Field Report NRI License # 02 023 13R-M

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

Scientific Research License Number: 02 023 13R-M

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Fieldwork Dates: June 29th to August 08th 2013 (Resolute In, Resolute Out)

Fieldwork Location: Sawtooth Range, Ellesmere Island

Field Activities:

Large parts of the Canadian Arctic Islands consist of sedimentary rocks, which were deposited in an ancient ocean basin called Sverdrup Basin. CASP has a longstanding interest in the depositional history of these sedimentary rocks, particular in the depositional history of sandstones. The composition and age of mineral grains in sandstones are characteristic for their source region and their transport history. This means that sandstones fingerprint their origin and the way of transport. Understanding this fingerprint will help us to understand how the Canadian Arctic Islands evolved during time. Because sediments can be transported hundreds of kilometres, locating the different sediment source areas and patterns of sediment transport will refine our understanding of how the Canadian Arctic Islands are linked with other Arctic regions such as Alaska, Greenland and Svalbard.

During the summer of 2013 we set up two camps in the Sawtooth Range. Camp A was located in the NE Sawtooth Range (79˚ 53.043' N, 82˚ 26.414' W) and Camp B on the mid-western Sawtooth Range (79˚ 35.799' N, 83˚ 39.945' W). The Sawtooth Range is an excellent study area, because a thrust fault tilted and exposed almost the entire Sverdrup Basin strata. This enabled us to measure four sections, each of up to 2 km length, on the eastern and western side of the Sawtooth Range. All sampling sites were within walking distance to our camp. Sampling involved walking, describing rocks and outcrops, photographs of outcrops, and the collection of small samples from the ground surface. Additional, spot samples were collected on various localities on Ellesmere Island and Axel Heiberg Island during four days of helicopter supported work. This part of the season was based in Eureka and done in cooperation with Professor Graham Pearson from the University of Alberta.

Data collected are as follows:

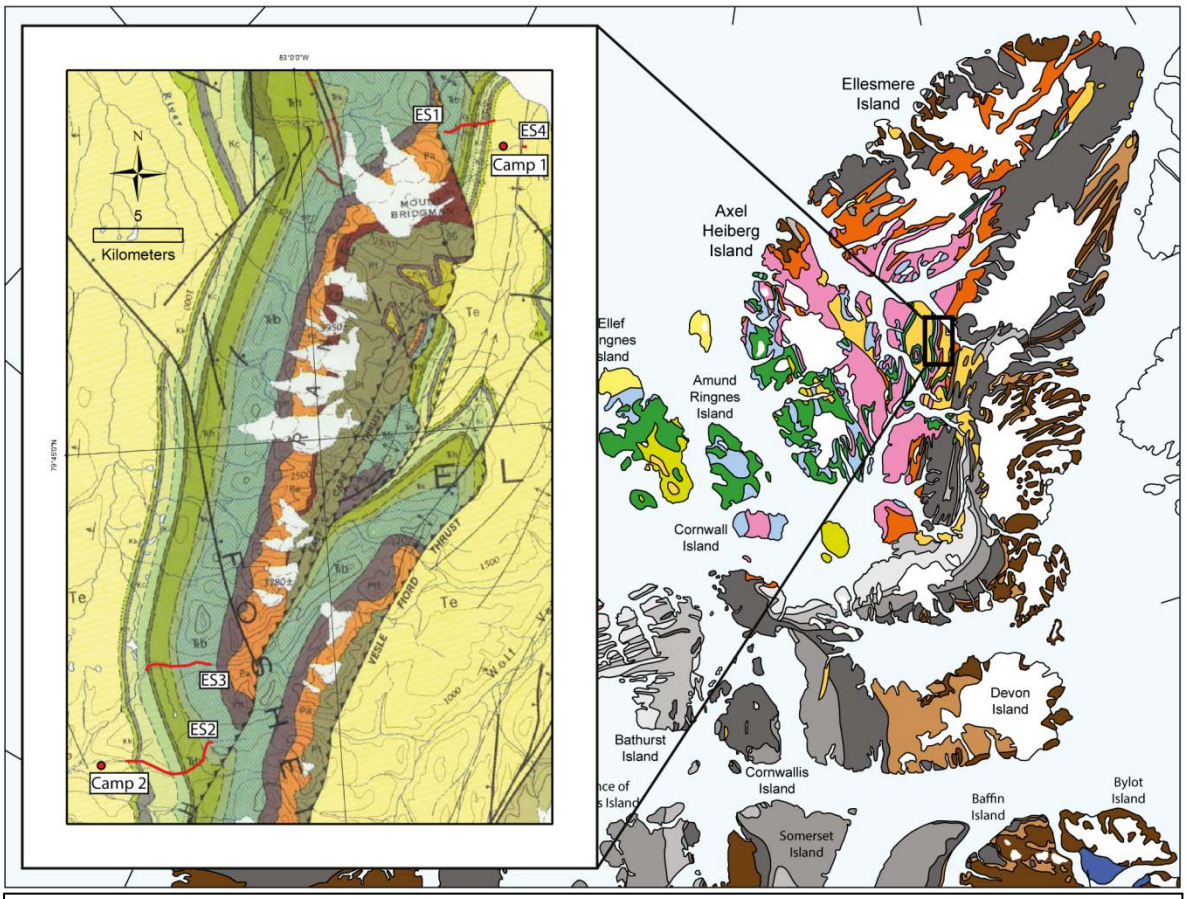
- 4 sections totalling more than 3600 m of sedimentary strata and ranging in age from Triassic to Paleogene were measured.

- Sediment samples were collected from the four sections and during four days of helicopter supported work.
- Sediment samples were collected for a variety of purposes. These include analysis of sandstone composition, geochemical analyses for palaeoenvironmental studies and isotopic dating of volcanic ash beds found in parts of the sedimentary succession.
- Fossil samples were collected for palaeoenvironmental studies and to provide a biostratigraphic framework (time frame).

Samples are currently being prepared for analysis. The data then will be integrated in results from previous field season on the Canadian Arctic Islands.

The field season was very successful. This was due to mostly good weather but more importantly due to excellent logistical preparation. Logistics were provided by PCSP, who assisted before and during the fieldwork. Our team was transported by Twin Otter from the PCSP headquarters at Resolute Bay, Cornwallis Island, to the Eureka airstrip on Ellesmere Island. From Eureka the team was transported into the Sawtooth Range by helicopter. One helicopter supported camp move within the Sawtooth Range was successfully carried out approximately mid-season. At the end of the season, the helicopter returned the team back to Eureka prior to departure by Twin Otter for Resolute Bay.

Fieldwork location map:



The larger map shows the location of our study area on Fosheim Peninsula, Ellesmere Island (modified after Okulitch, 1991). Locations of our camp sites and sections (ES1 to ES4) in the Sawtooth Range, Fosheim Peninsula, are displayed on the smaller map (after Thorsteinsson, 1971).

Photographic examples of campsites, outcrops and fossils:

Camp A: Five sleeping tents and one cooking tent. All food and garbage was stored in blue barrels outside the kitchen tent. The latrine pit is located out of view behind the next terrace.

A. Overview of the Late Cretaceous-Paleogene succession in Section ES2 (see map). **B.** Volcanic ash beds found in the marine black shales of the Kanguk Formation. **C.** Sphenoceramid marine bivalves found in the black shales of the Kanguk Formation.