NEWSLETTER

Summer 2016

PROGRAMME COORDINATOR: JEREMY WILKINSON BRITISH ANTARCTIC SURVEY, UK

The last few months has seen significant activity right across all ICE-ARC work packages, from deployments of buoys near the North Pole and working with communities in NW Greenland, through to the planning of round-table discussions with key stakeholder groups. In the coming months things do not slow down much either as we have our second periodic report due, as well as the more general review of ICE-ARC programme by the EU. We certainly have lots to discuss at our upcoming General Assembly, so do not forget to sign up!

An area of particular interest to our programme is the recent announcement that the IPCC will produce an in-depth review of what global warming of 1.5C above pre-industrial levels might do to humans, society, economics, and ecosystems. Most of the literature to date has concentrated on a more severe, some may say realistic, warming of our planet. Studies of the impacts of more modest warming are much less prevalent, consequently the EU have thrown out a challenge to all funded climate programmes to try to publish on this topic. WP2 and WP4 are looking in to this and we should hear more in Tromsø at the General Assembly.

The Arctic is again high profile – the Rio Olympic opening ceremony even mentioned Arctic sea-ice loss as an important consequence of how we are treating our planet. Coming up there is the White House Arctic Science Ministerial in September that will bring Ministers from across the globe to Washington, DC to talk about Arctic matters. This event may even coincide with a possible new minimum for summer sea ice (to match the minimum in winter!), and a maximum melt of the Greenland ice sheet. The COP22 is in November, and we are working with colleagues from EU PolarNet and European Polar Board for another Arctic event.

What the summer holds for the Arctic in 2016 we will find out is a few short weeks. In the meantime I wish you a wonderful summer break, and we will see you all in Tromsø at our General Assembly.

Photo: Francois Guerraz

MEETINGS AND EVENTS

12-16 September **UArctic Congress** *St Petersburg, Russia*

15 September **ICE-ARC Policy Roundtable—Impacts of Black Carbon emissions from the growth in Arctic shipping** *Brussels*

7-9 October **Arctic Circle** *Reykjavik, Iceland*

18 October **ICE-ARC Steering Committee** *Tromsø, Norway*

19-21 October **ICE-ARC General Assembly** *Malangen Resort, Tromsø, Norway*

7-18 November **COP22** *Marrakech, Morocco*

12-16 December **AGU** *San Francisco,*

17-20 January 2017 **ICE-ARC Arctic Base Camp, WEF Annual Meeting (TBC)** *Davos, Switzerland*

22-27 January 2017 **Arctic Frontiers** *Tromsø, Norway*

31 March –7 April 2017 **Arctic Science Summit Week** *Prague, Czech Republic*

FURTHER DETAILS:

http://www.ice-arc.eu/events/

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THAWING PERMAFROST AND FRESHWATER DRIVE ARCTIC OCEAN ACIDIFICATION

Members of the East Sibrian Arctic Shelf scientific research expedition drill into sub-sea permafrost under fastice. Photo by Igor Semiletov.

ICE-ARC researchers Igor Semiletov and Natalia Shakhova (AME) have recently published a study in journal Nature Geoscience that shows acidification off the coast of Northern Siberia in the Arctic Ocean is caused by increased thawing permafrost and freshwater discharge. Importantly the study finds acidity levels of the region are much higher than previously predicted.

Ocean acidification, which affects marine ecosystems and carbon cycling, is considered to be a direct effect of atmospheric carbon dioxide uptake. The Arctic Ocean is especially sensitive to ocean acidification because more CO2 can dissolve in cold water.

The current study shows, however, that anthropogenic CO2 uptake from the atmosphere is not the major cause of the acidification in the East Siberian Arctic Shelf. The researchers studied the chemical and physical characteristics of ESAS waters over 13 years since 1999. Using carbon isotopic data and simulations of water sources, they found that degradation of terrestrial organic matter from thawing coastal permafrost and discharge of Arctic river water with elevated CO2 concentrations drive the persistent acidification.

ESAS is particularly vulnerable, as four large Arctic rivers that accumulate their waters from extensive permafrost-underlain watersheds bring river discharge to the area. The study warns that ESAS waters may become more acidic if thawing permafrost increases terrestrial organic carbon inputs and if freshwater discharge continues to increase.

The paper entitled, "Acidification of East Siberian Arctic Shelf waters through addition of freshwater and terrestrial carbon," was published in journal Nature Geosciences.

TECHNOLOGY AND TRADITION

Moving to next location for an oceanographic measurement. Photo taken of Rasmus Avike sled from Lars Jeremiassen's sled .Photo: S.Olsen DMI

Arctic coastal communities rely on sea ice. Sea ice is utilised in all aspects of a community's daily life; from commercial needs (hunting/fishing) though to social needs such as a transport network and the collection of drinking water (via icebergs frozen into the sea ice). Like the sea ice of the high Arctic, sea ice in these most northerly Arctic fjords is undergoing change; the sea ice is thinner and it forms later and melts earlier.

For many years these communities have been highlighting these changes to the world. However traditional knowledge is generally empirical in nature, i.e. knowledge gained through personal observations, and therefore it is difficult to assimilate by the scientific community. By working together through the combination of local traditions and cutting edge technology we can be overcome this challenge.

Within WP3 we are developing a system that hunters can attach to their sleds. The idea being that when the hunters take their sledges out they autonomously and automatically collect valuable information on sea-ice thickness throughout the sea-ice growth and melt seasons.

In Spring this year we headed up to Qaanaaq, northwest Greenland (77°28′ 00″ N, 69°13′ 50″ W), to run tests of the instrumentation we have developed to autonomously measure the thickness of sea ice. Results were very encouraging and we will return next year with an operational system. These new systems will continuously monitor the 'health' of the sea ice around their communities. Data will be automatically transmitted back to a central database, where it will be freely accessible to the communities in near real-time. The designed system and software will be fully open-source so that the systems can be continuously improved and updated. Watch this space… | **Jeremy Wilkinson**

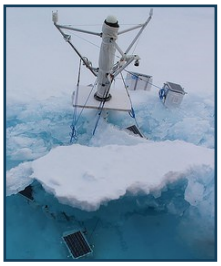
WP4 MEETING

Lancaster University hosted a meeting with Ingrid Ellingsen and Dag Slagstad from SINTEF as part of the collaboration between WP2 and WP4. The SINTEF team specialise in modelling the ecology of the Arctic ocean under climate change scenarios, with distinct behaviours seen compared with the rest of the world's oceans. The response of Arctic primary production to warming climate could have implications for the long-term viability of fisheries and aquaculture in the Arctic region, and may also affect the net global carbon sink from the atmosphere to the ocean. The team at Lancaster University, led by Gail Whiteman and Dmitry Yumashev, are looking to use these findings to explore potential regional as well as global economic impacts of the biological changes in the Arctic ocean under different climate change scenarios. | **Dmitry Yumashev**

Ingrid Ellingsen, Dag Slagstad (SINTEF) met in Lancaster with Gail Whitemean and Dmitry Yumsshev (ULancs).

SATICE BUOY DEPLOYMENTS

Within ICE-ARC we've focused on optimizimg the power consumption of the SATICE systems by adding on board power monitoring hardware and by changing the core GNSS receiver to a newer and less power hungry device (0.5W less). We have also redesigned some parts of our software to reduce the power consumption of non-essential payload during winter night operation. Deployments during 2016 include: Beafourt Gyre (SI06), North Pole region (SI07). Further information about SATICE buoys, along with data plots to download, can be found here: http://arctic.icm.csic.es | **Oriol Sanchez Garcia**



SI04 last sighting, later that month all communications were lost, presumably the system sank.

WP3 DISSEMINATION ACTIVITIES IN QAANAAQ

A visit to Qaanaaq was undertaken January 20th – 27th 2016 by Lene Kielsen Holm and Naja Mikkelsen, the overarching purpose of the visit was dissemination of results from ICE-ARC investigations. The visit also opened up for a wide range of other ICE-ARC related activities as outlined below.

The two ICE-ARC project members were invited to give special lectures for the older classes in the school. The presentations of results from the ICE-ARC studies on social sciences and hunting traditions were received with great interest and the students from the oldest class had discussions with Lene about work they been carrying out recording elders and family members on issues within their hunting culture .

Lene Kielsen Holm discusses hunting traditions and climate change with the oldest class Photo: Naja Mikkelsen

Balthymetric data from the 2014 ICE-ARC cruise on the Danish Navy ship has been transformed into a 3D map of the big fjord system off Qaanaaq. The map was received with great interest by hunters and fishermen in the community of Qaanaaq. The reason is that depth information is crucial to find the best fishing grounds in the fjord to secure successful and efficient fishing. Fish stocks undertake vertical migrations to specific levels according to time of the year.

Naalakkersuisut Siulittaasuat (Prime Minister of Greenland), Mr. Kim Kielsen together with Lene Kielsen Holm in Qaanaaq

January 23rd was the "Culture Night 2016 of Greenland". During this day a wide variety of activities were taking place in all Greenlandic towns and settlements. Institutions opens their doors for the public to visit and learn about the work they are doing on an everyday basis. The same happened in Qaanaaq. The program of the 'Culture day' in Qaanaaq also included two public ICE-ARC lectures.

A special opportunity was the unexpected arrival of the government of Greenland and the Mayor of Qaasuitsup Kommunea, Ole Dorph. Naalakkersuisut Siulittaasuat (Prime Minister), Kim Kielsen, hosted, together with seven of the nine Naalakkersuisut (ministers), a two day public meeting in the Community Hall. These meetings and the associated workshops were of special interest to the ICE-ARC members as many subjects of great value for WP3 were debated. Read the full report here. | **Naja Mikkelsen and Lene Kielsen Holm**

2ND PERIODIC REPORT

As you may be aware, the end of the Second Reporting Period is coming up. The majority of this can be done now – please don't leave it until the last minute! The earlier you can get the reports in, the more time the WP leaders will have to review and collate to write their bits to show overall progress and fit to the WP objectives.

Please note, the **Periodic Report** - the technical report on what we've done – is **cumulative**. We need an update of activities from this period (**1st April 2015 – 30th September 2016**). We will add this to those from RP1. Please therefore give updates – don't repeat the last report!

Financial reports – **Form C** - are for just this reporting period, i.e. 1st April 2015 – 30th September 2016. We don't believe any other partners (than BAS) will need an audit – however it is possible depending on what you've spent this period. If in doubt, book the auditors in, and ask us if you need to.

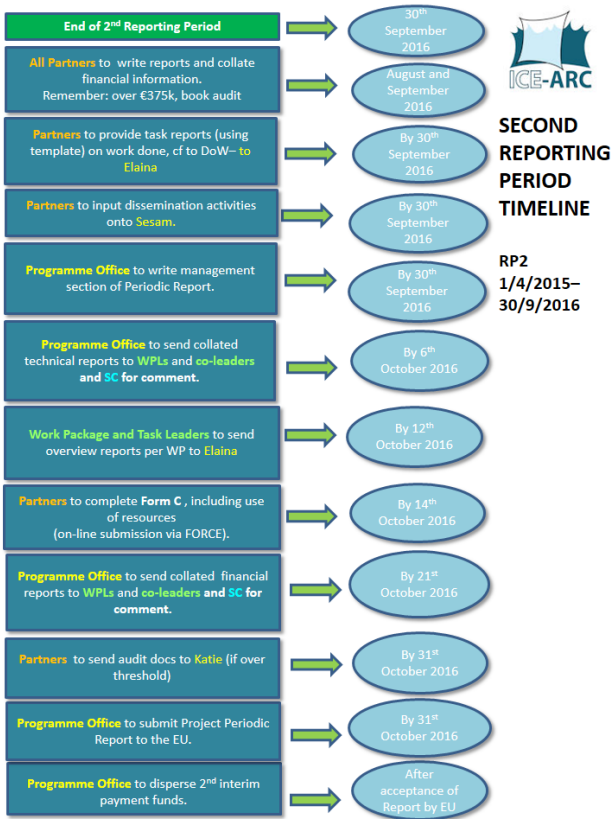
Timeline – who/what/when. (where=your office, why=the EC says so...). The EC has asked us to complete reporting by end of October so we can be paid this year.

Template – to fill in for each partner (=institute) for each Task you're in.

Dissemination template – again to add to the list. The travel in your Form C (the 'what') needs to also be on this list (the 'why')

Financial reporting – guidance document

First Periodic Report - this is the report for the first period.



Upcoming Deliverables and Milestones	Due
MS541 Policy brief at roundtables with stakeholders #1	Aug 16
D4.11 New socio-economic model, PAGE-ICE	Oct 16
MS112 Completion of AUV field experiments in Summers 2014 and 2016	Oct 16
MS313 Field visits to NW Greenland communities completed	Oct 16
MS432 Distribution of PAGE-ICE model outputs	Oct 16
D431 Report on ice-loss impact on socio-economic sectors	Nov16
D1.23 Report on the SAR inversion technique and ice thickness generated and its application to mapping Arctic frazil-pancake ice regimes	Dec 16
D1.25 Report on the SAR inversion technique and advancement of the theoretical modeling of waves in ice-water mixtures	Dec 16
D1.61 Report on remote sensing of sea ice: surface temperature and passive microwave accuracies	Dec 16
D3.12 Community based observations and monitoring in NW Greenland	Dec 16
D3.32 A 4500 year climate and environmental record of NW Greenland based on published data and where possible marine sediment cores	Dec 16

Recently submitted deliverables and milestones (All submitted deliverables and milestones are available to ICE-ARC members on dropbox or the members area of the website):

D2.61 Assessment of model uncertainties related to treatments of atmospheric processes (aerosols, clouds)

D6.05 Steering Committee Meeting Minutes 2016 Spring

D6.10 Advisory Board Meeting minutes 2015

MS231 Description and results performed with the CREG configurations

MS333 Historical accounts of interactions between communities in NW Greenland and western civilisations

Thank you to those who contributed to this newsletter. If you would like to contribute to the next edition please send your text and images to ice-arc@bas.ac.uk. Deadline: 15 September 2016