Compound-specific ^{14}C dating of IODP Expedition 318 core U1357A obtained off East Antarctica

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It is difficult to construct chronologies of Antarctic margin sediments. Not only these sediments generally lack calcareous foraminifera, but also the sediments are subjected to contamination of relict organic matter eroded from the Antarctic continent [1], leading to older radiocarbon ages of bulk sedimentary organic matter. Compound-specific (CS) ^{14}C dating mainly targets short-chain (C_{14}, C_{16} and C_{18}) fatty acids isolated from the sediments. These compounds are ubiquitous in organisms, but little contained in relict organic matter due to the relatively fast decomposition rate [1]. Therefore, CS ^{14}C dating is little affected by relict organic matter from Antarctic continent [2] and thus provides accurate age. We applied CS ^{14}C dating to U1357A core taken from Adélie Basin located on the continental shelf off Wilkes Land, East Antarctica during IODP Expedition 318. We targeted C_{16} fatty acid as well as $C_{16:1}$ fatty acid and cyclopheophorbide-*a*-enol, a derivative of chlorophyll *a* isolated from the sediment. Samples were processed chemically using the protocol of Ohkouchi *et al*. [1]. Purification of target compounds were conducted with HPLC-CoronaCAD at JAMSTEC. Graphitization was undertaken by a dedicated high vacuum line of University of Tokyo [3], and the measurement of ^{14}C was conducted by AMS at MALT, University of Tokyo [4]. We obtained 12 CS ^{14}C ages that spans in Holocene age (9800 to 440 cal BP) and are consistent with their stratigraphic order [5]. These results suggest that significant sedimentation started ca. 10,000 cal BP. Moreover, our data suggest that radiocarbon measurements of $C_{16:1}$ fatty acid and cyclopheophorbide-*a*-enol are also useful for dating sediments from the Southern Ocean [5].

[1] Ohkouchi *et al*. (2003) *Radiocarbon* **45**, 17–24. [2] Ohkouchi & Eglinton (2008) *Quat. Geochronology* **3**, 235–243. [3] Yokoyama *et al*. (2010) *Radiocarbon* **52**, 310–318. [4] Matsuzaki *et al*. (2007) *NIM-B* **259**, 36–40. [5] Yamane *et al*. (2014) *Radiocarbon* **56**, 1009–1017.