

## Different oceanographic responses during last two deglaciation in the western subtropical Pacific

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Deglaciation process is one of the results that the tropical climate forcing impact on the global changes by its large heat capacity. The Okinawa region, where the Kuroshio Current and central water of the subtropical gyre are oscillated, provides the high-resolution paleoceanographic records of the tropical-subtropical Pacific during the late Quaternary. Two IMAGES cores collected from the Okinawa Trough under the Kuroshio Current (MD982196) and Ryukyu Trench under the influence of central water of the subtropical gyre (MD012398) covered the records back to Marine Isotope Stage (MIS) 7. Here, we demonstrate the environmental changes of the surface and intermediate waters during two glacial-interglacial shifts, MIS 6 to 5 and MIS 2 to 1, based on the comprehensive analyses of the oxygen isotopes, Mg/Ca ratios of two planktic foraminiferal faunas (surface and upper intermediate species), and faunal assemblages of planktic foraminifera.

The  $d^{18}O$  and Mg/Ca paleo-temperature of surface water were changed according with the glacial-interglacial cycles in whole of the Okinawa region. During MIS 1/2, the paleo-temperature of upper intermediate water decreased in the Okinawa Trough, while it increased in the Ryukyu Trench. This temperature increased during MIS 5/6 at both the Okinawa Trough and Ryukyu Trench. Small temperature differences between surface and intermediate waters during MIS 5/6 suggest that the water-column was mixed well in the Okinawa region. Temperature difference during MIS 1/2 showed the strong stratification at the Okinawa Trough, whereas it was stable at the Ryukyu Trench.

The faunal compositions of planktic foraminifera provide further detailed changes of the four water masses represented the oceanic condition in the Okinawa region. Two warm water groups (subtropical gyre and Kuroshio groups) showed a negative correlation between the Okinawa Trough and Ryukyu Trench area during the interglacial periods. It suggests oscillation between the Kuroshio Current and subtropical gyre. Two cold-water groups (northern Pacific and upper intermediate groups) showed different fluctuations between two glacial periods. The northern Pacific group increased during MIS 2, whereas the upper intermediate group of the subtropical gyre was dominant during MIS 6. Moreover, the upwelling species drastically increased at the deglaciation of MIS 5/6 in the Okinawa Trough. Straightforward implication for this phenomenon is expansion of intermediate water to the subtropical gyre during MIS 6 causing mixture of water-column in MIS 5/6.

Our multidisciplinary analyses successfully inferred two different glacial mechanisms of MIS 2 and 6 leading unique oceanographic response to the deglacial processes. When the effect of the Kuroshio Current was weakened in the NW subtropical Pacific, the cold-water came down during MIS 2 due to southward shift of the subtropical gyre front. During MIS 6, the intermediate water of the subtropical gyre extended westward because of weak subtropical gyre and/or development of intermediate water itself.

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