Geophysical Research Abstracts
Vol. 13, EGU2011-6945, 2011
EGU General Assembly 2011

Late Carboniferous cyclic carbonate platform deposits from the Franklinan Shelf: from Svalbard to the Sverdrup Basin

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During the Late Paleozoic most of the present-day Arctic regions, including the Canadian Arctic, Greenland, Svalbard, and Arctic Russia, formed a continuous, west-east-oriented shelf area at the northern rim of Pangaea. Important Late Paleozoic depositional centers are preserved in the Canadian Arctic (Sverdrup Basin), NE Greenland (Wandel Sea Basin), Svalbard, the Barents Sea and Arctic Russia. Due to their close paleogeographic proximity these basins contain very similar sedimentary successions. Mid-Carboniferous to lower Permian deposits are dominated by warm-water, shallow-marine carbonates rich in fusulinids, corals, algae, brachiopods and gastropods. These deposits are represented in Arctic Canada by the marginal Nansen Formation and on Svalbard by the Wordiekammen Formation. Both formations include shallow-marine to peritidal strata that are characterized by a pronounced cyclicity, formed by vertically stacked parasequences of up to several meters in thickness. The cyclic appearance results from fluctuations in the thickness of southern Gondwanan Polar ice-caps that caused global sea-level changes at a scale of more than 100 m. Similar, high cyclic appearance of different orders also occurs in other Upper Paleozoic deposits all around the world. Large-scale regressive-transgressive cycles have been successfully correlated nearly worldwide, and are also recognizable in the Nansen and Wordiekammen formations.

Although previous authors already mentioned that the Upper Carboniferous successions of the Sverdrup Basin and of Svalbard appear very similar and probably exhibit the same cyclic stratigraphy, a direct cycle-by-cycle correlation has not been accomplished to date. This is because all previous studies concentrated on one area only, either the Sverdrup Basin or Svalbard, which hampers detailed comparisons. This project aims to provide a first documentation and analysis of Upper Carboniferous deposits in both regions. The application of the same investigation methods and concepts, i.e. facies analysis, biostratigraphy and cyclostratigraphy, for both regions will allow much more detailed correlations and interpretations.

In this study we will concentrate on the comparison of the general appearance of individual cycles and of the various microfacies types in both regions. Further investigations will include a thorough investigation of the biostratigraphically relevant fossil groups, like fusulinids and conodonts.