



## NEWSLETTER no. 2, 2017

ARCTic Marine Resources under Climate Change:  
Environmental, Socio-Economic Perspectives and Governance

*In the Arctic, higher temperatures and retreating sea ice will redefine boundaries of biological life, ecological structure, and commercial and social opportunities. Complex interactions exist, from the physical impacts in terms of temperature, ocean currents, and sea ice, via biological and ecological adaptations in terms of changing habitats, growth, and species interactions, via social and business enterprises in terms of new fishing areas and trade routes, to governance implications in terms of pressure on existing agreements, surveillance, and commercial activity. ARC-Change will study some of these interlinkages while bringing together expertise from an array of disciplines and institutions.*

Newsletter no. 2, headlines:

- *Aftenposten article on Svalbard climate*
- *Special session at the NAAFE Forum 2017*
- *Workshops & meetings*

### *Aftenposten article on Svalbard climate*

On 8 February, Anne Britt Sandø (ARC-Change) published an article in Aftenposten Viten (*Svalbard er et termometer på naturlige og menneskeskapt klimaendringer*). Sandø notes that recent temperatures at both Svalbard and the North Pole has been 20 degrees above their normal levels, and moves on to explain how both natural variability and human made climate change has contributed to the situation. Factors that matter are increased interaction between the ocean and the atmosphere and reduced albedo, both because of reduced sea-ice cover, and further variability in ocean temperature and salinity. Understanding how these different factors interact and influence the Arctic climate has been a major research topic in recent years, and developing this understanding is a crucial part of the ARC-Change project. The full article is available here:

<http://www.bjerknes.uib.no/artikler/nyheter/svalbard-er-et-termometer-pa-naturlige-og-menneskeskapt-klimaendringer>

### *Special session at the NAAFE Forum 2017*

At the North American Association of Fisheries Economists (NAAFE) Forum 2017, held at La Paz, Baja California Sur, Mexico, 22 – 24 March, Yajie Liu (NTNU) organized a special interdisciplinary session that targeted bioeconomic, social and institutional research focusing on the polar region (*How climate change is shaping fisheries and fishing communities in the Polar region*). NAAFE is an international group of industry, government and academic practitioners of fisheries economics. NAAFE aims to facilitate communication among fisheries and aquaculture economists in industry, academia, government and other areas, to promote dialogue between economists and others interested in

fisheries and aquaculture, and to advance fisheries and aquaculture economics and its useful applications.

In the special session, Nils-Arne Ekerhovd (ARC-Change) presented ongoing research on game theoretic analysis of fisheries agreements over straddling fish stocks in a multispecies context. The analysis focuses on the current disputes over the herring, mackerel, and blue whiting fisheries in the Northeast Atlantic.

The special session further included talks by Alan Haynie (NOAA Alaska Fisheries Science Center), Jennifer Bailey (NTNU), and Yajie Liu (NTNU). Haynie presented empirical work using data from the Bering Sea pollock fishery. His findings are critical for efficient management in the future, as climate change and variability of the pollock population is predicted to increase. Bailey presented plans for a study of conflicts related to the inevitable migration of fish farming industry to Northern Norway as water temperatures increase with climate change. The study will use media mining techniques and will contribute to a comparative study that eventually will inform an evaluation of the use of media mining techniques as a data gathering method. Liu presented an investigation of how climate change affects fisheries resources and economic performance of the fishing sector and coastal communities in the Arctic. The study focuses on the Svalbard Fisheries Protection Zone. Changes in the spatial distribution and relative abundance of commercially exploited and potentially valuable fish species are likely to change the dynamics of fishing activities and exploitation patterns, and further affects revenues, profits, and fishing costs. The results highlight



NAAFE Forum 2017 special session. From left: Jennifer Bailey, Nils-Arne Ekerhovd, Alan Haynie, Yajie Liu.

the disparity in climate vulnerability in fisheries related food security and livelihood between different fishing sectors and areas.

Together with Liu, ARC-Change contributed to the initiative for this special session, and we are grateful for the collaboration and Liu's efforts in organizing the special session.

---

### *Workshops & meetings*

**PAME 2017** The PAME (Protection of the Arctic Marine Environment) working group in the Arctic Council has for many years addressed an ecosystem approach to the oceans. In 2015, PAME and the International Council for the Exploration of the Sea (ICES) organized a workshop discussing an integrated ecosystem assessment for the central Arctic Ocean. Following this workshop, a dedicated ICES/PAME working group for integrated ecosystem assessment of the central Arctic Ocean was established. As of 2017, the working group has been expanded to also include the North Pacific Marine Science Organization (PICES, a sister organization of ICES), thereby covering both the Pacific and the Atlantic Gateways to the central Arctic Ocean. The second full meeting of the working group was held at NOAA premises in Seattle, 19-21 April. The core business of this meeting was a review of on-going science programs, presentations of policy-related processes, as well as discussion of the outline for the report that the group will deliver in 2018. Alf Håkon Hoel (ARC-Change) took part in the meeting.

**NAERE 2017** The first Nordic Annual Environmental and Resource Economics (NAERE) workshop was held in Helsinki, Finland, 21-22 April. The NAERE initiative is meant to give researchers from the Nordic countries a regular meeting place and aims to facilitate collaborations and contacts between Nordic institutions. Both Nils-Arne Ekerhovd and Sturla Kvamsdal (ARC-Change) took part and presented on-going research. Nils-Arne presented on the same topic as at the NAAFE Forum 2017 (see report above). Sturla's presentation regarded a method for dealing with certain types of non-autonomy (periodicity) in discrete optimization problems. The method is relevant

for management of seasonal fisheries, and Sturla presented a simple example which demonstrated how problems may arise if existing seasonal variations are abstracted from in the management scheme.

**Bringing Knowledge to Action** The Arctic Monitoring and Assessment Programme (AMAP), a working group in the Arctic Council, held a major science conference ('Bringing Knowledge to Action') in Reston outside Washington DC 25-27 April. A major event at the conference was the presentation of an update to the ACIA report, the Snow, Water, Ice and Permafrost Assessment (SWIPA). Important themes here were updated assessments of sea level rise and reductions of ice in the Arctic Ocean. Comprehensive assessments of status and scenarios for certain regions in the Arctic were also presented, based on the Arctic Adaptations to a Changing Arctic project. The conference attracted some 350 participants and featured panels and plenaries over a wide range of themes, including science - policy interaction, in keeping with the overall theme of the conference. Alf Håkon Hoel (ARC-Change) took part in the conference and presented on science-policy communication.

**The Once and Future Arctic** On April 28, The Earth Institute of Columbia University in cooperation with the Norwegian Consulate General and the Scandinavia House in New York organized the symposium 'The Once and Future Arctic.' The symposium featured speakers from the scientific community, as well as from indigenous people and from the arts. Findings from research on climate change, fisheries management, attitudes to the Arctic, and others were reported. Also, indigenous perspectives on Arctic change was presented along with artistic perceptions of changes in sea ice. Alf Håkon Hoel (ARC-Change) took part and presented in the session *Planning Ahead – Setting Policies for a Sustainable Future*.

---

Note: Alf Håkon Hoel is currently employed at the Norwegian Embassy in Washington DC, and his presence at various meetings is not exclusively as an ARC-Change researcher. The ARC-Change project nevertheless benefits greatly from the experience and insight he gains in his current work.

Main project partners:



**HAVFORSKNINGSINSTITUTTET**  
INSTITUTE OF MARINE RESEARCH