Application of compound-specific ^{14}C dating to IODP Exp.318 U1357A core

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Radiocarbon (^{14}C) dating of Antarctic margin sediments is difficult. Because, these sediments generally lack calcareous foraminifera. Moreover, the sediments are subjected to contamination of relict organic matter eroded from the Antarctic continent (*e.g.* Ohkouchi *et al.*, 2003), leading to older radiocarbon ages of bulk sedimentary organic matter. Compound-specific (CS) ^{14}C dating targets short-chain (C_{14}, C_{16} and C_{18}) fatty acids isolated from sediments. These compounds are derived from photosynthetic organisms, and it does not included in most relict organic matter because the decomposition rate is relatively fast (Ohkouchi *et al*., 2003). Therefore, CS ^{14}C dating is unaffected by relict organic matter from Antarctic continent (Ohkouchi and Eglinton, 2008) and can provide accurate age. The aim of this study is establishment of accurate age model of U1357A core using CS ^{14}C dating. U1357A core (66º24.7991'S, 140º25.5008'E; 1014.9 m water depth; 186.6 m core length) was drilled at Adelie Basin located on the continental shelf off Wilkes Land, Antarctica during Integrated Ocean Drilling Program (IODP) Expedition 318 by D/V JOIDES Resolution (Expedition 318 Scientists, 2011). Lithology of this core is diatom ooze with lamination. We measured CS ^{14}C ages from 13 samples. Target compound is mainly C_{16} fatty acid. In some samples, $C_{16:1}$ fatty acid and cyclopheophorbide *a* were used for CS ^{14}C dating. Samples were processed chemically using the protocol of Ohkouchi *et al*. (in review). Purification of target fatty acids uses high performance liquid chromatography – evaporative light scattering detector (HPLC-ELSD) of JAMSTEC. Purification of ^{14}C was undertaken by dedicated high vacuum line of University of Tokyo (Yokoyama *et al*., 2010), and the measurement of ^{14}C was conducted by Accelerator Mass Spectrometry (AMS) at University of Tokyo (Matsuzaki *et al*., 2007). ^{14}C ages were calibrated using CALIB 6.02 and the Marine09 calibration curve (Reimer *et al*., 2009) with a reservoir age of 1144 ± 120 years (Hall *et al*., 2010). We successfully obtained 13 CS ^{14}C ages. CS ^{14}C ages showed the deepest samples is last glacial period (21,957 ± 260 cal. BP) and other samples are Holocene (9,663 ± 190 cal. BP to modern). This suggests that; i) there is hiatus between 176.65 meters below seafloor (mbsf) and 181.66 mbsf of this core, ii) this core has a continuous record of the past ~10,000 years.

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