The northernmost sampled rocks (83.68407°N) and preliminary geological and geomorphological data from recently discovered “islands” located between North Greenland and the North Pole

Denis M. Schlatter[1*], Martin Nissen[2]

1) Helvetica Exploration Services GmbH, Zürich, Switzerland (*http://www.helvetica-exploration.ch)

2) Office for Earth Observation, Agency for Data Supply and Infrastructure. Ministry of Climate, Energy and Utilities, Copenhagen, Denmark

At 83.66249° N, Inuit Qeqertaat (Kaffeklubben Ø) is located in the Arctic Ocean, just north of the northernmost point of Greenland, Cape Morris Jesup. Further north several islands have been reported, however it has been debated, which of them are real islands, which are ephemeral “islands”, and which represents the northernmost real island. In 2021 the “Around North Greenland” expedition resulted in the discovery of the northernmost “island”, Qeqertaq Avannarleq (Leister Island 2021) at 83.68407° N, whereas the follow-up expedition “Go North” (2022) confirmed that this and previously discovered “islands” did not qualify as islands, due to the non-permanent feature of these short-lived islets. Hence the northernmost island of the world, thereby also the northernmost border of Greenland, is still Inuit Qeqertaat with a size of 825 x 270m.

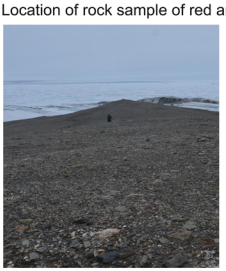
Field work comprised airborne LIDAR surveys, geodetic measurements, sea ice measurements, gravimetric measurements and echo sound measurement of the depth of the Arctic Ocean, as well as establishing precise GPS locations. These surveys showed that the Qeqertaq Avannarleq and smaller “islands” in the vicinity, lack a rock basement, and their surfaces are debris-covered ice island fragments. This debris possibly represents a former medial moraine of the glacier from which a piece is broken off. By contrast, the larger Inuit Qeqertaat shows continuity with a rock basement, hence is classified as an island.

Our field work in the summer of 2022 also consisted of collecting five rock samples that were analyzed for geochemistry, showing a large variety with different contents of e.g. Fe and Al. By contrast one rock sampled from Inuit Qeqertaat shows distinct differences in the geochemical contents compared to the four samples from the Qeqertaq Avannarleq by having elevated REE and interestingly also a slight anomalous gold content of 16 ppb.

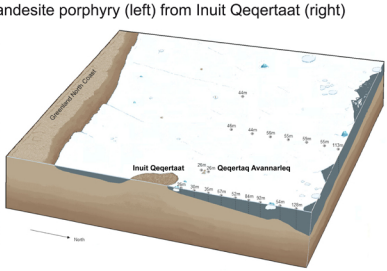
Our geological field work of 2022 revealed that the surface of Inuit Qeqertaat is covered by large amounts of glacial boulders of red andesite porphyry. The four rock samples from glacial boulders from the Qeqertaq Avannarleq show a large variety of rock types, supporting that these are glacial debris. The surface of the “island” also comprises sandy areas with mud cracks, and some patches of about 10x10 m of glacial moraine material, with erratic blocks of various sizes up to 1.2 x 1 x 1 m.

Inuit Qeqertaat (Kaffeklubben Ø)

Location of rock sample of red andesite porphyry (left) from Inuit Qeqertaat (right)



Inuit Qeqertaat looking in the direction of the North Pole, scientist for scale



Cross section showing rock basement, ice thickness and ocean depth, as well as continuity with a rock basement of Inuit Qeqertaat (right)

Leister Island 2022

Qeqertaq Avannarleq (Leister Island 2021)

Qeqertaq Avannarleq (top). Sandy areas with mud cracks (middle). Location of a glacial block rock sample (bottom)

Bennike, O. & Shea, J. 2019: Polar Record 55: 14–24

Leister Foundation (ed.) Leister, C., Lassen, H., Breum, M., Nissen, M., Thor, S., Rasch, M., Forsberg, R., Elberling, B., Priemé, A., Schneider, T., Schlatter, D.M., Biersma, E., Rixen, C. & Charrière, J. 2023: 268 pages

21st swiss geoscience meeting 2023 Mendrisio