

## Deep ocean circulation and water temperature variation in Late Cretaceous based on carbon and oxygen isotopes of benthic

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Oceanic anoxic event 2 (OAE 2) occurred by global climatic warming in the latest Cenomanian to earliest Turonian. Global climate was gradually getting cool just after OAE 2. In the North Atlantic, deep water called NCW (Northern Component Water) was formed (Frank and Arthur, 1999; MacLeod et al., 2011; Martin et al., 2012), and oxygenated bottom water was flowing into North Atlantic by opening of Central Atlantic Gateway (CAG) between South Africa and South America in the early Turonian (Poulsen et al., 2001). Otherwise, climatic cooling from the early Campanian had affected SCW (Southern Component Water) forming in Southern high latitude and this deep water had flowed into Pacific (Brady et al., 1998; Huber et al., 1995; Murphy and Thomas, 2012; Robinson and Vance, 2012; Robinson et al., 2010).

It is cleared that deep water was sourced from high latitude during cooling time from the Campanian to Maastrichtian. However, deep ocean circulation before the Campanian has not yet clarified: especially, deep-water source during the warming periods. In this study, we reconstruct deep-ocean circulation during the late Cretaceous. We selected epifaunal species of benthic foraminifera from core samples in North Atlantic, South Atlantic, Southern Ocean, and Indian Ocean, to analyze carbon and oxygen isotopes in Kochi Core Center in Japan. We report new findings on deep-sea circulation and water temperature changes from the Cenomanian to Maastrichtian by compiling analyzing data and previous literature data.

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