

ArcRisk is a project supported under the Seventh Framework Programme of the European Community for research, technological development and demonstration activities.

ArcRisk enters its final phase

After four years of intensive scientific work, the ArcRisk project is entering its final phase.

Earlier newsletters have described the research activities conducted under the three main ArcRisk Work-Packages: WP2 – where modelling studies were conducted to study the impacts of climate change on pollutant transport and fate and their transfer through food chains into humans; WP3 involving field studies and evaluating observational data to improve understanding of the transfer of chemical contaminants in the environment and their uptake

in food chains; and WP4 – Human health studies looking at the effects of contaminants on people in the Arctic and in selected areas in Europe to evaluate the potential influence of climate change on dietary exposure and health effects. These work-packages have now largely completed their activities and are now focussed on delivering their final products. These include the project 'deliverables' that summarise the results for the entire work package, and new articles in scientific journals (see lists attached).

However, during this last year of ArcRisk, the two remaining work-packages – WP5 and WP6 concerned, respectively, with 'Synthesis' and 'Communication' – have only really begun the main parts of their work.

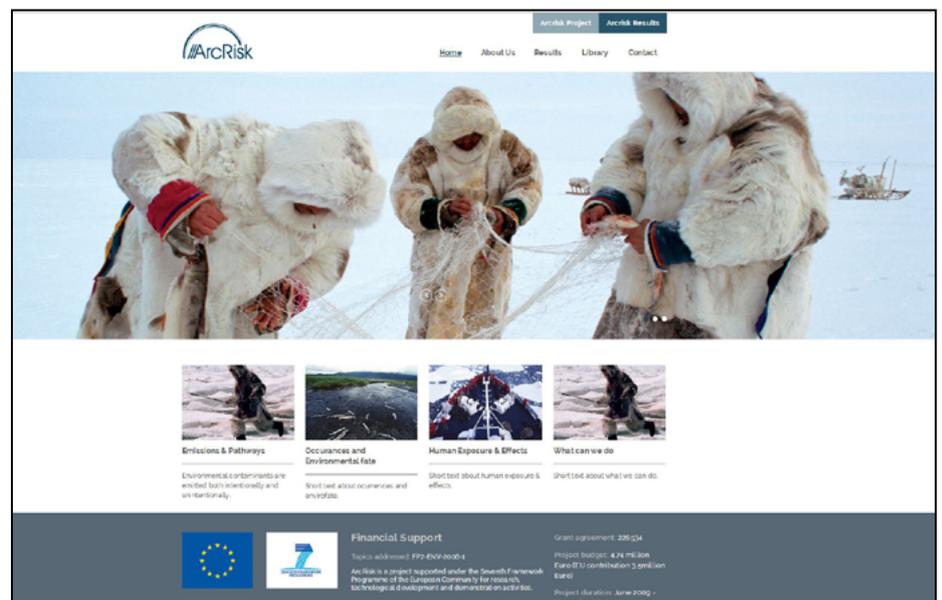
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ArcRisk Results – Synthesis and Dissemination plans

The ArcRisk results web site - communicating research results to a broader audience

The ArcRisk results website is one of several methods that will be used to communicate the results of the project. The main purpose of this website is to allow open and transparent dissemination of the key results, and explain how they were obtained and interpreted. It is intended to serve the wider audience of interested public, policy- and decision- makers and also the scientific community. The website contains results organized under four main headings: Emissions and pathways; Occurrence and environmental fate; Human exposure and effects; and What can we do about it?



The ArcRisk results website.

Under each heading, key results from the project are presented according to 3-4 levels of detail, where the top level provides an overview in layman language and lower levels are increasingly more scientific and technical. For the scientific audience,

information is included about methods, key references to research publications and contacts for further information. The ArcRisk results website will also act as a storage facility for project results after the project is completed.

Communicating ArcRisk results to Policy-makers and Arctic residents

In addition to web-based products, ArcRisk work-package 5 and 6 partners are busy developing other information products for stakeholders. Deliverable D52 will consolidate the

results from a series of periodic policy-related summary reports. The resulting report will include messages that will hopefully assist policy-makers as they develop future strategies to address contaminant and health issues related to climate change.

Arctic residents, including indigenous peoples are important stakeholder groups for ArcRisk project results; however, ArcRisk is essentially a scientific research activity. To bridge

the gap between science and people, and recognizing the special expertise that is required when communicating sensitive messages on diet and health in a responsible manner, ArcRisk is partnering with the AMAP human health assessment group and feeding information into an ongoing risk communication project that has been developed in recent years. This work will be presented at the Arctic Frontiers Conference.

Arctic Frontiers 2014

'Arctic Frontiers' conferences have been arranged annually in Tromsø in northern Norway since 2007. These conferences provide an international arena for discussing sustainable development in the Arctic, and each year attract more than 1000 participants from Arctic and non-arctic countries, representing science, business, politics, and civil society. A unique feature of the 'Arctic Frontiers' conference is its blend of science and policy – with the conference format specifically designed to facilitate a dialog between the two.

The theme of the 2014 Arctic Frontiers Conference is 'Humans in the Arctic', and through a cooperation between AMAP and the conference organizers, the 2014 conference will include special sections devoted to presenting and communicating results of the ArcRisk project.

The conference will take place in Tromsø, from 19 - 24 January 2014, and consist of a policy section on the Monday and Tuesday, followed by three days of science. The science section has four parts organized under two main headings:

Health, Society and Environment

- Part I: Live, work and stay healthy in the Arctic
- Part II: Health & environment in the Arctic

Maritime operational challenges

- Part III: Shipping & offshore in the Arctic
- Part IV: Arctic search and rescue (SAR)

ArcRisk work will be presented under Part II Health & environment in the Arctic. A large number of abstracts related to ArcRisk research were submitted for this major event and the ArcRisk partners are well represented in both the oral

and poster sessions. The provisional programme for the conference can be found at:

<http://arcticfrontiers.conference-services.net/programme.asp?conferenceID=3796>

Keynote speakers in the policy part of the conference include:

- Erna Solberg, Prime Minister of Norway
- Aleqa Hammond, Prime Minister of Greenland
- Gunnar Bragi Sveinsson, Icelandic Minister of Foreign Affairs
- Dagfinn Høybråten, Secretary General, Nordic Council of Ministers
- Elisabeth Aspaker, Norwegian Minister of Fisheries
- Erkki Tuomioja, Minister of Foreign Affairs, Finland
- Rona Ambrose, Minister of Health, Canada
- Lesli McGuire, State Senator, Alaska
- Aqqaq Luk Lyngge, Chair Inuit Circumpolar Council

Keynote speakers under the science section include:

- **Pernilla Carlsson**, University Centre in Svalbard
- **Henry Wöhrnschimmel**, Swiss Federal Institute of Technology Zurich
- Mads Gilbert, University Hospital in North Norway
- Hannu Rintamäki, University of Oulu
- Eric Dewailly, Professor, Medical Sciences Director of the Public Health Research Unit of the Laval University Medical Center, Canada
- Alekseev Revo Zacharovich, Yakutia Clinical Hospital
- **Arja Rautio**, University of Oulu
- **Milena Horvat**, Institute Jožef Stefan

For more information about the Arctic Frontiers 2014 Conference, visit:

www.arcticfrontiers.com/2014-conference

(conference registration is now open).

The screenshot shows the website for the Arctic Frontiers 2014 conference. The header features the 'ARCTIC FRONTIERS' logo and the title 'HUMANS IN THE ARCTIC' with the dates '19 - 24 January 2014, Tromsø, Norway'. A navigation bar includes links for 'ARCTIC FRONTIERS', '2014 CONFERENCE', 'DOWNLOADS', 'ARCHIVE', 'CONTACT', and 'SEARCH'. Below the navigation is a large photo of a crowded conference hall. The main content area includes a breadcrumb trail 'You are here: 2014 conference > Science section', an 'Introduction' section, and a 'REGISTER HERE' button. A 'SCIENCE SECTION PROGRAM' box indicates that registration is now open and provides a link for general conference information. Below this, 'Keynote speakers - science section' are listed, including Aldo Chircop, Professor of Law at Dalhousie University.

News from other related EU-Projects (CLEAR)

ArcRisk was funded through an FP7 research call that also established other related projects with a focus on health effects of contaminants. Over the past years, ArcRisk has exchanged information with a sister project - CLEAR (Climate Change, Environmental

Contaminants, and Reproductive Health).

The CLEAR project was recently completed and held a final conference in Copenhagen on 2 October where project results were presented and discussed. The conference, titled 'Is Fertility at Risk from Environmental Exposure?', provided an overview of the results of the project, which studied the association between the exposure of pregnant women and their partners to perfluorinated compounds, phthalates,

heavy metals and organochlorines and male and female reproductive function as well as child growth and development. Studies were performed on populations in Greenland, Sweden, Poland and Ukraine. Despite a good design of the project, measurements, and a relatively large and diverse population studies, it was difficult to determine factors that affect male reproductive biomarkers. Further information is available at:

<http://www.inuendo.dk/clear/>

Students Experiences during ArcRisk

In past newsletters we have introduced some of the students whose research has been funded by and contributed to ArcRisk. Several of these students have now graduated or are close to completing their studies:

- Pernilla Carlsson successfully defended her PhD thesis entitled *Selective processes for bioaccumulative up-take of persistent organic pollutants (POPs) in Arctic food webs* at UNIS (University Centre in Svalbard) on 21 November 2013.
- Deguo Kong successfully defended his PhD thesis *Confronting new challenges in chemical assessment* at Stockholm University on 13 December 2013.
- Henry Wöhrnschimmel earned a Dr. Sc. from ETH Zürich with his dissertation *Modeling the global transport and fate of persistent organic pollutants in the context of international regulation* on 18 April 2013.
- Merce Gari received her PhD degree in April 2013 from the University Pompeu Fabra (Barcelona) with her thesis on *Patterns of accumulation of persistent organic pollutants in human populations*.

ArcRisk students still engaged in their studies include:

- Olivier Bertrand, working on his PhD at Lancaster University.
- Maria Kummu, working on her PhD on *ABC transporters and environmental chemicals during development* at the University of OULU.

- Elina Sieppi, working on her PhD on *The role of ABC transporters in the toxicity of chemical carcinogens* at the University of OULU.
- Marta Fort, working at the University Pompeu Fabra (Barcelona) on a PhD on *Accumulation of heavy metals and organohalogen compounds in pregnant women*.

ArcRisk postdoctoral researchers:

- Irene Stemmler worked as a postdoctoral fellow at the Max-Planck Institute for Chemistry on the ArcRisk project; her thesis *The Role of the Ocean in Global Cycling of Persistent Organic Contaminants Refinement and Application of a Global Multi-compartment Chemistry-Transport Model* earned her a Dr. rer. Nat. from University of Hamburg in 2009.
- Esther Vizcaino received her PhD in 2010 from the University of Barcelona and then worked as a postdoctoral fellow at the Institute of Environmental Assessment and Water Research, CSIC.
- Karel Castro Morales worked as a postdoctoral fellow on the ArcRisk project at the Alfred Wegener Institute, Germany, to improve the performance of sea-ice in a coupled ocean-atmosphere model configuration for the Arctic.

Asked about their experiences conducting research within the framework of ArcRisk, Pernilla, Deguo Karel and Henry commented as follows:

Pernilla Carlsson

Four years ago, I really looked forward to do this PhD, within the ArcRisk

project. I'm now about to finish my PhD in environmental chemistry.

My work is based on field data and I spent quite some time collecting samples from Greenland and Svalbard. ArcRisk has been a very good framework during these four years. The colleagues within the project have been very helpful with discussions during meetings and on mail. Thanks to ArcRisk, I know several people within my field as well as people from nearby fields, which have created several interesting and good discussions during my PhD.

I am very grateful for the funding from ArcRisk and for all the good and fruitful discussions with the involved colleagues.

Deguo Kong

Working within the ArcRisk project brought me a lot more invaluable things than I hoped, including new and advanced knowledge, "out-of-box" thinking and ideas, new research skills, opportunities to meet and experience of working with experts in the field from different countries etc.

I have witnessed how European projects were formed, started, progressed, finished and went to public, and how scientists from Europe and North America conducted their research and advanced science. As an oversea student from China, I do not know whether I will have opportunity to bring what I learnt back to China, but I do hope I will have opportunity to do so in the future. I am very proud of being involved in the ArcRisk project and meeting so many good scientists, particularly my two supervisors, Ian Cousins and Matthew MacLeod.

Karel Castro Morales

I am an oceanographer currently interested in the physics of sea-ice and numerical modelling in the Arctic. I worked in ArcRisk as a postdoctoral scientist for the Work Package 2. My role within the project was to improve the performance of sea-ice in a coupled ocean-atmosphere model configuration for the Arctic. Because models are a valuable tool to understand processes on large scale, within ArcRisk we aimed to perform short-term predictions of the state of the fast-changing Arctic sea-ice and its consequence for the distribution of pollutants. ArcRisk is a challenging collaborative project which successfully achieved the close interaction between several partner institutions and experts with different scientific backgrounds and one common goal. For me as a scientist, working in this multi-disciplinary project has been a very interesting and satisfying experience, which not only allowed me to meet scientists from other disciplines, but also broadened my scientific interest in the Arctic region in different topics.

Henry Wöhrnschimmel

Coming back to academia after several years of working in a government agency was, for me, an incredible opportunity to dedicate all my focus and energy to a critical environmental problem of global dimension. The ArcRisk project gave all the support for fulfilling this dream, not only with funding, but with plenty of possibilities to collaborate and discuss within a network of experienced scientists.

Under Matt MacLeod's guidance I was trained in the art of global modeling of the environmental fate of persistent organic pollutants (POPs), and I learnt to appreciate it as a powerful tool to support the international decision-making process. I grew conscience of the global environmental challenges imposed by POPs and their impacts on Arctic populations. Moreover, it was very exciting to explore the link between global climate change and pollution with POPs, and add some quantitative understanding to the open questions.

These four years were an invaluable experience, and complemented my earlier work on problems of atmospheric contamination in Latin America. The experience gained during my PhD has continued to help me in my new role as project manager in chemical risk assessment for an environmental consulting company in Zurich, Switzerland. I deeply acknowledge the opportunities that I received from ETH Zurich and the ArcRisk project, and I am looking forward to keeping contact.

Two of the ArcRisk students, Pernilla Carlsson and Henry Wöhrnschimmel have been invited to deliver keynote talks in the science section of the Arctic Frontiers Conference.

ArcRisk coordinators are proud of the contribution that this new generation of scientists have made to the project and congratulate those that have completed their studies, and wish those still working on their research well.

ArcRisk presentation at Indigenous Peoples Dialogue meeting

ArcRisk Project Coordinator, Janet Pawlak presented an overview of the project and some of its key results at an Arctic Indigenous Peoples Dialogue meeting at the European Commission in Brussels on 18 October. The meeting, which included presentations of EC programs relevant to the Arctic, was opened by Commissioner Maria Damanaki and chaired by Bernhard Friess, Director in DG Maritime Affairs and Fisheries at the EC. Participants included representatives of a number of Arctic indigenous organizations, missions and representatives of Arctic countries to the European Union, and representatives from a number of Directorates General at the EC.

ArcRisk publications:

An up-to date list of scientific publications presenting ArcRisk research results is attached to this newsletter.

In addition, ArcRisk work-packages are now preparing their final deliverables, including:

ArcRisk D41 - Summary of the Results by WP4 Partners of Human Health and Contaminants (POPs and heavy metals) (Work-package 4)

ArcRisk D43 - Synthesis Report on the Results of the Modelling Work Package (Work-package 2)

ArcRisk D44 - A trans-Arctic assessment of key contaminant transfer processes: An overview of findings on "Contaminant Process studies" (Work-package 3)

ArcRisk D45 - Report providing scenarios of future health risks induced by changes in contaminant profiles in the Arctic and in the exposed populations in Europe studied in this project (Work-package 4)

ArcRisk D48 - ArcRisk Mercury and PCBs Case Studies (Work-package 5)

ArcRisk D49 - Synthesis report (Work-package 5)

ArcRisk D52 - Information products for stakeholders (Work-package 6)

ArcRisk D54 Layman-style overview report for policymakers (Work-package 6)

Events

The main remaining event on the ArcRisk calendar is the Arctic Frontiers Conference in Tromsø, 19 - 24 January 2014 (www.arcticfrontiers.com/2014-conference) (see article above). This conference session **Part II: Health & environment in the Arctic** is a major event associated with public delivery of ArcRisk results, including communication and outreach to policy-makers and stakeholders. The final ArcRisk Partner Forum meeting will take place on 20 January in conjunction with the Arctic Frontiers Conference.

Editorial information

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ArcRisk scientific publications (by partner)

AU

Hansen, K.M., Christensen, J.H. et al., 2011. Increase of contaminant levels in the Arctic due to future climate change. SETAC Europe, 21st Annual Meeting, 5-19 May 2011, Milan, Italy.

AWI

Castro-Morales, K., Kauker, F., Losch, M., Hendricks, S., Riemann-Campe, K. and Gerdes, R., 2013. Sensitivity to realistic ice thickness distributions and snow parameterizations of simulated Arctic sea ice. *Journal of Geophysical Research: Oceans* (submitted)

CSIC

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Manaca, M.N., Grimalt, J.O., Sunyer, J., Guinovart, C., Sacarlal, J., Menendez, C., Alonso, P.L. and Dobaño, C., 2013. Population characteristics of young African women influencing prenatal exposure to DDT (Manhiça, Mozambique). *Environmental Science and Pollution Research*, 20:3472-3479. Doi: 10.1007/s11356-012-1293-2.

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Vizcaino, E., Grimalt, J.O., Lopez-Espinosa, M.-J., Llop, S., Rebagliato, M. and Ballester, F., 2010. Maternal

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EC-GC and ULANC

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MUNI

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NIPH

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SU

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