Non-Technical Project Proposal Summary CASE 16: 02.01.2014

- ***Project Title:***
  CASE 16 – Alexandra Fiord

- ***Researcher's Name and Affiliation:***
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- ***Project Location:***
  Area between Bay Fiord/Strathcona Fiord in the west, Dobbin Bay in the northeast, Cadogan Inlet in the southeast and Stenkuhl Fiord in the southwest.

- ***Timeframe:***
  20th of June 2014 – 20th of July 2014

- ***Project Description:***
  - ***Purpose:***

Since the beginning of Earth´s history, the development of our planet is dominated by change and evolution. Especially the continents and oceans changed and drifted through time, and the recent geography of our world is just a snapshot of a long development: some 90 million years ago, there was no Arctic Ocean and no North Atlantic, and North America, Europe and Asia have been unified within a large, ancient landmass called Laurasia. The major task of the BGR-project CASE (Circum-Arctic Structural Events) is the examination of the recent circum-Arctic continental margins and the processes who resulted in the break-up of Laurasia and finally in the formation of the Arctic Ocean.

Geoscientists of the BGR are working on the onshore geology in the circum-Arctic land masses where the rocks and their structures and deformations can be directly observed. Like surveyors of car-accidents, the structural geologists try to find out the reason and the process of the "accident" by examination the structures of the "crush-collapsible zones" along the recent continental margins, for example, e.g., the western margin of the Barents Shelf and the northern margin of Greenland/Ellesmere Island. The observation of tectonic structures like folds or thrusts enables the structural geologist to interpret the direction, the process and the intensity of a collision of two plates. With the help of palaeontologists, the collision can often be dated.

Because the answers cannot be found only in a small part of the Arctic, e.g. Svalbard, examinations have to be extended to see new rock units, structures, metamorphic mountain ranges or sedimentary basins. In geology, it is not possible to make new big theories just by reading papers. One has to go in the field, and by following the Arctic coasts, the process of learning and getting knowledge is continuing and increasing from expedition to expedition. The

more we can examine, the more we will know about the evolution of the Arctic. This is the reason why geologists of BGR are working consequently from Svalbard across North Greenland to Ellesmere Island.

- ***Project objectives and goals:***

During the planned field work we would like to fill a gap or link between our study areas in the north (expeditions 1998, 1999 and 2000 in the area between Allman Bay and Judge Daly Promontory) and in the southwest (expeditions 2004, 2008 and 2011 in the Vendom Fiord/Strathcona Fiord areas). One of the major research problems will be the question, if there is a major fault (Wegener Fault) between Ellesmere Island and Greenland or not. This question is a key issue and of major importance for the interpretation and reconstruction of the plate tectonic configuration and development during the Eurekan Deformation in Tertiary times. Most of the geologists and geophysicists suggest that a lateral transform fault exists connecting the spreading centers of the Eurasian Basin and Baffin Bay through Nares Strait, Kane Basin and Smith Sound is necessary. But there are other colleagues who deny the existence of the Wegener Fault and call the fault zone “a myth”!

Another objective of CASE expedition is sedimentological observations in the Late Cretaceous and Tertiary basins between Stenkul Fiord and Allman Bay area to compare the different development of the fine grained Tertiary deposits west and directly north of the Inglefield Uplift (Stygge Glacier) and the coarse conglomerate successions of the Allman Bay area. In addition, the Cretaceous and Tertiary coal occurrences on Bache Peninsula and Allman Bay shall be compared with the coal seams in the Vendom Fiord/Strathcona Fiord areas.

An third important target is the searching for volcanic ashes in the Cretaceous and Tertiary sediments along the Eurekan Fold-and-Thrust Belt. After the first discovery of volcanic ash layers in the Stenkul Fiord Tertiary during CASE 8 in 2004, more bentonites have been detected. Because of the possibility to date these rocks, they are essential both for the stratigraphy and age determination of the deposits and the timing of the complicated Eurekan movements in the Early Tertiary.

- ***Methodology:***

The methods which will be used during CASE 16 are classical geological methods. We will not carry out any drilling. We will take samples from the solid rocks for geochronological, geochemical and microscopic in the home laboratories in Erlangen, Hannover and Iowa. The structural inventory of the rock units will be measured with special geological compasses.

- ***Method of transportation:***

The transport of personnel, food, fuel and equipment from Resolute Bay to Alexandra Fiord and back will be carried out by Twin Otters. The field work will be carried out from this base camp. The field work will be supported by helicopter during the entire expedition. The helicopter will be

used for geological field work: the study area is very big, and the helicopter will be mostly used to bring the field parties in the field in the morning and fly them back to the base camp in the evening.

- ***Any structures that will be erected (permanent / temporary):***
  The base camp of CASE 16 with maximum 12 people at the same time will be situated at the old RCMP-station and landing strip at Alexandra Fiord. We will not erect permanent buildings or structures but only a temporary camp with kitchen tent, mess tent, storage tent and sleeping tents. If it is possible we would like to use the cabin of the RCMP at Alexandra Fiord.

- ***Restoration / abandonment plans:***
  The base camp will be erected on non-vegetated grounds near the RCMP-station Alexandra Fiord. After field work, all the tents and equipment as well as empty fuel drums will be removed and transported by Twin Otter back to Resolute Bay. As it is not proposed to install a fuel depot, we do not need to remove an entire depot by the end of the field trip. The fuel will be transported from Resolute Bay to Alexandra Fiord just in time, when we need it. The garbage will be burnt or collected and transported back to Resolute Bay.

- ***Indicate why specific communities or individuals were selected for your research:***
  We would like to engage two Inuit polar bear monitors from Resolute Bay for our field work because most of the geologists do not have licenses for guns. The Inuit should observe the landscape for polar bears or muskoxen especially during the work in the field.