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The Lower Cretaceous strata in Svalbard and the Barents Sea; basin infill dynamics and palaeobathymetry

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Data from cliff sections on Svalbard and seismic sections from the Barents Sea indicate an Early Cretaceous depositional system of far greater reach than the Svalbard archipelago, with a source area to the northwest of Svalbard and a basin deepening to the southeast in the western Barents Sea. Seismic imagery shows large-scale, low-angle clinoforms that demonstrate progradation of shallow-marine clastic deposits hundreds of kilometres into the present day Barents Sea, sourced from areas near the High Arctic Large Igneous Province (HALIP) to the northwest. Field data and seismic imagery are coupled to map architectural patterns that provide information on basin physiography and scale. The results of the study show that the sediment infill of the epicontinental basin was largely controlled by availability of accommodation space, and how the formation of localized syn- and post-depositional troughs and highs altered the position and orientation of the Early Cretaceous shoreline, and thereby its corresponding facies distribution. The Early Cretaceous accommodation space covering a wider part of the Barents Shelf, was created by regional subsidence of a possible deep-seated origin. In the SW Barents Sea additional accommodation space was formed by prominent rift events during Late Jurassic-Early Cretaceous times. Cenozoic uplift and erosion, increasing northwards, has removed most of the Lower Cretaceous strata in the NW Barents Sea. Thus, a direct tie between the prograding units in the southern Barents Sea and the exposed more proximal Lower Cretaceous strata on Svalbard is not possible. An on-going analysis of seismic profiles along with well data will provide new constraints for estimating palaeo-water depths and facies distribution for the Cretaceous in the Barents Sea.