Stable oxygen isotope of bivalve shells in Aso-kai Lagoon (central Japan) in the Medieval Warm Period

HIROYUKI TAKATA[1,*], DAVID L. DETTMAN[2], SATOSHI TANAKA[3], KOJI SETO[4], SABURO SAKAI[5], KAZUYOSHI YAMADA[6], KATSUMI TAKAYASU[4], BOO-KEUN KHIM[1]

[1] Pusan National University, Busan 609-735, Korea; *yuu@pusan ac.kr
[2] University of Arizona, Tucson AZ 85721, USA
[3] Kyoto University of Education, Kyoto 612-8522, Japan
[4] Shimane University, Matsue 690-8504, Japan
[5] Japan Agency for Marine-Earth Science and Technology, Yokosuka 237-0061, Japan
[6] Museum of Natural and Environmental History, Shizuoka, Shizuoka 420-8601, Japan

We have suggested that benthic foraminifera faunas in Aso-kai Lagoon (central Japan) were related to enhanced Tsushima Warm Current between ~AD700–1250 [1]. Expanding on this topic, we measured stable oxygen isotope ratios of fossil bivalve shells from the same core. We analyzed isotope ratios of bulk *Theora fragilis* shells between ~AD800–1600 (30 specimens/10 horizons). Additionally, we investigated sub-annual oxygen isotope ratios in *T. fragilis* and *Raetellops pulchellus* (7 specimens) along growth in order to demonstrate its seasonal variations.

Bulk shell oxygen isotope ratios were slightly more positive between ~AD1100 and 1200. This implies cooling and/or increased salinity in this interval. A hemipelagic diatom record off SW Japan has suggested warmer marine conditions during the Medieval Warm Period (MWP) [2]. Seasonal oxygen isotope ratios in shell generally have only a partial cycle (a positive shift and subsequent decline). *T. fragilis* and *R. pulchellus* have been described as opportunist taxa in organic-rich costal environments, living for less than one year. Our benthic foraminiferal data suggested seasonally oxygen-poor conditions. Thus, the more positive bulk-shell oxygen isotope values seem to be related to changes in cold season hydrology. The seasonal isotope signatures during ~AD1000–1200 have more positive values compared with those of other times. Benthic foraminifera data did not support significant salinity change in the lagoon. This suggests that temperature is driving isotope variation and colder winter temperature during ~AD1000–1200 might be a clue to understanding a). the opposing trends between our results and the hemipelagic diatom record and b). spatial variations of the MWP climate.

[1] Takata et al. (2014), JOPL 51, 421-435
[2] Koizumi (2008), Mar Micro 69, 263-281