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## **ABSTRACT BOOK**

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## Taxonomic revision of the Japanese Middle Pleistocene *Mammuthus* (*M. protomammonteus*), with a new observation method for fossil elephant molars using X-ray computed tomography

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*Mammuthus trogontherii*, the steppe mammoth, is the representative mammoth of the Middle Pleistocene, and was widely distributed in northern Eurasia. However, fossil molars that resemble those of *M. trogontherii* found in Japan, located on the eastern margin of Eurasia, have mainly been described as *M. protomammonteus*.

The first report of *M. protomammonteus* was by Matsumoto (1924), based on a right lower M3 from Chiba Prefecture, Japan. He described the specimen as a new species and erected a new genus, *Euelephas*, to accommodate it. Later, the genus *Euelephas* was considered to be a junior synonym of *Mammuthus* (Otsuka, 1978). However, because the molar characteristics of this species are similar to those of other species of *Mammuthus*, and also some species of *Palaeoloxodon*, three main opinions on the systematic assignment of this species have been presented: (1) *M. protomammonteus* is a valid species (Matsumoto, 1924; Otsuka, 1978; Takahashi and Namatsu, 2000). (2) *M. protomammonteus* is a *Palaeoloxodon* species, such as *P. naumanni* or *P.*

*antiquus* (Dietrich, 1927). (3) *M. protomammonteus* is a junior synonym of the steppe mammoth, *M. trogontherii* (Taruno and Kawamura, 2007).

For this study, a comparative analysis was conducted between the holotype of *M. protomammonteus* from Japan and *M. trogontherii* specimens, including the lectotype, from Germany. For taxonomic studies based on morphological characteristics of molars, observations of the various attrition states are important, but such studies on *M. protomammonteus* are hindered by the small number of available specimens. To solve this problem, various attrition states of the holotype of *M. protomammonteus* were imaged with CT scanning, and these images and measurements of the molar were compared with data from other Eurasian specimens.

Results show that *M. protomammonteus* had a different enamel loop morphology and smaller molars compared with those of *M. trogontherii*. Additionally, morphological disparity in the mandibles of the two species was also recognized. We therefore conclude that *M. protomammonteus* is a valid species, endemic to the Japanese islands during the Early to Middle Pleistocene.

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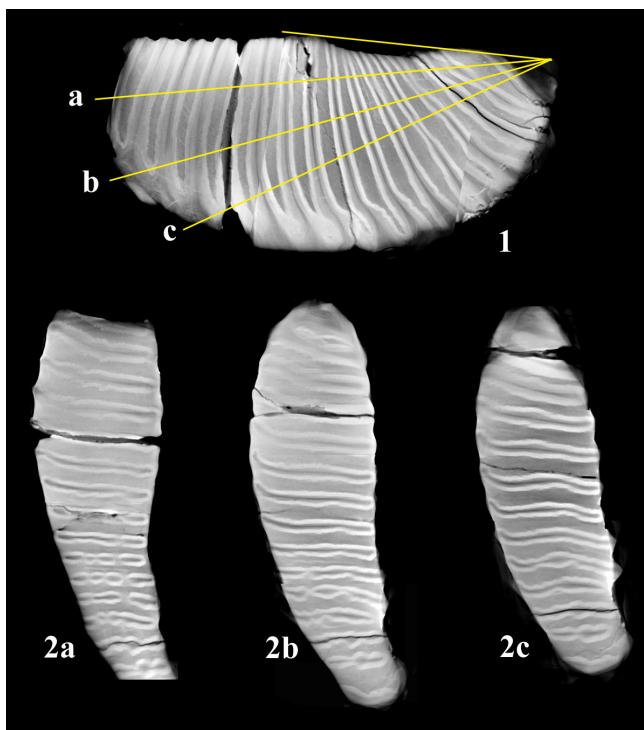


Fig. 1. Corn-beam CT cross section images of *Mammuthus protomammonteus*. 1, Cutting-plane position; 2, CT cross section images.

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