東南極エンダービーランドに分布する第四系の ESR/ルミネッセンス信号特性と年代学・堆積学的背景

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Characteristics of ESR and luminescence signals from Quaternary sediments in Enderby Land, East Antarctica, and their implications for dating and sedimentology

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Dating of raised beach and emerged marine deposits is an important clue to reconstruct sea level, ice advance and environmental changes in Antarctica. In the Lützow-Holm Bay region, East Antarctica, there have been obtained many conventional radiocarbon dates of fossil organic materials from raised beaches. They are classified into two groups; the postglacial ages between 1,000 and 10,000 yr BP and those between 22,000 and 34,000 yr BP or more (e.g. Hayashi and Yoshida, 1994). Igarashi et al. (1995a, b) showed that AMS (Accelerator Mass Spectrometry) ^{14}C dates of in situ fossil molluscs (Laternula elliptica) around Lützow-Holm Bay can be classified into two groups; late Pleistocene (33-42 ka) and Holocene (3-8 ka) without the $\delta^{13}C$ and reservoir corrections. Maemoku et al. (1997) and Miura et al. (1999) reveal that the former ages are from lower beds of transgression onlap facies and the latter ones are from upper beds of deltaic regression offlap facies, discussing on the ice melting history. Though radiocarbon dates are useful for interpreting the regional geohistory, those for marine fossils around Antarctica are problematic because of the reservoir effect (Adamson and Pickard, 1983; Stuiver and Braziunas, 1985). Furthermore the late Pleistocene (33-42 ka) ages around the area may be regarded as minimum ages because they are close to the limit of conventional ^{14}C analysis and sensitive to the effect of contamination. Therefore Takada et al. (2003) investigated Electron Spin Reasonance (ESR) dates of in situ fossil molluscs around Lützow-Holm Bay, suggesting that the true ages of some samples in the late Pleistocece group may be much older than the AMS ^{14}C ages. Their ESR dates, however, were obtained from bulk samples from each sedimentary layer. Thus we think that dating of the indivisual shell sample should be investigaed in the next step. In this study we tried to measure ESR signals from an individual shell sample, as well optically stimulated luminescence (OSL) signals from a single quartz grain, to discuss on possibilities of dating and imterpretation of sedimentary environment.

References

Adamson, D. A. and Pickard, J., Late Quaternary ice movement across the Vestfold Hills, East Antarctica, Antarctic Earth Science, ed. by R. L. Oliver et al., Canberra, Aust. Acad. Sci, 465-469,1983.

Hayashi, M. and Yoshida, Y., Holocene raised beaches in the Lützow-Holm bay region, east Antarctica, Mem. Natl Inst. Polar Res., Spec. Issue, 50, 49-84, 1994.

Igarashi, A., Harada, N. and Moriwaki, K., Marine fossils of 30-40 ka in raised beach deposits, and Late Pleistocene glacial history around Lützow-Holm Bay, East Antarctica, Proc. NIPR Symp. Antarct. Geosci., 8, 219-229, 1995a.

Igarashi, A., Numanami, H. Tsuchiya, Y., Harada, N., Fukuchi, M. and Saitoh, T., Radiocarbon ages of molluscan shell fossils in raised beach deposits along the east coast of Lützow-Holm Bay, Antarctica, determined by accelerator mass-spectrometry. Proc. NIPR Symp. Polar Biol., 8, 154-162, 1995b.

Maemoku, H., Miura, H., Saigusa, S. and Moriwaki, K., Stratigraphy of the late Quaternary raised beach deposits in the northern part of Langhovde, Lützow-Holm Bay, East Antarctica, Proc. NIPR Symp. Antarct. Geosci., 10, 178-186, 1997.

Miura, H., Moriwaki, K., Maemoku, H. and Hirakawa, K., Fluctuations of the East Antarctic ice sheet margin since the last glaciation from the stratigraphy of raised beach deposits along the Soya Goast, Ann. Glaciol., 27, 297-301, 1999.

Stuiver, M. and Braziunas, T. F., Complication of isotopic dates from Antarctica, Radiocarbon, 27(2a), 117-304, 1985.

Takada, M., Tani, A., Miura, H., Moriwaki, K. And Nagatomo, T., ESR dating of fossil shells in the Lutzow-Holm Bay region, East Antarctica, Quaternary Science Review, 22, 1323-1328, 2003.