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IODP Expeditions 342 ニューファンドランド沖掘削航海の成果速報
The preliminary results on drilling Paleogene drift sediments off Newfoundland, IODP Expedition 342

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In June and July 2012, the R/V JOIDES Resolution for IODP Expedition 342 drilled the seafloor off Newfoundland. This cruise successfully recovered high quality cores from nine sites (U1403 to U1411) across a depth transect ranging from 3022 to 4944 m water depth. The recovered sedimentary sequence consists of carbonate clay to oozes, recording Cretaceous to Miocene climatic and oceanographic events, including the K/Pg boundary, the Paleocene/Eocene thermal maximum, Middle Eocene climatic optimum, and the Eocene-Oligocene transition.

The shipboard biostratigraphy and magnetostratigraphy provide high-quality age models of the sediments. The models are consistent and correlative between the cores. In all the sites, Pleistocene foraminifer ooze caps the Miocene clay and Eocene calcareous ooze. The pre-Pliocene sediments are dated to 102 to 15 Ma. Sedimentation rates indicate rapid accumulation in middle Eocene (47-40 Ma; $>$ 3 cm/k.y.) and in the Oligocene-Miocene sediments (26-22 Ma; $>$10 cm/k.y.).

The Expedition aims to evaluate changes in the carbonate compensation depth (CCD) through the Eocene hyperthermal events. Shipboard analytical results of the recovered sediments allow us to reconstruct the history of the CCD in the North Atlantic. Carbonate contents in the sediments suggest the CCD was deeper than ˜4.5 km depth through the late Cretaceous to the early Eocene and as deep as ˜4.5-3.5 km after the early Eocene.

Another main objective of the expedition was to obtain high deposition rate records of the transition form the early Eocene climatic optimum ˜50 Ma, though the development of northern hemisphere ice sheets in the Oligocene and Miocene. We recovered expanded records of the middle Eocene that include numerous carbonate accumulation events that are possibly correlative with those in the equatorial Pacific. In the early Oligocene sediments, we found sand-sized lithics, possibly correlating with expansion of ice sheets around Greenland. We also recovered an exceptionally expanded record of the Oligocene/Miocene boundary. Many of the mid-depth sites display well developed lithologic cycles that likely reflect astronomical forcing. Other objectives were to understand overturning of deep-water masses in the North Atlantic and to tune bio- and magneto-stratigraphic events astronomically. We found exceptionally well-preserved calcareous and siliceous microfossils in the sedimentary succession of the cores. The biostratigraphy, magnetostratigraphy, cyclostratigraphy, and geochemistry of the microfossils will provide high-quality data for understanding North Atlantic paleoceanography and calibrating geochronology of the Eocene and Oligocene.

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