

Lagomorph Paleoecology of the Middle Cenozoic in Eastern Asia



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Introduction

- Lagomorphs are small mammals made up of rabbits, hares, and pikas
- The first lagomorphs date back to roughly 55 million years ago (MYA)
- Modern day pikas are considered an indicator species, which is an animal that is sensitive to change in its environment and can indicate environmental fluctuations
- Fossil localities provide information on diversity, ecosystems, and environment in an area at a certain time but are highly selective
- In this study, I hypothesize that the lagomorphs studied will increase in size through time in relation to the rise of the Mongolian Plateau
- I used this information to make inferences about changes in geology and geography through the Middle Cenozoic in Mongolia

Methods

- Data was pulled from the Paleobiology Database to form a taxon list and published literature was used to find mass proxies
- Molar and premolar measurements were used to find body mass estimations
- Excel, Adobe Illustrator, Rstudio, and Fiji software were used for data analysis and visualization



Fig. 4: Map of sites and surrounding landforms. The Altai mountain range rose in the late Miocene and increased the aridity to the East. The Hangay mountain range rose in the Early Oligocene and caused aridification to the southwest. The rise of the Tibetan Plateau began 40 MYA, and increased the aridity of the land to the North. Lastly, little is known about when the rise of the Mongolian Plateau began, but is thought to have begun during the late Cenozoic.

Results

- The two sites with the largest body mass were the plateau sites in both the Eocene and the Miocene
- Great variation in the species found at valley and plateau sites
- Little change in body mass seen from the Oligocene to the Miocene valley sites

Key Findings

- Increase in body size of lagomorphs from the Eocene to the Miocene at plateau sites
- There was little change in body mass of lagomorphs from the Oligocene to the Miocene in the valley

Legend

- ▲ Eocene plateau sites
- Eocene valley sites
- Oligocene valley sites
- Miocene plateau sites
- ▲ Miocene valley sites

Conclusions

- The rise of the Altai mountains had little effect on the lagomorphs in the valleys (fig. 5)
- The rise of the Hangay mountains narrowed the geographic range of lagomorphs after the early Oligocene (fig.5)
- This study suggests that rise of the Mongolian Plateau is likely to have begun at the Eocene and continued to rise throughout the late Cenozoic based off the increase in pika size through the Cenozoic (fig. 7)

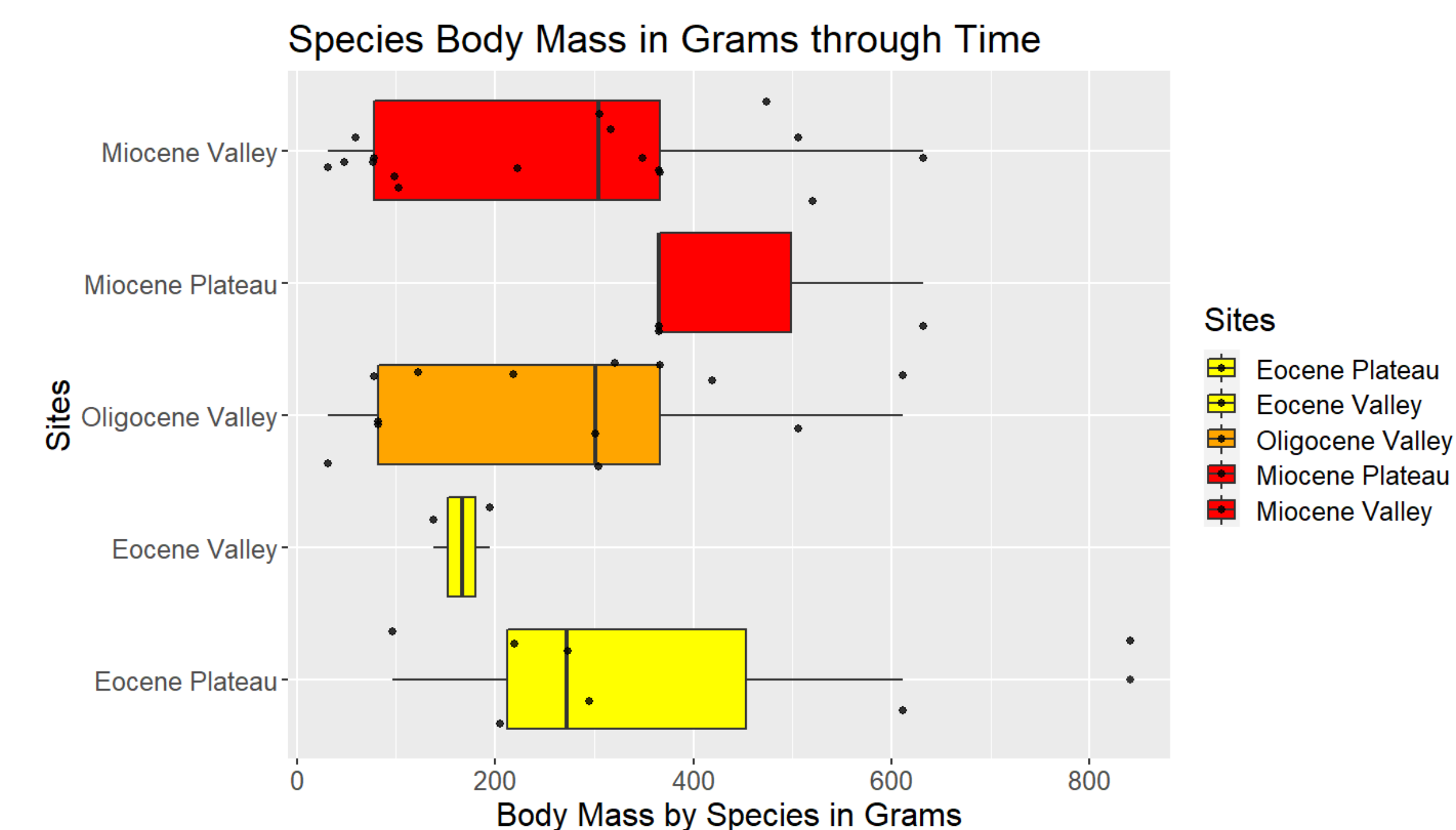


Fig. 7: plotted body mass and mean for each taxa for each epoch at both the valley and plateau sites. Increase in body size at the plateau sites through time indicates rise in the Mongolian Plateau from the Eocene through the Miocene and possibly beyond.



Fig. 1: Tolai hare (*Lepus tolai*) commonly found throughout Mongolia in the modern day



Fig. 2: Northern pika (*Ochotona hyperborea*) commonly found on the Mongolian Plateau in the modern day



Fig. 3: Plateau pika (*Ochotona daurica*) commonly found on the Mongolian Plateau in the modern day

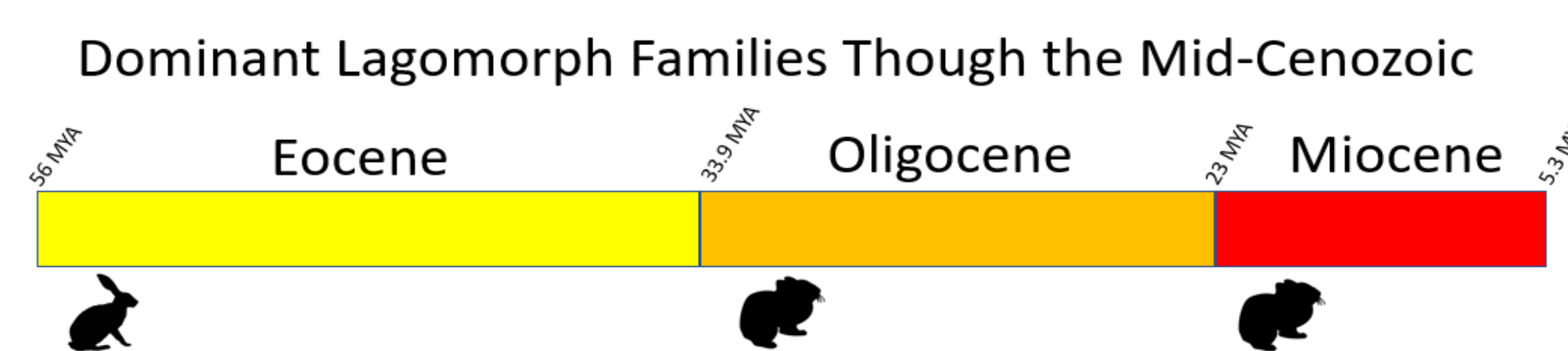


Fig. 5: Fluctuation of dominant lagomorph families through time which indicates increased aridity and spread of grasslands, which supports the previously known Eocene-Oligocene Mongolian Turnover

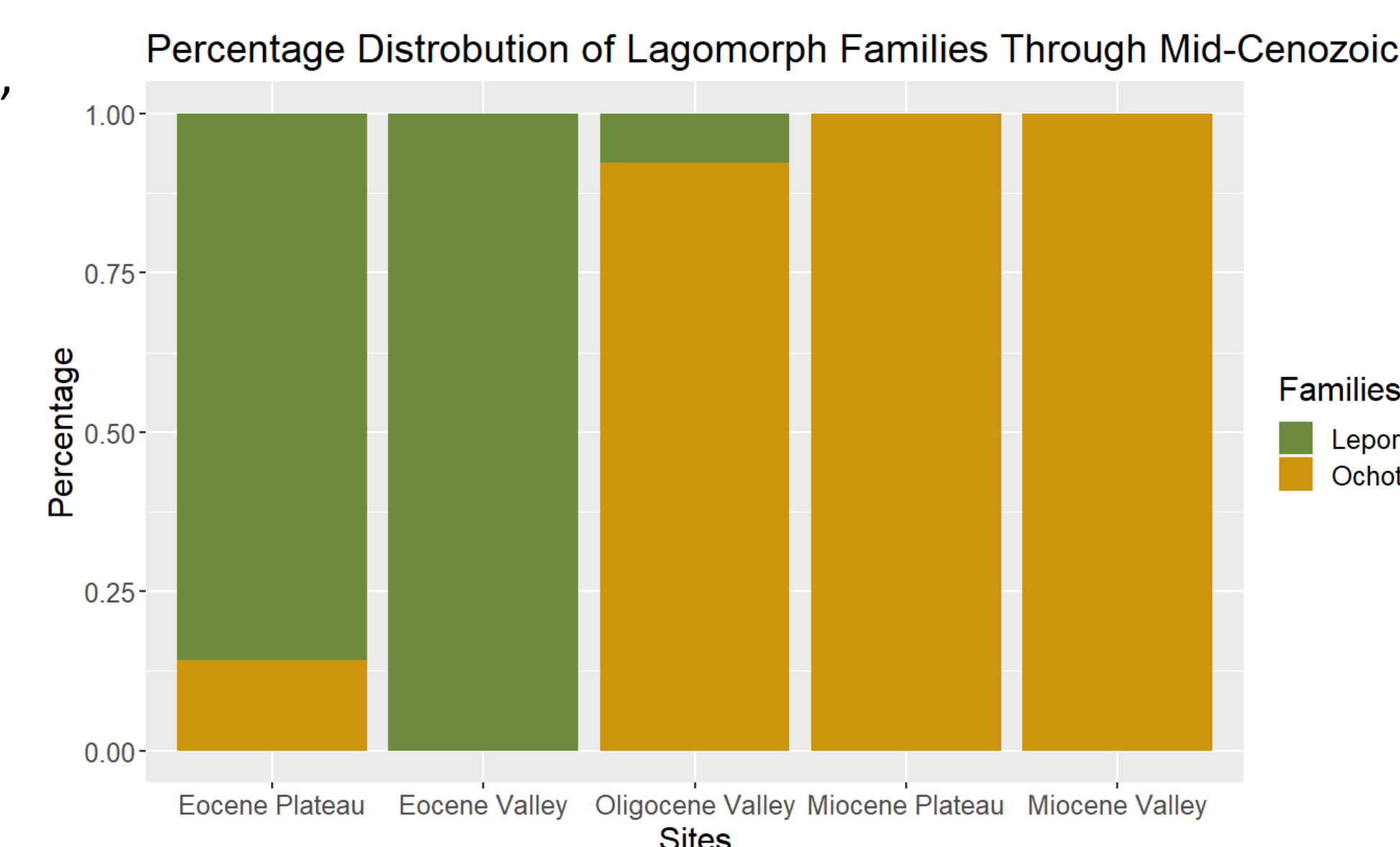


Fig. 6: Distribution of lagomorph family occurrences grouped by each epoch analyzed in this study and whether it was close or far from the Mongolian Plateau

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