



BELMONT FORUM

**NICH-Arctic final meeting
Program**

October 25-26-27, 2023

**Laboratoire Chrono-Environnement,
Besançon, France**

NICH-Arctic final meeting program

**Address: Laboratoire Chrono-Environnement, room -107M, 16 route de Gray
25030 Besançon cedex, France**

Zoom link: <https://uqam.zoom.us/j/89286639611>

WENESDAY, OCTOBER 25

10:00-10:15 – Welcome

10:15-10:30 – Introduction Émilie G.

10:30-12:00 - Dissymmetry of the coastal (sub)Arctic North Atlantic from a (paleo)ecological, archaeological perspective

Anne de Vernal, Natasha Roy and NICH-Arctic members

Nunavik, Labrador, southwest Greenland and Iceland are located in the same subarctic latitudinal zone. They thus share common features, such as solar insolation and the daylight duration changing from winter to summer. Other common features include the glacial history of large ice sheets during the last ice age and landscapes that evolved from glacial deserts to subpolar ecosystems after the ice retreat. Besides these common features, Nunavik, Labrador, southwest Greenland, and Iceland are characterized by different climate and environmental conditions, notably in relation to ocean currents that modulate the distribution of sea ice in coastal areas and/or the release of heat in winter from Atlantic waters. Furthermore, these areas experienced different types of human occupation with the succession of distinct Inuit cultures since about 4500 years in Nunavik and Labrador, while the Norse history in Iceland and southern Greenland is relatively recent dating mostly from the medieval times. In the context of the subarctic North Atlantic, the climate and ocean changes probably played a role in human occupation, but they still need to be documented prior to any assessment.

After a brief presentation, this session is intended to open the discussion about the past and present similarities and disparities of the coastal subarctic North Atlantic, including Nunavik, Labrador, southern Greenland, and Iceland, with special attention paid to the bio-climatic environment and human occupation. The discussion will aim at framing the context (quadriptych) for the introduction of our special issue in *Quaternary Science Reviews*. The outcome of the discussion will be the detailed outline of a collective manuscript.

12:00-13:30 – Lunch

13:30-13:50 - Environmental changes in Hudson Strait and Cultural transition in Kangiqsujaq, Nunavik

Bianca Fréchette, Natasha Roy, Anne de Vernal, Elsa Cencig, Susan Lofthouse, André Rochon and Matthias Moros

13:50-14:10 - Land-fast ice freeze-up and break-up in the Hudson Strait (Canada) from 1880 to 1950: Determining the role of temperature and wind

Ouellet-Bernier, Marie-Michèle, Bhiry, Najat, Brassard, Laura

Sea-ice is a dominant feature in Arctic and Subarctic environments. Freeze-up and break-up dates were extracted from historical sources and analysed to better understand past sea-ice conditions of the Hudson Strait. Atmospheric temperature and wind records were compiled to determine their role in the presence of sea-ice in Kangiqsujaq (Québec, Canada) and Killiniq (Nunavut, Canada). From 1880 to 1950, our results show that the freeze-up period was likely determined by the current atmospheric conditions, while the break-up period was more influenced by pre-existing conditions (such as the length of the freeze-up period). A stronger correlation between atmospheric temperature and sea-ice presence was found in Kangiqsujaq, while Killiniq's sea-ice was more influenced by wind. Periods of late freeze-up were associated with stronger winds favoring the transport of ice out of the bay, but periods of early freeze-up were associated with weak northerly and westerly winds that detained the ice in the bays. During early break-up periods, stronger and warmer southerly winds helped the ice to move out. Late break-up periods were characterized by an increased north wind in Kangiqsujaq and a north-west wind in Killiniq. This study suggests that sea-ice cover in Kangiqsujaq and Killiniq is inclined to be controlled by both local and regional atmospheric conditions.

14:10-14:30 - Building an international lipid biomarker database

Franklin, H.; Thomas, E.K.; Williams, J.W.; Aguilar, J.M.; Castaneda, I.S.; Freeman, K.H.; McKay, N. and Morrill, C.

Lipid biomarkers are common in climate and environmental studies because they are readily analyzed lipids that have homologous series distributions, ratios, and isotope abundances with high utility for the paleoclimate community. Paleoclimatic analyses of lipid biomarkers at subcontinental to global scales, however, are hindered by the lack of any comprehensive and community-curated controlled vocabulary for biomarker names. A key objective for the NICH project is to establish an open-access database for climate and ecological data. Here we present a draft controlled vocabulary, developed by community leaders, that encompasses several major classes of lipid biomarkers

commonly applied for paleoclimate research. To facilitate interoperability among data resources, the Neotoma Paleoecology Database, the NOAA World Data Service, and LiPDverse have all agreed to adopt this vocabulary. The vocabulary is being developed as an open process, with an article in press in PAGES Magazine, and we welcome community input for this first version until January 2024. Variable names are now being actively added to Neotoma, and the next stage, now beginning, is to upload lipid biomarker data from modern reference and stratigraphic records to Neotoma and other community paleo data resources.

14:30:15:00 – Healthy break

15:00-16:00 – “Surface ocean conditions in the Arctic and subarctic North Atlantic during the present and past interglacials”

Anne de Vernal et al., presentation in the International Quaternary Webinars organized by Ray Bradley and hosted at the University of Massachusetts (on site in Besançon)

Zoom link provided by UMass: <https://umass-amherst.zoom.us/j/6140930719>

Password: IQW2023

16:15-16:45 – Holocene organic matter production, respiration, and burial on the Greenland shelf: insights from isotopic and trace element chemistry (Online)

Wang, Yunfeng; Allan, Estelle; **Douglas, Peter**; de Vernal, Anne; Solveig-Seidenkrantz, Marit; Mucci, Alfonso; Gélinas, Yves.

Organic carbon burial in sediments is a critical component of the global carbon cycle, but the sensitivity of this process to climatic change is not well understood. In particular, glacial dynamics could play an important role in controlling carbon burial in coastal sediments. In our work we have combined isotopic and trace element measurements of sediments in a core from the southeast Greenland shelf, to better understand how primary productivity, heterotrophic respiration, and sedimentary preservation of organic matter relate to glacial dynamics. We find the highest rates of carbon burial in the Neoglacial period, which is associated with evidence for stronger organic matter preservation and high sediment accumulation. We infer that glacial advances during this period deposited large amounts of iron-rich sediment that effectively trapped marine organic matter in the shelf, leading to high rates of carbon burial. In contrast, during the early Holocene primary productivity was much higher, but organic carbon burial was lower. Based on fatty acid hydrogen isotope analyses we infer that high productivity was counteracted by high rates of heterotrophic respiration. In sum, our results highlight the key importance of inorganic sediments delivered by advancing glaciers for promoting organic matter preservation in high latitude shelf environments.

17:00-19:00 - Cocktail

THURSDAY, OCTOBER 26

Room -107M

10:00-12:00 - Working session: onshore-offshore linkages and climate changes along the southern Greenland coasts.

Taking advantage of the expertise of participants (ET, MSS, EG, NR, AdV, etc.) regarding the various components of the Greenland environments (ice, vegetation, archeology, marine ecosystems, etc.) we aim to discuss and explore the linkages in the system.

Topics for discussion could include, for example, the relationships between (i) surface ocean (sea-ice) and the isotopic composition of precipitation as preserved in leaf waxes, (ii) marine productivity, land vegetation, and food resources, (iii) the respective ecological and/or climatic significance of proxies, terrestrial and marine, (iv) etc.

The participants are invited to prepare material for the discussion.

12:00-13:30 – Lunch

13:30-15:00 – Grounding climate change into local narratives in the Arctic: changing seasonality, sea-ice changes and polar bears as emerging risks in Ittoqqortoormiit (Inuit Nunaat/Greenland)

Guest speakers : Jeanne Gherardi and Tanguy Sandré, Université de Versailles Saint-Quentin, France

14:30:15:00 – Healthy break

15:30-15:50 – Multi-proxy analysis of the long-term walrus exploitation in the Eastern Arctic

Claire Houmard, Anne Birgitte Gotfredsen, Christyann Darwent, Sean Desjardins, Emily Ruiz Puerta

The walrus, an animal often considered potentially dangerous and aggressive, began to be hunted more intensively from the Dorset period (~800 BCE) in the Eastern Arctic. Its tusks, present in all individuals but more developed for the males, were most often used for technical purposes. We are interested in how and why hunted individuals were selected: skin, bone, ivory, fat, and meat may have been targeted. Individuals have not yet been systematically identified by age and sex, but this could provide valuable information for a better understanding of how this species was exploited by the various Arctic societies.

15:50-16:10 – An approach to predictive modeling in archaeology. Norse and Thule sites in Greenland.

Corentin Desquaire, Emilie Gauthier

16:10-17:00 - Free time for spontaneous presentations or discussions

17:00-18:30 - FREE TIME

19:00-21:00 – FRANCOMTOIS DINNER

You are invited to join us for a dinner group at l'Effet Boeuf.

Address: 3 Rue Mairet, 25000 Besançon, France

Website: <https://www.lesmeilleursrestos.fr/restaurant-besancon/142-1-effet-boeuf-besancon.html>

FRIDAY, OCTOBER 27

9:00-16:00 – Ammonite hunting and Jura discovery

Subject to change according to weather conditions