

November 7, 2022

## News and notes

Before going on to talk about the fossils of terrestrial plant life from the [Neogene Period](#), here are some news items that I thought were interesting.

## Research

- [New Geology articles published online ahead of print in October](#).
- Geophysics and the formation of the Earth: [How was the Earth–Moon system formed? New insights from the geodynamo](#); Eureka Alert summary [here](#).
- The beginning of plate tectonics: [Barium content of Archaean continental crust reveals the onset of subduction was not global](#).
- Building Pangaea: [Final closure of the Paleo Asian Ocean basin in the early Triassic](#).
- Neogene research: [Oceanic nutrient rise and the late Miocene inception of Pacific oxygen-deficient zones](#).
- Peat geology: [Hydroclimatic vulnerability of peat carbon in the central Congo Basin](#); behind a paywall, Phys.org summary [here](#).
- Coastal geology: [Weekly Small Uncrewed Aerial System Surveys, Structure from Motion, and Empirical Orthogonal Function Analyses Reveal Unique Modes of Sediment Exchange Generated by Seasonal and Episodic Phenomena: Waikīkī, Hawai‘i](#); Eureka Alert summary [here](#).
- Mineralogy: [Major-element geochemistry of pelites](#); pelite is synonym for [mudstone](#).

## Paleontology

- [Potential mass extinction: X-Ray Luminous Supernovae: Threats to Terrestrial Biospheres](#); Phys.org summary [here](#).
- [Exceptional soft tissue preservation reveals a cnidarian affinity for a Cambrian phosphatic tubicolous enigma](#); Eureka Alert summary [here](#).
- [Revision of the \*Semicytherura henryhowei\* group \(Crustacea, Ostracoda\) with the new records from Korea](#); The genus *Semicytherura* has nearly 300 species.
- Footprints: [About the age and depositional depth of the sediments with reported bipedal footprints at Trachilos \(NW Crete, Greece\)](#).
- Mineralogy of shells: [Calcitic shells in the aragonite sea of the earliest Cambrian](#).
- [Hairy Snail Discovered in 99-Million-Year-Old Amber](#); Geology In summary [here](#).
- [Fluid Dynamics of Tiny, Ancient Marine Animals](#); research article [here](#).

- [Examining abnormal Silurian trilobites from the Llandovery of Australia.](#)

## Glacial Geology

- [Volcanic trigger of ocean deoxygenation during Cordilleran ice sheet retreat](#); behind a paywall, Phys.org summary [here](#).
- Stable isotope analysis: [Use of  \$\delta^{18}\text{O}\_{\text{atm}}\$  in dating a Tibetan ice core record of Holocene/Late Glacial climate.](#)
- [Terrestrial records of deglaciation events during terminations V and IV in the central Apennines \(Italy\) and insights on deglacial mechanisms.](#)
- [Supraglacial debris thickness and supply rate in High-Mountain Asia.](#)
- [Watch an ancient ice sheet cover the British Isles then vanish, in eerie time-lapse animation.](#)

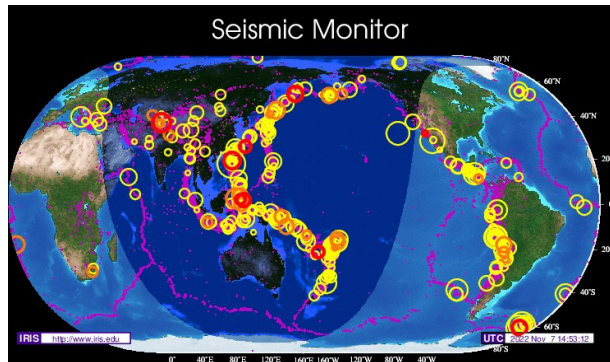
## Mining and Energy

- Geopolitics and critical minerals: [Column: Canada slams the door on China in critical minerals race.](#)
- [Livent looks to Canada for lithium growth opportunities – CEO.](#)
- Good news: [Two South Korean miners rescued from collapsed mine after nine days.](#)
- [The role of graphite in the formation of unconformity-related uranium deposits of the Athabasca Basin, Canada: A case study of Raman spectroscopy of graphite from the world-class Phoenix uranium deposit](#); behind a paywall, Research Gate copy [here](#) with link to request a PDF.
- [A recently discovered trachyte-hosted rare earth element-niobium-zirconium occurrence in northern Maine, USA.](#)
- Business as usual: [Prosecutors Allege Glencore Flew Cash Bribes To West Africa.](#)
- From the United States Energy Information Administration (USEIA) [Natural Gas Trade Between the United States and Canada.](#)
- Also from the USEIA: [U.S. electric-generating capacity for combined-cycle natural gas turbines is growing.](#)
- Opinion: [David Yager: Political Attacks on North America's Oil Producers Put Votes Before Energy Security.](#)
- Exploration activity: [U.S. drillers add oil and gas rigs for third week in four – Baker Hughes.](#)
- Petroleum geology: [Characterization of Upper Jurassic Organic-Rich Caprock Shales in the Norwegian Continental Shelf.](#)

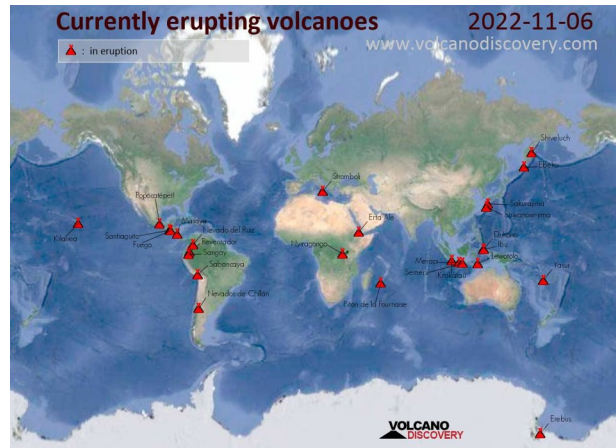
## Environmental Geology and Hydrogeology

- [Groundwater as emergency water supply: case study of the 2016 Kumamoto Earthquake, Japan](#); Phys.org summary [here](#).
- More on groundwater, from Phys.org: [Ripple effect: As global freshwater basins dry up, the threat to ecosystems and communities grows](#).
- From Phys.org: [Creating a better way to track groundwater contamination](#).

## Volcanoes, Earthquakes and Geohazards



[Link](#)



[Link](#)

- [Volcanically hosted venting with indications of ultramafic influence at Aurora hydrothermal field on Gakkai Ridge](#); Phys.org summary [here](#).
- [The January 2022 eruption of Hunga Tonga-Hunga Ha'apai volcano reached the mesosphere](#); Phys.org summary [here](#).
- More on the Hunga Tonga-Hunga Ha'apai volcano: [Wave propagation of meteotsunamis and generation of free tsunamis in the sloping area of the Japan Trench for the 2022 Hunga-Tonga volcanic eruption](#).
- [Pyroclastic deposits of Ubehebe Crater, Death Valley, California, USA: Ballistics, pyroclastic surges, and dry granular flows](#).
- Japanese earthquake research: [Crustal structure beneath earthquake swarm in the Noto peninsula, Japan](#).
- More Japanese earthquake research: [Weakening behavior of the shallow megasplay fault in the Nankai subduction zone](#).

November 7, 2022

## Terrestrial Plant Life During the Neogene

As the basis of terrestrial ecosystems, plant life is extremely important. The types of plant life growing in any place and time will determine the kinds of herbivores also living in that time and place. The types of herbivores will, in turn, determine the kinds of carnivores that prey on the herbivores. Plant life supports them all. Fossils of plant life from the [Neogene Period](#) tell us of the changes in the ecosystems during that time.

These changes included:

- A [gradual increase in the area covered by grasslands](#) and deciduous forests brought about by the climate change that began at the end of the [Paleogene Period](#);
- The increase in grasslands led to the creation of new savanna ecosystems in [North America](#) and [South America](#);
- A concurrent [diversification](#) of [gymnosperms](#) (conifers, sequoias, ginkgos and cycads) in response to climate change; and
- The rise and diversification of daisies ([Asteraceae](#)) during the Neogene.

Let's look at some plants fossil from that time.

## Angiosperms

### *Acer latahense*



Figure 1 – *Acer latahense* from Pickett Creek

Credit: [University of Michigan Online Repository of Fossils \(UMORF\)](#)

UMORF data is provided courtesy of the [University of Michigan Museum of Paleontology](#)

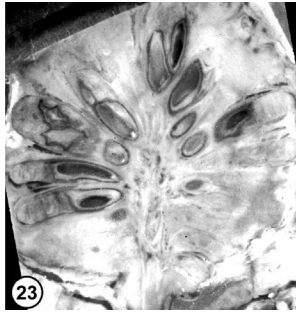
An extinct [maple](#) from the [Miocene](#) Epoch, [Acer latahense](#) lived in what is now Idaho, Oregon and Washington state in the United States. Fossil occurrences of *Acer latahense* include:

- The [Latah Formation](#) near Spokane in Washington state;
- The [Mascall Formation](#) near Tipton, Oregon; and
- The [Succor Creek Formation](#) near Nyssa, Oregon.

Both the Latah and Mascall Formations were deposited in temporary lake beds. The two formations are interbedded with [Columbia River Basalt Group](#) lava flows. The Succor Creek Formation consists of mixed pyroclastic and sedimentary rocks.

[Jack A. Wolfe](#) of the United States Geological Survey, [Denver Office](#) (USGS) and [Toshimasa Tanai](#) of [Hokkaido University](#) first described [Acer latahense](#) in 1987.

### *Liquidambar changii*



*Liquidambar changii* is an extinct species of [sweetgum](#) tree and is another fossil plant from the Miocene Columbia River Basalt Group. Amazingly, the *Liquidambar changii* fossils were preserved in [chert](#) within basalt deposits of the [Grande Ronde Basalt](#).

[Kathleen B. Pigg](#), [Stefanie M. Ickert-Bond](#), and [Jun Wen](#) first described *Liquidambar changii* in 2004 from [research originally published in 2002](#).

Figure 2 -*Liquidambar changii* infructescence

Credit: [Pigg, K. & Wehr, W.C. \(2002\)](#), [public domain](#)

### *Nothofagus beardmorensis*

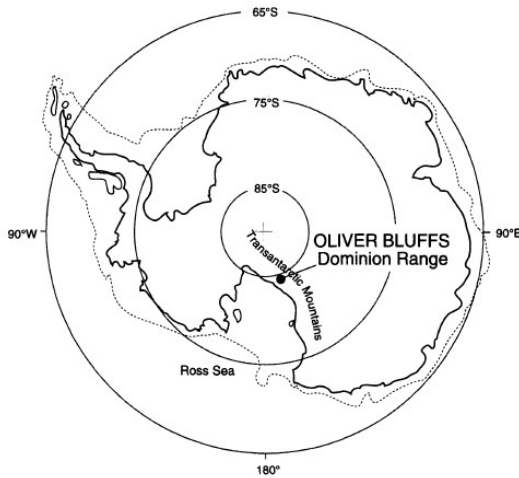


Figure 3 - *Nothofagus beardmorensis* Leaves

Credit: [Figure 3 in Francis and Hill, 1996](#)



An extinct species of [southern beech](#), *Nothofagus beardmorensis* grew in Antarctica during the [Late Pliocene](#). Jane Francis (British Antarctic Survey) and Robert Hill (University of Adelaide) were the first to [find fossils](#) of *Nothofagus beardmorensis* in [glaciofluvial sediments](#) within the [Meyer Desert Formation](#), Sirius Group, at Oliver Bluffs in the Dominion Range of the Transantarctic Mountains.



**FIGURE 1**—Location map showing the position of Oliver Bluffs in the Dominion Range, Transantarctic Mountains.



**FIGURE 2**—Sedimentary sequence of the Meyer Desert Formation, Sirius Group, at Oliver Bluffs. Glacial diamictite forms the major component of the section, with interbedded fluvio-glacial sediments in which the fossil were found.

#### Figure 4 – Location of Oliver Bluffs and Photo of Outcrop

[Credit: Figures 1 and 2 in Francis and Hill, 1996](#)

Robert Hill, David M. Harwood (University of Nebraska at Lincoln) and Peter-Noel Webb (Ohio State University) [first described](#) *Nothofagus beardmorensis* in [January 1996](#).

## Gymnosperms

### *Sequoiadendron chaneyi*



**Figure 5** – *Sequoiadendron chaneyi* from Clark, Nevada

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



An extinct [cypress](#) tree, [Sequoiadendron chaneyi](#) grew in what is now Nevada and California during the Miocene. *Sequoiadendron chaneyi* is one of the oldest species in the genus *Sequoiadendron*, a genus that includes the [giant sequoia](#) redwood tree. In 2016, [an example of Sequoiadendron](#) was found in [Cretaceous](#) rocks from the [Enmyvaam River Basin, Central Chukotka](#) in Siberia.

Fossils of *Sequoiadendron chaneyi* are found in:

- The Miocene [Middlegate](#) and Eastgate Formations of Churchill County, Nevada;
- The late Miocene [Relief Peak Formation](#) of Alpine County, California;
- The middle Miocene [Chloropagus Formation](#) deposits of Storey County, Nevada;
- In Pliocene formations near [Minden-Gardnerville in Douglas County, western Nevada](#).

[Daniel I. Axelrod](#) was the [first to describe Sequoiadendron chaneyi](#) in 1956.

**Figure 6 - *Sequoiadendron chaneyi***  
**Credit: [Dinopedia Fandom](#), [CC-BY-SA](#)**

## Wrapping it Up

That any plants are fossilized is a wonder. Although pollen grains are quite resilient ([as in this study](#)), in most cases, plants that don't get eaten by animals are decomposed by bacteria and their components recycled. Burial within volcanic deposits or in the anaerobic depths of lakes is the best way of preserving any plant remains.

Over the next few weeks, we'll look at some of the animals that lived in the Neogene.

## 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.