1,1,2,2-tetrafluoroethyl ether with OH radicals, NO_3, Cl atoms and O_3, as the most important atmospheric oxidants, were determined at room temperature by relative kinetics method. As analytical instruments for both the kinetic and mechanistic parts of the study a Fourier Transform Infrared (FTIR) spectrometer and a Proton Transfer Reaction-Time of Flight-Mass spectrometer (PTR-ToF-MS) were employed.

During *HELIOS-011-2021* four prototypes of a biological air treatment device (AIRcel) were tested for the response when used against a diverse range of air pollutants. The prototypes were sent to Orléans one month before the campaign started, to give time to the biomass to adhere to the support and form the active biofilm. AIRcel abatement capacity was tested with a wide range of pollutants: acetone, sulfur dioxide, nitrogen oxides (nitrogen oxides and nitrogen dioxide), toluene, benzene, limonene, and methane. The tests were performed with standard and modified AIRcel configuration.

(3) Access granted to ISAC (CNRS)

ISAC hosted two TNA activities with a total duration of with a total duration of 20 access days. The report for the first activity was sent with the DEL7.1.

ISAC-002-2019 was dealing with the fate of nanoplastics in aquatic environments with respect to their photochemical degradation, namely reaction with ozone, OH radicals and light. As model substances were used polystyrene derivate nanoparticles. The VOCs emitted during the degradation of nanoplastics were injected and concentrated in the simulation chamber. These VOCs were then exposed to ozone, ozone/UV and ozone/UV-vis light in order to evaluate their reactivity under atmospheric relevant conditions. The study indicates that the degradation of such substance is a source of small oxygenated compounds such as formaldehyde and acetic acid.

This is a first step in understanding the environmental and, in particular, the atmospheric impact of nanoplastic pollution in surface waters.

(4) Access granted to QUAREC (BUW)

Up to date QUAREC hosted seven TNA activities, of combined training and mobility type, with a total duration of 145 days. This are the reports corresponding to the present deliverable.

QUAREC-003-2019 investigated the tropospheric degradation of a series of furanones derived initiated by Cl atoms and OH radicals at 298 K. Furans and furanones are not intentionally manufactured but escape accidentally as by-products of high temperatures industrial processes and wild fires or by the atmospheric degradation of other compounds such as isoprene. The kinetic and mechanistic investigations were performed as scheduled. The determined rate coefficients correlate well with the structure of the furanones. The results were published as shown in Table xx and were included in the Ph.D. thesis of the user visiting the facility.

The activity *QUAREC-004-2019* started as scheduled in March 2020, but had to be interrupted due to the Corona pandemic. The first part included training on performing atmospheric simulation experiments. The investigation was finalized remotely in February 2021 by the QUAREC team, the produced data being exchanged via sciebo (https://hochschulcloud.nrw/).

The study was performed according to the initial working plan, covering kinetics and mechanistic aspect of the tropospheric chemical degradation of a series of fluoroesters initiated by OH radicals and Cl atoms. For three of the investigated compounds, namely, methyl trifluoroacetate, ethyl trifluoroacetate and methyl difluoroacetate the stationary experimental set-up proved unsuitable. A future collaboration is envisaged to develop a proper experiment. The results were evaluated by the users together with the QUAREC team, the contact being kept by means of virtual meetings (zoom). They contribute to the Ph.D. thesis of the visiting student (in progress).

The *QUAREC-005-2019* was scheduled for April 2020 but has to be postponed and eventually to be conducted entirely in a remote mode. The QUAREC team performed the experiments and uploaded the spectral data on a sciebo (https://hochschulcloud.nrw/) account. At the end of the activity was held a first on-line tutorial (zoom) of a series intended to explain the experimental conditions and supervise the evaluation of the spectra. Further meetings are scheduled outside the duration of the TNA.

The experiments were conducted according to the working schedule. Calibrated IR spectra were produced for all investigated compounds (unsaturated esters). Due to the wall loss of the esters the experiments required more time than originally planned. The evaluation of the results is in progress. The atmospheric relevance of the studied reaction systems will be estimated after completing the evaluation of the experimental results.

In the *QUAREC-006-2019* the ozonolysis of 1,2,3-, 1,2,4- and 1,3,5-trimethoxybenzene was investigated under kinetic and mechanistic aspect. Due to pandemic it has to be rescheduled and only the PI could travel, so no “hands on” training could be provided. Virtual training is envisaged for a later time.

Trimethoxy benzenes are released in the troposphere by industry and land use as well as biomass burning, being found on the national priority list of strictly regulated compounds issued by EPA (U.S.). The rate coefficients for the reaction with ozone of the three trimethoxy benzene isomers were determined within this activity for the first time, by means of relative kinetics. The evaluation of the experiments targeting the products formed in the title reaction is in progress.

QUAREC-007-2021 was dealing with the gas-phase OH radical oxidation of aromatic compounds such as 2-methylstyrene and nitrotoluene isomers. The activity was performed remotely, with several webex meeting for discussion and evaluation of the performance along the duration of the project. The results were included in the M.Sc. thesis of C. Bulei.

(5) Transnational Access granted to AIDA (KIT)

Up to date at AIDA nine TNA activities were completed, one (*AIDA-011-2021*) being ongoing at the time this report is being issued.

AIDA-006-2019 (Intercomparison of atmospheric hygrometers - AquaVIT04) was cancelled due to pandemic since instrument operation cannot be performed remotely. It will be performed later under a follow-up funding scheme. The reports below belong to activities hosted in the period covered by the actual report.

In *AIDA-007-2021* the performance of an unmanned aerial vehicle as platform for aerosols and cloud probes was tested. The UAV aerosol monitoring package was placed into the cloud chamber, and the UCASS units were placed below the chamber attached to an outlet. Different aerosols were injected into the chamber and the atmospheric conditions were

varied. The instrument responses to different atmospheric conditions and aerosol types were assessed. The results were part of the KIT calibration centre activity and will be reported with WP8.

The key objective of the activity *AIDA-008-2021* was to demonstrate the presence of size dependent multiphase equilibria and heterogeneous reactions in aqueous droplet systems comprising surface active organic aerosol components. However, the user requires that the report is not made public until the publication of results.

AIDA-009-2021 hosted the TROPIC06 campaign which was dedicated to homogeneous freezing experiments under cirrus cloud conditions and performed entirely remotely. It aimed at the determination of the water saturation of supercooled liquid water using ice-inactive DEHS aerosol particles. The first experiments were conducted at T > 210 K, where the saturation pressure is better known, to confirm the measurement method. Thereafter, the focus changed to low temperature experiments, which offer new perspectives in the investigation of water saturation pressure. Daily virtual meetings accompanied the experiments, where current experiments were discussed or other related work from campaign participants was presented in the group and discussed in relation to the TROPIC06 campaign.

AIDA-010-2021 (AEROICELAB) was tackling with the prediction of atmospheric ice formation in mixed-phase clouds, where supercooled water droplets and ice crystals coexist. The activity was performed remotely. Three soil dust samples are injected into the chamber using a rotating brush generator for aerosol particle generation. The ability of those dust samples to act as immersion freezing mode ice-nucleating particle (INP) was determined in the temperature range above -30 °C. Several online and offline instruments were employed to measure aerosol properties and INP number concentrations. Individual dust samples but also size-segregated, mixed dust, dust mixed with known inorganic INP types, and aged dust samples were examined for immersion freezing. These various acquired data sets allow to probe multiple venues of assessing the predictive capability emerging from the of observed immersion freezing events.

(6) Transnational Access granted to SAPHIR (FZJ)

Up to date SAPHIR hosted a number of six TNA activities. All activities included training guest researcher in performing experiments at the SAPHIR chamber. This are the reports corresponding to the present deliverable.

The *SAPHIR-004-2018* and *SAPHIR-005-2019* activities were dealing with measurements of nitryl chloride ($ClNO_2$) – a compound with a large impact on the formation of ozone – by filling the SAPHIR chamber with ambient air collected at 50 m above the ground. The first campaign took place in winter, the second during summer. The aims of both campaigns, the direct determination of $ClNO_2$ concentration and the ozone production in the chamber, were successfully achieved.

The *SAPHIR-006-2019* activity was aiming at characterizing the phase state of SOA generated in the SAPHIR chamber following the photo-oxidation of plants emissions. Subsequently, the gas-phase partitioning of SOA was investigated using seeded experiments with controlled humidity.

(7) Transnational Access granted to PACS-C3 (PSI)

Eight transnational access activities were completed at PSI up to the date of this report. One activity (*PACS-C3-007-2021*) was recently completed and the user and scientific reports will be produced until the end of the project. The reports bellow represent the period covered by the present deliverable.

Within *PACS-C3-004-2018* the dual inlet Extractive Electrospray Ionization Time-of-Flight Mass Spectrometer (EESI-TOF) which allows for real-time, online chemical characterization of aerosol constituents in the gas and particle phases without thermal decomposition or ionization-induced fragmentation was successfully characterized.

PACS-C3-005-2019 focuses on achieving data on the formation of SOA from the NO_3 radical initiated oxidation of various VOCs. Producing SOA under dark conditions and then turning on the irradiation source simulated a night to day transition. A comprehensive dataset on the chemical composition and volatility of the formed SOA was achieved by using state-of-the-art mass spectrometers and different methods for measuring volatility.

PACS-C3-006-2019 investigated the differences between chlorine-initiated and OH-initiated oxidation of volatile organic compounds (VOCs) such as toluene and car exhaust. A polluted atmosphere was simulated in the PACS chamber targeting the formation of nitryl chloride. This compound was identified in field measurements and the results of the study are useful to interpret the field campaign data.

PACS-C3-008-2021 focused on determining, on a molecular level, the driving factors behind singlet oxygen production and the different combustion sources present in the atmosphere leading to their production. The experiments provided a holistic approach to first understanding and subsequently predicting both chromophores and singlet oxygen production.

(8) Transnational Access granted to EUPHORE (CEAM)

Up to date the EUPHORE installation hosted six TNA activities, with a total duration of 80 access days. Below are summarized the information concerning the TNA activities taking place in the period covered by the present deliverable.

EUPHORE-005-2019 successfully investigated the photo-oxidation of a number of gamma- and beta-dicarbonyls with respect to kinetics and mechanistic data. The modelling of the results will inform the mechanisms in the MCMv3.3.1 (Master Chemical Mechanism).

EUPHORE-006-2021 aims at investigating the formation of isoprene nitrates and nitroxysulfates under polluted urban conditions and the SOA formation in the NO3 oxidation of isoprene. The activity was performed remotely, with one larger initial and brief daily virtual meetings for organisation of experiments and discussion of preliminary results.
By reproducing environmental conditions observed in a 2017 Beijing measurement campaign these experiments are intended to probe the formation pathways of isoprene oxidation products when these conditions are simulated in laboratory. Additionally, experiments were be performed under more widely applicable environmental conditions to contrast with the low-NO conditions observed in Beijing 2017. Some experiments were performed where isoprene was introduced to the chamber at the beginning of the experiment and allowed to react away over the course of the day to investigate later-stage chemical products. These experiments were performed with different permutations of opening and closing the chamber roof. The different experiments were run both with and without seed aerosol added to the chamber, and at high and low isoprene concentrations. The results will be used to update and develop the gas phase isoprene chemistry in MCMv3.3.1 (mcm.york.ac.uk) and do contribute to a Ph.D. thesis.

(9) Transnational Access granted to LEAK-LACIS (TROPOS)

Up to date seven TNA activities were granted at TROPOS. This are the reports corresponding to the present deliverable.

The *LEAK-LACIS-003-2019* activity investigates the influence of elusive compounds such as peroxides on the formation and growth of SOA. These species are difficult to identify due to their high reactivity in both gas- and aqueous phase. Moreover, they could interact with the human lung tissues, causing adverse health effects due to their oxidative capacity.

The work performed concerned the evaluation of the peroxide-content of the SOA formed in the photo-oxidation of two model substances carene and cumene, chosen as biogenic and anthropogenic SOA precursors, respectively. A follow-up will be to investigate the effect on lung tissues, for which a collaboration project is under development.

Within *LEAK-LACIS-004-2019* a prototype optical hygrometer – the Fast InfraRed Hygrometer (FIRH) developed at the University of Warsaw, in the Faculty of Physics – was tested against a host dew point reference device. The FIRH was designed as an independent (i.e., no calibration needed), reliable, fast-response optical system for measuring the air humidity under variable atmospheric conditions, such as airborne applications in clouds.
The experiments were carried out as planned. The results are used to understand and improve the capabilities of the FIRH system.

During the *LEAK-LACIS-005-2019* activity two portable aerosol samplers were tested against a scanning mobility particle sizer (SMPS) device monitoring the smoke released by burning 3 types of biomass fuels on the LEAK chamber's roof. Known as "low weight instruments" or

"personal samplers", they are important for determination of emissions of black carbon or other particles from biomass burning, e.g. wildfire events. The main focus was on measuring particle concentration and absorption. The overall results were positive and showed a good correlation for particle concentration measurements.
The results of this experiment did show a good agreement with the SMPS device but for the equivalent black carbon measurements that were underestimated.

Four different types of the UltraFast Thermometer 2 (UFT-2) were systematically tested during *LEAK-LACIS-006-2019* against a commercial coldwire thermometer and a slow-response accurate reference. The UFT was designed for high-resolution airborne temperature measurements in atmospheric turbulent warm clouds. The main goal of the activity was to explore the limits of application and performance of the instruments. For this, the LACIS chamber is perfectly suited, allowing assays in a controlled environment simulating clouds.
The experimental work was performed as scheduled. The results are used to improve the design of the UFT.

The *LEAK-LACIS-007-2019* activity supported an extensive investigation on the kinetics of heterogeneous OS formation using as model the reaction of alpha-pinene oxide with acidic and sulfated particles. These were generated using an aqueous mixture of (either or all) H_2SO_4/Na_2SO_4/HCl.
The main objective, which was successfully completed, was to achieve a comprehensive data set under different experimental conditions. Due to the size of the data set its analysis and interpretation are still on-going.

(10) Transnational Access granted to IASC (UCC)

Up to date at UCC three TNA activities were completed, one (*IASC-004-2021*) being performed remotely at the time this report is being issued. The reports below belong to activities hosted in the period covered by the actual report.

Within the *IASC-002-2019* activity were investigated the mechanisms and secondary organic aerosol formation in the atmospheric oxidation of 2,5-dimethylfuran and gamma-valerolactone. These are breakdown products of cellulose, with great potential for use as biofuels.

The IASC chamber has been selected due to its instrumentation (FIGAERO ToF-CIMS), which – complementary to offline analytical techniques used by the guest researchers – allows a comprehensive determination of the composition of both the gas and particle phase. Aerosol formation was monitored using a scanning mobility particle sizer, while NOx and ozone were measured continuously by automated gas analysers. The users did benefit also by the considerable expertise of the IASC team on the atmospheric chemistry of oxygenated VOCs like those involved in this study.

The *IASC-003-2019* activity supported a study on the particle formation in the night-time chemistry of iodine. A brown macroalgae (*Laminaria digitate*), known to emit I_2 when stressed, was introduced in the IASC chamber and the reaction of these emissions with NO_3 monitored by means of Open path IBBCEAS technique. The kinetics of the I2-N2O5 chemical system were investigated focusing on particle (aerosol) formation

The study confirmed qualitatively the work hypothesis that the night time particle formation caused by iodine could be important for polluted marine coastal environments (high NO_x levels) even when compared with the day time particle formation.

(11) Transnational Access granted to ILMARI (UEF)

Up to date three TNA activities were hosted by the ILMARI installation, spending a total of 47 access days. This are the reports corresponding to the present deliverable.

ILMARI-004-2019 supported a project investigating the sugar cane combustion and its potential to form SOA. The ILMARI facility was chosen due to its experimental set-up allowing coupling the combustion source directly to the simulation chamber and available expertize in analysing outcomes of combustion processes.

The sugar industry is one of the big purchasers of agricultural products in Africa, Asia and South America. In many developing or newly industrialized countries agricultural fires are very common for pre- or post-harvesting. This method of open biomass burning is one of the largest sources of aerosols (black carbon, SOA) and organic gases into the atmosphere and causes adverse health effects. The multitude of methods and instruments used within this multidisciplinary research project yielded in a large amount of data that is not fully analysed. However, the first results are very promising with regard to SOA formation.

In *ILMARI-005-2019* a DI-gasoline Euro6b car was used as the emission source and operated by a ROTOTEST chassis dynamometer in different steady engine conditions, using gasoline fuels with different fuel formulations. The emission atmospheric aging processes were simulated in the ILMARI smog chamber by using UV lights (340 nm) and H_2O_2 to generate oxidants. The OH-radical exposures represented approximately four equivalent days of photochemical aging in atmosphere. Particle concentrations, size distribution and chemical compositions as well as VOC concentrations were measured with versatile online instrumentation to determine changes in particle concentrations and physico-chemical properties during aging.

(12) Transnational Access granted to FORTH-SC (FORTH)

Six TNA activities were granted at FORTH up to date, accounting for 123 access days. The reports below belong to activities hosted in the period covered by the actual report.

FORTH-ASC-004-2018 was a training activity concerning the formation of aerosols in the photo-oxidation of biogene VOCs, namely β-caryophyllene which fulfilled successfully its

objectives. The selected compounds were synthetised and purified. In first experiments their gas-phase behaviour in the FORTH-ASC smog chamber chemical and physical properties was studied employying: a thermodenuder, a Proton Transfer Reaction Mass Spectrometry (PTR-MS, Ionikon Analytik), an Aerodyne High Resolution Time of Flight Aerosol Mass Spectrometry (HR-ToF-AMS) and Scanning Mobility Particle Sizer (SMPS, classifier model 3080, DMA model 3081, CPC model 3775, TSI). In the next experiments, HONO was introduced as a source of OH (UV lights are used for the HONO photolysis) and evolution of investigated compounds was studied. The results contributed to the PhD thesis of Agata Kolodziejcyk that was defended 2020 at the Institute of Physical Chemistry, Warsaw, Poland.

Within *FORTH-ASC-005-2019* was tested the role of organic species containing silica molecules (e.g., siloxanes) in the first stages of nucleation processes in the troposphere. These species, originated from various human activities such as industrial production and daily use of silicone oils, sealants, anti-foaming agents, biogas, etc., have been found in the atmosphere in concentrations that vary from a few tens of ng/m^3 in remote locations. Contrary to the findings of previous studies, the results here indicate that Si-containing compounds play a minor role as new particle formation agents.

The *FORTH-ASC-007-2019* project focused on the influence of humidity on particle formation during biomass burning. A total of twelve biomass burning experiments were carried out at the FORTH ACS: SOA formation was investigated under different experimental conditions in term of oxidants (OH or NO3), photochemical conditions (illumination vs. dark), and relative humidity (up to 80%). The formation and evolution of organic aerosol was monitored using a HR-ToF-AMS, while aerosol samples were collected for offline chemical characterization. Filter samples of fresh and aged smoke were extracted in deionized water and analysed by 1H-NMR spectroscopy at 600 MHz. Spectral fingerprints for biomass burning SOA were evaluated in relation to the different oxidation conditions employed in the chamber.

FORTH-ASC-008-2020 focused on quantifying the morphological properties and the evolution of combustion aerosols from residential wood burning during night-time processing: size distribution, degree of compactness and mixing state, and chemical composition. Night-time experiments of woodburning combustion for residential heating were conducted in the FORTH-ACS chamber according to the time schedule. Preliminary results show that two mechanisms seem to be present: coating of the fresh particles but also new amorphous spherical particle formation, being dominant the first. Coating of the already compacted fresh aggregates and the tar-balls seem to be predominant when aged. A further detailed analysis with better statistics will give light in the potential relationship between formation of nitro-OA and the formation of the tar-balls.

(13) Transnational Access granted to CERNESIM (UAIC)

Up to date, at CERNESIM five TNA activities were completed. Upon pandemic reasons, one activity (*CERNESIM-003-2019*) was performed remotely. The user and scientific reports for the period covered in the present deliverable are summarized below.

Within *CERNESIM-001-2019* was investigated the interaction between urban green waste products and atmosphere with respect to aerosol formation.

The recycling of different types of organic waste products (OWP) from livestock, urban or industrial sources is currently being promoted as a substitute for mineral fertilisers for agricultural land. The OWP can increase the organic matter stocks, and thereby improve soil chemical fertility, stimulate microbial activity, etc. On the other hand, they might pose different health and environmental risks: accumulation in soil, influence on water and/or air quality.

CERNESIM-002-2019 subjected the photochemical oxidation of new "green" solvents, under kinetic and product formation aspects. The reaction systems were observed employing FTIR and PTR-MS instruments. The experiments were successfully completed. Upon evaluation of results, combined with additional experimental work performed at the host laboratories' a collaborative publication is envisaged.

CERNESIM-003-2019 was focused on gas-phase photodegradation kinetics of the fungicide tebuconazole, using the ESC-Q-UAIC chamber facility. The relevant studies have been performed with in situ Fourier Transformed Infrared Spectroscopy (FTIR) as the main analytical tool, as well as online proton transfer reaction mass spectrometry (PTR-TOF-MS) as a complementary analytical device.

CERNESIM-004-2020 aimed at investigating the O3 initiated chemistry of two unsaturated oxygenated terpenes, namely Limonaldehyde and Ketolimonene. Thus, three main tasks were proposed in this work: Kinetics of the ozonolysis of the unsaturated oxygenated terpenes; identification of the gas-phase products from the target O3 reactions; evaluation of Secondary Organic Aerosol (SOA) formation. Eventually, since ketolimonene was not available at that time (synthesis problem), it was replaced by 4-terpineol, another oxygenated unsaturated terpene. In addition, OH reactions were also investigated for both limonaldehyde and 4-terpineol.

CERNESIM-005-2020 supported an investigation on the atmospheric degradation of two major VOCs that are ingredients of selected essential oils (Clary sage and Lavender), with respect to their gas phase chemistry and SOA formation potential. The kinetic and mechanistic studies have been performed employing in situ Fourier Transformed Infrared Spectroscopy (FTIR), on-line proton transfer reaction mass spectrometry (PTR-TOF-MS) and scanning mobility particle analyser (SMPS). The SOA chemical composition was performed using offline liquid chromatography mass spectrometry (LC-MS) and laser desorption/ionization coupled with

time-of-flight mass spectrometry (LD/LI-MS). Samples of extracted oils and synthetic linalool and linalyl acetate were brought by the user. Prior to experiments they have been characterized by FTIR-ATR, GC-MS and UHPLC-DAD to check their composition and purity as well as the stability over the transport from PI's laboratory to the CERNESIM centre.

(14) Transnational Access granted to RvG-ASIC (NCAS)

The RvG-ASIC facility hosted seven TNA research projects up to date. These are the reports corresponding to the present deliverable.

Through *RvG-ASIC-004-2018* the guest researchers received training in reproducing in laboratory the growth processes of artificial ice. They come from the Polar Engineering Research Group (PERG, University of Cape Town, South Africa) who has built the first sea ice facility in Africa.

The primary objective, i.e., to receive training and make use of the knowledge and experience of the personnel at the RvG facility, was fulfilled. A second issue was to duplicate the experiments in the PERG own facility and compare the results. Although large disagreement occurred, this leads to a better understanding of the technical requirements such a laboratory needs. Therefore, the activity is considered by the PERG as a success.

During the *RvG-ASIC-005-2019* activity, the sensitivity of an underwater methane sensor relative to various dissolved methane concentrations, i.e., to mimic field conditions, was tested. The CONTROS HydroC®-CH4 (Kongsberg Maritime) is intended for use in polar environment monitoring and therefore it is desirable to assess previously its performances under controlled conditions. The results contribute to the Ph.D. thesis of C. Jaques.

RvG-ASIC-006-2019 addressed the influence of ice growth and dynamics on the distribution of poly- and perfluoroalkyl substances (PFASs) in sea ice. PFASs are anthropogeneous VOCs that are present in air, water soil and biota worldwide, recent measurements shown their presence in the Arctic. PFASs are persistent in the environment and bioaccumulative in animals and humans, raising serious health and environmental concerns.

In *RvG-ASIC-007-2019* the techniques available to date to measure gas concentrations of N_2O, CH_4, and CO_2, in sea ice – including sampling, processing, storage, and analyses – were compared. A thorough investigation of the impact of microbial processes or gas diffusion on the gas concentrations in stored samples was performed.

(15) Transnational Access granted to MAC-MICC (NCAS)

Up to date, UMAN hosted four transnational activities und the TNA scheme in the EUROCHAMP 2020 project. The *MAC-MICC-004-2020* activity had to be interrupted due to the pandemic outbreak, and it will be reported in the final report. The amount of access offered (see Table 1.1, above) will be also adjusted accordingly.

MAC-MICC-001-2019 supported an investigation on the influence of the phase state of particles on the nucleation and condensation processes. This was performed using 2 biogenic (α-pinene, isoprene) and 1 anthropogenic (o-cresol) model VOCs, under seeded conditions (ammonium sulphate) and various humidity levels. According to the user and scientific report the objectives were fulfilled with respect to the experimental schedule. The report shows that the preliminary results are positive with respect to the scientific purpose of the investigation.

The activity *MAC-MICC-002-2019* concerns a study about the influence of photochemical aging on the physical, chemical, and optical properties of Black Carbon Particles. An experimental campaign to evaluate the response of a source of BC emissions over a wide range of nanoparticle diameters and coating thicknesses was designed and performed. The project made full use of the sophisticated photochemical aerosol chamber at the University of Manchester. The emissions were characterised using state-of-the-art diagnostic instruments, including new and prototype instruments supplied from industrial partners.

The *MAC-MICC-003-2019* addresses the impact of short-term air pollution (notably, Diesel Exhaust (DE)) exposure on cognitive function in adults. The "inflammation hypothesis" is assumed to be the mechanism behind these effects. Further scientific objectives seek to identify if this is prevalent in the middle-aged population (as previous research focuses on either the developing or aging brain), identify if this impact is seen after purposeful short-term air pollution exposure (as opposed to epidemiological studies which look primarily at chronic air pollution exposure, not manipulated by experimenters), and lastly using psychological tasks relevant to the inflammation hypothesis (as opposed to crude questionnaire measurements previously utilised). The project involved human participants breathing air mixtures containing either diluted DE, or solely Filtered Air (FA) from the atmospheric chamber for one hour, utilising a non-rebreather face mask with a tube attached to the chamber.

After exposure, participants took part in computer tasks related to learning & memory, social cognition, and executive function. Participants were divided in two groups: Participants in the Immediate Exposure group did the cognitive task immediately after exposure to the chamber air. Participants in the Delayed Exposure group did the cognitive tasks 4 hours after exposure to the chamber air. Preliminary results indicate that qualitative differences exists between the performances of the two groups.

Blood samples were collected before and after exposure for all participants. In addition, for the participants of the Delayed Exposure group, a third blood sample was collected 4 hours after exposure. Serum was extracted from blood and stored in the -80˚C freezer for analysis of inflammatory markers.

(16) Transnational Access granted to ChAMBRe (INFN)

INFN hosted two of the three granted TNA activities. One activity (*ChAMBRe-002-2020*) had to be cancelled because of the pandemic. The corresponding user and scientific reports are summarized below.

ChAMBRe-001-2019 focused on understanding how the carriage of Antimicrobial Resistance Genes (ARGs) influences the survival of bacteria in an atmospheric environment. For this pilot study two factors were chosen to be evaluated to understand their effect on the survival of *non-resistant bacteria* compared to the survival of *resistant bacteria* in an atmospheric environment: the effect of CO_2 and the effect of dust particles.

Within two time periods, it was studied if CO_2 have an effect on the survival of a non-resistant and a resistant *E.coli* strain. In each experiment one of the two strains was injected into the chamber and subjected to different atmospheric conditions. By counting the *cfus* (colony-forming units) on agar plates that were placed inside of the chamber, the number of bacteria that survived at the different conditions were calculated. To decipher the influence of dust more investigations are necessary.

ChAMBRe-003-2021 is a continuation of the investigation initiated in *ChAMBRe-001-2019*. For this second pilot study, dust was chosen as the changing parameter, to understand its effect on the survival of non-resistant bacteria compared to the survival of resistant bacteria in an atmospheric environment. Within a time period of two weeks, it was studied if dust particles have an effect on the survival of a non-resistant and a resistant E.coli strain. For this matter, the ChAMBRe at INFN, Genova, Italy was used as an atmospheric simulation chamber to simulate different atmospheric conditions. Per each experiment one of the two strains was injected into the chamber and subjected to standard atmospheric conditions (=baseline) or additionally to dust particles. By counting the *cfus* on agar plates that were placed inside of the chamber, the number of bacteria that survived at the different conditions were calculated.