# Report Ny-Ålesund Atmosphere Flagship – Guest Visits Program 2019

The Ny-Ålesund Atmosphere Flagship program announced a Guest visit program for guest visits between researchers and research groups. The aim was to accommodate for increased collaboration between research groups at different institutes and nations working on similar topics to intensify their common work on data analysis and/or publication. The Guest visit program would cover travel costs for these visits.

The activity had to take place between 1. May 2019- 1. December 2019, and needed to involve more than one institute and more than one country. The decision was made by the atmosphere flagship science committee ranking the candidates after the expected results and outcome, prioritizing new activities.

The flagship program was able to support all received applications, as listed here

| **Time of visit** | **Gust** | **Host** | **Topic** |
|---|---|---|---|
| 11-24 May 2019 | Marco Zanatta, Alfred Wegener Institute, Germany | Robin Modini, Paul-Scherrer-Institute, Switzerland | Coordination of measurements and scientific investigation of refractory black carbon (rBC) particles in the Fram Strait during the MOSAiC year. |
| 22-25 Oct 2019 | Boyan H Petkov, Institute of Atmospheric Sciences and Climate at Italian National Research Council, Italy | Anna Solomatnikova, Ozone layer monitoring laboratory, Voeykov Main Geophysical Observatory (GGO)-Saint Petersburg, Russia | Further collaboration within the local Svalbard network for the solar UV radiation and ozone column monitoring |
| 16-23 Nov 2019 | Tymon Zielinski, Institute of Oceanology PAN, Poland | Luca Ferrero, University of Milano-Bicocca, Italy | Work on common data analyses of several years of measurements from summer research cruises in Svalbard region -led to submission of joint publication. Other topics included discussions on joint cruises and plans for joint summer school. |
| 16-23 Nov 2019 | Paulina Pakszys, Institute of Oceanology PAN, Poland | Luca Ferrero, University of Milano-Bicocca, Italy | Same as above. |

Below follow the reports from the individual visits:

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**Guest: Marco Zanatta, Alfred Wegener Institute, Germany**
**Host: Robin Modini, Paul-Scherrer-Institute, Switzerland**
**Time of visit: 11-24 May 2019**

**Goal**
Coordination of measurements and scientific investigation of refractory black carbon (rBC) particles in the Fram Strait during the MOSAiC year.

**Description of activity**
Set up of the instruments took place from 11 to 12 May 2017. Introduction of work performed in the Arctic by PSI and AWI was given on 13 May. Confrontation and discussion on best procedures to analyse single particle soot photometer (SP2) data took place between 14 and 15 May. From 16 to 24 May laboratory work was performed and aimed to intercompare SP2 instruments involved in the MOSAiC project and deployed at Zeppelin Station, RV Polarstern, AWI P6-Aircraft, Alert Station, Villum Station and Pallas Station. Specific meetings took place on daily basis and aimed to:

a) Establish common procedures for the calibration of the SP2 instruments, treatment and sharing of the data acquired during the MOSAiC year
b) Evaluate best strategy for the formation of specific working groups for the assessment of aerosol phenomenology during the MOSAiC year.
c) Finalize the application to the Ny-Ålesund Atmosphere Flagship proposal call "Dedicated workshops on topics of special interest".

**Preliminary outcome**

a) rBC observation during MOSAiC

The basis for the formation of a working group (WG) focused on refractory black carbon measurements were established. The WG includes scientists from AWI, PSI, BNL, FMI and EC. The following technical outcomes were achieved:

- The performances of 6 SP2 instruments involved in the MOSAiC project (deployed at Zeppelin Station, RV Polarstern, AWI P6-Aircraft, Alert Station, Villum Station Pallas Station) were evaluated under controlled conditions. Data are currently under analysis.
- Fullerene soot was chosen as standard for SP2 calibration and the "SP2 toolkit" developed at PSI by Martin Gysel will be used as data analysis software.
- A common reference-calibration was performed and used as reference for the treatment of the future data.

b) Aerosol phenomenology during the MOSAiC year

The list of atmospheric measurements that will be performed during MOSAiC at the IASOA stations and MOSAiC observatory was updated and discussed. Properties and concentration of aerosol particles will be performed at approximately 11 stations for the entire duration of MOSAiC drift (from September 2019 to September 2020). The measurements will cover different aerosol properties such as size distribution, optical properties, chemical composition, cloud nucleation behaviour. Overall, the observations will offer the opportunity to investigate the phenomenology of the aerosol population on the Pan-Arctic scale. AWI and PSI will coordinate the rBC working group, while coordination of other WGs will be organized

together within the MOSAiC and IASOA frameworks.

c) Black carbon workshop

The proposal for a "black carbon modelling-observation workshop" following the Ny-Ålesund Atmosphere Flagship call was finalized:

- Oslo was chosen as final location, CICERO will host the workshop
- The meeting will take place on 7 November 2019
- A preliminary core list of participants from both modelling and observational communities was defined
- The main topics of discussion were selected

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**Guest: Boyan H Petkov, Institute of Atmospheric Sciences and Climate at Italian National Research Council, Italy**
**Host: Anna Solomatnikova, Ozone layer monitoring laboratory, Voeykov Main Geophysical Observatory (GGO)- Saint Petersburg, Russia**
**Time of stay: 22-25 Oct 2019**

In connection with the guest visit initiative supported by Atmosphere Flagship Program, which initiative was aimed to increase collaboration between research groups working on similar topics at different institutes and nations, I would like to inform You that my planned visit to the Voeykov Main Geophysical Observatory (GGO)- Saint Petersburg, Russia took place from 22 to 25 October 2019. I was met by Dr. Anna Solomatnikova, leading scientist in the Ozone Layer Monitoring Laboratory in GGO with whom we discussed the main issues of our future collaboration.

The measurements that GGO group has carried out at Barentsburg could considerably contribute the local Svalbard network for the solar UV radiation and ozone column monitoring that we are forming. Colleagues from GGO have a long ozone time series and the possibility for integration of these data in historical network database was discussed. In addition, a new UV spectrophotometer was recently established at Barentsburg that can become another important device in the network. With Dr. Solomatnikova we met Dr. Sergey Nikolaevich Shapovalov from the Russian Arctic and Antarctic Research Institute, whose group also perform measurements of solar UV irradiance at Barentsburg. Summarising, the main issues discussed during my stay in GGO can be listed as follows:

- Harmonizing the historical data set at Barentsburg with those available at the other Svalbard stations.
- Quality check of the Barentsburg instrument/s by comparison with other devices operating at one of the closest stations (Ny-Ålesund or Longyearbyen)
- Discussion of the methods for data processing and transfer.
- Plan for future activity, like joint project proposals, joint publications, exchange of methodological approaches etc.

Actually, we took contact with the Russian colleagues about three years ago and our collaboration can be illustrated by the common article published in Atmospheric Research, 2018 but thanks to the Atmosphere Flagship support we could meet each other and carry out a face-to-face conversation about our joint work. This meeting does contributed to the closer relationship between our teams and opened opportunity for more fruitful activity.

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**Guest: Tymon Zielinski, Institute of Oceanology PAN, Poland**
**Host: Luca Ferrero, University of Milano-Bicocca, Italy**
**Time of stay: 16-23 Nov 2019**

During the visit to University of Milano-Bicocca, Tymon Zielinski worked with professor Ezio Bolzachini and Dr. Luca Fererro on data analyses. Data refer to several years of joint measurements on board of r/v Oceania during summer research cruises in the Svalbard region. As a result of discussions and joint work, during the visit, a following research paper has been submitted to a per-review journal, Oceanologia:

- Changing Arctic. Firm scientific evidence versus public interest in the issue. Where is the gap? Paulina Pakszys, Tymon Zielinski, Luca Fererro, Izabela Kotynska-Zielinska, Marcin Wichorowski.

In this paper we provide hard evidence for significant impact of long distance atmospheric pollution advections to the Arctic. The advections are both of natural or anthropogenic origin. We discuss results from literature and provide our own data on physical atmospheric research made in the Arctic region. At the same time, we present the results of two independent studies, dedicated to the recognition of the awareness and the level of interest of people in eight Arctic countries and among young learners in Poland. The results of these two independent studies, show that not only the level of interest is low, but it is both decreasing or, at the best, low to societies.

A second issue which has been discussed relates to the research plans for the summer Arctic cruise in 2020. Both teams have agreed on the level of co-operation and scientific interests, which will further be utilized in research papers.

The last issue regards a planned International School on INtegrated Environmental Studies in the Arctic (INES) with respect to climate changes. Both teams, together with colleagues from a German AWI in Potsdam and NILU, plan to run a school to facilitate international and interdisciplinary cooperation in studies on the interactive effects of climate change on Arctic nature and societies. We except that participants of the International School on Integrated Environmental Studies in the Arctic will understand the need for interdisciplinary scientific approach to discuss issues connected to the Arctic and Climate Change, as well as have a wider perspective of these changes. The activity is planned for late September and early November 2020 and will be held in Sopot, Poland (in IO PAN). During the visit all lecture and organizational issues have been completed and the school will be announced in December 2019.

A visit to Bologna regarded the above presented summer school idea and as a result the CNR team will also be a part of the planned activity.

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**Guest: Paulina Pakszys, Institute of Oceanology PAN, Poland**
**Host: Luca Ferrero, University of Milano-Bicocca, Italy**
**Time of stay: 16-23 Nov 2019**

Discussions regarding several scientific issues:

1) As a results of several previous cooperations with Dr. Luca Ferrero, joint with Assoc. Prof. Tymon Zielinski we discuss, finish and publish a paper to Oceanologia, Special Issue: Societal relevance of climate and ocean changes. In this paper we present results, which show that the atmospheric inflow of pollution to the Arctic has been increasing over the last decade. This situation has significant impact on the change of local climate patterns, hence influences the rest of the globe. We also present the results of two independent studies, dedicated to the recognition of the

awareness and the level of interest of people in eight Arctic countries and among young learners in Poland.
Acknowledgement: Changing Arctic. Firm scientific evidence versus public interest in the issue. Where is the gap? (2019). P. Pakszys, T. Zielinski, L. Fererro, I. Kotynska-Zielinska, M. Wichorowski. Oceanologia - OCEANO-D-19-00121, under review.

2) We also finish a discussion and publish second paper based on data collection during joint AREX cruise onboard S/Y Oceania submitted to Atmosphere 2020, Special Issue: Chemical-Physical and Optical Properties of the Aerosol in Europe and the Arctic.
Acknowledgement: Study of chemical and optical properties of biomass burning aerosols during long-range transport events towards the Arctic in summer 2017; Atmosphere 2020, Special Issue: Chemical-Physical and Optical Properties of the Aerosol in Europe and the Arctic, atmosphere-651992, under review, T. Zielinski, E. Bolzacchini, M. Cataldi, L. Ferrero, S. Graßl, G. Hansen, D. Mateos, M. Mazzola, R. Neuber, P. Pakszys, M. Posyniak, C. Ritter, M. Severi, P. Sobolewski, R. Traversi, C. Velasco-Merino

3) Research plan for 2020 were discussed, also submitted proposal for GRIEG project, which is one of the three calls funded from the Norway and EEA Grants 2014–2021 under the Basic Research Programme operated by the National Science Centre, entitled PollAr-GATE: Pollution gate: What impact have human activities on the environment of an increasingly accessible Arctic?; and its related grant based on Italian side that will be submitted soon. Plan included also discussion about AREX 2020 cruise onboard S/Y Oceania, were both side agreed on a level of scientific co-operation interests.

4) We were working on the details of planned International School on INtegrated Environmental Studies in the Arctic (INES) with respect to climate changes. We complete the list of scientific committee members as well as almost a list of lecturers, so the announcement is really at the end of publishing. Both teams (Polish and Italian), together with colleagues from a German AWI in Potsdam and NILU, plan to run a school to facilitate international and interdisciplinary cooperation in studies on the interactive effects of climate change on Arctic nature and societies. We except that participants of the International School on Integrated Environmental Studies in the Arctic will understand the need for interdisciplinary scientific approach to discuss issues connected to the Arctic and Climate Change, as well as have a wider perspective of these changes. The activity is planned for late September and early November 2020 and will be held in Sopot, Poland (in IO PAN). During the visit all lecture and organizational issues have been completed and the school will be announced in December 2019.

5) We have also discussed a results of last year World Café Workshops (conducted in Poland) that we want to expand outside Poland. Both side agreed incorporates the plan into scientific activities.