

February 6, 2023

## News and notes

Before going on to look at some of the wonderful fossils from the Pleistocene, this week we'll look at the faunal assemblage from Eurasia, here are some news items that I thought were interesting.

## Research

- From Eureka Alert: [New Geology articles published online ahead of print](#).
- Carbon cycle research: [A widely-used eddy covariance gap-filling method creates systematic bias in carbon balance estimates](#); Phys.org summary [here](#).
- Erosion research: [Mineral weathering is linked to microbial priming in the critical zone](#); Phys.org summary [here](#).
- Sedimentology research: [Size, shape and orientation matter: fast and semi-automatic measurement of grain geometries from 3D point clouds](#).
- More sedimentology: [Geochemical characteristics and provenance of the detrital sediments in the junction area of Yinggehai and Qiongdongnan basins, South China Sea](#).

## Paleontology

- Seeing fossils where there aren't any: [Stinging News: 'Dickinsonia' discovered in the Upper Vindhyan of India not worth the buzz](#); Phys.org summary [here](#).
- Evolution: [The origin and evolution of methanogenesis and Archaea are intertwined](#).
- [Fossils in a northern Alberta riverbed may reveal new facts about dinosaur evolution](#).
- [Exceptional fossil preservation and evolution of the ray-finned fish brain](#); behind pay wall, Phys.org summary [here](#).
- [A new early diverging thalattosuchian \(Crocodylomorpha\) from the Early Jurassic \(Pliensbachian\) of Dorset, U.K. and implications for the origin and evolution of the group](#); Phys.org summary [here](#), related research article [here](#).
- From the Royal Society: [The Cambrian cirratuliform \*Iotuba\* denotes an early annelid radiation](#); Eureka Alert summary [here](#).
- The Petrified Forest: [225-Million-Year-Old Petrified Opal Tree Trunk Located in Arizona](#).

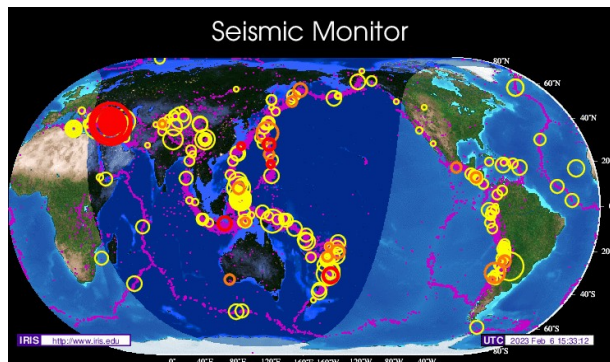
## Glaciers and Climate Change

- In the ice record: [Underestimated Passive Volcanic Sulfur Degassing Implies Overestimated Anthropogenic Aerosol Forcing](#); Phys.org summary [here](#).
- [Drilling campaign reaches a depth of 808 meters in the Antarctic ice sheet](#).

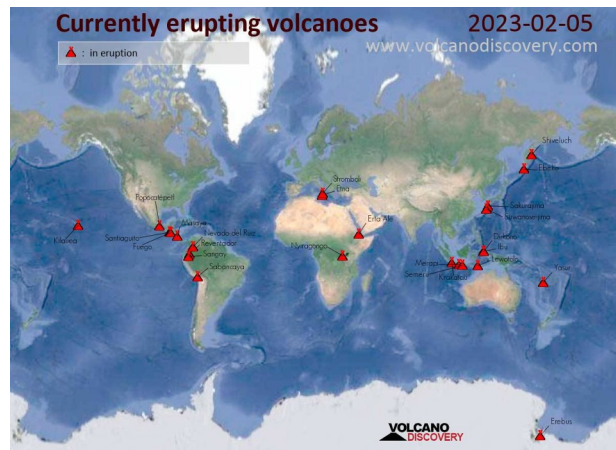
## Mining and Energy

- [Junior miner looks to revive Kenora area cobalt mine.](#)
- [Location of ferrochrome smelter still up in the air, says Ring of Fire Metals CEO.](#)
- [Permitting solutions for mining in British Columbia ‘a priority’, says gov’t.](#)
- [Justin’s Just Transition Comes With Big Costs – Canadian Taxpayers Federation.](#)
- [Canada Regulator Licences Equinor’s Significant Oil Discovery Offshore.](#)
- [U.S. oil & gas rig count falls by the most in a week since June 2020 – Baker Hughes.](#)
- [Oil Prices Crash After Perky Jobs Data.](#)

## Volcanoes, Earthquakes and Geohazards



[Seismic Monitor](#)



[Active Volcano Map](#)

- Volcano research: [Pre-eruptive dynamics at the Campi Flegrei Caldera: from evidence of magma mixing to timescales estimates.](#)
- Two big earthquakes in Turkey & Syria: [Bloomberg News](#), [USGS](#).
- Small earthquake, Buffalo and Niagara Falls: [Yahoo News](#), [Geological Survey of Canada](#)
- Geohazards: [Slippery slopes: Why the Auckland storm caused so many landslides—and what can be done about it.](#)
- More geohazards, wildfire: [Shifting social-ecological fire regimes explain increasing structure loss from Western wildfires](#); Phys.org summary [here](#).

## From Out of this World

- [Meteor over Krasnoyarsk: Locals report their houses shaking.](#)
- [Perseverance Rover Completes Depot of Mars Rock Samples.](#)

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## Mammals of Pleistocene Eurasia – Elephants



Figure 1 – Late Pleistocene Landscape in Northern Spain with Woolly Mammoths  
**Credit:** Mauricio Antón, [Creative Commons Attribution 2.5 Generic](#) license

In past postings on fossils, I've gone through the various kinds of fossil plants and animals throughout the world and shown examples from that time. For the [Quaternary Period](#), I am going to something different. Here is my plan for posting in the next few weeks (or months):

- We'll look at the [Pleistocene](#) fauna separate from the [Holocene](#) fauna because of the [megafauna extinctions](#) at the end of the Pleistocene.
- For the Pleistocene Epoch, we will look at the [faunal assemblages](#) for the six major eco-zones: the [Afrotropic](#) (tropical Africa), the [Indomalayan](#) (India, Indochina, Southern China, Malaysia, Indonesia, and the Philippines), the [Palearctic](#) (Eurasia), [Nearctic](#) (North America), the [Neotropic](#) (South America), and [Australasia](#).
- We'll look at fossils of human ancestors in the discussions of the African Pleistocene.
- For the Holocene Epoch, we'll focus on fossils of the predecessors to our common everyday domestic animals since humans and their livestock currently account for [96% of mammal biomass](#).

Each faunal region could take many postings. In addition to mammals, there are birds, reptiles and invertebrates so we'll have to cover them as well. This week we'll look at fossil elephants from Eurasia.

### The Palearctic or Eurasian Eco-zone

As shown in Figure 2, the Palearctic or Eurasian Eco-zone covers a huge area and is further divided into several [bioregions](#): the [Euro-Siberian region](#); the [Mediterranean Basin](#); the [Sahara](#) and [Arabian Deserts](#); and [Western](#), [Central](#) and [East Asia](#). During the Pleistocene, much of the northern part of the eco-zone was under continental glaciers. The unglaciated areas had a different climate than the present. Much of

Central Asia and Euro-Siberia were tundra and the Sahara and Arabian Deserts were more like prairies or steppes.

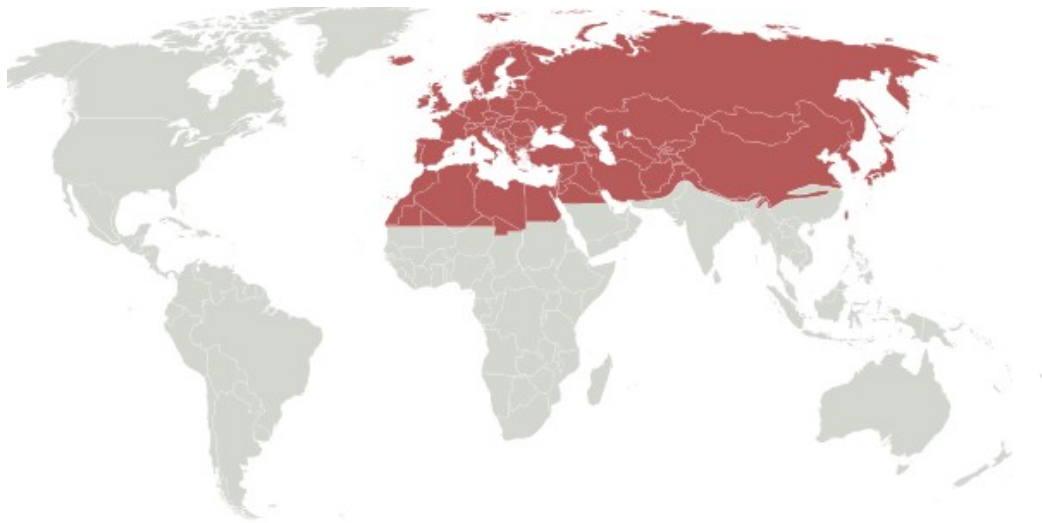


Figure 2 – Palearctic Eco-zone

Credit: [carol](#), [Creative Commons Attribution-Share Alike 3.0 Unported](#) license

## Steppe Mammoth



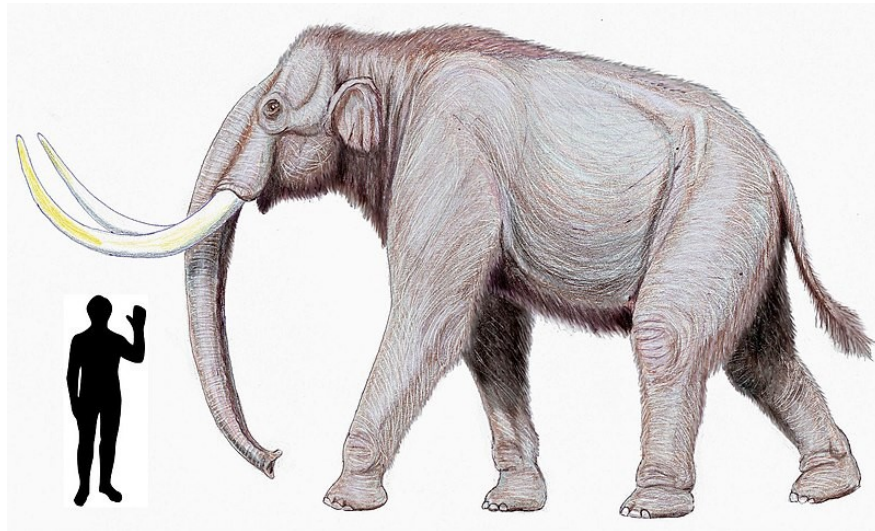
Figure 3 – *Mammuthus trogontherii*

Credit: [Ghedoghedo](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

The Steppe Mammoth or *Mammuthus trogontherii* lived in most of northern Eurasia during the late [Early](#) and [Middle](#) Pleistocene. Fossils of *M. trogontherii* [have been found](#) in the Czech Republic, Georgia, Germany, Greece, Hungary, Israel, Italy, Kyrgyzstan, Romania, Russia, Spain, Syria, Taiwan, Turkey, Turkmenistan, and the United Kingdom. *M. trogontherii* fossils come from sediments found in caves as

well as those from terrestrial, lacustrine and fluvial environments. It had curved tusks, was 4 to 4.5 m tall and weighed between 9 and 10 tonnes.

*M. trogontherii* is [thought to have descended](#) from an earlier elephant, *M. meridionalis*, and to have, in turn, been ancestral to the woolly mammoth (*M. primigenius*) and the Columbian mammoth (*M. columbi*). The genetics suggest that the [genetic history](#) of is fairly messy with multiple episodes of [speciation](#) and [hybridization](#).



**Figure 4 – *Mammuthus trogontherii* Compared in Size to a Man**  
**Credit:** Kurzon, [Creative Commons Attribution-Share Alike 3.0 Unported](#) license

German paleontologist [Hans Pohlig](#) first [described \*M. trogontherii\* in 1885](#) from fossil remains found in Europe. As is common in paleontology, Pohlig's *M. trogontherii* turned out to pretty much the same as a species [described](#) by the Scottish geologist [Hugh Falconer](#) in 1857 that he called *M. armeniacus*. In 1973, [Vincent J. Maglio](#) published [Origin and Evolution of the Elephantidae](#) in which he indicated that Falconer's designation should be used for the species. However, in 1996, Jeheskel Shoshani and Pascal Tassy published [The Proboscidea: Evolution and Palaeoecology of Elephants and Their Relatives](#), now considered the definitive work on the subject, in which they indicated that Pohlig's designation, *M. trogontherii*, should be the correct term, at least for the specimens found in Europe. [Mammoth fossils from Japan](#) were assigned a variety of names, but are now considered to be *M. trogontherii*.

The genus [Mammuthus](#) was first described by the British naturalist [Joshua Brookes](#) in 1828. The type species of *Mammuthus* is the aforementioned woolly mammoth, first described by [Johann Friedrich Blumenbach](#) in 1799.

### **Straight-tusked Elephant**

The [Straight-tusked Elephant](#) (*Palaeoloxodon antiquus* or *Elephas antiquus*) lived during the Middle to the [Late Pleistocene](#). Fossils of *P. antiquus* [have been found](#) in France, Germany, Greece, Italy, Portugal, Spain, Tajikistan, and the United Kingdom. Fossils of *P. antiquus* come from sediments deposited in caves, as well as those from terrestrial, lacustrine and fluvial environments. It grew around 4.2 m tall and weighed up to 15 tonnes.



Figure 5 – Straight Tusked Elephant at the [Museo di Scienze della Terra, Sapienza University of Rome](#)  
Credit: [Diagram Lajard, Creative Commons CC0 1.0 Universal Public Domain Dedication](#)

The Straight-tusked Elephant [appears to have lived](#) like modern elephants, in small groups. Humans such as [Homo heidelbergensis](#) probably [hunted them](#).

*P. antiquus* probably evolved from an African elephant, [P. recki](#), which arrived in Europe sometimes during the Middle Pleistocene. An interesting coincidence is that its arrival in Europe coincided with the replacement of *Mammuthus meridionalis* by *Mammuthus trogontherii*.



Figure 6 – *Palaeoloxodon antiquus* statue at the [Ambrona Archaeological Site-Museum, Spain](#)  
Credit: [PePeEfe, Creative Commons Attribution-Share Alike 3.0 Unported license](#)

Hugh Falconer and [Proby Cautley](#) first [described \*P. antiquus\*](#) in 1847, originally calling it *Elephas antiquus*. [Hikoshichiro Matsumoto](#) coined the genus name [Palaeoloxodon](#) in 1924 and *E. antiquus* was [subsequently assigned](#) to the genus in 2019.

## Pygmy Elephants descended from the Straight-tusked Elephant



**Figure 7 – Skeleton of *Palaeoloxodon falconer*, from the [Mountain Museum of Ancient Life](#), Utah  
Credit: [Ninjatacoshell](#), [Creative Commons Attribution-Share Alike 3.0 Unported](#) license**

One of the most interesting phenomena in evolution is [insular dwarfism](#) where animals that are stranded on islands by rising sea levels become smaller over time. During the [Late Glacial Maximum](#), many places that are now islands were connected to the mainland. Many animals, including the Straight-tusked Elephant wandered these areas. When the sea-levels rose at the end of the Pleistocene, the animals were stranded and the conditions of life on these islands led to a selection for smaller creatures.

Among the elephants stranded on Mediterranean islands were these three:

- [Palaeoloxodon falconer](#), just under a metre high, *P. falconer* lived on the islands of Sicily and Malta during the Middle and Late Pleistocene. It was descended from an intermediate species, [Palaeoloxodon mnaidriensis](#).
- [Palaeoloxodon chaniensis](#) lived on the island of Crete and is known from limited remains from in Stylos and in Vamos cave near Chania.
- [Palaeoloxodon cypriotes](#) lived on the island of Cyprus and was descended from an intermediate species, [P. xylophagou](#). *P. cypriotes* was about a metre tall and lived on Cyprus during the Late Pleistocene.

An interesting fact about the pygmy elephants that lived on Mediterranean islands is that the remains of the animals, especially the skull, appears to be the source of the [myth of the Cyclops](#). Looking at the

skull in Figure 8, below, you can see how someone might interpret it as the remains of some ancient monster like the Cyclops.



**Figure 8 – *Palaeoloxodon falconer* skull, Origin of the Cyclops Myth?**  
from the [Museo di Scienze della Terra](#), Sapienza University of Rome

**Credit:** Matteo De Stefano / MUSE, [Creative Commons Attribution-Share Alike 3.0 Unported](#) license

There is many more neat fossils from the Pleistocene of Eurasia, we'll look at some more next week.

### **Standard Caveat**

The purpose of my weblog postings is to spark people's curiosity in geology. Don't entirely believe me until you've done your own research and checked the evidence. If I have sparked your curiosity in the subject of this posting, follow up with some of the links provided here. If you want to, go out into the field and examine some rocks on your own with the help of a good field guide. Follow the evidence and make up your own mind.

In science, the only authority is the evidence.

