

## SCIENCE HIGHLIGHT

### Detection of rain-on-snow events and caribou

In constant population decline since the 1980s, the Peary caribou made its dire entry onto the endangered species list in 2016. According to wildlife biologists, the primary suspect responsible for this population decrease is climate change. In a recent article published in *Remote Sensing of Environment*<sup>1</sup>, CEN researcher Alexandre Langlois and his team tested the hypothesis that the more frequent rain-on-snow (ROS) events, causing snow to be laden with ice crusts, is the leading cause for the decline in the Peary caribou herd. These events make winter grazing conditions much more difficult for the animals. With the remote sensing technology developed by the team, these ice crusts can be observed via satellite and linked to caribou distribution. This work is in collaboration with researchers at Environment and Climate Change Canada (ECCC) who monitor caribou populations.

Using passive microwave retrieval signals emitted from the Earth's surface and measured from satellite imagery, the team developed indices that detect ROS events. These indices, when incorporated into a temporal database using data from five satellites, allowed the team to quantify the occurrence of ice crusts and then link these occurrences to caribou population counts. This innovative technology developed to detect the presence of ice crusts and events of ROS (rarely detected given the absence of met stations at these latitudes), has proven to be extremely relevant to both climatologists and wildlife biologists. Upon reading the article, a researcher from ECCC suspects that these ice crusts may also be responsible for the sharp increase observed in incidences of broken teeth amongst muskox. This multidisciplinary study eloquently shows that there exists causal links between ice crust occurrence and Peary caribou population decline.

<sup>1</sup>Langlois et al. (2017) *Remote Sensing of Environment*, 189, 84-95.



Photo: N. Bhry and W. Vincent (CEN), J. Elster and B. Richardson

## INTERNATIONAL AGREEMENTS

A memorandum of understanding was signed between the CEN and the **Centre for Polar Ecology (U South Bohemia, Czech Republic)** which will foster student exchanges and use of research facilities (Antarctic and Svalbard). An official event took place at the Canadian embassy in Prague after the signing (photo above).

Another agreement was signed with a **Japanese institution** whose researchers are already involved in numerous collaborations taking place at various CEN stations.

## NEW CEN AWARDS!

The CEN now offers **awards for undergraduate students** who present their research as first author at a national or international conference (poster or oral presentation) or as a published scientific paper. For more information, please visit the [scholarships and awards page](#) on CEN's website (in French only).

## NEWS FROM OUR STATIONS

CEN was successful in obtaining a grant through the NSERC Operations and Maintenance Support program. The grant totals 150k\$/yr over a 2 yr period. The funds will be used for operations, maintenance, and repairs.

A team of film makers (SilverBack Film) spent time in Whapmagoostui-Kuujuarapik this winter in the hope of capturing images of predation on caribous. The CEN served as their logistics base for both ground and aerial shoots. The team were able to film extraordinary images thanks to CEN's support.



## CEN RESEARCHER: CHRISTOPHE KINNARD

Christophe Kinnard has been a regular CEN member since May 2016. After pursuing graduate studies at UOttawa, he worked as a researcher at the CEAZA in Chile. He later joined the faculty in the Department of Environmental Sciences at UQTR. His research interests focus on glaciology and hydrology of alpine and northern watersheds. Christophe and his team are investigating the impact of climate change on hydrological systems in cold environments, from the Chilean Andes to the Canadian Rockies and, more recently, on Bylot Island, in collaboration with other CEN researchers. Christophe uses drone technology in order to characterize small-scale glaciological processes and spatial variations of the snow.



Photo: Christophe Kinnard (credit: M. Demuth)

## A STUDENT'S PERSPECTIVE

### The hazards of winter sampling

By Isabelle Fournier (Biology PhD student, ULaval)

When I arrived on the lake with my pack sleigh, there was already a lot of snow falling. As the day went by, the oxymeter I had inadvertently left outside its case between two profiles was now broken, its membrane frozen. I had to put my bare hands in zero degree water to get some samples, because the plastic straps of my sampler did not resist the cold. By the time I had collected all of the samples I had come for, everything I had placed on the ground was buried under snow and it was a lot of fun to recover it all! That first day of my PhD winter fieldwork, I don't remember if I was more rapidly frozen or discouraged. Yet, on this Tuesday of February, I was not up north in the Arctic, but on Saint-Charles Lake in Quebec City.

The reality of the rigorous conditions I was confronted with last winter is experienced by a lot of researchers and students who, as I, overcome the challenges of sampling in cold, sometimes harsh conditions. Research in cold regions seeks to answer fundamental questions, such as: Does the use of deicing salts impact urban lakes? How does climate change influence vegetation change in the Arctic? Which factors influence the dynamics of animal populations? Northern research undoubtedly includes the work conducted beyond the Arctic Circle, and we must not forget to include all that is done in cold regions (wherever you are!), as the cold challenges our material, techniques and tolerance!



Photo credit: L. Fournier

## MARK YOUR CALENDARS!

Université Laval's Forêt Montmorency will be the site of the 3rd **congrès international francophone en écologie végétale, Écovég13**, which will take place 10 to 13 September 2017.

The 5th quadrennial International **Conference in Arctic Fox biology** will take place from 12 to 14 October 2017 at Université du Québec in Rimouski. The conference theme will be: Fostering Circumpolar Collaborations.

ArcticNet is inviting you to the **Arctic Change 2017 international conference** which will be held at the Quebec City Convention Centre, 11 to 15 December 2017. Over 1500 participants are expected to attend this multi-sectorial conference. Many CEN researchers will organize roundtables, workshops, thematic sessions, etc.

