

February 13, 2023

News and notes

Before going on to look at some more Eurasian mammal fossils from the [Pleistocene](#), here are some news items that I thought were interesting. Also, I have started a new feature on my website, [FN C1A1](#), which is an irregular posting of my social and political opinion.

Research

- Soil formation: [Formation of necromass-derived soil organic carbon determined by microbial death pathways](#); Phys.org summary [here](#).
- Igneous rock formation: [Origin and implication of two newly identified peraluminous A-type granites in the early Paleozoic orogeny, Southeast Asia](#).
- Sedimentology: [Peak Cenozoic warmth enabled deep-sea sand deposition](#).
- [Upwelling, climate change, and the shifting geography of coral reef development](#).

Paleontology

- Life in the Pleistocene: [The LGM refugia of deciduous oak and distribution development since the LGM in China](#); Phys.org summary [here](#).
- A new species, *Kumimanu fordycei*: [Largest-known fossil penguin provides insight into the early evolution of sphenisciform body size and flipper anatomy](#); behind a pay wall, Phys.org summary [here](#).
- Snail shells as index fossils: [Early diagenetic imprints and U–Th isotope systematics of fossil land snail shells from the Chinese Loess Plateau](#); Phys.org summary [here](#).
- [A Mesozoic fossil lagerstätte from 250.8 million years ago shows a modern-type marine ecosystem](#); Eureka Alert summary [here](#).
- [Species of *Dickinsonia* Sprigg from the Ediacaran of South Australia](#).
- Ancient geochemistry, evolution and activity of microbial life: [Low phosphorus concentrations and important ferric hydroxide scavenging in Archean seawater](#).

Plate Tectonics

- [Stranding continental crustal fragments during continent breakup: Mantle suture reactivation in the Nain Province of Eastern Canada](#).
- From the University of Texas: [Scientists Detect Molten Rock Layer Hidden Under Earth's Tectonic Plates](#); Geology In summary [here](#).
- Europe and Africa: [The Gibraltar slab dynamics and its influence on past and present-day Alboran domain deformation: Insights from thermo-mechanical numerical modelling](#).

Coastal Geology

- [Mapping 21st Century Global Coastal Land Reclamation](#); Phys.org summary [here](#).
- Coastal geology: [Pacific shoreline erosion and accretion patterns controlled by El Niño/Southern Oscillation](#); behind a pay wall, Phys.org summary [here](#).

Hydrothermal Vents

- Hydrothermal vents and early life: [Relatively oxidized fluids fed Earth's earliest hydrothermal systems](#); behind a pay wall, Phys.org summary [here](#).
- Organic carbon and hydrothermal vents: [Hydrothermal-derived black carbon as a source of recalcitrant dissolved organic carbon in the ocean](#); Phys.org summary [here](#).

Glaciers and Climate Change

- [Record low sea ice cover in the Antarctic](#).
- [Complex motion of Greenland Ice Sheet outlet glaciers with basal temperate ice](#); Phys.org summary [here](#).
- From the European Geoscience Union: [Perspective on Listening to Permafrost](#).
- Ancient glacial lake research: [Rock surface luminescence dating of gravel determines the age of a glacial outburst megaflood, Glacial Lake Missoula, Montana, USA](#).

Environmental Geology and Hydrogeology

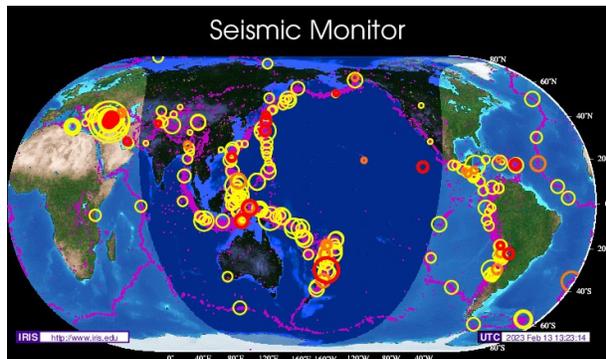
- Groundwater contamination: [Air temperature spikes increase bacteria presence in drinking water wells downstream of hog lagoons](#); Phys.org summary [here](#).
- [Seasonal biodegradation of the artificial sweetener acesulfame enhances its use as a transient wastewater tracer](#); Phys.org summary [here](#).
- Groundwater shortages and drought: [Quantifying the Central European Droughts in 2018 and 2019 With GRACE Follow-On](#); Sci Tech Daily summary [here](#).
- [Teck fined over \\$11 million for failing to build water treatment facility in British Columbia](#).

Mining and Energy

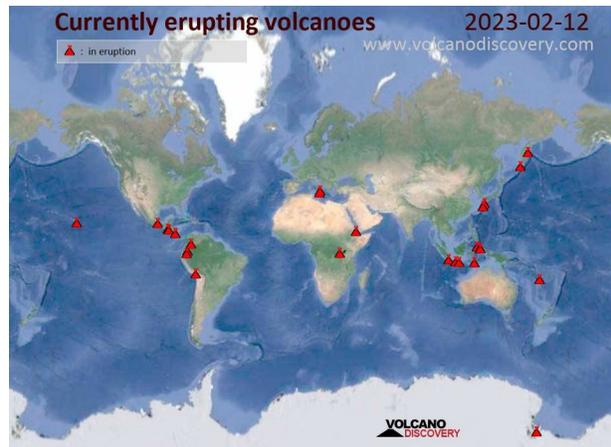
- Geology of ore deposits: [Analyses under the curve, identifying how invisible gold is held in pyrite](#); sorry, behind a pay wall.
- More on the geology of an ore deposit: [Geology and Structural Evolution of the La Huifa Ore Deposit, Central Chile: A Newly Discovered Porphyry Cu-Mo System in the El Teniente District](#); sorry, behind a pay wall.
- Red Lake gold camp geology: [Crustal conductivity footprint of the orogenic gold district in the Red Lake greenstone belt, western Superior craton, Canada](#).
- From Mining.com: [CHART: Copper exploration budgets jump, but major discoveries elusive](#).

- [Energy security: the role of shale technology.](#)
- [Full Steam Ahead: New Major Oil Sands Project to Proceed as Producers Build for the Future.](#)
- [COMMENTARY: Why We Shouldn't Confuse Energy Facts With Wishes – Irina Slav.](#)
- [THE ESG THREAT: Saudi Aramco Says ESG Investing Threatens Energy Security](#); related: [U.S. ESG Funds Suffer Disastrous Fourth Quarter In 2022.](#)
- From the United States Energy Information Administration (USEIA): [U.S. residential heating oil prices decline from record-highs in November.](#)
- From OilPrice.com: [Why Russia Finally Decided To Cut Its Oil Production](#) and [Goldman Sachs: Oil Prices Won't Hit \\$100 Until December.](#)

Volcanoes, Earthquakes and Geohazards



[Seismic Monitor](#)



[Active Volcano Map](#)

- Volcano research: [Deep magma storage during the 2021 La Palma eruption](#); Eureka Alert summary [here](#).
- [Turkey-Syria earthquakes: Shallow depth of main shocks is a key reason why they've been so devastating, says geologist](#); related [Turkey detains building contractors as the quake death toll rises to more than 33,000.](#)
- California not sliding into the Pacific, yet: [Seismologist explains why California will inevitably shake like Turkey.](#)
- Earthquake research: [Strain accumulation and release associated with the occurrence of SSEs in the subduction zones of the Japanese Islands](#); Phys.org summary [here](#).

Fun Stuff

- From the European Geoscience Union: [Geo-Fantasy – between Fantasy Novel and the Real World.](#)

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Mammals of Pleistocene Eurasia – Carnivores and Ungulates

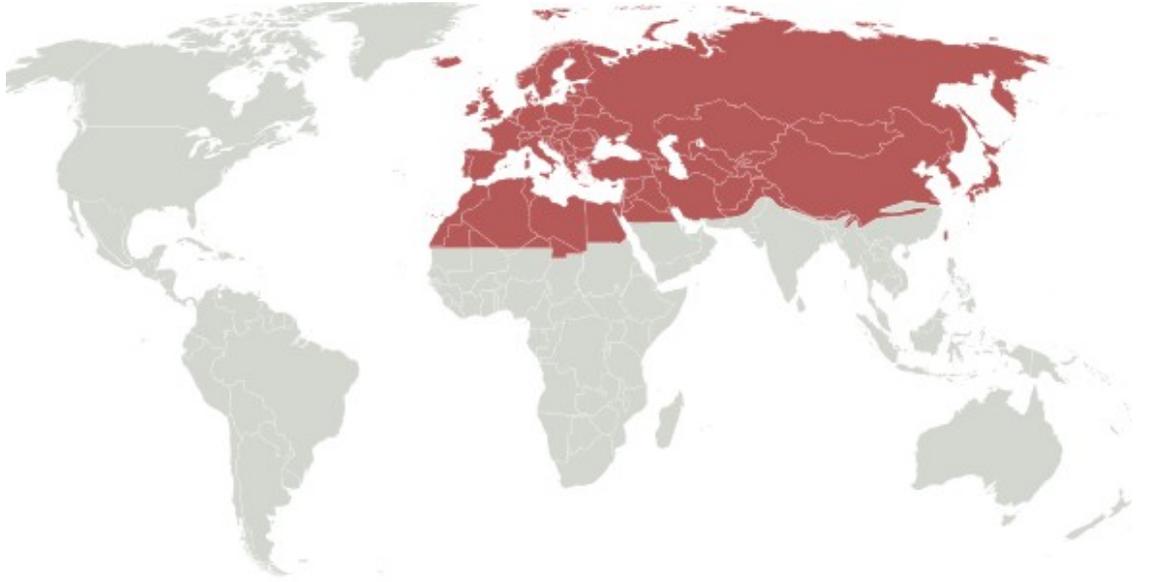


Figure 1 – Palearctic Eco-zone

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

Eurasia, the [Palearctic Eco-zone](#), covers a huge area of the Earth and was home to many kinds of animals during the [Pleistocene Epoch](#). In [last week's posting](#), we looked at Pleistocene elephants. This week we'll examine a few of the carnivores and ungulates that were unique to that epoch.

Carnivores

Cave Lion – Panthera spelaea

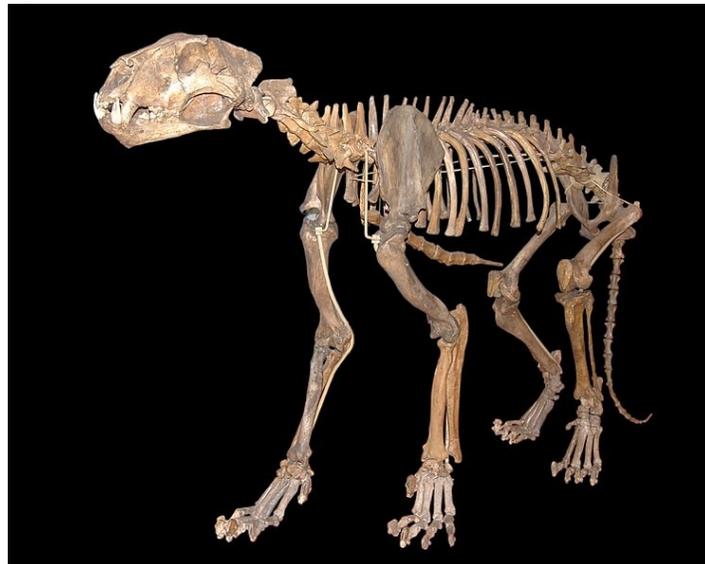


Figure 2 – *Panthera spelaea* Skeleton at the [Naturhistorisches Museum Wien](#)
Credit: [Tommy](#), [Creative Commons Attribution 2.0 Generic](#) license

The cave lion, [*Panthera spelaea*](#) was a large cat that lived from 450,000 to about 11,900 years ago, i.e. from the middle of the [Chibanian Age](#) until the [Late Pleistocene](#). Their extinction coincides with the [Quaternary Extinction Event](#) between the Pleistocene and the [Holocene](#) Epochs. The cave lion was widespread, fossils of the cat have been found in the Iberian Peninsula, Southeast Europe, Great Britain, Central Europe, the East European Plain, Siberia and into Alaska and into the Yukon Territory of Canada. Cave Lion fossils include not only bones, but frozen specimens such as the [lion cubs found in the permafrost of Siberia](#).

Fossils of *Panthera spelaea* show a big cat, with adult males ranging in size from 1.2 m to 2.5 m tall at the shoulder and [weighing](#) up to 339 kg. I don't think that you would want to go up to it and say "here kitty kitty".



Figure 3 – *Panthera spelaea* depicted at [Chauvet Caves](#)
Credit: HTO, [public domain](#)

Humans living in Europe during the Pleistocene documented cave lions via paintings they made on the walls of caves such as at the [Lascaux](#) and [Chauvet Caves](#) in France. These paintings [are thought to be](#) between 15,000 to 17,000 years old. Among other things, the Lascaux and Chauvet Caves drawings show that cave lions did not have manes like modern lions ([Panthera leo](#)) and that they hunted in packs,

like modern lions. From the cave paintings, it is clear that the people of that time were in awe of the beast.



Figure 4 – Cave Lion
Credit: Zygard Master, CC-BY-SA

[Georg A. Goldfuss](#) first [described *Panthera spelaea* in 1810](#), calling it *Felis spelaea*. Once thought to be a subspecies of either lions (*Panthera leo*) or tigers (*Panthera tigris*), modern studies confirm that [it is a distinct species](#) with the genus *Panthera*. The genus *Panthera*, [first described](#) by [Lorenz Oken](#) in 1816 contains five living species and about 10 extinct species.

Cave Bear – Ursus spelaeus



Figure 5 – Cave Bear Skeleton at the [Geological Museum of the Polish Geological Institute, Warsaw](#)
Credit: [Wikipiek](#), [Creative Commons Attribution-Share Alike 3.0 Unported](#) license

The cave bear, *Ursus spelaeus*, lived in Europe and Asia during the Pleistocene, becoming extinct during the [Last Glacial Maximum](#) about 27,500 years ago. *Ursus spelaeus* fossils are commonly found in caves, hence the common name, cave bear. Fossils of *Ursus spelaeus* [have been found](#) in France, Germany, Greece, Hungary, Italy, Kazakhstan, Monaco, Spain, and the United Kingdom.

Ursus spelaeus was a large bear. The [fossil evidence](#) suggests that males grew to between 350 and 600 kg while females grew to between 225 and 250kg. Some specimens were bigger, [up to 1000 kg](#). The cave bear is thought to have evolved from an earlier bear, the Etruscan bear (*Ursus etruscus*) and Deninger's bear (*Ursus deningeri*). Cave bears had a [common ancestor](#) with modern brown bears (*Ursus arctos*) about 1.2 to 1.4 million years ago (Mya).



Figure 6 – Cave Bear
Credit: Zygard Master, CC-BY-SA

The earliest documentation of cave bears was by [the artists](#) who painted the bear in the Chauvet Caves. In more modern times [Johann Friedrich Esper](#) described the cave bear in 1774 in his book *Description des zoolithes nouvellement découvertes d'animaux quadrupèdes inconnus et des cavernes*. Later, in 1794, [Johann C. Rosenmüller](#) gave the species its current binomial name.

Ungulates

Woolly rhinoceros – Coelodonta antiquitatis

One of the iconic megafauna of the Pleistocene was the woolly rhinoceros, *Coelodonta antiquitatis*. (Not to be confused with [Woolly Bully](#)) Fossils of the woolly rhinoceros [have been found](#) in Pleistocene

deposits in Belgium, China, Germany, Greece, Hungary, Kazakhstan, the Netherlands, Russia, and the United Kingdom. Fossils of the [woolly rhinoceros include not only bones but also specimens frozen in permafrost](#). The oldest fossil of *Coelodonta antiquitatis*, from about 3.6 Mya, [was found in Pliocene](#) deposits in Tibet. The woolly rhinoceros appears to have gone extinct during at the end of the Pleistocene during the Quaternary Extinction Event although it [may have persisted](#) till as late as 10,000 years BP into the Holocene.



Figure 7 – *Coelodonta antiquitatis* Skeleton in the [Muséum de Toulouse](#)
Credit: [Didier Descouens](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

The woolly rhinoceros was a big animal, about 3 to 3.8 m long and weighing between 2,000 and 3,000 kg. We know what they looked like in life because [paleolithic](#) humans painted depictions of the woolly rhinoceros in the Chauvet, [Font-de-Gaume](#), Lascaux, and [Rouffignac](#) caves of France as well as in the [Kapova Cave](#) in the Russian Ural Mountains.

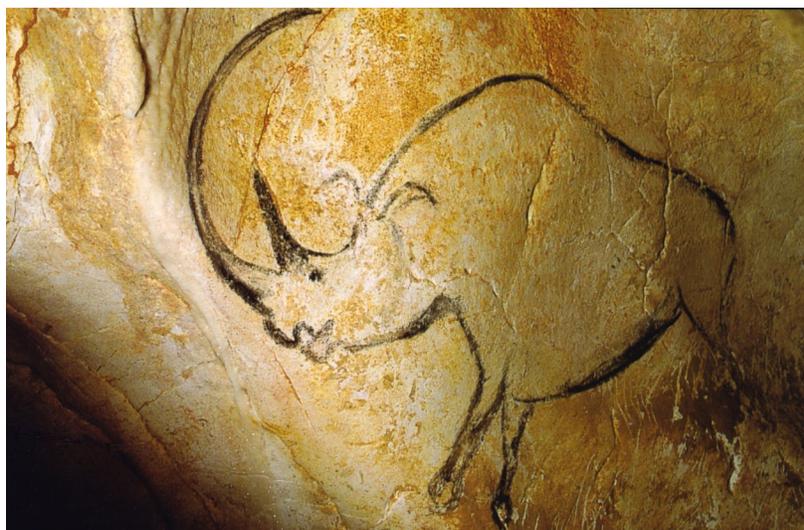


Figure 8 – Woolly Rhinoceros in the Chauvet Cave
Credit: [Inocybe](#), [public domain](#)

In more modern times, the people of Siberia believed that the bones of the woolly rhinoceros belonged to [mythical giant birds](#). Along the same line, a woolly rhinoceros skull found in 1335 in Austria was [thought to be dragon](#) and in 1590 [Gotthilf H. von Schubert](#) thought it [was the mythical griffin](#). In 1799, [Johann F. Blumenbach](#) named it [Rhinoceros antiquitatis](#) and its [modern name](#), *Coelodonta antiquitatis* was coined by [Heinrich Georg Bronn](#) in 1831.

Irish Elk – Megaloceros giganteus



Figure 9 – Irish Elk Skeleton at the Cleveland Museum of Natural History
Credit: [James St. John](#), [Creative Commons Attribution 2.0 Generic](#) license

One of the largest deer that has ever lived, the Irish elk, *Megaloceros giganteus*, lived from the Pleistocene until the early Holocene. The [oldest unequivocal](#) *Megaloceros giganteus* fossil came from [Middle Pleistocene](#) deposits in England. It appears that the [last of the species](#) went extinct around 7,700 years ago in Siberia and [persisted in Central Europe](#) until around 10,000 years ago. However, *Megaloceros giganteus* generally died out in Western Europe during the [Younger Dryas Event](#). The Younger Dryas is closely connected to the Quaternary Extinction Event. Fossils of the Irish elk have been found from Ireland in the west to Lake Baikal in the east.

While called an elk, *Megaloceros giganteus* is not closely related to the European elk, *Alces alces* (called moose in North America) or the North American elk or wapiti or *Cervus canadensis*. Modern studies ([here](#), [here](#) and [here](#)) suggest that the closest living relative to *Megaloceros giganteus* is the fallow deer, *Dama dama*. The Irish elk appears to have evolved from earlier species of *Megaloceros* that first appeared during the Early [Pleistocene](#).

Megaloceros giganteus [was big](#), generally 2.1 m tall at the shoulders and weighing between 450 and 700 kg. It also [had huge antlers](#), up to 3.65 m wide and weighing 40 kg. For hunters, it would have been a great prize.



Figure 10 – *Megaloceros giganteus* Painting at Lascaux Cave, France
Credit: [Codex](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

As with many other megafauna from the Pleistocene, ice age humans left paintings of *Megaloceros giganteus*. These paintings are found in caves at the Lascaux and Chauvet Caves in France. In modern times, [Thomas Molyneux](#) made the first scientific description in 1695, from large antlers found near Dublin. J. F. Blumenbach [described the species](#) in 1799, calling it *Alce gigantea*. Many other names for the species were proposed and the debate over the proper name for the species was joined by many luminaries in the field of paleontology such as [Georges Cuvier](#), [Richard Owen](#) and [George Simpson](#). Finally, in 1989, the [International Commission on Zoological Nomenclature](#) settled on the [current designation](#) *Megaloceros giganteus* in the [International Code of Zoological Nomenclature](#). Let's hope they don't change their minds again.



Figure 11 – Reconstruction of *Megaloceros giganteus* at [Parc pyrénéen de l'art préhistorique, Tarascon](#)
Credit: [Tylwyth Eldar](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

Winding it Up

I think that this a good place to place leave it for now. Next week we will look at non-mammalian fossils from the Pleistocene of Eurasia.

We have only taken a look at a few of the fossil mammals from Eurasia. There are lots more, so if this interests you, take a look at [this link](#) and follow up on the ones that you like.

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.