

Bjørnøya - a window into the Barents shelf

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The small island of Bjørnøya ("Bear Island", only 178 km² in area), situated near the Barents Sea's western margin midway between northern Norway and Spitsbergen, shows a Precambrian to Triassic succession in a continuous series of spectacular cliff exposures. The Stappen High, on which Bjørnøya rests, was a positive Late Paleozoic feature; it then subsided in the Mesozoic and was again uplifted in the Cenozoic. The sedimentary succession exposed on the island itself ranges from the Upper Precambrian to the Upper Triassic, with a composite thickness approaching 3 km. Significant unconformities define the boundaries between three main depositional complexes: viz. the Pre-Devonian economic basement, the Late Paleozoic basin and the Permo-Triassic platform.

The extensive northern plain of Bjørnøya generally undulates between 20 and 50 m above sea level, with a labyrinth of rock fields, marshes and small lakes and the succession is best studied in coastal cliffs with spectacular exposures. The south and southeastern part of the island is a rugged mountainous terrain dominated by basement exposures. Mountaintops in this area show almost flat-lying exposures of the Permo-Triassic platform sequence unconformably overlying all older units; however Late Paleozoic half-grabens are locally developed. Triassic strata - the youngest pre-Quaternary deposits preserved on the island - are exposed in three conical peaks on the Miseryfjellet massif, with youngest Carnian deposits preserved at 536 m above sea level.

The Devonian and Carboniferous coal-bearing Røedvika and Nordkapp formations are dominated by sandstones and occur in local grabens where they may provide combinations of stratigraphical (pinch-out and truncation) and structural traps, with structuring provided by mid-Carboniferous rifting. The overlying conglomerates, sandstones and limestones of the Landnørdingsvika, Kapp Kåre and Kapp Hanna formations are generally tightly calcite cemented in exposures on Bjørnøya. The bioherms and associated dolomites of the Kapp Dunér Formation are porous bodies that are associated with bituminous limestones with an interesting source potential.

The overlying limestones of the Hambergfjellet Formation appear to have been formed in cooler water transgressive regimes and are characterized by pervasive marine calcite cementation leaving no effective reservoir potential. Uplift in the latest Permian was apparently accompanied by regional regression and at this time the silica-cemented sandstones and limestones of the Miseryfjellet Formation with its shelf carbonates were subaerially exposed. The youngest rocks on the island are 200 meters of Triassic shales and sandstones capping the highest mountain.

A synthesis of all recent work will be presented on the excursion following the *Geoscience World Congress 2008*, comparing and contrasting the development of Bjørnøya with the surrounding Barents Shelf.

< Back