

# ARCTIC CENTRE ANNUAL REPORT 2010

University of Lapland, Rovaniemi, Finland



## CONTENT:

- Research, p. 2
- Education, p. 4
- Science Centre, p. 6
- Science Communications, p. 8
- Library, p. 9

- EU Arctic Information Centre, p. 10
- Administration, p. 11
- Events, 15
- Publications, p. 17
- Contact information, p. 24

## **RESEARCH**

During the year 2010 Arctic Centre's research has been carried out across the Arctic as well as presented in numerous international conferences and publications. The research focuses on three main themes. Each theme group is led by a research professor and includes a multidisciplinary team of researchers.

Arctic Centre's professors and researchers participated in 22 short-term international exchanges and 4 long-term exchanges. In addition five foreign researchers worked in the Arctic Centre in a short-term exchange and two in a long-term exchange.

### **The research themes and some examples of the topics in 2010:**

#### **Global change**

- Adaptation to rapid land-use and climate change on the Yamal Peninsula
- Cultural resilience in Nenets social-ecological systems
- Stability and variations of Arctic Land Ice
- Ice core drilling on Vestfonna
- Palaeoclimatology of Finnish temperature variability: a total approach integrating air and subsurface records
- Urban bird atlas of Rovaniemi
- Reindeer forage and supplementary feeding in changing climate
- Fennoscandian reindeer herding, reindeer grazing grounds and physiological adaptation
- Effects of parasites on population dynamics of grouse



The photo is taken by research Professor Bruce Forbes during the expedition to Yamal where the research group was sampling willow shrubs from the tundra for work on dendro climatology and also interviewing elders of the Nenets herder communities.

#### **Sustainable development**

- Barents International Political Economy: Governance and Gender in Development
- Assessing senses of place, mobility and viability in industrial northern communities
- Traditional cultures and lifestyles of the Arctic



The photo is taken by senior researcher Florian Stammler in Sakha Republic.

### **The Northern Institute for Environmental and Minority Law, NIEM**

- Arctic Footprint and Policy Assessment
- Regulation of fishing in the upper part of Lapland
- Indigenous property systems
- Evaluation of the Finnish environmental impact assessment system from the viewpoint of how it fulfills Finland's international obligations
- The reform of the Arctic Council

### **Others**

- Change and variability of Arctic systems Nordaustlandet, Svalbard (KINNVIKA); outreach & communication activities of KINNVIKA expedition
- Knowledge in environmental planning and decision making

In this report you can also find the list of **publications in 2010** (p. 17) and the list of **externally funded projects in 2010** (p. 13).

More Information of the ongoing and completed research projects: [www.arcticcentre.org/projects](http://www.arcticcentre.org/projects)



Researcher Emilie Beaudon works at the laboratory.

## EDUCATION



Arctic Doctoral Programme (ARKTIS) is a nationwide multidisciplinary programme which educates doctors with special expertise on Arctic research in Finland. It is coordinated at the Arctic Centre and funded by the Ministry of Education and Culture and the Academy of Finland. The theme of is “Social and Environmental Impacts of Modernization and Global Change in the Arctic”.

During 2010 the Programme had 24 doctoral students enrolled at the Universities of Lapland, Oulu, Helsinki and Eastern Finland in the fields of law and humanities, social sciences and natural sciences. During 2009, the Programme received funding for three new fully-funded PhD student posts for 2010–2013 from the Ministry of Education and Culture. In addition three students were selected to previously vacated posts for extra years.



ARKTIS guest lecture by Hiroshi Maruyama on Thule in the March 2010.

### Examples of activities in 2010

Four ARKTIS PhD students defended their doctoral theses during 2010:

- Timo Kumpula: Patterns of Mixed Land Use on Remote Eurasian Rangelands.
- Stefan Walter: Structural Conditions of Natural Resource Management: Understanding the Roles of Complexity, Control and Evolution in Societal Resource Use.
- Leena Heinämäki: The Right to Be a Part of Nature: Indigenous Peoples and the Environment.
- Anu Pajunen: Willow-Characterised Shrub Vegetation in Tundra and its Relation to Abiotic, Biotic and Anthropogenic Factors.

PhD students of ARKTIS published altogether 33 publications, including 10 which appeared in international peer-reviewed scientific journals.



Participants of the 8th Annual Research Seminar.

ARKTIS organized 8th Annual Research Seminar “Politics of Development, Identity and Space” on the 4–5<sup>th</sup> May, 2010 (*picture above*). The number of participants was 43, including 22 PhD students and 8 international senior scholars. ARKTIS organized also public lectures about possibilities of co-operation in the Barents Region among other public and guest activities. ARKTIS hosted also a few guest lectures by international visitors in 2010, including scholars June Shappa (Canada); Hiroshi Maruyama (Japan) and Vice-President of EU Parliament, Diana Wallis (UK) in August (50 participants). (The list of the main events, p. 15–16)

In cooperation with BANG (Barents Arctic Network of Graduate Schools) ARKTIS organised an international BANG excursion in 11–16 June in Northern Finland, Sweden and Norway. Theme was ‘Contested North – Socio-economic, cultural and environmental aspects of resource development conflicts’. 15 PhD students and 6 senior scientists participated the course.

More information: [www.arcticcentre.org/arktis](http://www.arcticcentre.org/arktis)

### **Arctic Studies Program (ASP)**

The Arctic Studies Program (ASP) is a multidisciplinary study program providing a possibility to specialize in the Arctic issues. It gives comprehensive understanding on the physical, environmental, social and cultural aspects of the Arctic. The ASP is designed for Finnish and foreign degree students and the courses are taught in English. The program is administrated by the Faculty of Social Sciences, and the teaching is provided by the Arctic Centre's researchers. About 30–40 students participate the ASP yearly.

More information: [http://www.arcticcentre.org/InEnglish/EDUCATION/Arctic\\_Studies\\_Program.iw3](http://www.arcticcentre.org/InEnglish/EDUCATION/Arctic_Studies_Program.iw3)

## ARCTIC SCIENCE CENTRE

The main purpose of the Arctic Science Centre is to popularize information achieved by the researchers of the Arctic Centre. This happens mainly through functional exhibitions but also by organizing public events and providing programmes for schools. The Science Centre Exhibition at the Arktikum house presents the Arctic with its beautiful nature and various indigenous cultures through an interactive and scientific based approach. More than 70 000 persons visited the Arktikum house in Rovaniemi in 2010, about half of them from abroad.



### Science Centre exhibitions in 2010:

- The permanent exhibition "The Arctic in Change"
- TARA, an eye on arctic climate: Photo Exhibition about the TARA schooners two years journey at the Arctic Ocean, 27.11.2009–15.1.2010
- The Finnish Nature Photograph of the Year 2009 competition's winning pictures, 1.–31.7.2010
- Pathways, sustainable art education exhibition at the Science Centre and at the galleries of Faculty of Arts and Design, 22.6.–30.9.2010 (*picture below*)
- Way Out, exhibition based on the Aalto University's design students' expedition to Lapland, 22.10.2010–16.01.2011



## ACCENT – Action on Climate Change through Engagement, Networks and Tools

“I do” was the message of the ACCENT project (2009–2011), which coordinated European action on climate change, engaging the public inside and outside of science centres and museums across Europe throughout 2010. Arctic Science Centre was responsible for gathering and systematizing the best practices on how to communicate climate change related issues to the general public.

### Examples of I DO happenings in 2010

- Snow sculpture workshops in the Ounasvaara school, Rovaniemi (16.3.) and in the Kilpisjärvi school, Enontekiö (17.–18.3.)

During the workshops school students became familiar with climate change by designing and carving animal figures out of snow. (*picture below*)



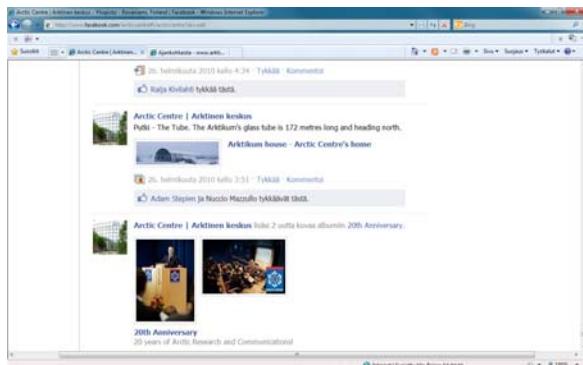
- Science Centre in a Snow Cave, Halti, 5.–6.5.

The happening offered a possibility to discuss climate change related issues in the mountain regions of Lapland. It was open and free of charge for everyone travelling by skies, snowmobile or reindeer. (*picture below*)



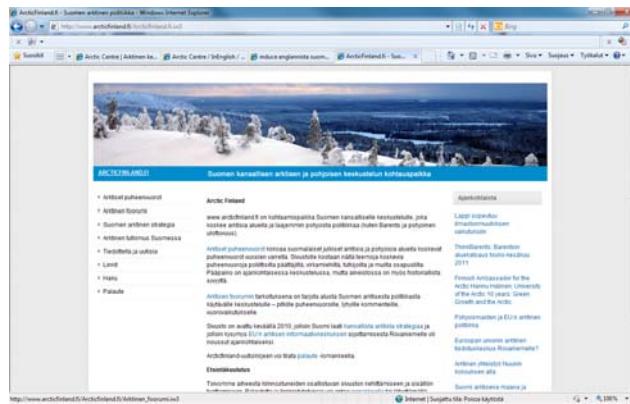
## SCIENCE COMMUNICATIONS

The Science Communications unit at the Arctic Centre communicates on Arctic issues to experts and the general public through multiple channels, like websites, media and events. For example, in the year 2010 Science Communications made 54 press releases in Finnish and 22 in English. There were over 100 stories in newspapers concerning or about the Arctic Centre, e.g. in Lapin Kansa, Pohjolan Sanomat, Helsingin Sanomat, Yle and Uusi Rovaniemi. The Science Communications unit also presented Arctic research at the Turku Science Fair. Science Communications unit also created a Facebook page for the Arctic Centre ([www.facebook.com/arcticcentre](http://www.facebook.com/arcticcentre)) as a place to share information of the current Arctic research, events and people.



The unit has important role in the information management in the Barents Euro-Arctic region. The Barents Euro-Arctic Council and the Barents Regional Council have selected it to implement the information strategy.

## **Examples of the hosted websites and databases in 2010**



- [www.arcticfinland.fi](http://www.arcticfinland.fi)

National meeting place for discussions on Arctic regions and Northern politics.

- [www.barentsinfo.org](http://www.barentsinfo.org)

General portal which includes maps, photos and links as well as news and events in the Barents region.

- <http://arcticcentre.ulapland.fi/amd/>

## International database for Antarctic research.

## LIBRARY

The library of the Arctic Centre contains a comprehensive collection of literature and information sources dealing with northern regions. Library patrons include visitors of Arktikum, local residents, students and national and foreign experts, e.g. scientists and administrative authorities, who need information on arctic and northern issues. In 2010 library had about 11 000 books, almost 100 subscribed journals as well as an access to over 30 000 electronic books and over 10 000 electronic journals.

The library has worked from the beginning of the year 2010 organizationally as an independent unit of the Lapland University Consortium Library but functionally according to the strategic mission and goals of the Science Communications unit. The library and information services have taken an active role by producing book exhibitions, book launches and other events in close cooperation with the research units and the Science Centre.



### Book exhibitions in 2010

- Across the Arctic Ocean (December 2010 – March 2010)

This exhibition introduced both well-known and forgotten Russian Arctic navigators. It included the variety of Russian literature and unique pictures of Arctic Expeditions. The exhibition asked: What makes people to go to the Arctic Region? Is their sacrifice worth the goal?

- Mauno Astala – Grand old man of music in Lapland (June 2010 – October 2010)

Exhibition presented books, music sheets, posters, brochures, vinyls and songbooks from Mauno Astala's vast collection of Lapland's music culture especially at 60's, 70's and 80's. (*pictures above and below*)



## **EU ARCTIC INFORMATION CENTRE INITIATIVE**

In the September 2010 the Ninth Conference of Parliamentarians of the Arctic Region adopted a conference statement which gave support to the EU Arctic Information Centre.

According to the statement the conference asked to “move forward on the plans by the European Commission to set up an EU Arctic Information Centre, taking note of the idea to set up such a centre as a network with a hub at the Arctic Centre of the University of Lapland, Finland, and cooperating with relevant research institutions”.

The EU Arctic Information Centre initiative was also discussed in the Brussels when the Finnish Ministry of Foreign Affairs had invited a discussion seminar on topic (14.9.). The interest was very high with over 80 participants representing different EU institutions, universities and research institutions. Discussion was opened by Finnish Arctic Ambassador Mr. Hannu Halinen followed by Ms. Diana Wallis, the vice president of the European Parliament and Mr. Raimo Väyrynen, chairman of the board of the University of Lapland.

Ms. Wallis spoke about her very positive impressions after visiting the Arctic Centre in Rovaniemi on late August.

“Why not have Rovaniemi to provide the heart of the EU Arctic information”, Ms. Wallis asked.

Director of the Arctic Centre, professor Paula Kankaanpää presented the concept of building the EU Arctic Information Centre as a network of institutions and service packages with a hub at the Arctic Centre.



## **ADMINISTRATION**

The Arctic Centre has a staff of approximately fifty persons and many nationalities: Professors, researchers, students, experts on communication, producers, artists and planners.



Staff of the Arctic Centre.

### **The Arctic Centre Board (20.4.2010–31.12.2011)**

#### ***Chairman***

Director Matti Hepola, Centre for Economic Development, Transport and the Environment, Lapland

#### ***Members***

Professor Suvia Ronkainen (vice chairman)

Dean Timo Jokela

Lecture Lassi Heininen

Professor Susan Meriläinen

Professor Esa Poikela

Director of international Relations Outi Snellman

Professor Lotta Viikari

#### ***Staff representative***

Head of Science Communications Markku Heikkilä

#### ***External member***

Director Kari Laine, Thule Institute, University of Oulu

## **The Arctic Centre Scientific Advisory Board (1.1.2009–31.12.2011)**

The scientific board meets yearly and it has an advisory and supervisory role.



Dr. Philip A.  
Wookey

Dr. Frank  
Burnet

Dr. Peter  
Prokosch

Dr. David  
Leary

Ms. Liisa  
Holmberg

Dr. Grete  
Hovelsrud

Dr. Karl  
Erb

Director Paula  
Kankaanpää

Ms. Annika  
Lindblom

Dr. Elena  
Andreeva

## **Funding**

The Arctic Centre's basic budget comprises the share from the University of Lapland and the appropriation granted by the Ministry of Education. The sources of external funding are Academy of Finland, EU framework and regional programs, ministries and companies.

**Budget by the Arctic Centre**

	<u>2010</u>
Basic budget (m€)	3,207
External funding (m€)	1,118
<b>TOTAL</b>	<b>4,325</b>

## **Externally funded projects in 2010**

### **Global Change**

- Adaptation to Rapid Land-Use and Climate Changes on the Yamal Peninsula, Russia: Remote Sensing and Models for Analyzing Cumulative Effects / Bruce Forbes / University of Alaska Fairbanks / 1.6.2009–31.5.2012
- Resilience of Human-Rangifer System / Bruce Forbes / University of Alaska Fairbanks / 1.1.2006–31.8.2010
- Application of Space-Based Technologies and Models- Land-Cover/Land-Use Change / Bruce Forbes / University of Alaska Fairbanks / 1.1.2007–2.2.2010
- Suomen Paleoklimatologia: tämänhetkisen ja menneitten ilmastovaihteluiden yhteisanalyysi perustuen ilman, maan ja kallioperän suoriin ja epäsuoriin lämpötilahavaintoihin / Samuli Helama / Suomen Akatemia / 1.9.2009–31.12.2010
- Rovaniemen kaupunkilintuatlas / Jukka Jokimäki / EAKR – Lapin ympäristökeskus / 1.6.2009–31.12.2011
- Dynamical Evolution of Scharffenbergbotnen Blue Ice Area since the Late Glacial Maximum / John Moore / Suomen Akatemia / 1.1.2009–31.12.2012
- Ice core drilling on Vestfonna / John Moore / Suomen Akatemia / 1.1.2007–31.12.2010
- Clim-ATIC Northern Periphery Programme Project / John Moore / EU-NPP/ Ympäristöministeriö / 1.3.2008–28.2.2011
- Sval Glac / John Moore / Liikenne- ja viestintäministeriö / 1.1.2010–31.12.2012 / 110 088 €
- Stability and Variations of Arctic Land Ice (SVALI) / John Moore / Nordic Centre of Excellence, Financed by Toppforskningsinitiativet (TFI) / 1.1.2010–31.10.2015
- Poron ravinto ja lisäruokinta muuttuvassa ilmastossa / Minna Turunen / Maa- ja Metsätalousministeriö / 1.1.2008–31.3.2011

### **Sustainable Development**

- BIPE - Barents International Political Economy: Governance and Gender in Development / Monica Tennberg / NordForsk / 1.10.2010–30.09.2012
- BOREAS MOVE-INNOCOM Assessing senses of place, mobility and viability in industrial northern communities / Florian Stammler / Suomen Akatemia / 1.10.2006–31.12.2010
- Boreas Final Conference / Florian Stammler / National Science Foundation of the US / Boise State Univeristy / 16.10.2009–31.5.2010

### **Northern Institute of Environmental and Minority Law**

- Kalastuksen oikeudellinen säädely Pohjois-Lapissa / Juha Joona / Maa- ja metsätalousministeriö / 1.1.2009–30.6.2010
- Arctic Footprint Policy Assessment / Timo Koivurova / EU- Ecologic Institute / 23.12.2009–23.12.2010
- Indigenous property systems / Timo Koivurova / Nordic Council of Ministers, Nordregio / 1.5.2009–30.4.2012
- Ihmisoikeustutkimuksen tutkijakoulu / Timo Koivurova / Åbo Akademi / 1.1.2010–31.12.2013
- Selvitys YVA-lainsäädännön kansainvälistä kuulemistä koskevien säännösten toimivuudesta / Timo Koivurova / Ympäristöministeriö / 12.11.2010–28.2.2011
- The Reform of the Arctic Council / Timo Koivurova / Walter & Duncan Gordon Foundation / University of Toronto / 24.11.2010–1.12.2012

## **Administration**

- Tieto ympäristön käytön suunnittelussa ja päätöksenteossa / Paula Kankaanpää / EAKR / 1.1.2010–31.12.2012
- ARKTIS 2007–2011, Arktinen tutkijakoulu/ Paula Kankaanpää ja Päivi Soppela / Opetusministeriö, määräraha tutkijakoulun palkkakustannuksiin / 1.1.2007–31.12.2011
- ARKTIS 2010–2013, Arktinen tutkijakoulu / Paula Kankaanpää ja Päivi Soppela / Suomen Akatemia, tutkijankoulutuskurssit / 1.1.2010–31.12.2013
- Kinnvika Legacy / Paula Kankaanpää / Nordic Council of Ministers, Nordregio / 1.5.2009–31.12.2011
- BANG – Barents Arctic Network of Graduate Schools / Paula Kankaanpää / Nordforsk / 1.10.2007–30.9.2010

## **Science Centre**

- ACCENT – Action on Climate Change through Engagement, Networks and Tools / Nicolas Gunsley / EU-FP7, partner / 1.4.2009–31.3.2011
- Natural Europe / Nicolas Gunsley / EU-FP7, partner / 1.10.2010–30.9.2013
- Rooseveltin majan muutostyöt / Nicoals Gunsley / Rovaniemen kaupunki /1.5.–30.6.2010

## **Science Communications**

- Barents Mediashpere / Markku Heikkilä / 15.5.2010–15.11.2010/ Opetus- ja kulttuuriministeriö / Ulkoasiainministeriö
- Finnish Antarctic research data / Markku Heikkilä / Finnish Marine Research Institute / 1.1.2003–31.12.2011
- Barents Euro-Arctic Council website, Barentsinfo-portal, Barents Information Strategy / Markku Heikkilä / Barents Euro-Arctic Countries / 1.1.2008–31.12.2011

## MAIN EVENTS IN 2010

- Arktinen poro (Arctic Reindeer), seminar, 21.22.1.
- Second Yamal Land-Cover Land-Use Change workshop, 8.–10.3.
- Uartic: Arctic Virtual Learning Tools project workshop, 8.–9.3.
- ARKTIS public lecture by Kristiina Jokelainen, 16.3.
- FIN-CRO seminar, 17.–19.3.
- ARKTIS guest lecture by Hiroshi Maruyama 24.3.
- ARKTIS public seminar “Nunavut governance and the use of traditional knowledge” by Juna Shappa, 29.3.
- ARKTIS public lecture by Anni Huhtala, 31.3.
- Tulevaisuusfoorumi (Future Forum), seminar, 19.4.
- ARKTIS public lecture by Sami Laakkonen, 20.4.
- ARKTIS public lecture by Aileen Espiritu, 3.5.
- ARKTIS annual seminar "Politics of Development, Identity and Space", 4.–5.5.
- Science Centre in a Snow Cave, Halti 5.–6.5.
- International Museum Day at the Arktikum house, open doors, 18.5.
- “Tiedettä pallolla” happening in the Science Centre, 18.5.
- METLA Conference WD 2010, welcome reception, 13.6.
- Jutajaiset: Komilainen esiintyjäryhmä, Singing performance, 1.7.
- ARKTIS guest lecture “EU Arctic Information Centre” by Diana Wallis, 27.8. (*picture below*)



- UArctic "Climate Change and Human Security", seminar, 6.–8.9.
- EU arjessa – Euroopan unionin arktinen horisontti – Leipää luonnosta, seminar 10.9. (*picture below*)



- Rovaniemi Day 12.9.
- Presentation of the EU Arctic Information Centre initiative in Bryssel, 13.–15.9.
- Barents Café: "Arktiset kysymykset Euroopan Unionissa", open discussion, 21.9.
- Arctic Section at the Turku Science Fair 1.–3.10.
- BANG workshop "Cross-border mobility and citizenship", 12.–13.10.
- Barents Café: "Mihin Suomi tarvitsee arktisen strategian?", public discussion, 2.11.
- Arctic Fury, film and media festival, 3.–7.11.
- Climate Change, open films and panel discussions, 4.11.
- The Arctic Centre as a part of the University of Lapland, open doors for students and staff, 30.11.
- ARKTIS theme day: Science communication and oral presentation skills, 9.12.
- BIBE workshop: "Barents international political economy: Governance and Gender", 14.–15.12.
- Arctic Market Days, 17.–19.12. (*picture below*)



## PUBLICATIONS IN 2010

Members of AC staff are marked with **bold**.

Authors who are Ph.D. students in the Arctic Doctoral Programme ARKTIS are underlined.

Visiting scientists in the Arctic Centre are marked with *cursive*.

### Peer reviewed articles in scientific journals

- Bartsch, A., Kumpula, Timo, **Forbes, Bruce C.**, **Stammler, Florian** (2010). Detection of snow surface thawing and refreezing in the Eurasian Arctic with QuikSCAT: implications for reindeer herding. *Ecological Applications*, 20(8), p. 2346–2358.
- **Forbes, BruceC.**, Macias Fauria, Marc and Zetterberg, Pentti (2010). Russian Arctic warming and 'greening' are closely tracked by tundra shrub willows. *Global Change Biology* 16, p. 1542–1554.
- Forsman, J., Reunanen, P., **Jokimäki, Jukka** and Mönkkönen, Mikko (2010). The effects of small-scale disturbance on forest birds: a meta-analysis. *Canadian Journal of Forest Research* 40, p. 1833-1842.
- *Frandy, Tim.* (2010). Lust, labor and lawlessness: the bad Finn in Finnish-American folksong. *Journal of Finnish studies* 14(1), p. 29-45.
- Grinsted, Aslak, **Moore, John C.** and Jevrejeva, Svetlana (2010). Reconstructing sea level from paleo and projected temperatures 200 to 2100AD. *Climate Dynamics*, 2010, 34 (4), p. 461–472.
- **Helama, Samuli**, Macias Fauria, Marc, Mielikäinen, Kari, Timonen, Mauri, and Eronen, Matti (2010). Sub-Milankovitch solar forcing of past climates: mid and late Holocene perspectives. *Geological Society of America Bulletin* 122, p. 1981–1988.
- **Hasanat, Md. Waliul** (2010). Cooperation in the Barents Euro-Arctic region in the light of international law. *Yearbook of Polar Law* 2, p. 279-309.
- **Hasanat, Md. Waliul** (2010). Towards model arctic-wide environmental cooperation combating climate change. *Yearbook of International Environmental Law* 20 (2009). p. 122-157.
- **Helander-Renvall, Elina** (2010). Animism, personhood and the nature of reality: Sami perspectives. *Polar Record* 46 (236): 44-56.
- **Helama, Samuli**, Seppä, Heikki, Birks, H. John B., Bjune, Anne E. (2010). Reconciling pollen-stratigraphical and tree-ring evidence for high- and low-frequency temperature variability in the past millennium. *Quaternary Science Reviews* 29 (2010) 3905-3918.
- **Helama, Samuli** ja Holopainen, Jari (2010). Ilmastonmuutos ja puhdas maantiede: Lähiö, maisema ja kartografia J.G. Granön teorian kontekstissa. *Alue ja ympäristö* 39 (1), s. 3–14.
- **Helama, Samuli**, Vartiainen, Matti, Kolström, Taneli, Meriläinen, Jouko (2010). Dendrochronological investigation of wood extractives. *Wood science and technology* 44, p. 335–351.
- Holopainen, Jari, **Helama, Samuli**, Partonen, Timo (2010). Meemit ja suomalainen itsemurha. *Sosialilääketieteellinen aikakauslehti* 47 (3), s. 174–186.
- Hood B. and **Helama Samuli** (2010). Karlebotnbakken reloaded: shifting the chronological significance of an iconic late stone age site in Varangerfjord, North Norway. *Fennoscandia Archaeologica* 27, p. 35-43.
- **Hossain, Kamrul** (2010). EU energy policy and the Arctic region: a balancing interest between environmental responsibility and resource dependence. *European energy and environmental law review* 19 (6), p. 295-305.
- **Hossain, Kamrul** (2010). International governance in the Arctic : the law of the sea convention with a special focus on offshore oil and gas. *The yearbook of polar law* 2, p. 139-169.
- Jevrejeva, Svetlana, **Moore, John C.** and Grinsted, Aslak (2010). How will sea level respond to changes in natural and anthropogenic forcings by 2100? *Geophysical Research Letters*, 37.

- **Joonia, Tanja** (2010). International Norms and domestic practices in regard to ILO Convention No. 169 – with special reference to Articles 1 and 13 – 19. *International Community Law Review*, 12 (2) p. 213-260.
- **Koivurova, Timo** (2010). Limits and possibilities of the Arctic Council in a rapidly changing scene of Arctic governance. *Polar Record* 46 (2), p. 146 -156.
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- **Koivurova, Timo** (2010). Governing arctic shipping: finding a role for the Arctic Council. *The year-book of polar law* 2, p. 115-138.
- **Koivurova, Timo** and Pölönen, Ismo (2010). Transboundary Environmental Impact Assessment in the Case of the Baltic Sea Gas Pipeline. *The International Journal of Marine and Coastal Law* 25 (2010) 151–181.
- **Koivurova, Timo**, Molenaar, Erik and VanderZwaag, David (2010). Canada, the EU and the Arctic Ocean governance: a tangled and shifting seascape and future directions. *Journal of Transnational Law and Policy*, 18 (2), p. 247-288.
- Korhola Atte, Ruppel, Meri, Seppä, Heikki, Välimäki, Minna, Virtanen, Tarmo, Weckström, Jan (2010). The importance of northern peatland expansion to the late-Holocene rise of atmospheric methane. *Quaternary Science Reviews* 29 (2010) 611–617.
- Kumpula, Timo, **Forbes, Bruce**, **Stammler Florian** (2010). Remote Sensing and Local Knowledge of Hydrocarbon Exploitation: The case of Bovanenkovo, Yamal Peninsula, West Siberia, Russia. *Arctic* 63 (2), p. 165–178.
- Kynkäanniemi, S-M., Kortet, R., Härkönen, L., Kaitala, A., Paakkonen, T., Mustonen, A-M., Nieminen, P., Härkönen, S., Ylönen, H., Laaksonen, S. (2010). Threat of an invasive parasitic fly, the deer ked (*Lipoptena cervi*), to reindeer (*Rangifer tarandus tarandus*): experimental infection and treatment. *Annales Zoologici Fennici* 47, p. 28-36.
- Luoto, Tomi P. and **Helama, Samuli** (2010). Palaeoclimatological and palaeolimnological records from fossil midges and tree-rings: the role of the North Atlantic Oscillation in eastern Finland through the Medieval Climate Anomaly and Little Ice Age. *Quaternary Science Reviews* 29 (2010) 2411-2423. doi:10.1016/j.quascirev.2010.06.015
- Macias Fauria, Marc, Grinsted, Aslak, **Helama, Samuli**, **Moore, John C.**, Timonen, Mauri, Isaksson, Elisabeth, and Eronen, Matti (2010). Unprecedented 20<sup>th</sup> century low values of sea ice extent in the Western Nordic Seas since A.D. 1200. *Climate Dynamics*, 34 (6), p. 781-795.
- **Moore, John C.**, Jevrejeva, Svetlana and Grinsted, Aslak (2010). Efficacy of geoengineering to limit 21st century sea-level rise. *Proceedings of the National Academy of Sciences*, 107 (36) 15699-15703.
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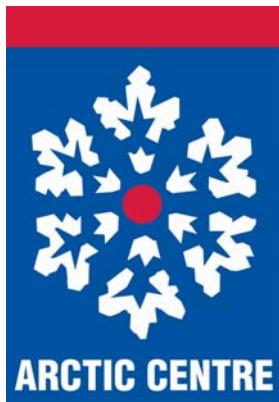
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#### **Multidisciplinary research institute and science communicator**

The Arctic Centre founded 1989 at the University of Lapland is a national and international hub of information and centre of excellence, which conducts multidisciplinary research in changes in the Arctic region and in their impacts. About 50 researchers, communicators and other professionals work at the Arctic Centre.

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