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Change in deep-seawater [CO_3^{2-}] in the coastal area off Chile during the last deglaciation

Shinya Iwasaki (1), Frank Lamy (2), Kana Nagashima (1), Helge Arz (3), Naomi Harada (1), and Katsunori Kimoto (1)

(1) Japan Agency for Marine-Earth Science and Technology, Yokosuka, Japan (s.iwasaki827@gmail.com), (2) Alfred Wegener Institute Bremerhaven, Bremerhaven, Germany (frank.lamy@awi.de), (3) Leibniz-Institute for Baltic Sea Research Warnemu¨nde, Rostock, Germany (helge.arz@io-warnemuende.de)

Deep-sea water circulation in the Southern Ocean plays an important role in global carbon cycle. It has been supposed that enhanced upwelling at coastal area off Chile in the Southern Ocean contributed to the deglacial rise in atmospheric CO_2 (Siani et al., 2013). However, the amount of CO_2 discharged from this area to atmosphere during this period is not well understood. To resolve this issue quantitative reconstruction of deep-sea water [CO_3^{2-}] is necessary.

Dissolution and preservation of foraminiferal test is a key to understand change in [CO_3^{2-}] in deep-sea water. In this study, we employed X-ray micro-CT (XMCT) scanning of foraminiferal test to estimate the test dissolution intensity, and used this method as paleo-[CO_3^{2-}] proxy.

Planktic foraminiferal (*Globigerina bulloides*) tests were obtained from piston cores, which were sampled at three sites (depth transect: 1537–3072 m) at coastal area off Chile during the cruise of MR16-06. Based on the measurement in foraminiferal test dissolution intensity by XMCT scanning, changes in deep-sea water [CO_3^{2-}] after the last glaciation were reconstructed. The results suggested that patterns of deep-sea water [CO_3^{2-}] change differed depending on the depth. This may support the scenario that deep-sea water circulation at this area contribute to deglacial rise in atmospheric CO_2, and suggested the possibility of estimation in amount of CO_2 discharge to atmosphere during the last deglaciation.

Siani, G. et al., 2013, Nature Commun., 4, 2758.