information

Project title

Impact of Arctic urbanization on the occurrence of new “urban” contaminants in the Norwegian Arctic (ARC-URB)

Year

2016

Project leader

Pernilla Bohlin-Nizzetto

Geographical localization of the research project in decimal degrees (max 5 per project, ex. 70,662°N and 23,707°E)

69.64822°N and 18.93968°E, 78.2223°N and 15.6308°E, 78.9245°N and 11.9284°E, 79.260°N and 11.5180°E, 78.9071°N and 11.8866°E

Participants

Anders Røsrud Borgen – NILU, Kjeller, Norway

Knut Breivik – NILU, Kjeller, Norway

Ingjerd Sunde Krogseth – NILU, Tromsø, Norway

Nicholas A. Warner – NILU, Tromsø, Norway

Ian Allan, NIVA – Norwegian Institute for Water Research, Oslo, Norway

Guttorm Christensen – Akvaplan-NIVA, Tromsø, Norway

Anita Evenset – Akvaplan-NIVA, Tromsø, Norway

Branislav Vrana – RECETOX, Brno, Czech Republic

Flagship

Hazardous Substances

Funding Source

Theme 3: Industry and urbanization. Impact from industrial development and urbanization in the North – Fate and effects of pollutants on Arctic ecosystems

WP2.2: Environmental contaminants in a multi-stress perspective

The activities during the initial year of the Arc-URB project (i.e. 2016) have focused on i) collection of air and water samples and ii) initiation of chemical analysis of the collected samples. No data is available at the date of this status report.

Three highlights of 2016 are: i) collaboration with PassNet and AMAP, ii) successful sampling campaign, and iii) an unforeseen loss of a passive water sampler as food for a polar bear.

The ARC-URB project was initiated with selection of sampling sites and sampling strategies. This was done in close collaboration with NIVA (Ian Allan) and PassNet (project funded by Svalbard Strategic Grants) in order to obtain a wider spatial distribution of sites for ARC-URB and to initiate a possible passive sampling network for Svalbard. A workshop jointly for ARC-URB and PassNet was held at NIVA, Oslo in April. The topic of the workshop was to establish sampling infrastructures for passive air and water samplers in the Svalbard region, including the ARC-URB project. Details of the planned and conducted sampling campaign are presented in Table 1.

Table 1. Sampling plan for ARC-URB and the collaborative PassNet.

Sampling site	**Location**	**Geographical localization**	**Type of sampler**	**Deployment period**	**Field responsible**	**P**
Tromsø	City centre	69.64822, 18.93968	Air: PUF-PAS XAD-PAS	Mid-June to Mid-September	Ingjerd Sunde Krogseth	A
	Sewage outlet		Water: Silicon rubber	Mid-June to Mid-September	Guttorm Christensen	A
Grøtfjorden		69.774967, 18.60515	Air: PUF-PAS XAD-PAS	Mid-June to Mid-September	Ingjerd Sunde Krogseth	A
			Water: Silicon rubber	Mid-June to Mid-September	Guttorm Christensen	
Longyearbyen	Center	78.2223, 15.6308	Air: PUF-PAS XAD-PAS	July to October	Guttorm Christensen	A
	Sewage outlet		Water: Silicon rubber	July to October	Guttorm Christensen	A
	Marine site		Water: Silicon rubber	July to October	Guttorm Christensen	P
Ny-Ålesund	Centre	78.9245, 11.9284	Air: PUF-PAS XAD-PAS	Mid-June to Mid-September	Are Backlund (NILU)	A
	Sewage outlet		Water: Silicon rubber	Mid-June to Mid-September	Guttorm Christensen	A

	Marine site		Water: Silicon rubber	Mid-June to Mid-September		P
Zeppelin Observatory		78.9071, 11.8866	Air: PUF-PAS XAD-PAS	Mid-June to Mid-September	Are Backlund (NILU)	A
			Active air sampling (n=4)	July, August, September	Station holder	A
Remote site	Erlingvatn*	79.2557, 11.4673	Air: PUF-PAS XAD-PAS	Mid-June to Mid-September	Guttorm Christensen	A
			Water: Silicon rubber	Mid-June to Mid-September	Guttorm Christensen	A
	Hajeren*	79.2604, 11.5180	Water: Silicon rubber	Mid-June to Mid-September	Guttorm Christensen	P
Barentsburg	Centre	78.0618, 14.2144	Air: PUF-PAS	July to October	Guttorm Christensen	P
	Grønfjorden		Water: Silicon rubber	July to October	Guttorm Christensen	P
	Linnevatn		Water: Silicon rubber	July to October	Guttorm Christensen	P
Bjørnøya		74.5039, 18. 9949	Air: PUF-PAS	July 2016 to July 2017**	Guttorm Christensen	P
			Water: Silicon rubber	July 2016 to July 2017**	Guttorm Christensen	P

*The passive water sampler deployed at Erlingvatn was eaten by a polar bear. Data from the passive water sampler in Hajeren will be used as a replacement.

**Anticipated retrieval date is summer 2017. Exact date will depend on access to the area.

Samplers were prepared: cleaned and spiked with performance reference compounds, in May. All samplers were deployed in the period mid-June to mid-July (Table 1). The preparation and deployment incorporated all of the partner institutes: NILU, NIVA, Akvaplan-NIVA and RECETOX. The samplers were retried September to October and samplers were shipped back to NILU and NIVA in October-November.

In total, ready for analyses are: passive air samplers from six sites (plus two sites from PassNet) and passive water samplers from five sites (plus five sites from PassNet). The analyses will start in November-December 2016 and continue into 2017. The first results are expected in March/April 2017.

Master and PhD-students involved in the project

Master student from NMBU.

For the Management

No results ready at the date of this status report.

Published Results/Planned Publications

To date, no results are available and no publications have been done.

Planned publications:

At least one scientific publication in an international journal is anticipated during 2017.

Abstract and presentation at a scientific conferences in the second half of 2017 or the first half of 2018.

Communicated Results

The aim of the project as well as the sampling plan have been presented for the secretariat of AMAP as well as for the monitoring group at the Norwegian Environment Agency. The results of the ARC-URB project are planned to be presented at AMAP meetings as well as at the Norwegian Environment Agency in 2017-2018.

Interdisciplinary Cooperation

The ARC-URB project has been performed in a close collaboration between three Fram Centre partners and one international partner in Czech Republic. The implementation of the project has greatly benefited from the expertise in environmental contamination (hazardous substances) in the partner institutes. The involvements of all institutes have been crucial for the fulfilment of the first year of the project. NILU for coordination, responsibilities for air sampling (passive and active) and analyses, NIVA for responsibilities for water samplers and analyses, Akvaplan-NIVA for field work and knowledge about Svalbard, and RECETOX for preparation of passive water samplers and analyses.

Difficulties with the cooperation has solely been related to communication over distances.

Budget in accordance to results

The budget from the Fram Centre funding in 2016 has been crucial for the field work, establishment of collaboration and the chemical analyses in ARC-URB. As the project is ongoing, costs are expected to the end of December 2016. The project aims to be completed in the end of 2017 by financial support from the Fram Centre.

Could results from the project be subject for any commercial utilization

No

Conclusions

The use of passive samplers have facilitated the sampling campaign in ARC-URB by their simplicity and no need for electricity. The use of passive samplers however requires a long deployment time in order to achieve detection. This means that the first year of a project like ARC-URB mainly will be dedicated to the field work (sampling). Results are expected earliest in the second year of the ARC-URB project.

The interest for the results have been highlighted by the Norwegian Environment Agency and AMAP. The results of this study aim to increase the understanding of the importance of local sources/impacts versus long-range transport of new hazardous substances in the Arctic. Such knowledge is crucial for the establishment of new approaches within long-term air and water monitoring programmes. It will also provide information for regulatory purposes. The findings of ARC-URB will be communicated to key stakeholders in Norway and the Arctic.

The use of passive air samplers for non-regulated substances are not explored to full extent. The results from this project will allow for the evaluation of using passive samplers also for new hazardous substances.