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Fieldwork report. Permit n° 2018-04

Palaeoenvironmental investigation and archaeological survey

at Cap Höegh (Liverpool land) and Ittoqqortoormiit.

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This summer fieldwork take place in the WP2 (Landscape and soilscape evolution: natural versus anthropogenic forcing recorded in pedo-sedimentary, peaty and lacustrine archives) and in the task 2.3 of this WP2 (Sea birds dynamic) of the InterArctic ANR project (Coord. Emilie Gauthier).

This multidisciplinary WP is based on multiscale а systemic approach to geomorphological and ecological processes, with special emphasis on the dynamic combinations of biotic, abiotic, and other factors (human, animals) involved in landscape evolution. This part of the project is strongly linked to Adamclim the project, studying the little auk colony at cap Hoegh (IPEV project, coord. David Gremillet).

Seabirds are essential hunting targets across our study area, and their populations appear to have undergone contrasting dynamics through time. So far, the interactions between humans and animals have mainly been studied though artefacts retrieved during



excavations of dwellings and kitchen middens, while animal tracers in the environment have rarely been tracked through palaeoenvironmental studies. We have chosen to develop our palaeoenvironmental approach in the Liverpool land area. The little auk's colony at Cap Hoegh has been studied for 10 years. Furthermore, archaeological sites are numerous on this coast. Several Palaeoeskimo cultures successively colo-nized this area: the Independence I group around 2200 BC, Saqqaq around 1500 BC and Dorset around 500 BC After several centuries without human settlement, the area was recolonised by Thule hunters between 1400 and 1850 AD (Sørensen and Gulløv, 2012). The extreme cold episodes of the end of the Little Ice Age and the intensive European whaling could explain their disappearance. It is not until the 1930s that a small Inuit community from Eastern and Western Coast was relocated at Ittoqqortoormiit (Scoresbysund). Since then, several hunting cabins have been established on the most strategic sites. Cape Hoegh (30 km north of Ittoqqortoormiit – Fig. 1.A) is one of these sites, the current cabin (the third since 1930) is regularly occupied by hunters but also by scientists who study the little auks (*Alle Alle*) nesting at the foothills of Cap Hoegh.

During this fieldwork, lacustrine cores have been retrieved in order to reconstruct sea birds temporal dynamics. Chosen lakes were at Cap Hoegh and Ittoqqortoormiit (Liverpool Land). The first one was adjacent to a little auks (*Alle alle*) breeding site. The second one was located near Ittoqqortoormiit and will be used as a reference sequence (without bird). Finally, with the help of a drone, we have made a survey (photographs and photogrammetry) of Thule archaeological sites (NKAH 800) 1 kilometer away from the Cape Hoegh hutting cabin.

A first fieldwork (permit n° 2017/02) took place in summer 2017 (video: <u>https://vimeo.com/289469102</u>). A first core was taken in the small lake next to the cabin (Fig. 1. A.a). However we couldn't perform a core at Little Auks Lake because it was frozen (3 km west from the cabin - Fig. 1. A.b). First core performed in coastal lake nearby the cabin was disappointed and the stratigraphy was essentially made of 5 storms deposits. So we went back to Cap Höegh this summer, 2 weeks after the annual fieldwork of my ornithologists' colleagues from Montpellier, Jerome Fort and David Gremillet. We also took benefit of this stay to make a better survey (begun last year) on the NKAH 800 archaeological site.

We were **3 researchers** attending this fieldwork: Emilie Gauthier (PI and professor at the University of Franche-Comté, Besançon), Hervé Richard (Senior Scientist, CNRS, Besançon) and Vincent Bichet (lecturer at University of Franche-Comté, Besançon).

The Liverpool fieldwork took place from August 21st to September 5th:

Aug. 21: Flight from Paris to Reykjavik

Aug. 22: Flight from Reykjavik to Ittoqqortoormiit. Initially a helicopter flight from Constable Point to Cap Höegh was scheduled. Weather was fine at the airport but there was a lot of fog on the coast and it was impossible to land at the hut cabin. Luckily, there was no fog on the lake and we could drop our zodiac boat and the corer. We spent the night in Ittoqqortoormiit.

Aug. 23: Boat trip from Ittoqqortoormiit to Cap Hoegh and installation in the cabin.

Aug. 24[:] Coring at Little Auks Lake (unformal name – Fig. 1. A.b ,2 and 7). This is lake about 3km from the cabin, we had to carry on a part of material, knowing that the zodiac boat and corer were



dropped the day before. We made a bathymetry of the lake (max depth 25m) and then we tried to make a first core. This first core was very difficult to sample because, at about cm deep in the 30 sediment, there was a very compact clay level. So the tube of the corer was stuck in it and it was impossible to remove the tube. Finally we have pulled it from the shore and we succeeded in

removing the corer. Then we tried carefully another core, however it was impossible to pass through the clayey level and finally we obtained a short core of only 30 cm. We have tried many other times but we had some troubles with a rocky layer (probably collapsed from the cliff). Finally we were quite lucky to succeed at least in one try, knowing that clayey and rocky layers were a real problem for achieving the coring. At the end of the day, we went back to the cabin with material. We have transported the boat still inflated until a neve (Fig. 1. A.c), using it to carry on the material down to the beach. On the sea shore, we were only 1 km from the cabin and we paddled to it.





Aug. 25. We have checked the drone and make some tries over the cabin (Fig. 3). Then we have made a first survey of the 3 cabins at Cap Höegh. We went also to the archaeological site 1 km east from the cabin (Fig. 1. A.d). Tent ring structures seen last year were still visible (Fig. 4) and we have also seen a winter dwelling site which was covered by snow and invisible last year (Fig. 5).

Aug. 26 and 27. We have finished the survey of summer and winter dwellings by the mean of the drone. We didn't touch at the ruins. There was no artifact in and out the ruins, only some seal bones around the winter dwelling.

Aug. 28. We went to the little auks breeding site above the cabin (Fig. 1.A.d). We had to pick up a video

camera for Ander Mosbech (Department of Bioscience, Aarhus University) and brought it to the cabin. At the foot of the colony, we have noticed a large zone of green moss fertilized by birds' feces.



So we have a 40 cm deep **monolith** in this moss accumulation (Fig. 5). Pollen and macro-remains analysis will be performed on this sequence and this will help us to complete the results of Little Auks Lake analysis.

Aug. 29. We went back by boat to Ittoqqortoormiit (Fig. 6).

Aug. 30. Rest at the guesthouse.

Aug. 31. Rainy, windy and cold day... we stay at the guest house.

Sept. 1. Rainy day... we have carried on boat and corer to the lake 2 km north of Ittoqqortoormiit.

Sept. 2. Coring at the Walrus Lake (located in Walrus bay). The lake was 35m deep. We have performed two cores. Contrary to Little Auks Lake, there was no tough

layer to pass. Sediment at the basis of the core was guite sandy and it was difficult to retrieve the



sediment without the technical help of the core catcher.

Sept. 3. We have packed our material in boxes and put it in Nanu Travel containers, except the cores which were brought back with us. Boxes with boats and peat monolith arrived in December 17th.

Sept.4. Flight from Ittoqqortoormiit/Constable point to Reykjavik.

Sept. 5. Flight from Reykjavik to Paris.

Fig. 6. Sites locations; A. Cap Hoegh, B. Ittoqqortoormiit **First results:** We have recently opened the cores retrieved this summer. Cores from Walrus Lake made show a silty laminated sequence. Core made at Little Auks Lake is short but stratigraphy is very interesting (Fig. 7). The tough layer at the basis of the core is made of compact clay, and then there is laminated sediment ending by a detrital layer. The last part, at the top is made of dark/greenish sediment, probably related to Little Auks feces releasing in the lake, which suggest a recent installation in the catchment. First XRF results reinforce this interpretation: sulfur, coming from organic matter decomposition, reaches high values on the top while Titanium, related to mineral inputs from the catchment, is low. Now we have to check this hypothesis and make radiocarbon dates. Whatever the result, the sequence will be sampled and analyzed (pollen, non-pollen palynomorphs, sedimentological, geochemical analyses and DNA analyses). The same kind of analyses will be made on Walrus Lake. Pollen and macrofossil analysis will be tried on the monolith. Photographs obtains with the help of the drone will enable a spatial study of the archaeological site. We know that this area was settled from 1400 to 1850 by Thule hunters. We are currently working on it with a phogrammetry software and we hope to date dwellings according to their typology.



Fig. 7. Core from the Little Auk Lake and XRF analysis (Sulfur and Titanium)