

December19, 2022

News and notes

Before winding up our look terrestrial life during the Neogene Period, here are some news items that I thought were interesting.

Research

- Plate tectonics: [Breaking Up Is Hard to Do: Magmatism During Oceanic Arc Breakup, Subduction Reversal, and Cessation](#); Phys.org summary [here](#).
- Not as good as actual field work, but a fun game never-the-less: [Virtual field experiences in a web-based video game environment: open-ended examples of existing and fictional field sites](#); Phys.org summary [here](#).

Paleontology

- Giant arthropods: [New fossil assemblages from the Early Ordovician Fezouata Biota](#); Phys.org summary [here](#).
- Did you hear what Katy did? [High acoustic diversity and behavioral complexity of katydid in the Mesozoic soundscape](#); Phys.org summary [here](#).
- Late Pleistocene extinctions: [Thresholds for the presence of glacial megafauna in central Europe during the last 60,000 years](#); Eureka Alert summary [here](#).
- Insects in amber: [Oregon State amber researcher finds new species of cockroach, first fossilized roach sperm](#); Geology In summary [here](#).

Glaciers and Climate Studies

- [Glaciers have existed on Earth for at least 60 million years—far longer than previously thought](#).
- Greenland's glaciers melting fast: [An Improved and Observationally-Constrained Melt Rate Parameterization for Vertical Ice Fronts of Marine Terminating Glaciers](#); Phys.org summary [here](#).
- The periglacial environment, arctic permafrost studies: [Simulated Hydrological Dynamics and Coupled Iron Redox Cycling Impact Methane Production in an Arctic Soil](#); Phys.org summary [here](#).
- More on the periglacial environment: [Recent Intensification \(2004–2020\) of Permafrost Mass-Wasting in the Central Mackenzie Valley Foothills Is a Legacy of Past Forest Fire Disturbances](#).
- Climate change: [Astrochronology of the Paleocene-Eocene Thermal Maximum on the Atlantic Coastal Plain](#); Phys.org summary [here](#).
- More on periodic climate change: [Extending the Range of Milankovic Cycles and Resulting Global Temperature Variations to Shorter Periods \(1–100 Year Range\)](#).
- Stable isotope analysis: [Chert oxygen isotope ratios are driven by Earth's thermal evolution](#).

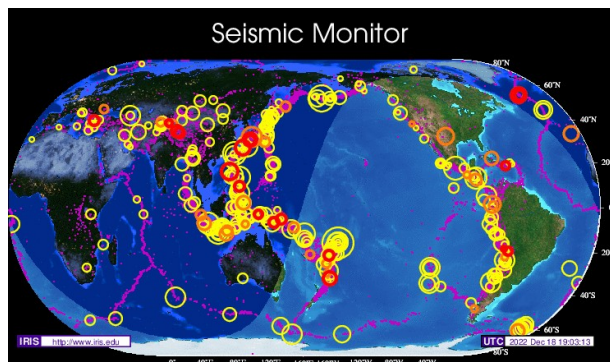
Environmental Geology and Hydrogeology

- [Household water wells are drying up in record numbers as California drought worsens.](#)
- Unexpected consequences: [Cascading Delays in the Monsoon Rice Growing Season and Postmonsoon Agricultural Fires Likely Exacerbate Air Pollution in North India](#); Phys.org summary [here](#).
- [NASA sensors to help detect methane emitted by landfills.](#)
- Cleaning up mine tailings: [The effect of alkali concentration on the properties of activated tungsten tailings.](#)

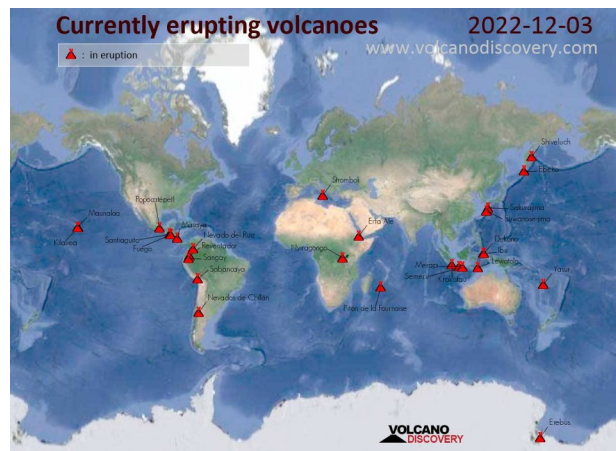
Mining and Energy

- Crooked dealing: [Police searched Ivanhoe Mines' Vancouver office as part of Swiss bank transfer investigation.](#)
- [Oil ends week by dropping over \\$2 per barrel, dogged by recession fears.](#)
- Exploration activity: [Canada's Weekly Rig Count Currently Stands at 199](#) and [U.S. drillers cut most oil rigs since September.](#)
- [50 facts About Canadian and the World's Oil and Gas: A Summary Research Brief.](#)

Volcanoes, Earthquakes and Geohazards



[Link](#)



[Link](#)

- [Magma recharge and mush rejuvenation drive paroxysmal activity at Stromboli volcano](#); Phys.org summary [here](#).
- [Fighting misinformation in seismology: Expert opinion on earthquake facts vs. Fiction.](#)
- Fault research: [Fault permeability from stochastic modeling of clay smears.](#)
- [Automatic Tsunami Hazard Assessment System: "Tsunami Observer"](#).

December 19, 2022

Terrestrial Vertebrates of the Neogene – Mammals, Part 4: Carnivores and Primates

We'll wind up our view of the mammals that lived during the [Neogene Period](#) with a look at two mammalian orders: the [Carnivores](#) and the [Primates](#).

Carnivores

While the term carnivore refers to any meat-eating creature, the mammalian order of [Carnivora](#) includes a more narrow group of mammals such as [viverroids](#) (hyenas, mongooses and viverrids), [cats](#), [canids](#), [bears](#), (skunks, raccoons and weasels), and [pinnipeds](#) (seals, sea lions and walrus). Lets look at some of these from the [Miocene](#) and [Pliocene](#) Epochs.

Ursavus



**Figure 1 – *Ursavus tedforti* at the [Muséum National d'Histoire Naturelle](#) in Paris
Credit: [Skye McDavid](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license**

Thought to be [one of the earliest](#) true bears, the genus [Ursavus](#) lived during the Miocene. *Ursavus* species varied in size from about the size of a modern house cat to roughly the size of a wolf. Fossils of *Ursavus* [come from various locations](#) in Bosnia-Herzegovina, Canada, China, France, Germany, Greece, Hungary, Poland, Slovakia, Switzerland, Turkey, and the United States. Most of the fossils are of teeth

and skull fragments, although a nearly complete skeleton of *U. Orientalis* came from diatomaceous member of the Early Miocene [Shanwang Formation](#) of China. Like most modern bears, *Ursavus* were omnivores.



Figure 2 – *Ursavus* Reconstruction
Credit: [Charlie1022, CC-BY-SA](#)

German zoologist [Max Schlosser](#) was the first [to describe](#) *Ursavus* in 1899. There are eight species of *Ursavus*: *U. brevirhinus* (type), *U. primaevus*, *U. intermedius*, *U. pawniensis*, *U. ehrenbergi*, *U. sylvestris*, *U. isorei*, and *U. tedfordi*.

Ursus etruscus



Figure 3 – *Ursus etruscus* skull at the [Museo di Paleontologia di Firenze](#)
Credit: [Ghedoghedo, Creative Commons Attribution-Share Alike 3.0 Unported](#) license

Ursus etruscus lived from the Pliocene until the [Pleistocene](#). Fossils of *Ursus etruscus* [have been found](#) in Croatia, France, Georgia, Germany, Greece, Hungary, Israel, Italy, Morocco, Romania, Russia, Spain, and Tajikistan. *Ursus etruscus* was about the size of [modern brown bears](#). It probably evolved from [Ursus minimus](#) and is the predecessor to modern brown bears.

[Georges Cuvier](#) first described *Ursus etruscus* in 1823. The genus [Ursus](#), first described by [Carl Linnaeus](#) in 1758, includes four living species (*U. arctos* (type), *U. americanus*, *U. maritimus*, and *U. thibetanus*) as well as 11 extinct species (*U. abstrusus*, *U. arvernensis*, *U. deningeri*, *U. etruscus*, *U. ingressus*, *U. dolinensis*, *Ursus rossicus*, *U. sackdillingensis*, *U. savini*, *U. spelaeus*, and *U. minimus*).

Homotherium



Figure 4 – *Homotherium* at the [Tianjin Natural History Museum](#)

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

Also called the [scimitar-toothed cat](#) or [scimitar cat](#), the genus [Homotherium](#) lived from the Miocene until the Pleistocene. *Homotherium* fossils are widely spread and [have been found in](#) Austria, China, Bulgaria, the Czech Republic, Ethiopia, France, Georgia, Greece, Germany, Hungary, Italy, Kazakhstan, Kenya, Mexico, Moldova, Morocco, [the North Sea](#), Romania, Russia, South Africa, Spain, Tajikistan, Tanzania, Ukraine, Uganda, the United Kingdom, the United States, and Venezuela.

Homotherium was a fairly large cat, about 1.1 m at the shoulder and weighing around 190 kg. It was comparable in size to modern male [African lions](#). Also, like modern lions, it [may have been a social creature](#). Like all cats, it was an obligate carnivore.



Figure 5 – *Homotherium serum* Reconstruction

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

Dr. E. Fabrini (no biography available) [first described](#) *Homotherium* in 1890. There are four species in the genus: *H. latidens* (type), *H. ischyurus*, *H. serum*, and *H. venezuelensis*. [Edward D. Cope](#) originally described American specimens of *Homotherium* by the name *Dinobastis*. However *Dinobastis* is now considered synonymous with *Homotherium*.

Panthera blytheae



Figure 6 – *Panthera blytheae*

Credit: [AnimalKeeper21](#), [CC-BY-SA](#)

Considered to be the [oldest of the big cats](#) in the fossil record, *Panthera blytheae* lived during the [Late Miocene \(Messinian\)](#) and [Early Pliocene \(Zanclean\)](#). Fossils of *Panthera blytheae* [came from](#) the Zanda Canyon trail approximately 15 km north of the [Zanda county seat](#), Ngari District in the Tibet Autonomous Region of China. *Panthera blytheae* was a medium sized cat, roughly the size of a modern [clouded leopard](#).

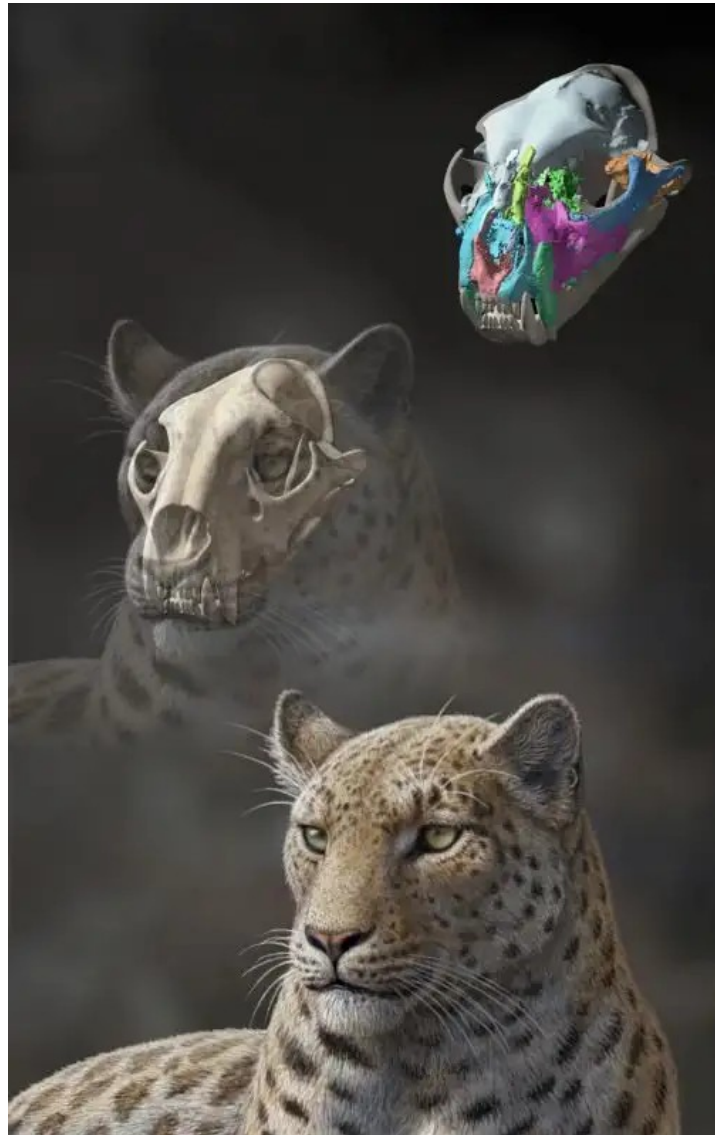


Figure 7 – Reconstruction of *Panthera blytheae* based on the newly discovered skull
[Credit](#): Mauricio Ant3n

The team of [Z. Jack Tseng](#), [Xiaoming Wang](#), [Graham J. Slater](#), [Gary T. Takeuchi](#), [Qiang Li](#), [Juan Liu](#), and [Guangpu Xie](#) were the first to describe *Panthera blytheae* in their [2014 paper](#). The genus [Panthera](#) was first described by Carl Linnaeus in [1758](#) and includes five living species (*P. leo*, *P. onca*, *P. pardus* (type), *P. tigris*, and *P. uncia*), nine extinct species (*P. blytheae*, *P. palaeosinensis*, *P. zdanskyi*, *P. youngi*, *P. atrox*, *P. balamoides*, *P. gombaszoegensis*, *P. spelaea*, and *P. shawi*) as well as eight extinct subspecies (*P. leo fossilis*, *P. leo sinhaleyus*, *P. onca augusta*, *P. onca mesembrina*, *P. pardus spelaea*, *P. tigris acutidens*, *P. tigris soloensis*, and *P. tigris trinilensis*).

Primates

Dryopithecus



Figure 8 – Jaw of *Dryopithecus* from Saint-Gaudens, France
Credit: 120, [Creative Commons Attribution-Share Alike 3.0 Unported](#) license

Dryopithecus was an ape that lived during the [Middle](#) to [Late](#) Miocene of Europe and Asia. The exact relation of *Dryopithecus* to modern apes and humans is not well established, however it is clear that it was part of a general [adaptive radiation](#) of great apes out of Africa and into Eurasia during the [Miocene Climatic Optimum](#). *Dryopithecus* was of moderate size, males weighed about 44 kg. and their build suggested that they lived in the trees. They suffered from dental caries, probably as the result of a diet heavy in fruit. Also, the males had longer canines than the females. They may have been capable of limited bipedal locomotion. Overall, they resembled modern day chimpanzees and gorillas.



Fossils of *Dryopithecus* [have been found](#) in China, Egypt, France, Hungary, and Kenya. A certain Monsieur Alfred Fontan found the first fossil of *Dryopithecus* in the French Pyrenees. In 1856, [Édouard Lartet](#) described the fossil in "*Note sur un grand Singe fossile qui se rattache au groupe des Singes Supérieurs*". *Comptes Rendus de l'Académie des Sciences de Paris* (in French). 43: 219–223 (not online). There is one official species in *Dryopithecus*, *D. fontani* (the type) as well as a number of species that may or may not be considered part of the genus including: *D. brancoi*, *D. chinjiensis*, *D. crusafonti*, and *D. mogharensis*. *Rangwapithecus* and *Ataxopithecus* have also been included in the genus.

Figure 9 – *Dryopithecus*
Credit: DiBgd, [Creative Commons Attribution-Share Alike 4.0 International](#) license

Ardipithecus



Figure 10 – *Ardipithecus* Skull

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

A [hominine](#) related to the ancestors of modern human beings, *Ardipithecus* lived in East Africa during the Late Miocene and Early Pliocene. Another moderately sized ape, an *Ardipithecus* female skeleton was estimated to be 50 kg in life, it also had a brain more in line with other apes, about 300 cc in size. Its skeleton suggested that it lived mostly on the ground but frequently climbed into the trees. The teeth of *Ardipithecus* suggest that it had a varied, omnivorous diet.

A research team headed by [Tim White](#) found the first fossils of *Ardipithecus* between two volcanic strata: the basal [Gaala Tuff Complex](#) and the [Daam Aatu Basaltic Tuff](#) in Afar region of Ethiopia. The fossils were originally described in [1994](#) as a species of [Australopithecus](#) and later, in [1995](#), the fossils were assigned to a new species *Ardipithecus ramidus*. Later, in [2004](#), a second species of *Ardipithecus*, *A. kadabba*, was identified.

Homo habilis



Figure 11 – *Homo habilis* Skull at [Göteborgs Naturhistoriska Museum](#)

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

Once thought to be our direct ancestor, *Homo habilis* lived during the Late Pliocene and into the Early Pleistocene. Fossils of *Homo habilis* come from Ethiopia, Kenya, and Tanzania. Recent analysis suggests that *Homo habilis* was not in the direct line of modern human ancestors, but represents a side branch.

Homo habilis was another moderately sized creature, about 100–120 cm in height and 20–37 kg in weight. Its brain was about 500 to 900 cc, approaching the size of modern humans which are generally more than 1000 cc. *Homo habilis* was the earliest human species known to use tools, the so-called Oldowan industry.

There has been a lot of speculation on the social structure and [mating behavior](#) of *Homo habilis* based solely on a study of the bones and stone implements. If this interests you, follow up on the links in the [Wikipedia article](#) on *Homo habilis*. For my part, I am skeptical of such speculation although it is interesting to contemplate.

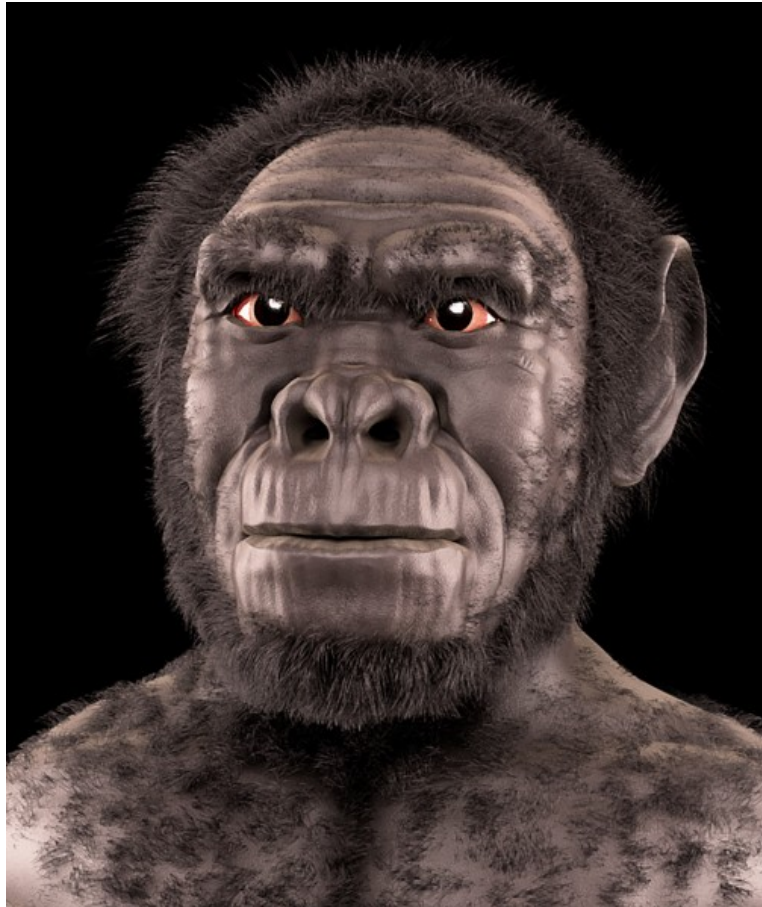


Figure 12 – *Homo habilis* Forensic Facial Reconstruction

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

Jonathan Leakey, son of [Louis](#) and [Mary Leakey](#) found the first fossils of *Homo habilis* in 1960. The species Louis Leakey, [Philip Tobias](#) and [John Napier](#) together [described](#) *Homo habilis* in 1964. The genus [Homo](#) was first described by Carl Linnaeus in [1758](#) and includes one living species (*H. sapiens*, i.e. us) and at least 12 extinct species (*H. antecessor*, *H. erectus*, *H. ergaster*, *H. floresiensis*, *H. habilis*, *H. heidelbergensis*, *H. longi*, *H. luzonensis*, *H. naledi*, *H. neanderthalensis*, *H. rhodesiensis*? = *H. bodoensis*, and *H. rudolfensis*).

Wind Up

That kind of finishes it for the Neogene, although there are lots more fossils from that period. If you want to follow up some more, try these sites for a start:

- [Pliocene animals](#)
- [Miocene animals](#)

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.