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LAKE BIWA MUSEUM

ナウマンゾウの 100 年に渡る研究成果のまとめが海外誌 Historical Biology（Online 版）に公表されました

ナウマンゾウは日本を代表する、約 34 万～3 万年前に生息していたゾウです。滋賀県では、多賀町を流れる芹川から 18 点の臼歯や切歯化石が見つかっているほか、大津市石山の瀬田川からも発見されています。このナウマンゾウの基準となる標本（ホロタイプ）は、1921 年に静岡県浜松市の浜名湖近くから発見されました。これ以降 100 年あまりの間に研究が進展し、その地理的分布、生息年代、形態、生態などが明らかになってきました。しかし、こうした研究の多くは、日本語で書かれていたことから、世界の研究者が知りたい情報を手にいれることができませんでした。

今回、滋賀県立琵琶湖博物館　高橋啓一館長（専門：古脊椎動物学）が、古生物学の海外誌 Historical Biology に英文でこれまでの研究成果を発表しました。このことによって、日本の研究が海外に紹介され、この分類群の系統や進化の研究に世界的な貢献をすると思われます。

なお、ナウマンゾウ研究に関する 300 頁以上におよぶ日本語の論文『ナウマンゾウ研究百年』も、今年中に琵琶湖博物館の研究報告として公表される予定です。

記

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An overview of *Palaeloxodon naumanni*, the *Palaeoloxodon* (Elephantidae) of the far east: distribution, morphology and habitat

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ABSTRACT

This paper summarizes previous studies of *Palaeloxodon naumanni*, including stratigraphic distribution, chronology, morphological characteristics, taxonomy, habitat, and accompanying fauna. *P. naumanni* has been reported from over 300 sites on the Japanese Islands, ranging from 44° to 33° N latitude. Many of them have been dated by tephra stratigraphy, sequence stratigraphy, or ^{14}C dating. Based on the age-dated specimens, *P. naumanni* is thought to have lived in Japan from 340,000 to 26,000 years ago. Skeletal morphology of *P. naumanni* is well known. In particular, the skull has been identified as male and female. And the examination of the skulls indicate that *Palaeoloxodon* is an independent genus within Elephantinae, and also *P. naumanni* as an independent species within *Palaeoloxodon*. Based on the vegetation data obtained from *P. naumanni* localities and the co-existed animal species with *P. naumanni* indicate that it has inhabited mixed forests with deciduous broad-leaved trees and conifers in the temperate zone. During the latter half of the Late Pleistocene, when the mammoth fauna migrated southwards to Japan, the deciduous broad-leaved forests that were widespread in Honshu were inhabited by the fauna accompanied by *P. naumanni*. These two faunas repeatedly shifted north and south in response to global climatic changes.

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Introduction

Palaeoloxodon naumanni is the most abundant of about 10 species of elephant fossils recovered from the Japanese Islands. The species was named by Makiyama (1924), who divided specimens previously lumped together as *Elephas namadicus* in Japan into two groups; those with a form similar to continental *E. namadicus* (broad crown, enamel loops not closely arranged), such as found on Shodo Island in the Seto Inland Sea, and those with a form similar to Europe's *E. antiquus* (narrow crown, developed loxodont sinus) as found from Sahama, Shizuoka Prefecture (Figure 1). The former was designated *E. naumanni namadi* and the latter *E. naumanni naumanni*. The name *naumanni* was in honor of the German geologist Heinrich Edmund Naumann (1854–1927), who while working in Japan studied fossil elephants.

From the end of the 1920s to the 1930s, several new species and subspecies were established in Japan based on the variation found in the molars of *Palaeoloxodon*. Those names used in this period include *Palaeoloxodon tokunagai*, *P. namadicus naumanni*, *P. namadicus namadi*, *P. n. yabei*, *P. aomoriensis*, *P. yokohamanus* (Shikama 1937). But these were gradually combined during the 1970s, and all of the *Palaeoloxodon* remains found in Japan are now designated as *P. naumanni* (Hasegawa 1972; Kamei and Taruno 1973).

P. naumanni from Japan is very important in the study of the genus *Palaeoloxodon* because many of the specimens have ages determined by tephra stratigraphy, sequence stratigraphy, or ^{14}C dating.

This paper provides an overview of *P. naumanni* in Japan summarizing previous studies.

Distribution and chronology of *P. naumanni* on the Japanese Islands

The distribution of *P. naumanni* on the Japanese Islands has been reported from more than 300 localities, ranging from Hokkaido in the north to Kagoshima Prefecture in the south (44° to 33° N latitude) (Takahashi 2022) (Figure 2). Reports from the Ryukyu Islands (Tokunaga 1940; Otsuka 1941; Nohara and Hasegawa 1973) belong to *Mammuthus*, not *P. naumanni* (Kamei 1970; Otsuka 1978; Taruno and Kawamura 2007; Kitagawa et al. 2010). In addition to terrestrial areas, *P. naumanni* has also been found from coastal waters of the Japanese Islands, including the Seto Inland Sea, and the Yamato Bank in the center of the Sea of Japan (Hasegawa 1972; Taruno 1988; Takahashi et al. 1990 etc.). The fossils from the seabed are from individuals that inhabited the plains that spread during the low sea level period, or those that drifted out to sea.

The stratigraphic and chronological ages of *P. naumanni* have been previously reported (e.g. Kamei et al. 1988a; Kawamura 1998; Taruno and Kamei 1993; Taruno 2010; Kondo 2003, 2005 etc.). Takahashi (2022) re-examined these, and concluded that the oldest horizons and ages are the Yabu Formation of MIS 10.2 of the Shimosa Group in Ibaraki and Chiba Prefectures, and the Miyata Formation (MIS 11–10) in Kanagawa Prefecture in the Kanto Region, immediately below the marine clay bed Ma10 of the Osaka Group (MIS 10.2–9.3) in Osaka Prefecture in the Kinki Region.

Konishi and Yoshikawa (1999) considered that the first appearance of *P. naumanni* is from MIS 10 (360–340 ka). However, studies of Ocean Drilling Program (ODP) cores in the Sea of Japan have shown a high possibility that a land connection formed during MIS 12 (about 430 ka) and also the period of the fossils yielded is during

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