Chronostratigraphy and paleoenvironmental change in the Makarov Basin of the western Arctic Ocean during the last ~1 Ma

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Establishing an accurate chronostratigraphy is essential in reconstructing paleoenvironmental changes in the Arctic Ocean. This requisition, however, has been impeded by the lack of biogenic remnants such as calcareous and siliceous microfossils, as well as alteration of paleomagnetic properties by post-depositional processes. Consequently, foundation of chronostratigraphy in the Arctic Ocean has been mostly relying on stratigraphic correlations. This study examines lithological features and physical properties of sediments of gravity core ARA03B-41GC02 collected in the Makarov Basin and correlates with previously studied cores from the western Arctic Ocean, in order to establish an age model that could eventually facilitate a precise reconstruction of paleoenvironmental changes in the western Arctic Ocean. Age control in the uppermost part was determined by AMS ^{14}C dating of planktonic foraminifera and inter-core correlation was conducted in the upper *ca.* 3.8 m of the core which corresponded to MIS 15. Age constraints older than MIS 15 were treated using cyclostratigraphic model based on Mn-$\delta^{18}O$ stack comparison, assuming that brown and high Mn concentration layers represent generally interglacial or interstadial periods. Based on our result, the core bottom corresponds to MIS 28 with an average sedimentation rate of *ca.* 0.5 cm/ky. The first appearance of detrital carbonate, planktonic foraminifera, and benthic foraminifera occurred during MIS 16, 11, and 7, respectively. MIS 16 is known as the coldest glacial period when $\delta^{18}O$ of the LR04 stack first becomes heavier than 5‰; the occurrence of detrital carbonate likely transported from the Canadian Arctic indicates the initial buildup of the large ice sheets in the North America during this time. Since MIS 11 which is known as the warmest interglacial period during the late Pleistocene in the Northern Hemisphere, the appearance of planktonic foraminifera represents the warmer condition during interglacial periods in the western central Arctic Ocean. Additional geochemical and mineralogical proxies need to be conducted for better understanding of depositional environments and sediment provenance as well as transport pathways.