

August 1, 2022

News and notes

Before going on to look at other terrestrial animals of the [Cretaceous Period](#), here are some news items that I thought were interesting.

Good News!

- [Family of geologist freed from Iraq thank 'kindness of strangers' for his return.](#)

Research

- From Eureka Alert: [New Geology articles published online ahead of print in July.](#)
- From the Geological Society of America: [Biogeodynamics: Coupled evolution of the biosphere, atmosphere, and lithosphere.](#)
- Related, teaching geology as a holistic system: [Leopoldina recommends establishing Earth System Science in Germany](#); Eureka Alert summary [here](#).
- Geological history: [Metamorphic diamond from the northeastern margin of Gondwana: Paradigm shifting implications for one of Earth's largest orogens](#); Phys.org summary [here](#).
- More geological history: [Fluid processes in the early Earth and the growth of continents](#); Phys.org summary [here](#).
- Even more geological history: [U-Pb and fission-track data from zircon and apatite resolve latest- and post-Alleghanian thermal histories along the Fall Line of the Atlantic margin of the southeastern United States.](#)
- ['They look almost human made.' NOAA finds weird lines of holes in mid-Atlantic floor; must be Aliens!](#)
- [Greenland Geothermal Heat Flow Database and Map \(Version 1\).](#)
- Mineralogy: [Tridymite in a lacustrine mudstone in Gale Crater, Mars: Evidence for an explosive silicic eruption during the Hesperian](#); Eureka Alert summary [here](#).
- Plate tectonics: [Timing and mechanisms of Tibetan Plateau uplift](#); behind a paywall, you can [request a copy](#) through Research Gate.
- More plate tectonics: [Seismic attenuation tomography of the Sn phase beneath the Turkish-Iranian Plateau and the Zagros mountain belt.](#)
- [Satellite Images Reveal a New View of Ancient Earth's Rivers.](#)

Paleontology

- [Meet Nun Cho Ga, The Latest Frozen Mammoth Discovered in Canada!](#)
- Gorgosaurus: [76 million-year-old dinosaur fossil sells at auction for \\$6.1 million.](#)
- Disputes over *T. rex*: [Insufficient Evidence for Multiple Species of Tyrannosaurus in the Latest Cretaceous of North America](#); Reuters report [here](#).
- [Jurassic marine world unearthed in a farmer's field.](#)

- Weird critters from the Cambrian: [The soft-bodied biota of the Cambrian Series 2 Parker Quarry Lagerstätte of northwestern Vermont, USA.](#)
- Rare fossil, exceptional preservation: [A new marrellomorph arthropod from southern Ontario: a rare case of soft-tissue preservation on a Late Ordovician open marine shelf;](#) summary in [The Soo Today.](#)
- Related to last week's post: [A new istiodactylid pterosaur, *Lingyuanopterus camposi* gen. et sp. nov., from the Jiufotang Formation of western Liaoning, China.](#)
- [David Attenborough gets a namesake: the oldest known relative of living animals.](#)
- Fossil frogs, caught in the act: [The skeletal taphonomy of anurans from the Eocene Geiseltal Konservat-Lagerstätte, Germany: insights into the controls on fossil anuran preservation;](#) Insider summary [here.](#)

Environmental Geology and Hydrogeology

- Coal waste remediation: [Blue Sky Remediate and Repurposes Coal Waste.](#)
- Cleaning up groundwater contamination: [Passive convergence-permeable reactive barrier \(PC-PRB\): An effective configuration to enhance hydraulic performance;](#) Phys.org summary [here.](#)
- [Increasing Accumulation of Perfluorocarboxylate Contaminants Revealed in an Antarctic Firn Core \(1958–2017\);](#) Phys.org summary [here.](#)
- Groundwater and glaciers: [Sedimentary basins reduce stability of Antarctic ice streams through groundwater feedbacks;](#) behind a paywall.

Climate Change

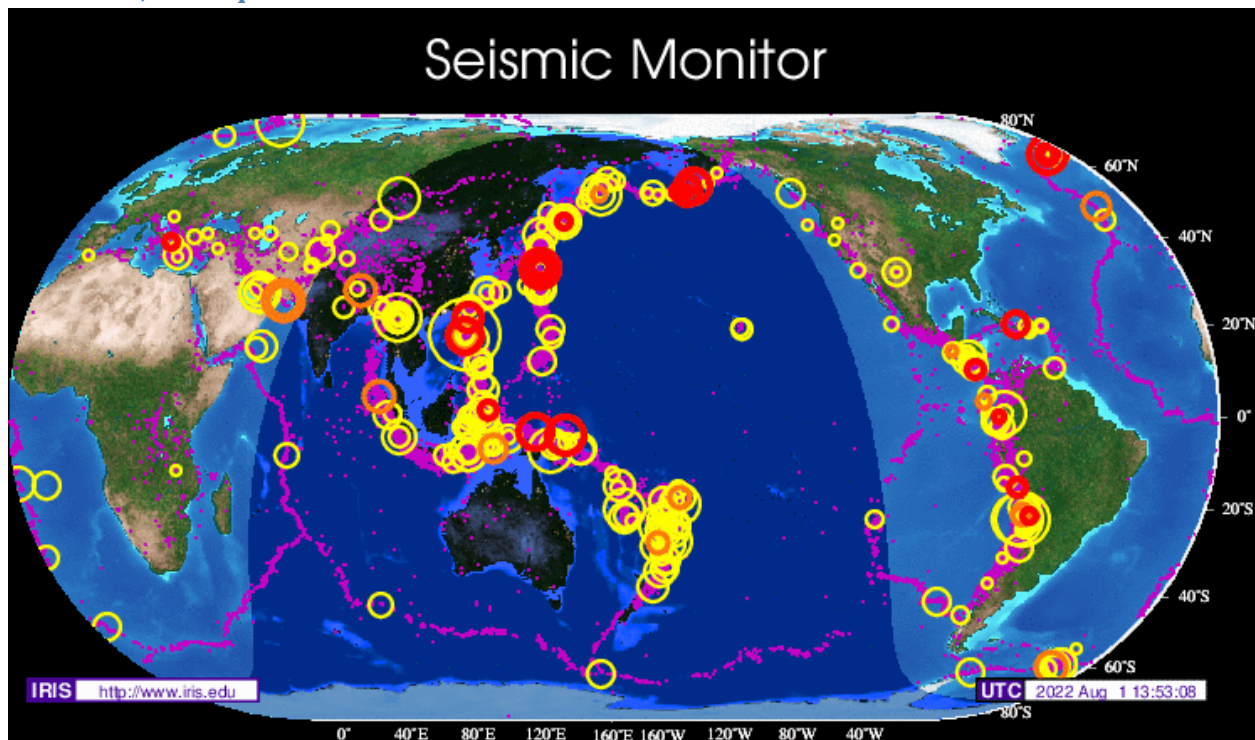
- From the University of Saskatchewan: [Volcanic stratospheric sulfur injections and aerosol optical depth during the Holocene \(past 11 500 years\) from a bipolar ice-core array;](#) Phys.org summary [here.](#)
- Rapid ice sheet instability and sudden climate change: [Subsurface ocean warming preceded Heinrich Events;](#) Eureka Alert summary [here.](#)
- Carbon sequestration: [Groundwater May Fix as Much Carbon as Some Ocean Surface Waters.](#)

Energy & Mining

- International Energy Agency: [Global coal demand is set to return to its all-time high in 2022.](#)
- [U.S. drillers add oil and gas rigs for record 24th month.](#)
- Gold mining research: [Progressive crushing ⁴⁰Ar/³⁹Ar dating of a gold-bearing quartz vein from the Liaotun Carlin-type gold deposit, Guangxi, southern China.](#)
- More gold mining research: [Ancient structural inheritance explains gold deposit clustering in northern Peru;](#) behind a paywall.

- From the United States Energy Information Administration (USEIA): [The United States Became the World's Largest LNG Exporter in the First Half of 2022](#).
- Also from the USEIA: [Small-scale solar is changing hourly utility electricity demand in New England](#).
- Ooo, shiny: [Miners just discovered the largest pink diamond in more than 300 years](#); also in [The Conversation](#).
- New iron ore mine: [Rio Tinto inks deal to unlock huge Simandou iron ore project](#).
- Make batteries safer: [Fast Zn²⁺ mobility enabled by sucrose modified Zn²⁺ solvation structure for dendrite-free aqueous zinc battery](#); Mining.com summary [here](#).
- [Energy Aspects: Crude Oil Demand Not Declining In Recession Pattern](#).
- [Despite High Prices, Oil Piracy Is In Decline](#).

Volcanoes, Earthquakes and Geohazards



[Seismic Monitor Link](#)

- [Powerful 7.1 earthquake strikes Philippines; at least 5 dead](#); USGS [report](#). Aftershocks: [Besao, Philippines](#), and [Luzon, Philippines](#).
- Earthquake detection: [Infrasound from large earthquakes recorded on a network of balloons in the stratosphere](#); Phys.org summary [here](#).
- Earthquake clusters: [Spatio-temporal clustering of successive earthquakes as inferred from analyses of global CMT and NIED F-net catalogs](#).

- Landslide research: [Augmentation and Use of WRF-Hydro to Simulate Overland Flow2 and Streamflow-Generated Debris Flow Hazards in Burn Scars](#); Eureka Alert summary [here](#).
- Flooding in Kentucky: [Catastrophic flash flooding kills 25 in Kentucky and at least a dozen missing](#).
- From the Geological Society of America: [Autobrecciation and fusing of mafic magma preceding explosive eruptions](#), behind a paywall.
- [Worldwide Volcano News and Updates](#).

Bad Science

- [Corrupted Climate Stations: The Official U.S. Surface Temperature Record Remains Fatally Flawed](#), Watts Up With That summary [here](#).

Reference

- From the Geological Society of America: [Decade of North American Geology](#); this looks like a significant reference work, there are 66 volumes at US\$9.99, so you might want to be selective or buy only a few at a time.

Upcoming Events



**SUDBURY 2023 GAC-MAC-SGA
Joint Annual Meeting
May 23 to 26, 2023**

[Link to Event Website](#)

August 1, 2022

Other Terrestrial Animals of the Cretaceous Period

The last few weeks we have looked at fossil mammals, birds, dinosaurs and pterosaurs from the [Cretaceous Period](#). This week we'll wrap up our look at other terrestrial life during the Cretaceous such as [rhynchocephalians](#), and [choristodera](#) reptiles, as well as [arthropods](#) (insects, spiders, etc.)

Rhynchocephalians

Rhynchocephalians are an order of reptiles that are similar to, but not the same as [squamate](#) reptiles (lizards and snakes). While very common as fossils throughout the world from the [Middle Triassic](#) to the [Late Jurassic](#); by the [Late Cretaceous](#) their fossils are only found in places that were formerly part of [Gondwana](#). By modern times, the only representative of the rhynchocephalian order is the New Zealand [tuatara](#). Here are a couple of rhynchocephalians from the Cretaceous.

Lamarquesaurus



Figure 1 - Maxilla of *Lamarquesaurus*

Credit: [Fanboyphilosopher](#), [Creative Commons Attribution 4.0 International](#) license

[Lamarquesaurus](#) was a genus of rhynchocephalian reptiles that lived during the Late Cretaceous. Paleontologists Sebastian Apesteguia and Guillermo W. Rougier [first described](#) *Lamarquesaurus* in 2007 from a fossil [maxilla](#) collected from the [Allen Formation](#) at a site called Cerro Tortuga, about 30 km from [Lamarque](#), Argentina. There is one species in the genus *Lamarquesaurus*; *L. cabazai*, named after the discoverer of the Cerro Tortuga site, Tito Cabaza.

With only one fossil, an upper jaw bone about 3.6 cm long, there is not much that you can say about *Lamarquesaurus* other than it shows the survival of rhynchocephalian in the Southern Hemisphere.

Derasmosaurus



Figure 2 - *Derasmosaurus pietraroiae*

Credit: [Ghedoghedo](#), [Creative Commons Attribution-Share Alike 3.0 Unported, 2.5 Generic, 2.0 Generic and 1.0 Generic](#) license

Derasmosaurus was another rhynchocephalian reptile from the Cretaceous, fossils of which come from the [Early Cretaceous](#) (Albian age) [Pietraroja Plattenkalk](#) limestone formation near Benevento, Italy. Based upon the geology of the host formation, *Derasmosaurus* lived in aquatic environments.

Classification of *Derasmosaurus* went through a twisted path. When first found in 1866, Oronzio Gabriele Costa identified it as a specimen of [*Lacerta brevicauda*](#). Later, in 1915, Geremia d'Erasmus said that it was a specimen of [*Chometokadmon fitzingeri*](#). In 1988, researchers C. Barbera and L. Macuglia gave the fossil its current designation [*Derasmosaurus pietraroiae*](#) as the single species in the genus in the Italian publication *Revisione dei tetrapodi del Cretacico Inferiore di Pietraroja*, *Memorie della Società Geologica Italiana* 41(1):567-574 (not online).

Choristodera Reptiles

Choristodera were an order of reptiles that arose during the [Middle Jurassic](#) and went extinct sometimes during the [Miocene Epoch](#). Their exact relationship to other reptiles is not well known, and may always be ambiguous given the paucity of information available in the fossil record - small creatures do not generally preserve well. Here are a couple of examples from the Cretaceous.

Philydrosaurus



Figure 3 - *Philydrosaurus proselus* fossil from Liaoning, China.

Credit: Tiouraren (Y.-C. Tsai), [Creative Commons Attribution 4.0 International](#) license

Philydrosaurus was a choristoderan reptile that lived during the Early Cretaceous. Researchers Ke-Qin Gao and Richard C. Fox [first described](#) *Philydrosaurus* from fossils found in 2005 in the [Jiufotang Formation](#) of Liaoning, China, part of the [Jehol Biota](#). There is one species in the genus, *Philydrosaurus proselus*.

The fossils of *Philydrosaurus* come from a volcanic shale and are exceptionally well preserved, right down to the contents of the guts. Another interesting feature of the fossils is the association of juvenile and adult forms of *Philydrosaurus*, suggesting parental care.

Ikechosaurus



Figure 4 - *Ikechosaurus* Fossil

Credit: Tiouraren (Y.-C. Tsai), [Creative Commons Attribution 4.0 International](#) license

Paleontologist [Denise Sigogneau-Russell](#) first described [Ikechosaurus](#) in 1981 from fossils found in the [Jiufotang Formation](#) of Liaoning, China. The description was in the French Academy of Sciences publication *Présence d'un nouveau Champsosauridé dans le Crétacé supérieur de Chine*, Comptes Rendus de l'Académie des Sciences de Paris 292(1):1-4 (not online) In 1999, J. Lü, Y. Kobayashi, and Z.-G. Li [described specimens of the genus](#) from fossils found in Mongolia. There are two species in the genus: *Ikechosaurus sunailinae* and *Ikechosaurus gaoi*.

Arthropods

Spiders, insects, other arthropods make up the largest number terrestrial animals in number of species, number of individuals and in total biomass. They are critical to ecosystems as predators, prey and pollinators. However, as small relatively fragile creatures, they do not often end up as fossils. However, enough do get fossilized that we have some really interesting fossils of them.

Arachnids - *Chimerarachne*



Figure 5 - *Chimerarachne yingi* in Amber
Credit: University of Kansas

Researchers from the [University of Kansas](#) found fossils of [Chimerarachne](#) in Cretaceous aged amber from Myanmar in 2018. Not quite a spider, *Chimerarachne* shows the origin of modern spiders (two papers: [here](#) and [here](#)). There is one species in the genus, *Chimerarachne yingi*.

The body of *Chimerarachne* was small, about 2.5 cm long, and it had a tail about 3 cm long. It appears to have been able to produce silk and it had a modified male organ on the [pedipalp](#) for transferring sperm.



Figure 6 - *Chimerarachne* Reconstruction

Credit: [Nobu Tamura](#), [Creative Commons Attribution 4.0 International](#) license

Insects, Amarantorphidia ventolina

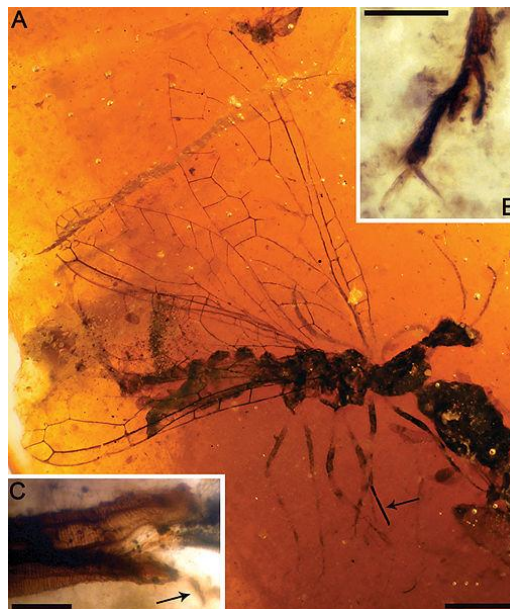


Figure 7 - *Amarantorphidia ventolina* in Spanish Amber

Credit: [R. Pérez-de la Fuente](#), [E. Peñalver](#), [X. Delclòs](#), and [M.S. Engel](#), [Creative Commons Attribution 3.0 Unported](#) license

In 2012, researchers [R. Pérez-de la Fuente](#), [E. Peñalver](#), [X. Delclòs](#), and [M.S. Engel](#) [found fossils](#) of [Amarantorphidia ventolina](#) in amber dating from the Early Cretaceous (Albian). The amber came from the [Escucha Formation](#) in Moraza, Burgos Province, Spain.

Amarantoraphidia was apparently a [snakefly](#). There is only one fossil of *Amarantoraphidia ventolina*. However, like most fossils in amber, it is exceptionally well preserved.

Insects, Chronomyrmex



Figure 8 - *Chronomyrmex medicinehatensis* in Amber

Credit: [Ryan McKellar, Creative Commons Attribution 4.0 International](#) license

In 2013, researchers R.C. McKellar, J.R.N. Glasier and M.S. Engel [described a new species of ant](#) from the Late Cretaceous ([Campanian](#)), *Chronomyrmex medicinehatensis*. The amber came from the Taber Coal Zone of the [Foremost Formation](#), near Medicine Hat, Alberta.

Insects, Plumalexius

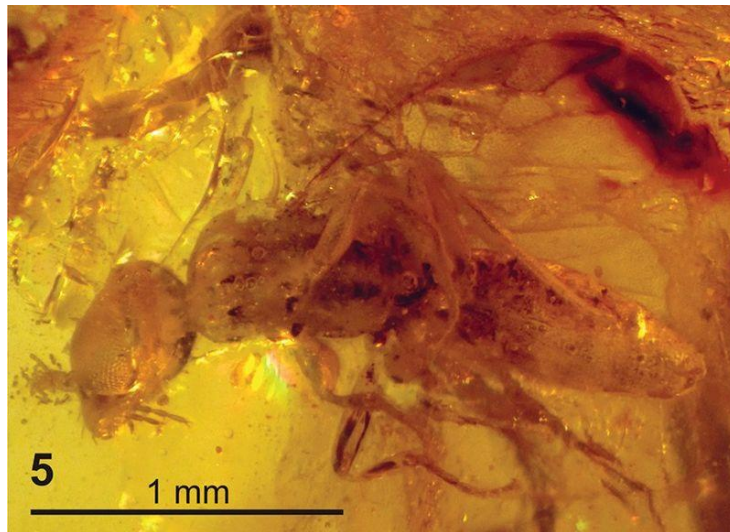


Figure 9 - *Plumalexius* in New Jersey Amber

Credit: [Denis J. Brothers, Creative Commons Attribution 3.0 Unported](#) license

[Plumalexius](#) is a genus of wasps known from fossils in amber. There are two species: *Plumalexius rasnitsyni* and *Plumalexius ohmkuhnlei*. Denis J. Brothers [first described Plumalexius](#)

[rasnitsyni](#) in 2011 from a fossil found in Late Cretaceous ([Turonian](#)) amber from the [White Oaks Pit, New Jersey](#). In 2020, Brothers and Alexandr P. Rasnitsyn [described](#) *Plumalexius ohmkuhnlei* from a fossil in Mid-Cretaceous Burmese Amber from Myanmar. Both specimens are well preserved male wasps.

Further Reading

There are lots more fossil insects from the Cretaceous. If they interest you, check out the links at this [Wikipedia entry](#).

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.