Late Eocene–early Oligocene deep-sea ostracode faunas at Integrated Ocean Drilling Program Site U1411, off Newfoundland, northwestern Atlantic

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Under the North Atlantic Deep Water (NADW), modern ostracode faunas are characterized by *Krithe*, *Poseidonamicus*, and *Henryhowella* (Dingle and Lord, 1990, Palaeogeogra., Palaeoclimat., Palaeoeco., 80, 213–235). The NADW faunas are called the "psychrosphere" fauna and considered to have appeared during the Eocene–Oligocene climatic transition (e.g., Benson, 1975, Lethaia, 8, 69–83). Using foraminiferal carbon stable isotopes and Nd isotopes, some studies hypothesize that the NADW was initially formed during the early Oligocene (e.g., Via and Thomas, 2006, Geology, 34, 441–444; Katz et al., 2011, Science, 332, 1076–1079). The formation of the NADW may link with the " psychrosphere" fauna. The formation of the "psychrosphere" fauna is still in controversy (e.g., Dall' Antonia et al., 2003, Mar. Micropal., 48, 91–106). In the North Atlantic, any studies have not studied changes in deep-sea ostracode faunas during the Eocene–Oligocene climatic transition. Here I report ostracode taxa from the late Eocene–early Oligocene ostracodes from Integrated Ocean Drilling Program (IODP) Site U1411, off Newfoundland, North Atlantic, and discuss the faunal changes during the Eocene–Oligocene climatic events.

At Site U1411 (41°37' 5.94" N, 48°59' 59.94" W), three holes were drilled on the seafloor of the Southeast Newfoundland Ridge at 3299 m depth (Norris et al., 2014, Proc. IODP, 342). I took 132 sediment samples of ~20 cm³ volume from silty clay with nannofossils (140 to 235 m CCSF) and nannofossil chalks with foraminifers (235 to 266 m CCSF). Using the planktic foraminferal and calcareous nannofossil biostratigraphy, the core sediments are dated to be ~37.9–33.4 Ma, the late Eocene to early Oligocene (Norris et al., 2014).

Entirely 332 specimens were obtained from 67 of 132 sediment samples. 23 taxa were identified. Through the late Eocene to the early Oligocene, *Krithe crassicaudata* occurs most frequently. *Henryhowella asperrima* and *Platyleberis* sp. are often found. The samples contain *Poseidonamicus pseudorobustus*. The faunas contain the genera diagnostic for the NADW. At ~36.4 Ma, the ostracode abundance dropped off from 1–27 to 1–9 specimens, indicating changes in export productivity. The decrease in the abundance fell in the Late Eocene warming event of Bohaty and Zachos (2003, Geology, 31, 1017–1020). The faunas show no clear changes in taxonomic composition at and above the E/O boundary (33.7 Ma). At ~33.7 Ma, an increase in abundance of *Krithe* is observed and is coincidently with *"Krithe* pulse" in the Massignano Global Stratotype Section and Point in the Tethys Ocean (Slotnick and Schellenberg, 2013, Mar. Micropal., 103, 68–84).

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