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Changes in circulation and surface productivity in the southern Japan Sea during the late Quaternary

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Deep-Sea sediment core IMAGES MD01-2407 (water depth 932m) is collected from the Japan Sea and is characterized by alternating light and dark layers. Planktonic and benthic foraminiferal assemblages and their carbon and oxygen isotopic compositions were analyzed to reconstruct the circulation and surface productivity changes during the times of dark layer deposition. The dark layers were divided into 6 types based on benthic foraminiferal assemblages: Barren-type, Brizalina-type, Islandiella-type, Eilohedra-type, Angulogerina-type and mixture-type (Usami et al., 2007). Carbon isotope ratios offset between the surface-dwelling planktonic foraminifera and benthic species in the dark layers of Brizalina-type is smaller than those in dark layer of Islandiella -type, Eilohedra-type, and Angulogerina-type. Especially large values are shown in the dark layers of Angulogerina-type. These results suggest the differences in surface productivity between dark layers formed by reduced oxygen supply under weakened vertical circulation and those formed by enhanced oxygen consumption due to decomposition of organic matters under strengthened surface productivity.

Keywords: Japan Sea, isotope, foraminifera, Pleistocene, low-oxygen, surface productivity