

松山-ブリュンヌ古地磁気極性境界直下に位置する白尾E テフラ層 (Byk-E) の堆積相  
Sedimentary facies of the Byakubi-E tephra bed (Byk-E) just below the Matuyama-Brunhes  
Polarity Chronozone boundary in Boso Peninsula, central Japan

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白尾Eテフラ層 (Byk-E) は、上総層群国本層中部の暗灰色シルト層に挟まれる厚さ1.0~7.0cmほどの白色ガラ  
ス質細粒火山灰層である。房総半島中央部の千葉セクション (田淵・柳川・小草畑川セクション) において  
Byk-Eは、松山-ブリュンヌ古地磁気極性境界 (MBB) の約80cm下位に位置する (Suganuma et al.,  
2015; Kazaoka et al., 2015)。MBBを含む国本層中部が連続的に露出する千葉複合セクションは、前期-中期  
更新世境界の国際境界模式層断面とポイント (GSSP) 候補地の1つである (Head et al., 2008; Head and  
Gibbard, 2015)。松山-ブリュンヌ古地磁気極性境界直下の明瞭な岩相境界であるByk-E基底面は、前期-中期  
更新世境界のGSSPにおいて適切な基準面の役割を果たすことが期待される (Kazaoka et al., 2015)。  
房総半島におけるByk-Eの分布 (Kazaoka et al., 2015) やその給源火山 (Takeshita et al., 2015) につい  
ては明らかにされているが、Byk-Eの詳細な堆積相については報告がない。そこで、Byk-Eが下位のシルト層を侵  
食することなく堆積しているか否かを確認することを目的として、房総半島中央部の養老川セクション、柳川  
セクション、大福山林道沿いの露頭および房総半島南部の館山の露頭においてByk-Eの堆積構造を詳しく観察し  
た。

観察の結果、いずれの露頭においても次の3点を確認することができた。1. Byk-Eには明瞭なラミナが認められ  
ない。2. Byk-E中にはシルトの偽隙を含まない。3. Byk-Eの基底面は、下位のシルト層中の生痕化石を切断し  
ない。また、生物擾乱が著しい養老川セクションを除く3つの露頭では、Byk-Eの基底部に細粒火山灰からなる  
薄層が確認された。以上の観察結果は、Byk-Eは下位のシルト層を侵食することなく堆積したことを示してい  
る。

キーワード：Byk-E、前期-中期更新世境界、GSSP、堆積相、千葉セクション

Keywords: Byk-E, Lower-Middle Pleistocene boundary, GSSP, Sedimentary facies, Chiba composite  
section

## 房総半島の第四紀テフラのジルコンLA-ICP-MS U-Pb年代

## Zircon LA-ICP-MS U-Pb dating on some Quaternary tephras in Boso Peninsula

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房総半島に分布するいくつかの第四紀テフラを対象にLA-ICP-MSによるジルコンのU-Pb年代測定を行った。これらのテフラは第四紀更新世前期・中期境界の国際模式地の候補地とも関連があるため、正確な年代測定を行う意義は大きい。最近、房総半島に分布する松山-Brunhes (MB) 境界直下のテフラを対象にSHRIMPによるジルコンのU-Pb年代として $0.773 \pm 0.007$  Maという高精度な年代が報告された (Suganuma et al., 2015)。今回、MB境界より上位にある二つのテフラ (Ks11, Ch2) から高精度なジルコンU-Pb年代として、Ks11から $0.52 \pm 0.04$  Ma, Ch2から $0.61 \pm 0.02$  Maが得られた。これらは層序から推定される年代とも一致していることから、信頼性の高い年代であると考えられるとともに、日本や世界の更新世の年代層序の確立にも貢献することが期待される。

キーワード：U-Pb年代測定、ジルコン、テフラ、松山-ブリュンヌ境界

Keywords: U-Pb dating, zircon, tephra, Matuyama-Brunhes boundary

千葉セクション、大阪湾、北大西洋に共通する軌道スケール、千年スケールの古海洋変動  
Orbital and suborbital scale paleoceanographic features for marine isotope stage 19 from the Chiba section well correlated with those from Osaka Bay and North Atlantic

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Chemical and magnetic data of a 54-m long core drilled near the Chiba section, Tabuchi provide excellent proxies of sea-level variations. The Ca/Ti ratio, magnetic susceptibility, ARM, and ARM/magnetic susceptibility values measured every 1 cm interval show variations well correlated with those from the oxygen isotope data from planktonic foraminifera fossils. The existence of such correlations reflects combined effects of changes in biogenic calcium carbonate production, accumulation rate (a.r.) and grain size of clastics due to sea-level variations. The Ca/Ti curve, a best sea-level proxy, shows precession-related signals correlated with highstands 19.3 and 19.1, and lowstand 19.2. The orbitally tuned Ca/Ti curve represents a number of centennial scale features well correlated with those of sea-level proxies from Osaka Bay and North Atlantic. In consideration of a.r. variability, the age model for the Chiba section was refined with more control points between the orbital scale control points, adjusting to the astronomical time scale for the Osaka Bay core that has a uniform a.r. In the early MIS 19, the highest sea-level peak is preceded by a sea-level fall event, as in Osaka Bay. After MIS 19.2, there are many millennial scale fluctuation features, most of which are observed in the records from Osaka Bay and North Atlantic (IODP site U1313). These features are possibly global, and some of them are affected by eustatic sea-level changes. The MBB is dated at 777 ka in Osaka Bay, and 778 ka in the Chiba section and the North Atlantic.

キーワード：千葉セクション、マツヤマーブリュンヌ境界、大阪湾、北大西洋、海水準変動

Keywords: Chiba section, Matuyama-Brunhes boundary, Osaka Bay, North Atlantic, sea-level variation

## 上総層群国本層の浮遊性有孔虫生層序と古海洋の復元

Planktonic foraminiferal biostratigraphy and paleoceanographic reconstruction of the Pleistocene Kokumoto Formation, Kazusa Group in the Boso Peninsula, Japan

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The Plio-Pleistocene Kazusa Group is widely distributed in the Boso Peninsula. The Matuyama-Brunhes reverse boundary (MBB) has been recognized in the Kokumoto Formation of the upper part of the Kazusa Group. To reconstruct a detailed paleoceanographic record of environmental change across the early-middle Pleistocene boundary, we carried out a faunal analysis of planktonic foraminifera from a sediment core (TB2) obtained from the Kokumoto Formation at Tabuchi, Ichihara City, Chiba Prefecture, central Honshu, Japan. We also reexamined a planktonic foraminiferal biostratigraphy extending from the Kokumoto Formation to the lower Kakinokidai Formation along the Yoro River section, in order to identify important planktonic foraminifera biohorizons.

The 54-m core mainly consists of massive siltstone with a key tuff bed (Byakubi-E) and covers marine oxygen isotope stages (MIS) 20.2 to 19.2 with a high sedimentation rate of 1-2 m/ka. Total 41 species belonging to 15 genera of planktonic foraminifera were detected from 59 samples of the TB2 core. We reconstructed sea surface temperature and salinity based on the planktonic foraminiferal assemblages by using the Modern Analog Technique and the Transfer Function method. The results clearly demonstrates the migration process of the Kuroshio front from stages 20 to 19. The biostratigraphic result of the Yoro River section indicates that the top occurrence datum of *Neogloboquadrina inglei* Kucera and Kennett is placed near the boundary between Kokumoto and Kakinokidai formations. This biohorizon has been dated as 0.73 +/- 0.05 Ma at Ocean Drilling Program Site 1150 off the Sanriku region, Northwest Pacific (Domitsu and Oda, 2008, The Open Paleontology Journal, 1, 1-6). Combining with previous studies, we refined the planktonic foraminiferal biostratigraphy of the Kazusa Group.

キーワード：国本層、浮遊性有孔虫、生層序、古海洋

Keywords: Kokumoto Formation, planktonic foraminifera, biostratigraphy, paleoceanography

## 房総半島マツヤマーブリュンヌ地磁気逆転境界における高解像度珪藻化石群集解析

Detailed variations in diatom assemblages across the Matuyama-Brunhes magnetic polarity boundary from a core collected adjacent to the Chiba section, central Japan

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We conducted diatom analysis of a core named TB2 of the Kokumoto Formation of the Kazusa Group drilled near the Chiba section, a candidate for the Early to Middle Pleistocene boundary. 71 taxa of diatoms were identified. The number of total valves is controlled by coastal species such as *Paralia sulcata*, *Cyclotella striata* + *C. stylorum*, and *Actinoptychus senarius*. The coastal species show variations well correlated with the ratio of Ca/Ti, a biological production proxy, and planktonic  $\delta^{18}O$ , representing the highest peak at 44.5-33.9m and the second one at 19.9-14.8m. The former is correlated with highstand MIS 19.3 and the latter with highstand MIS 19.1. This result suggests not only the biogenic production rate but the production of coastal diatom species increases as the sea-level rise. Cold diatom species of the Oyashio Current are dominant below a depth of 25 m, and warm species of the Kuroshio Current become dominant above it. This suggests occurrence of a large current system change during MIS 19.

キーワード：パラリア・サルカータ、MIS 19、国本層、マツヤマーブリュンヌ地磁気逆転境界

Keywords: *Paralia sulcata*, MIS 19, Kokumoto Formation, Matuyama-Brunhes magnetic polarity boundary

## 千葉セクションにおける定方位試料から得られたマツヤマ・ブリュンヌトランジションの高解像度記録

High resolution magnetostratigraphy of the Matuyama-Brunhes transition from oriented samples from the Chiba Section, central Japan

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Pleistocene sediments of the Kokumoto Formation in the upper part of the Kazusa Group, central Japan have been studied by many research groups. However, very few studies have focused on the marine isotope stage 19 interglacial including the Matuyama-Brunhes magnetic polarity boundary (MBB). In order to establish detailed magnetostratigraphy across the MBB, we collected oriented samples for magnetic analyses by drilling from 140 horizons of the Chiba Section, a candidate for the Global Boundary Stratotype Section and Point (GSSP) of the Early to Middle Pleistocene Boundary. We also collected block samples to pick up foraminifera fossils from 35 horizons for construction of oxygen isotope stratigraphy. Here, we first report preliminary results of paleomagnetic analyses. Progressive thermal demagnetizations reveal natural remanent magnetizations (NRMs) consist of two components demagnetized at or below 350 degrees Celsius and between 500 degrees Celsius and 680 degrees Celsius. The values of magnetic susceptibility measured at each step of thermal demagnetizations begin to increase from 400 degrees Celsius and decrease above 500 degrees Celsius. These results indicate that the samples include a ferromagnetic iron sulfide mineral such as greigite, which is decomposed below about 350 degrees Celsius, followed by oxidation to form magnetite and further to hematite, causing an increase and a decrease of magnetic susceptibility, respectively. Characteristic remanent magnetizations isolated above 350 degrees Celsius show that reverse and normal polarity continue from 1440 cm below to 60 cm above and from 290 cm to 430 cm above the Byakubi tephra (Byk-E), respectively. Therefore, the Matuyama-Brunhes transition would lie between 60 cm and 290 cm above the Byk-E, which would require reviewing the previous MBB position in detail. The result of oxygen isotope analysis using fossils of *Bolivinita quadrilatera* will also be reported.

キーワード：下部-中部更新統境界GSSP、千葉セクション、マツヤマ-ブリュンヌ境界、*Bolivinita quadrilatera*、MIS19、Byakubi-E

Keywords: Early to Middle Pleistocene GSSP, Chiba Section, Matuyama-Brunhes boundary, *Bolivinita quadrilatera*, MIS19, Byakubi-E