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# 北西太平洋日本沖の堆積物コアにおける藻類バイオマーカー温度計の検討
# Examination for algal biomarker thermometry in sediment cores from the northwestern Pacific off Japan

三枝樹 慧[1*], 沢田 健[1], 小林 まどか[1]
Kei Mieki[1*], Ken Sawada[1], Madoka Kobayashi[1]

[1] 北海道大学大学院理学院
[1]Faculty of Science, Hokkaido University

Biomarker thermometers such as alkenone unsaturation index (UK37 and UK'37) have been often used for reconstructing paleo-sea surface temperatures from 1980s. The alkenone are well known to be derived from Haptophycean algae, which are ubiquitous species in shallow to open ocean areas at low to high latitude, and therefore, their thermometers are powerful proxies in the almost over the world oceans. However, it has been pointed out that there were limitations for alkenone proxies; physiological effect, deflection of temperature records during the season of high production, variability of source species, and so on. More recently, long chain alkyl diols such as C28 and C30 1,13-diols, 1,14-diols, 1,15-diols were proposed to be useful as proxy for paleotemperature of sea surface layer (Rampen et al., 2009; 2012). These compounds are likely to be derived from diatom, especially Proboscia, and eustigmatophyte. In the present study, we examine the applicability of such diatom biomarker thermometer from sediment cores from the northwestern Pacific off Japan.

Sediment cores were collected by multiple corer from the Nishishichitou Ridge (LM3 and LM5P, off centaral Japan; Sawada and Handa, 1998) and off the coast of Sanriku, northeastern Japan (LM8). Freeze dried sediment samples were ultrasonically extracted, and the extracts were fractionated by silica gel chromatography. Polar fraction was silylated by BSTFA before analyses using GC/MS (Sawada and Shiraiwa, 2004). Long chain diol index (LDI) was calculated according to the equation (Rampen et al., 2012) as follow: LDI = [C30 1,15-diol] / ([C28 1,13-diol] + [C30 1,13-diol] + [C30 1,15-diol]).

We identify saturated C28 and C30 1,13-diols, C28 and C30 1,14-diols, and C30 and C32 1,15-diols in all sediment samples. The LDI values are linearly related to annual mean sea surface temperatures (SSTs) among sites of LM3, LM5P and LM8. In addition, C27 and C29 12-hydroxy methyl alkenoates (12-OH m.a.) are detected in all samples, and we establish new index, 12-hydroxy Methyl Alkenoate index (MA12), which is calculated by the equation as follow, MA12 = [C29 12-OH m.a.] / ([C27 12-OH m.a.] + [C29 12-OH m.a.]). Down core profiles of the diols and methyl alkenoates in surface layers of 30 cm depth show that the concentrations are exponentially decrease, but the LDI and MA12 values are nearly constant. From these results, it can be seen that the diol and alkenoate ratios are hardly affected by early diagenesis in sediment-water interface.

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