



The driving force of changes in sea surface waters in the High Arctic during the Early Cretaceous

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The generally warm Cretaceous (c. 145-66 Ma) climate culminated in the mid Cretaceous Hot Greenhouse climate (95-85 Ma). Another characteristic feature of the Cretaceous period is a high number of Oceanic Anoxic Events (OAE) related with major carbon cycle perturbations. While the Lower Cretaceous successions from equatorial region and middle latitudes are relatively well studied, sections from High Arctic settings are sparse and occasionally suffering from poor age constrains.

The present study was performed within the LoCrA (Lower Cretaceous Basin Studies in The Arctic) consortium and focused on the Lower Cretaceous succession on Spitsbergen (this study) and the Barents Sea. The Lower Cretaceous succession on central Spitsbergen is divided into: the Rurikfjellet, Helvetiafjellet and Carolinefjellet formations. Each formation was deposited under different environmental conditions, ranging from open to shallow marine (Rurikfjellet and Carolinefjellet formations) to fluvio-deltaic (Helvetiafjellet Formation).

Our improved age model (based on palynology, microfossils and organic stable carbon isotopes) for the Rurikfjellet and Helvetiafjellet formation confirms that these two units span the Valanginian to lower Aptian. Dinoflagellate cysts (dinocysts) are excellent for biostratigraphy as well as paleoecology. Dinoflagellates, forming the primary component of marine plankton, are sensitive to various environmental factors: temperature, salinity, nutrient availability, etc. Within the studied interval a number of dinocyst events occurs, which appears to be synchronous between Spitsbergen and other high-Arctic basins (e.g. in Greenland and Arctic Canada). However, some of the characteristic Early Cretaceous dinocyst taxa, are either absent or only observed locally. Here, we investigate if the changes in the dinocyst assemblages are an effect of the local environmental changes or an effect of the regional to global climate perturbations.