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Amendment to NWB Licence 3BC-PRO 0914 Type "B"

Amendment type: Change of field campsites

Project title: *Provenance of clastic sediments in the Sverdrup Basin, Canadian Arctic Islands*

Primary Investigator: Dr Helen Smyth, CASP

SUMMARY

The purpose, goals and objectives outlined in the original licence paperwork have not changed. The amendment required is a change to the proposed camp sites.

Study type: Geological fieldwork (methodology provided below) involving small temporary "fly camps" 4 to 6 people and no permanent structures.

License number: 3BC-PRO 0914 Type "B"

Date issued: 17th June, 2009

Expiry date: 1st November, 2014

Reason for amendment: Change in camp location on Ellesmere Island

Area covered by original application: Fosheim Peninsula (2009 application)

Original Camp A. Canon Fiord Camp (Latitude 79.833°N, Longitude 82.50°W)

Original Camp B. Notch Lake Camp (Latitude 79.50°N, Longitude 83.167°W)

Area covered by 1st requested amendment: Raanes Peninsula, Ellesmere Island (2010 application)

2010 Camp A. Blind Fiord, Raanes Peninsula (Latitude 78.25° N, Longitude 85.50° W)

2010 Camp B. Trold Fiord, Raanes Peninsula (Latitude 78.70° N, Longitude 84.45° W)

Area covered by this (2nd) requested amendment: Fosheim Peninsula, Ellesmere Island (for field season in 2012).

- This area is key to linking together geological datasets from previous CASP field seasons at Lake Hazen, Slidre Fiord and on the Raanes Peninsula.

- The field area is located ~400 km northwest of Grise Fiord, and approximately 60 km to the east of the airstrip at Eureka (Slidre Fiord).
- The area of interest is shown on the accompanying map and the proposed locations of camp sites shown. The study area is bounded to the north by Canon Fiord and to the south by Vesle Fiord and Eureka Sound.
- The area will be accessed by Twin Otter and helicopter from Eureka Airstrip.
- The expedition will have low environmental impact, as following initial drop-off at campsite (either by helicopter or by Twin Otter) the group will travel by foot (no motorised vehicles will be used).
- **NTS Map Sheets:** 049H, 049G, 340 B02, 340 B03 and 340 B04 (scale 1:250,000)

AMENDED CAMP SITE A. Disused air strip to the west of Sawtooth Range 79°32'24.361"N, 84°6'19.294"W

AMENDED CAMP SITE B. South of Mount Bridgman 79°49'42.917"N, 82° 34'22.747"W

AMENDED CAMP SITE C. Southeast of Mount James 79°11'51.44"N, 83°2'48.631"W

TIME FRAME

This project is part of a long-term CASP research programme in the Arctic. Work will only be undertaken in the Spring/Summer months with field seasons lasting from 6 to 10 weeks. The teams in the field will range from between 4 and 6 people.

CASP will update the NWB with details of dates entering and leaving the field when final logistical programme is confirmed.

PROJECT DESCRIPTION

Purpose, goals & objectives

The field programme aims to build on previous CASP research and existing published information (Geological Survey of Canada and other workers).

- The main aim of this research is to characterise the nature and origin of sediment within the Sverdrup Basin.

- The aim is to make detailed field observations and measurements, and in addition to undertake sampling for sediment provenance analysis (sandstones), with a complementary palaeontological sampling programme (permit pending) to allow correlation across the basin.

- Other objectives are to compare the stratigraphic succession on the northern and southern margins of the Sverdrup Basin, to test existing sequence stratigraphic interpretation and facies models, and to collect a sample set with which to quantify the uplift and burial history of the Mesozoic and Cenozoic successions.

Method of transportation: Twin Otter flights, helicopter transport within field areas (approximately 2/3 days per season), and most access will be of low environmental impact as it will be on foot.

NO PERMANENT STRUCTURES WILL BE ERECTED. The field teams will be accommodated in "FLY CAMPS" comprising of approximately 4 sleeping tents and 1 communal tent, all of which will be removed on departure.

METHODOLOGY

We are particularly interested in the character of the sedimentary rocks which were deposited within the Sverdrup Basin between the Late Palaeozoic and the Cenozoic (ranging from around 350 million years to 40 million years ago).

The CASP programme of geological fieldwork involves measuring, observing, photographing and sampling the rocks found at the surface (no drilling, trenching or digging required). Examples of some of these are provided below:

Geological measurements: e.g. thickness of units and their orientation (flat lying or tilted)

Visual observations and descriptions: type of rock (e.g. sand or mud), environment indicators (e.g. marine or fresh-water, fossil evidence) and evidence of deformation (e.g. folds and fractures).

Our research is focused on the examination of the minerals within sandstones. Sandstones are the product of erosion of pre-existing rock types, and the minerals within the sandstone can help us to determine the types of rocks from which they came and their original location. We can build a picture of the landscape over time and in doing so determine where ancient mountains, rivers and oceans were located and how this changed over time.

In order to determine when the rocks were deposited we will search for fossils (permit pending) to provide age constraints for the rocks examined. Fossils can also aid our interpretation of environment in which the rocks were deposited (e.g. marine or fresh-water).

We will also collect igneous rocks which may also provide age information through isotopic analysis (in collaboration with the Geological Survey of Canada and the University of London).

DATA AND REPORTING

On return from fieldwork, analyses will be undertaken on the data and samples collected. The main focus of our research is sediment provenance analysis (i.e. examining the minerals which make up the sandstones). In order to do this we will:

- examine the samples under the microscope (CASP)
- analyse the composition of the minerals (CASP)
- date some of the minerals by examining their isotopic ratios (in collaboration with the University College London and the Geological Survey of Canada)

The results of these analyses will initially be documented in internal CASP reports. We are currently in discussion with the Geological Survey of Canada (point of contact Jim Haggart) to provide copies of all CASP internal reports related to research in Nunavut, under the terms of a MOU (Memorandum Of Understanding).

Data from previous field seasons are currently being prepared for publication through the GSC (Current Research and Open File Reports) and for publication in international peer reviewed scientific journals. Copies of all papers will be provided to NRI and PCSP, copies will be supplied to NWB if requested.

Reporting to the communities

The preliminary findings of the research programme were presented in June 2010 during an open meeting in Iqaluit, Baffin Island. Further presentations will be arranged for the communities of Resolute and Iqaluit during 2012.

Figure. Topographic map of the Sawtooth Range and Wolf Valley on the Fosheim Peninsula, Ellesmere Island. The map shows the proposed base camp locations (NTS map sheets 049G, 049H, 340 B02, 340 B03 and 340 B04. The area of interest is shown by the red polygon