



## **A 25 Ma gap in the central Arctic Cenozoic record; Why and how?**

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Integrated Ocean Drilling Program (IODP) Expedition 302, a.k.a. the Arctic Coring Expedition (ACEX), drilled >400 meters below the seafloor at the central Lomonosov Ridge, 250 km from the North Pole, in water depths of 1300 m. The partially recovered sediments provide a unique record of the geological and paleoceanographical evolution of the Arctic Ocean during the Cenozoic. The record indicates a transition from a “greenhouse world”, characterized by a relative shallow marine setting, with organic-rich sediment and frequent brackish or even fresh surface waters during the latest Palaeocene and the early Eocene, to an “icehouse world” of hemipelagic sedimentation affected by the occurrence of sea ice from the middle Miocene to present. These two states are separated by a major hiatus, not obvious from the seismic and lithological records, likely spanning at least 25 Ma, as based on dinoflagellate and benthic foraminifer stratigraphies. These testify that probable late early Miocene sediments directly overlie deposits of early middle Eocene age. To unravel “the why and the how” of the hiatus, we performed an integrated micropaleontological and geochemical analysis on sediments surrounding the hiatus. Our multiproxy paleoenvironmental reconstructions suggest brackish to freshwater settings immediately below, and

restricted marine to open marine conditions above the hiatus. In turn, these environmental changes are linked to major tectonic rearrangements including initial (Eocene) closure of the basin, uplift, and Neogene opening and rapid subsidence. Implications of our results will be discussed.