

# GEOLOGICAL MAPPING AND RESEARCH IN THE ARCTIC

Svalbard, which is one of the easiest accessed areas in the Arctic, presents an exceptional geological diversity within a relatively small area. Although most of the land is covered by glaciers, Svalbard is one of the few places in the world where nearly the entire Earth's history is exposed and relatively easy assessable. Another aspect of the geology of Svalbard is the presence of sedimentary successions that are rare or do not exist in other places in the northern Europe.

## BEDROCK MAPS OF SVALBARD

Approximately 80 % of Spitsbergen has been mapped to the scale of 1:100,000. Locally regional maps are published at the scale of 1:200,000 - eastern areas, 1:50,000 - Bjørnøya. Other map products include overview maps (1:750,000) and various topical maps at smaller scales. Quaternary and geomorphological maps and excursion maps are produced for selected areas. The maps are published together with extensive area descriptions, and all geological data are stored in GIS digital database for Svalbard which is under continual development. NPI's geological map and GIS production is a service function for research, education, administration and the public.



Geology field camp at Dicksonfjorden, Central Spitsbergen

## GEOLOGICAL RESEARCH

During the last decade NPI has carried out geological research within the Devonian, Carboniferous and Permian sedimentary superstructure of Svalbard. In order to facilitate research, various national and international research projects are organized within the framework of a comprehensive research program. The individual projects focus upon various lithostratigraphic units within the sedimentary record, comprising the Devonian Old Red Sandstone,

Carboniferous warm-water carbonate platforms as well as Permian temperate, mixed quartzitic-carbonate shelf strata. Investigations comprise various multi-proxy analyses in order to reconstruct sea-level fluctuations. Pre-Caledonian (basement) rocks occupy one-third of Svalbard and are exposed in the west and north of the archipelago. Petrological, structural and geochronological investigations have been taking place for many years in logistic combination with the geological mapping program.



The geological framework of Svalbard has much in common with that of the Barents Sea. Although Svalbard probably has no significant hydrocarbon resources, it is used as a geological reference area by oil companies which are prospecting for oil and gas below the Barents Sea.

## NEW PRODUCTS

NPI is currently preparing a **Geoscience atlas of Svalbard**. The atlas will present a comprehensive compilation of the current knowledge and data of the geosciences of Svalbard, covering topics like physiography, ocean currents, sea ice, land surface, glaciology, bedrock geology, geophysics, geochemistry, geo-resources

and physical environment. The atlas will be illustrated by maps, field photos, diagrams, cross sections, tables.



The naked landscape of the archipelago is cut through by fjords and valleys which result in a three-dimensional exposure of the geological record. This makes Svalbard well suited to illustrate geological processes and structures, and thus a great place for geological excursions and field courses.



Geological map data are collected during field expeditions and through co-operation with international research groups. Field work is often based on helicopters due to the lack of infrastructure.



Devonian sedimentary rocks, Verdalen Andree Land.

