Del. 6.1.2 Report on stakeholder engagement activities

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Helsinki, November 2021

WP6 Dissemination and strategic development

Task 6.1 ***Stakeholder engagement****, Del. 6.1.2*

Version 1.0

Introduction

In this iCUPE deliverable 6.1.2. "Report on stakeholder engagement" we summarize the interactions between the iCUPE community and our stakeholders. The identified key stakeholders for our work include: research community, public sector, educational organizations, policymakers.

This deliverable is connected to the follow-up iCUPE deliverable on iCUPE impacts (D6.3.1), where we summarize the scientific impacts and iCUPE impacts obtained through the stakeholder interaction events and opportunities summarized in this deliverable.

iCUPE Stakeholder Activities in 2019-2021

Events

- **Black carbon and Dust WS " IBA-FIN-BCDUST-project**, 16-17 Sep 2019, Moscow, Russia
  - audience: Finnish – Russia BC research community
  - number of participants: 40
  - agenda: https://www.atm.helsinki.fi/peexold/images/programme_Black_Carbon_fin.pdf

- **Arctic Urbanization under Environmental Change Workshop, 14-15 Jan 2020, Helsinki, Finland**
  - number of participants: https://www.atm.helsinki.fi/peexold/images/Arctic_Urbanization_under_Environmental_Change_WS_List_of_participants.pdf
  - agenda: https://www.atm.helsinki.fi/peexold/images/Agenda_final.pdf

- **PEEX Special Session at EGU2020 and** PEEX HQ online meeting 7 May 2020
  - audience: research community
  - number of participants: 70

- PEEX EGU20 session: https://meetingorganizer.copernicus.org/EGU2020/displays/35931
- PEEX HQ Online Meeting agenda: https://www.atm.helsinki.fi/peexold/images/egu/PEEX_EGU2020_programme_plenary.pdf

- **PEEX Special Session at EGU2021 (29 April) and** PEEX HQ online meeting 28 April 2021
  - audience: research community
  - number of participants: 60
  - PEEX session at EGU21 – https://meetingorganizer.copernicus.org/EGU21/session/40486
  - PEEX Online Meeting: summary - https://peexhq.home.blog/2021/05/03/peex-community-online-event-2021-sharing-results-and-highlights/

- **Online Research Seminar on "Holistic multi- and interdisciplinary approach in supporting the Arctic sustainable development" (19 Feb 2021)**
  - audience: research community (from 15 different research institutes/ organizations and universities)
  - number of participants: about 50 researchers from Austria, Czech Republic, Denmark, Finland, Norway, Russia, and Switzerland
  - agenda – 3 sessions: (i) Conceptual approaches and examples; (ii) Natural science in support for socio-economical studies, (iii) Brainstorming and Discussions https://www.atm.helsinki.fi/peex/images/PEEX_19Feb2021_ResSeminar-KSC-UHEL_agenda.pdf
  - presentations - https://www.atm.helsinki.fi/peex/index.php/academic-challenge/
  - summary - https://www.atm.helsinki.fi/peex/images/PEEX_19Feb2021_ResSeminar-KSC-UHEL_summary.pdf

- **PEEX research collaboration online meeting (12 Nov 2020)**
  - audience: Finnish and Russian researchers (from UH-INAR and Kola Science Center RAS)
  - number of participants: 26 from Finland and Russia
  - agenda – presentations and discussions on research and science education collaboration in PEEX frameworks, joining efforts in Calls for research proposals https://peexhqhome.files.wordpress.com/2020/12/peex_12nov2020_meet-ksc-uhel_agenda.pdf
  - presentations -https://www.atm.helsinki.fi/peex/index.php/academic-challenge/
  - summary - https://peexhqhome.files.wordpress.com/2020/12/peex_12nov2020_meet-ksc-uhel_summary_vf.pdf

- **Arena for the gap analysis of the existing Arctic Science co-collaborations AASCO virtual meeting 2-3.Nov.2020**
  - audience: research community, Arctic stakeholders
  - number of participants: 135

- **The #HackTheArctic hackathon took place on the weekend of 12.-14.March**
  - The event used open data portals to design new digital solutions for society, policy-making or research. A total of
  - audience: Open call was made on social media, websites of INAR, PEEX, ICOS and ENVRI FAIR news, as well as University of Helsinki student networks.
  - There were 147 participants in the virtual platform from 54 countries (including Africa, Europe, Asia, Oceania, and the Americas), with 46% male and 35% female participants.
  - Total 65 scheduled meetings between participants and science mentors took place during the weekend.The hackathon included 9 international partners together with iCUPE, including PEEX, University of Helsinki, ACTRIS, SeaDataNet, SIOS, eLTERRI, Arctic Data Center, Arctic SDI.
  - 6 expert speakers presented KeyNotes, including 2 companies (Avoin Oy, and VINCIT Oyj), head representatives of ICOS, ENVRI Fair and ACTRIS Finland/GlobalSMEAR, and an early career scientist.
  - The hackathon competition prize was sponsored by Finnish microsatellite company ICEYE (www.iceye.com).
  - The event received an overall grading of 4.3/5 from participants feedback after the event.
  - Website: www.HackTheArctic.com

PROFILE

Hack the Arctic: Transforming data into solutions as a community

Stephany Mazon from the Institute for Atmospheric and Earth System Research at the University of Helsinki, discusses how the 'Hack the Arctic' hackathon is making use of Arctic environmental data

We are well aware that we are facing global environmental challenges, such as extreme weather, rising sea levels, and biodiversity loss. We also know that to solve them, we have to work together. Their interlinked nature demands it.

Scientific data is allowing researchers to understand and predict the changes in the Earth System. This same data however can further assist other users to navigate and prepare for these changes through information and services tailored to their specific needs. In order to explore different possible user needs, we proposed employing a hackathon event that gathers multi-disciplinary teams through a public call to make use of existing environmental data from a network of research infrastructures. In our first hackathon, we focused on the Arctic region.

Making use of Arctic environmental data

Hack the Arctic is a 48-hr online hackathon open to anyone interested to make use of Arctic environmental data. The event is co-organised by INAR of University of Helsinki, including its PEEX initiative, together with ICOS Head Office and the ENVRI Community, bringing together a compilation of datasets and science mentors from their respective communities under one roof.

The participants gather on a virtual networking platform (12-14 March 2021) organised by Junction App, form teams around shared interested, skills, and aims, and work on their project for a weekend. In the virtual platform, participants have access to scientists from the contributing data providers who offer mentorship on both science and data handling.

Selected keynote talks are streamed throughout the weekend to serve as inspiration, and networking virtual spaces are open to allow interaction among the international group of participants through the weekend. The final projects are presented as two minute videos and shared publicly. The finalist projects are selected based on Community voting, where participants can vote for the best videos under criteria based on innovation and applicability. The hackathon is open for anyone, and participating students receive a certificate of completion, encouraging not only a final product, but a learning experience.

PEEX initiative

This is in line with the PEEX initiative goals. PEEX, or the Pan-Eurasian Experiment Project, is a multidisciplinary climate change, air quality, environment and research infrastructure programme focused on the Northern Eurasian including the Arctic regions.

Figure 1 - The Global Environmental Challenges we face, and which programmes like PEEX are working to address. "Pan Eurasian Experiment (PEEX) Science Plan. Editors Lappalainen H.K., Kulmala M. and S. Zilitinkevich. Copyright © 2015 WEB: http://www.atm.helsinki.fi/peex

- **Research Training Course on "Seamless / Online Integrated Meteorology-Chemistry-Aerosols Multi-Scale and -Processes Modelling" (24-29 June 2019, Tyumen, Russia)**
  - audience: young researchers and PhD students (from University of Tyumen, UTMN)
  - number of participants: 14 (Russia) + 1 (Finland)
  - agenda: Course - lecturing on theoretical and practical aspects of the Enviro-HIRLAM modelling system (with focus on research and development). Collaboration - a series of meetings took place on strengthening collaboration in the PEEX framework; on designing and enabling joint research activities; and on building links for students' training.
  - Theoretical aspects included: weather modelling in European community; advantages/ shortcomings of on-line vs. off-line approaches; model structure, downscaling, components, schematics; specific features of urban areas and modules/, parameterizations for urbanization; land-cover and land-use classification and datasets; statistics on urban lands; modelling results – meteorology and atmospheric composition - with/without modules implemented; model in other projects and applications.
  - Practical aspects included: introduction into Small-Scale Research Projects, SSRPs (with background discussions); analysis of meteorological situations for selected cases/ dates;

technical aspects of modelling and modules implementation; model runs for selected dates/cases; visualization of model output/ results and analysis of impact on meteorology and atmospheric composition; and finally - oral presentations with defence of SSRPs.

- **SIOS Terrestrial Remote Sensing Training (TRST) Course in Svalbard**
  - audience: worldwide ECRs
  - number of participants: 30
  - details on this training course are available on https://sios-svalbard.org/TRST_2020

- **Colloquium on "Future Directions in French Polar Pollution Research", Toulouse, 14-15 October 2019**
  - audience: France - Russia polar pollutant research community
  - number of participants: 40
  - agenda: https://polarpollutants.sciencesconf.org/

- **Midnight Sun Challenge with ESA -Hackathon in Sodankylä Space Campus on 11th-13th June 2019.**

Midnight Sun Challenge with ESA BIC Finland hackathon was organized by Ultrahack in co-operation with Business Lappi, ESA BIC, SGO and FMI-Arctic Space Centre. Altogether 17 participants from 8 different teams were gathered to pursue prizes and chances of getting into ESA BIC Finland, Space Accelerator, with funding and possibility to demo at ESA Booth in Slush 2019. The scope of the challenge was quite wide: space. Teams come up with ideas, concepts and solutions related to space tech and data or their applications on the Earth and remote sensing. Final pitching was held in Sodankylä at the Midnight Sun Film Festival area.
https://ultrahack.org/midnight-sun-2019

- **Popular science seminar for the NCSR Demokritos 20 years contribution at the Ny Ålesund Scientific community and the continuation through iCUPE**
  - audience: Norwegian – International Technical staff and research community of the Ny Ålesund Research station field workers and scientists
  - number of participants: 12

- **Presentation at the Ny Ålesund Atmosphere Flagship Workshop, Potsdam, Germany2019**
  - audience: International The wider research community of the Ny Ålesund Research station working in atmosphere and climate in the Arctic
  - number of participants: 70

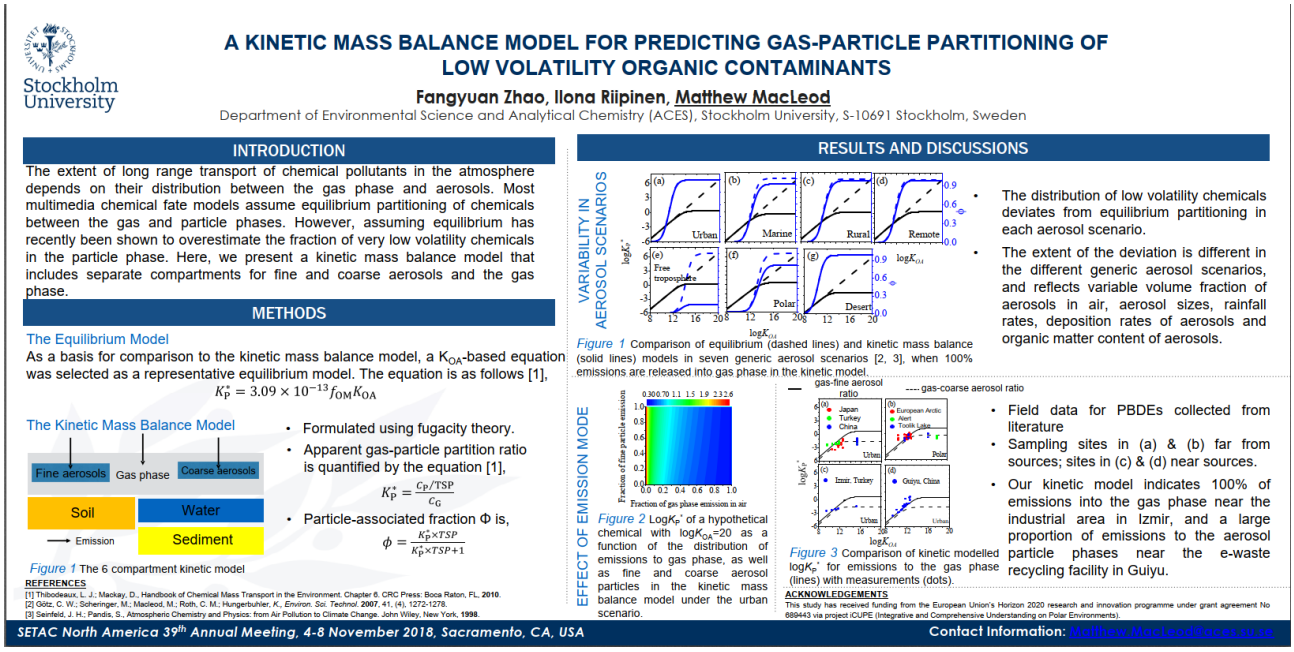
- **Presentation at the Ny Ålesund Atmosphere Flagship Workshop, Oslo, Norway 2019**
  - audience: International The wider research community of the Ny Ålesund Research station working in atmosphere and climate in the Arctic
  - number of participants: 30

- Robin Modini from PSI and Marco Zanatta from AWI have organized a workshop where modellers and observers have discussed the most pressing questions related to the black carbon in the

Arctic. The workshop was supported financially by the Ny-Ålesund Atmosphere Flagship (part of the Ny-Ålesund Science Managers Committee) and held in the Research park, which houses CICERO. The event was held for 2 days and included 28 participants in total. Julia Schmale has organized several data workshops related to MOCCHAA and MOSAiC.

- **Society of Environmental Toxicology and Chemistry 28th Annual European Meeting, 13-17 May 2018, Rome, Italy**
  - Audience: ~50 scientists and policy makers from academia, industry and government
  - Platform presentation was titled "Can we model emissions, fate and exposure on a global scale? A case study of PCB 153 in human milk"
  - Meeting overview video: https://www.youtube.com/watch?v=hqODSIwSgEo

- **Society of Environmental Toxicology and Chemistry 38th Annual North American Meeting**, 4-8 November 2018, Sacramento, USA
  - Audience: Scientists and policy makers from academia, industry and government
  - Poster presentation "A kinetic mass balance model for predicting gas-particle partitioning of low volatility organic contaminants"



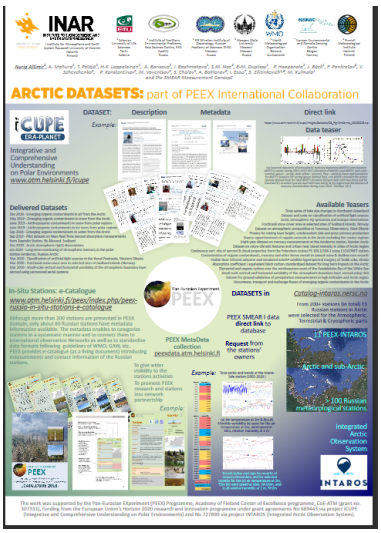
Meetings with local stakeholders and policy makers

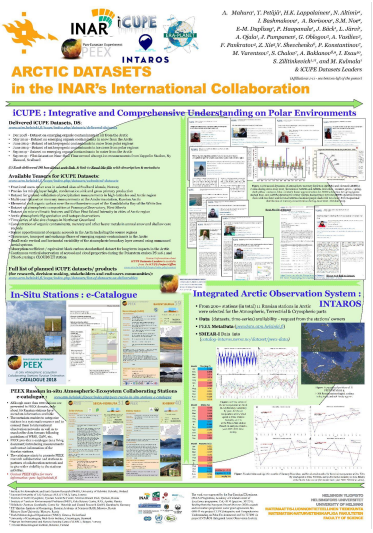
During the years 2019 until 2021 EULS had the possibility to meet the Estonian Ministers of Environment. In December 2019 during a visit at the University where the concept of iCUPE was communicated. In June 2021, the new Minister of Environment (after government change in 2020) was visiting the SMEAR Estonia station and the concepts of iCUPE and the role of ERA-PLANET was communicated.

In 2020 and 2021, a series of online meetings was organised by the Estonian Environmental Board and Environmental Ministry where EULS fulfills an adviser's role. These regular meetings are used to pinpoint initiatives and projects where EULS is involved towards local stakeholders.

Materials for communicating with the stakeholders

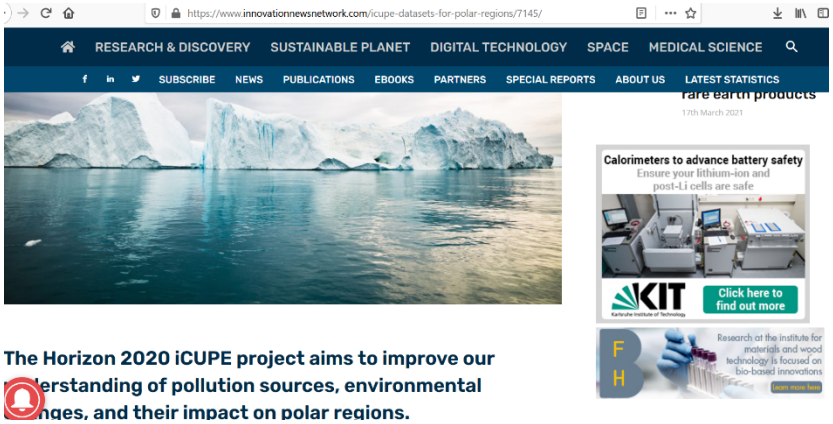
Posters in science conferences (May 2020 - European Geoscience Union General Assembly 2020, Vienna, Austria), **workshops** (Jan 2019 - Year of Polar Prediction (YOPP) Arctic Science Workshop - Helsinki, Finland), **congress** (Sep 2018: UArctic Congress - Oulu, Finland)





Adverts

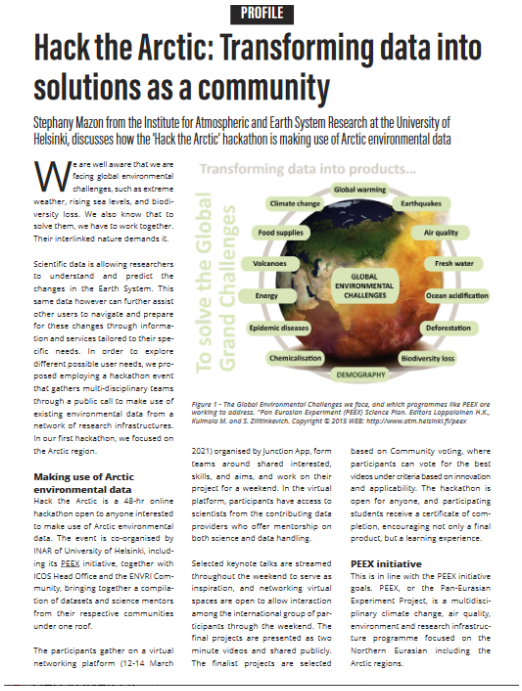
https://www.innovationnewsnetwork.com/icupe-datasets-for-polar-regions/7145/



The ACCC Service Portal (*with links to ACCC data providers that include comprehensive environmental observations and multiscale models*) - https://www.acccflagship.fi/index.php/portal

The INAR e-book "High Latitudes and Cold Regions"
https://www.atm.helsinki.fi/peex/wp-content/uploads/2021/03/INAR-Polar-ebook.pdf

Open Access Government article on Hackathon:



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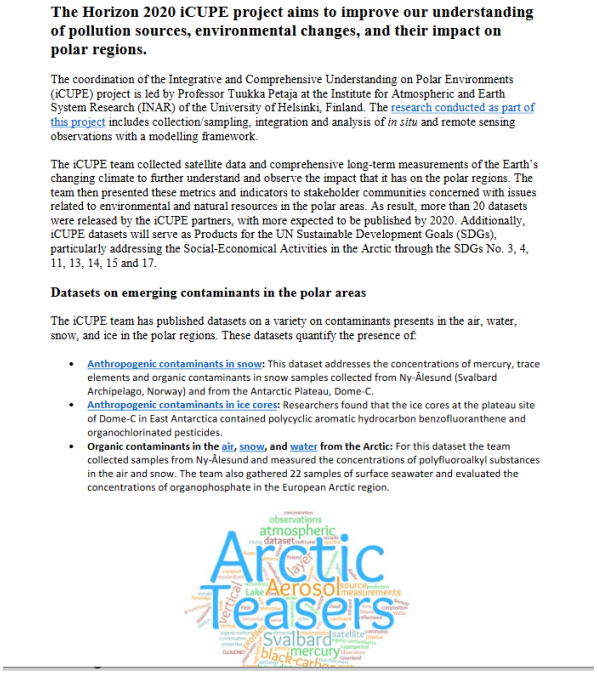

The Horizon 2020 iCUPE project aims to improve our understanding of pollution sources, environmental changes, and their impact on polar regions.

The coordination of the Integrative and Comprehensive Understanding on Polar Environments (iCUPE) project is led by Professor Tuukka Petaja at the Institute for Atmospheric and Earth System Research (INAR) of the University of Helsinki, Finland. The research conducted as part of this project includes collection/sampling, integration and analysis of *in situ* and remote sensing observations with a modelling framework.

The iCUPE team collected satellite data and comprehensive long-term measurements of the Earth's changing climate to further understand and observe the impact that it has on the polar regions. The team then presented these metrics and indicators to stakeholder communities concerned with issues related to environmental and natural resources in the polar areas. As result, more than 20 datasets were released by the iCUPE partners, with more expected to be published by 2020. Additionally, iCUPE datasets will serve as Products for the UN Sustainable Development Goals (SDGs), particularly addressing the Social-Economical Activities in the Arctic through the SDGs No. 3, 4, 11, 13, 14, 15 and 17.

Datasets on emerging contaminants in the polar areas

The iCUPE team has published datasets on a variety on contaminants presents in the air, water, snow, and ice in the polar regions. These datasets quantify the presence of:

- Anthropogenic contaminants in snow: This dataset addresses the concentrations of mercury, trace elements and organic contaminants in snow samples collected from Ny-Ålesund (Svalbard Archipelago, Norway) and from the Antarctic Plateau, Dome-C.
- Anthropogenic contaminants in ice cores: Researchers found that the ice cores at the plateau site of Dome-C in East Antarctica contained polycyclic aromatic hydrocarbon benzofluoranthene and organochlorinated pesticides.
- **Organic contaminants in the air, snow, and water from the Arctic:** For this dataset the team collected samples from Ny-Ålesund and measured the concentrations of polyfluoroalkyl substances in the air and snow. The team also gathered 22 samples of surface seawater and evaluated the concentrations of organophosphate in the European Arctic region.

Press communications:

Julia Schmale (PSI) has given several press conferences such as on the Swiss television SRF, and in several documentaries, and she regularly gave public talks or radio interviews: e.g. Futurium Berlin, talk with Julia Schmale and Matthew Shupe on MOSAiC; interview homecoming of MOSAiC expedition on SRF's "10 vor 10"; talk on carnotzet scientifique online; RTS's interview titled "Prisonnier des glaces de l'Arctique pour édutier le climat;", in Le Nouvelliste on "De Sion à l'Arctique pour étudier le climat;" and SRF Einstein documentary on "In 88 Tagen um den Südpol.

Newsletter articles

- **PEEX newsletters**
  -https://www.atm.helsinki.fi/peex/index.php/portfolio-items/peex-newsletter-blog

PEEX Arctic-Boreal Hub Newsletter Issue #16 April 2021

- "Holistic multi- and interdisciplinary approach in supporting the Arctic sustainable development" - https://peexhq.home.blog/2021/03/16/seminar-on-holistic-multi-and-interdisciplinary-approach-in-supporting-the-arctic-sustainable-development/

PEEX Arctic-Boreal Hub Newsletter Issue #15 December 2020

- **"Unprecedented high black carbon in the Arctic observed in September 2020" -** https://peexhq.home.blog/2020/11/09/unprecedented-high-black-carbon-in-the-arctic-observed-in-september-2020/
- **PEEX research collaboration – INEP KSC RAS and UHEL-INAR – virtual meeting -** https://peexhq.home.blog/2020/12/07/peex-research-collaboration-inep-ksc-ras-and-uhel-inar-virtual-meeting/

Conference presentations

Black Carbon Snow Surface Processes Connected to Atmospheric Variables. Michele Bertò, A. Spolaor, C. Varin, D. Cappelletti, E. Barbaro, M. Mazzola, K. Markowicz, J-C. Gallet and C. Barbante. Polar2018, Davos, Switzerland.

Mercury in precipitated and surface snow at Dome C, a first estimate of mercury depositional fluxes during the austral summer on the high Antarctic plateau. Cairns, Warren; Spolaor, Andrea; Turetta, Clara; Maffezzoli, Niccolò; Dommergue, Aurélien; Magand, Olivier; Angot, Hélène; Sprovieri, Francesca; Del Guasta, Massimo; Barbante, Carlo. ICMGP2019, 8-13 September 2019, Krakow, Poland

Fragrances as new contaminants in polar environments: local and long-range sources. Marco Vecchiato, Elena Barbaro, Elena Gregoris, Andrea Spolaor, Clara Turetta, Carlo Barbante, Rossano Piazza, and Andrea Gambaro. EGU General Assembly 2019

Persistent organic pollutants analysis in environmental matrices from polar areas. Alice Callegaro, Rachele Lodi, Andrea Spolaor, Jacopo Gabrieli, Carlo Barbante. EGU General Assembly 2019

Degradation of the climate signal preserved in Svalbard ice. Have the high Svalbard ice fields reached a tipping point? Spolaor A., Casado M., Wickström S., Barbante C., Barbaro E., Burgay F., Bjorkman M.P., Cappelletti D., Dallo F., De Blasi F., Divine D., Dreossi G., Gabrieli J., Gallet J.-C., Isaksson E., Iovino D., Larouse C., Luks B., Martma T., Maturilli M., Shuler T.V., Saiz-Lopez A., Scoto F., Stenni B., Turetta C., Werner M. & Zannoni D. 27th IUGG General Assembly, Montreal, Canada.

Has the Svalbard archipelago reached a climate tipping point? Evidence from an ice core study. Spolaor A., Casado M., Wickström S., Barbante C., Barbaro E., Burgay F., Bjorkman M.P., Cappelletti D., Dallo F., De Blasi F., Divine D., Dreossi G., Gabrieli J., Gallet J.-C., Isaksson E., Iovino D., Larouse C., Luks B., Martma T., Maturilli M., Shuler T.V., Saiz-Lopez A., Scoto F., Stenni B., Turetta C., Werner M. & Zannoni D. PaleoArc2021, 24-28 May 2021.

Terrestrial photography applications for snow cover monitoring: implementation of a shared approach. Salzano, R, Aalstad, K, Boldrini, E, Gallet, JC, Kępski, D, Luks, B, Nilsen, L, Salvatori, R, Westerman, S. SIOS Online Conference on "Earth Observation (EO) and Remote Sensing (RS) applications in Svalbard", 4-5 June 2020

Towards a Svalbard Time-Lapse Network: the PASSES experience. Salzano, R, Aalstad, K, Boldrini, E, Gallet, JC, Kępski, D, Luks, B, Nilsen, L, Salvatori, R, Westerman, S. SIOS Online Conference on "Earth Observation (EO) and Remote Sensing (RS) applications in Svalbard", 8-10 June 2021

Fractional snow cover area from terrestrial photography in Svalbard Islands (Norway). Salzano, R, Salvatori, R. 15th International Circumpolar Remote Sensing Symposium 10 – 14 September 2018, Potsdam, German

Snow-Ice Spectral library (SISpec) 2.0. Salvatori, R, Salzano, R, Di Franco, S, Fontinovo, G, Plini, P 2020.9th Workshop Remote Sensing of Land Ice and Snow of the European Association of Remote Sensing Laboratories (EARSeL), Bern 3-5 February 2020.

The optical behaviour of snow during a melting season at Ny Ålesund (Svalbard, Norway). Salzano, R., Lanconelli, C., Esposito, G., Giusto, M., Montagnoli, M., and Salvatori, R. EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-14667.

Evolution of the fraction of snow cover over the last decade in an Arctic site (Ny-Ålesund, Norway) using ground-based cameras. Salzano, R, Salvatori, R, Mazzola, M, Pedersen, CA. EGU General Assembly 2019, 7-12 Apr 2019, EGU2019-14732.

Supraglacial Hydrology at 79°N Glacier, Greenland – Lessons learned and Challenges. Angelika Humbert, Niklas Neckel, Ludwig Schröder, Veit Helm, Robin Zindler. 9th Workshop Remote Sensing of Land Ice and Snow of the European Association of Remote Sensing Laboratories (EARSeL), Bern 3rd - 5th February 2020

Greenland ice sheet, Angelika Humbert, AASCO - Arena for Gap Analysis & Arctic Science Workshop, 2nd-3rd Nov 2020

Enhanced arctic river particulate Hg export at the permafrost thawing front. Artem G. Lim, Jeroen E. Sonke, Ivan V. Krickov, Rinat M. Manasypov, Sergey V. Loiko, Oleg S. Pokrovsky, 2019 International Conference on Mercury as a Global Pollutant, Krakow, Poland.

Processes Controlling the Vertical Distribution of Methylmercury in the Arctic Ocean. Amina Schartup, Lars-Eric Heimbürger-Boavida, Anne Soerensen, Jeroen Sonke, Elsie Sunderland, 2019 International Conference on Mercury as a Global Pollutant, Krakow, Poland.

Total and methylated mercury inputs and outputs in the Arctic Ocean via Fram Strait and Barents Sea Opening. Mariia V. Petrova, Aurèlie Dufour, Javier A. Tesán Onrubia, Jeroen E. Sonke, Bruno Hamelin, Cedric Garnier, Lars-Eric Heimbürger-Boavida, International Conference on Mercury as a Global Pollutant, Krakow, Poland, 2019.

Reactive mercury speciation and dry deposition during amdes in the Arctic. Osterwalder, S., Dunham-Cheatham, S. M., Ferreira-Araujo, B., Magand, O., Thomas, J. L., Pfaffhuber Aspmo, K., H.T., M., Sonke, J., Dommergue, A., and Gustin, M. S. 14th International Conference on Mercury as a Global Pollutant Krakow (Poland), 2019.

Formation and growth of aerosol particles in boreal forest of Siberia. Demakova, A., Garmash, O., Ezhova, E., Arshinov, M., Davydov, D., Belan, B., Noe, S., Komsaare, K., Vana, M., Junninen, H., Bianchi, F., Dada, L., Petäjä, T., Kerminen, V.-M., and Kulmala, M. EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-14353, https://doi.org/10.5194/egusphere-egu21-14353, 2021

Chemical Characterization of New Particle Formation in Hemi-boreal Forest. Junninen, Heikki; Noe, Steffen M; Komsaare, Kaupo; Lipp Helina; Tamme, Kalju; Talts, Eero; Barreira, Luis; Ylisirniö,Arttu; Pullinen, Iida; Schobesberger, Siegfried; Keernik, Hannes; Maasikmets, Marek; Niinemets, Ülo; Mirme, Sande; Kangasluoma, Juha; Jokinen, Tuija; Kulmala, Markku; Hõrrak, Urmas. SMEAR Estonia. European Aerosol Conference, Gothenburg, Sweden, 25.08. - 30.08.2019. NOSA.

Role of volatile organic compounds in new particle formation in atmosphere of hemiboreal forest. Lipp, Helina; Komsaare, Kaupo; Talts, Eero; Niinemets, Ülo; Noe, Steffen Manfred; Tamme, Kalju; Hõrrak, Urmas; Kangasluoma, Juha; Junninen, Heikki. European Aerosol Conference - EAC 2019, Svenska Mässan, Göteborg, Sweden, 25- 30 August 2019.

Volatile organic compounds in the atmosphere of hemiboreal forest and their role in new particle formation. Lipp, Helina; Komsaare, Kaupo; Talts, Eero; Niinemets, Ülo; Noe, Steffen Manfred; Tamme, Kalju; Hõrrak, Urmas; Kangasluoma, Juha; Junninen, Heikki. 23rd Air Ions, Clusters and Atmospheric Aerosols Workshop, Kulttuurikeskus Sofia, Helsinki, Finland, 11-12 June 2019.

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Balloon-borne in-situ aerosol measurements in the Arctic atmospheric boundary layer during MOSAiC. Pilz, C., M. Lonardi, S. Düsing, H. Siebert, J. Voigtländer, B. Wehner and A. Wiedensohler. European Aerosol Conference (EAC), Gothenburg, Sweden, 25-30 August 2019.

Repositories

- **BETR Global 4.0 Open-source code repository**, Made public July 3, 2020.
  - Audience: Scientists and developers interested in modeling organic contaminants in the global environment. The repository has already received contributions from a developer unaffiliated with iCUPE.
  - https://github.com/BETR-Global/BETR-Global-4.0

Publications

Full list of publications can be found here:
https://www.atm.helsinki.fi/icupe/images/Deliverables/D631_Report_on_iCUPE_impacts.pdf