

Paleoenvironmental reconstruction of the North Pacific Subtropical Mode Water at the Last Glacial Maximum based on carbon- and oxygen-isotope composition of fossil brachiopod *Basiliola lucida*

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The North Pacific Subtropical Mode Water (STMW) is distributed along the southern side of the Kuroshio Current and the Kuroshio Extension in the western North Pacific Ocean. Long-term oceanographic data along the 137°E meridian south of Japan and profiling float CTD data from the International Argo Program showed that the STMW is absorbing a large amount of heat and CO₂ from the atmosphere to ocean, indicating that the STMW can serve as heat and CO₂ reservoir under recent global warming. Therefore, it is likely that the STMW has acted as an important positive/negative feedback on climate change at various time scales. However, a little is known about the behavior and changes in physical properties and chemical composition of the STMW on a long-term scale because instrumental data recording temporal variations of the STMW is limited to those after 1900's. Consequently, proxy records of the past STMW are required to improve and deepen our knowledge about dynamics of the STMW and the associated feedback effect. It is known that modern brachiopod *Basiliola lucida* around the Ryukyu Islands is mainly living in a range of the STMW, namely on the shelf slope at water depths of 200-300 m and that carbon- and oxygen-isotope composition of this brachiopod shells is useful to reconstruct the dissolved inorganic carbon concentration and seawater temperature of the ambient seawater. In this study, we first show an optimal way to reconstruct secular variations in the physical properties and chemical composition of the STMW with high accuracy and precision using carbon- and oxygen-isotope composition of semi-fossil *B. lucida* shells collected off the Ryukyu Islands. Then, we apply the way to fossil *B. lucida* shells dated to the Last Glacial Maximum (LGM). Finally, we will present the *B. lucida*-based seawater temperature/salinity and dissolved inorganic carbon concentration of the STMW at the LGM.

Keywords: North Pacific Subtropical Mode Water, Last Glacial Maximum, carbon-isotope composition, oxygen-isotope composition, brachiopod