The Rollrock Section - the most comprehensive Jurassic-Cretaceous boundary section of the Canadian Arctic Islands

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The Sverdrup Basin of Arctic Canada contains strata of Late Palaeozoic to Mesozoic age. The Deer Bay Formation, a lithostratigraphic unit in the upper part of the Sverdrup Basin succession, is up to 970 m thick and generally considered to be of Tithonian to Late Valanginian age. The Rollrock Section on northern Ellesmere Island, NE Canadian Arctic, Nunavut, exposes more than 500 m of mud- and siltstones of the Deer Bay Formation. Despite being located beyond the depocentre of the basin, the section was previously identified as the most important Jurassic-Cretaceous boundary section of the Sverdrup Basin in terms of macrofossil evidence. We revisited the Rollrock Section in summer 2015, producing a detailed log. 345 mudstone samples were taken at 1.5 m intervals, for micropalaeontology, palynology and geochemistry. Preliminary results of our study are presented here.

The base of the mudstone succession is not exposed. At the top, the contact with the fluvial-deltaic sandstones of the overlying Isachsen Formation is gradational. Over much of the succession, supposedly cyclic intercalations of sideritic concretions were recorded. Macrofossils, particularly ammonites and bivalves of the genus Buchia, were found in nine of these concretion horizons. Only five fossiliferous horizons had previously been documented. The newly obtained fossils include the best-preserved dorsoplanitid ammonites ever collected from the Canadian Arctic, among them a giant, >40 cm-sized specimen.

The fossil assemblages provide evidence for Early (?), Middle and Late Volgian (= Tithonian to Early Berriasian) ages, corresponding to the Buchia rugosa to B. unschensis biozones. Unlike in the western part of the Canadian Arctic, no Valanginian ammonites or Buchia keyserlingi were found. However, horizons with glendonites in the higher part of the Rollrock Section are tentatively correlated with similar, well-dated horizons of Valanginian age on Ellef Ringnes Island. The higher part of the succession further contains abundant dropstones indicating a cold seasonal climate with floating ice during much of the latest Jurassic and earliest Cretaceous. Microfauna, palynomorphs, δ13C isotope values and TOC need to be analysed, to assess the presence of a 'Berriasian hiatus', which was proposed for the eastern Sverdrup Basin in the literature. Integrating these data with ammonite and Buchia zones will result in a refined biostratigraphy for the Deer Bay Formation, and will lead to a better understanding of the palaeoecology and palaeoclimate of the Jurassic–Cretaceous boundary interval in the Arctic.