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# The ACEX siliceous microfossils: middle Eocene biogenic silica production and preservation in the central Arctic

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Integrated Ocean Drilling Program Expedition 302, "The Arctic Coring Expedition" (ACEX) provided the first long-core Paleogene sediments from the Arctic. New siliceous microfossil data from the ACEX cores are presented. We offer insights into central Arctic paleoenvironments from a siliceous microfossil perspective spanning a 5 myr interval of the middle Eocene (∼50-45 Ma), at the start of Cenozoic cooling.

In 2004, ACEX recovered 428 m of Late Cretaceous to Quaternary sediments from the Lomonosov Ridge, close to the North Pole. Biogenic silica is preserved between ∼202 and 313 mcd. These relatively expanded lower middle Eocene sediments are finely laminated and rich in endemic marine to brackish (diatoms, ebridians, silicoflagellates) and freshwater (chrysophyte cysts) siliceous microfossils. They also contain abundant palynomorphs (dinoflagellate cysts, spores, pollen) and other organic material but no calcareous microfossils.

Biosiliceous sediments of Late Cretaceous and middle Eocene age have been known from the central Arctic for some time, but up until now information was scarce and stratigraphically incomplete, i.e., Alpha Ridge piston cores. ACEX drilling helped complete most of the stratigraphic gaps and in doing highlighted the first 5 myr of middle Eocene time as being unique in the Cenozoic history of the central Arctic—the only phase of biogenic silica production and preservation during the last 65 myr for this region. We investigate the reasons for this by exploring the paleoenvironment and tectonic setting under which these sediments were deposited, the climatic changes

which affected nutrient supply, salinity and temperature, and the effects of Arctic ice initiation during the middle Eocene.