16th May 2024

The **Methuselah** tree in the White Mountains of California may [or may **not**] be **4,855 years old**.

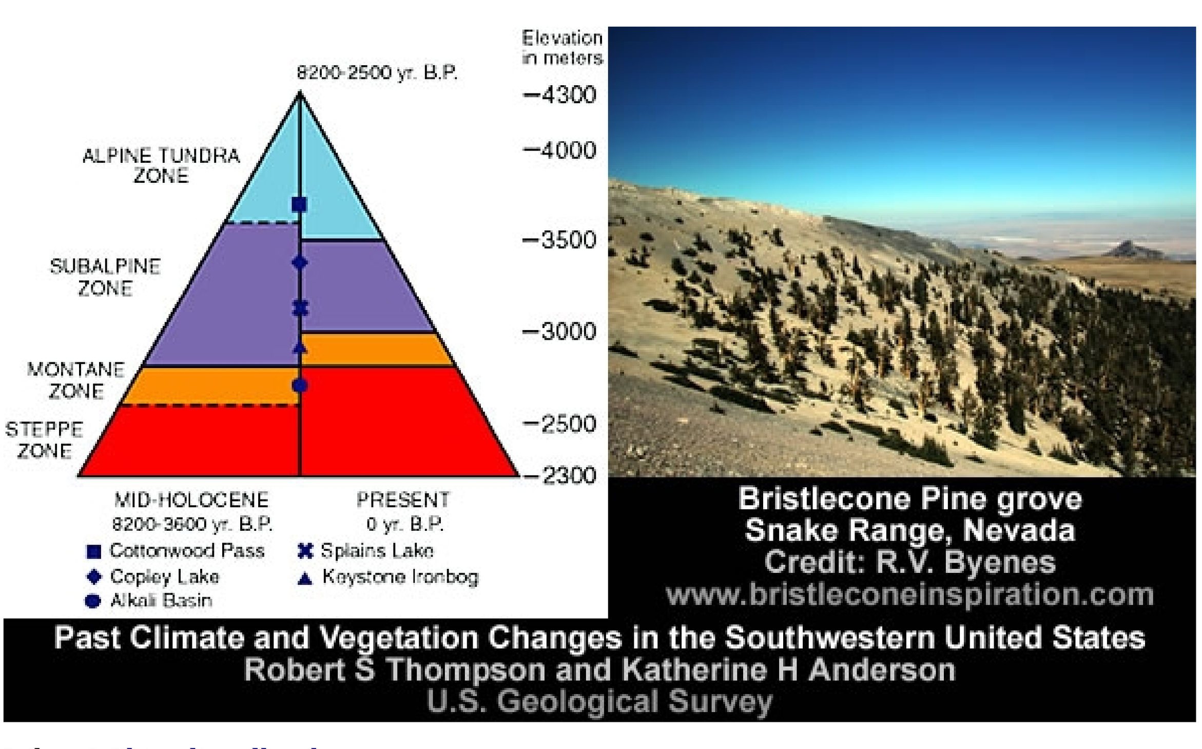

Great Basin Bristlecone Pine trees, Methuselah Grove - Wikimedia: Oke

The **Ancient Bristlecone Pine Forest** … in the **White Mountains** in … eastern **California** … **3,000-3,400 m** above sea level ... in xeric [dry shrubland] alpine conditions … is the location of the "**Methuselah**", a **Great Basin bristlecone pine** that is **4,855 years old**.

Wikipedia - Methuselah (pine tree)
https://en.wikipedia.org/wiki/Methuselah_(pine_tree)

Bristlecone wood is **very dense** and **resinous**, and thus resistant to invasion by insects, fungi and other potential pests. In very old specimens, often only a narrow strip of living tissue connects the roots to a handful of live branches.

Methuselah
Robert Hudson - 21 April 2011 - US Department of Agriculture
https://www.usda.gov/media/blog/2011/04/21/methuselah-bristlecone-pine-thought-be-oldest-living-organism-earth



Past Climate and Vegetation Changes in the Southwestern United States
Robert S Thompson and Katherine H Anderson
U.S. Geological Survey

When Wikipedia talks about:

i) The "**tree's longevity**" what it really **means** to say is that the tree is very resilient and that it can take **a very long time to die** [important difference].

ii) "Allowing bristlecones to thrive" what it really means to say is that "under present climatic and environmental conditions the rate of regeneration may be insufficient to sustain its population".

iii) "Bristlecone pines grow in **isolated groves** just below the tree line" what it really **means** to say is that the **many bristlecone pines are stranded** [and **slowly dying**] **above the tree line** which has retreated by about 100 metres due to a naturally changing climate.

Malaga Bay - Dendrochronology: Death and Double Counting
https://malagabay.wordpress.com/2014/08/26/dendrochronology-death-and-double-counting/

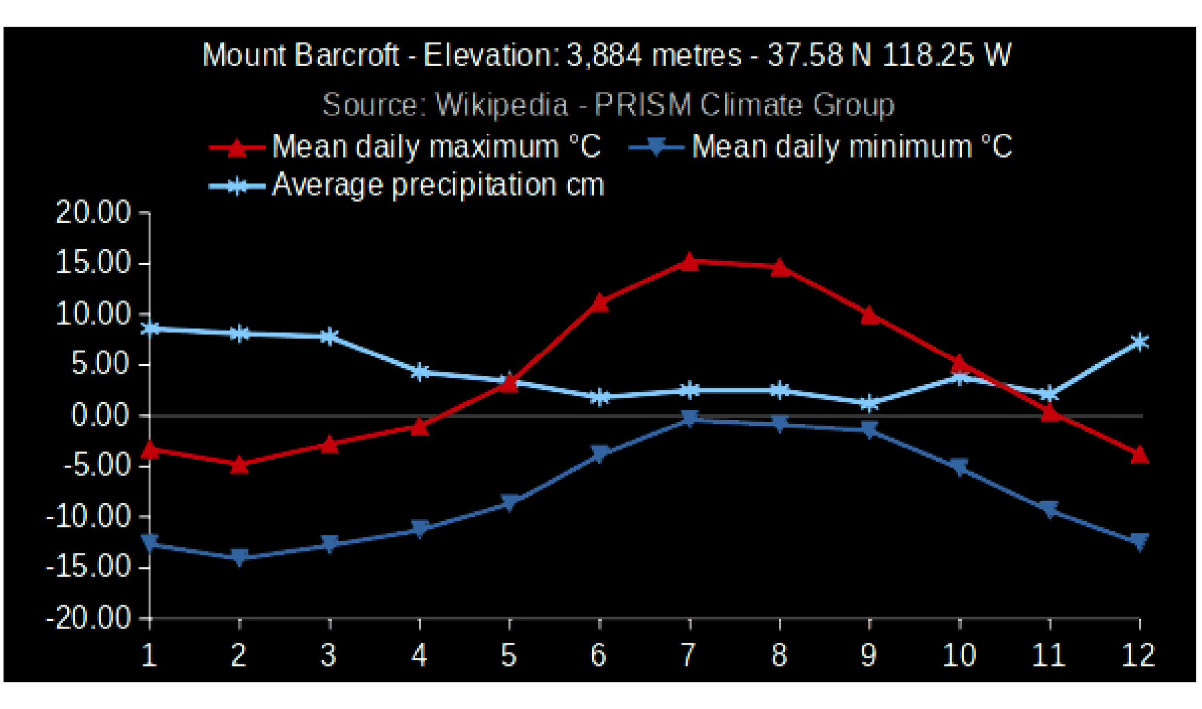
The dating of **Methuselah** is a remarkable ***dendrochronological* achievement** because [officially] it's **770 mm** diameter trunk has [on average] increased by **1 mm every 6.3 years**.
This implies an ***annual tree ring*** density of **12.6 years per 1 mm** [on average].

Methuselah
Height: 31.50+ ft (9.60+ m)
Elevation: 9,654 ft (2,943 m)
Width: 2.51 ft (**0.77 m**)
Discovery Date: 1957
Discovered By: Edmund P. Schulman, Maurice E. Cooley

Famous Redwoods - Methuselah
http://famousredwoods.com/methuselah_inf/

However:

It's evident the ***annual tree ring*** concept is **meaningless** for trees living in harsh alpine conditions because their survival depends upon **storing water whenever** it **rains** or
whenever the **snow melts** and
growing whenever it's **moist and mild**.



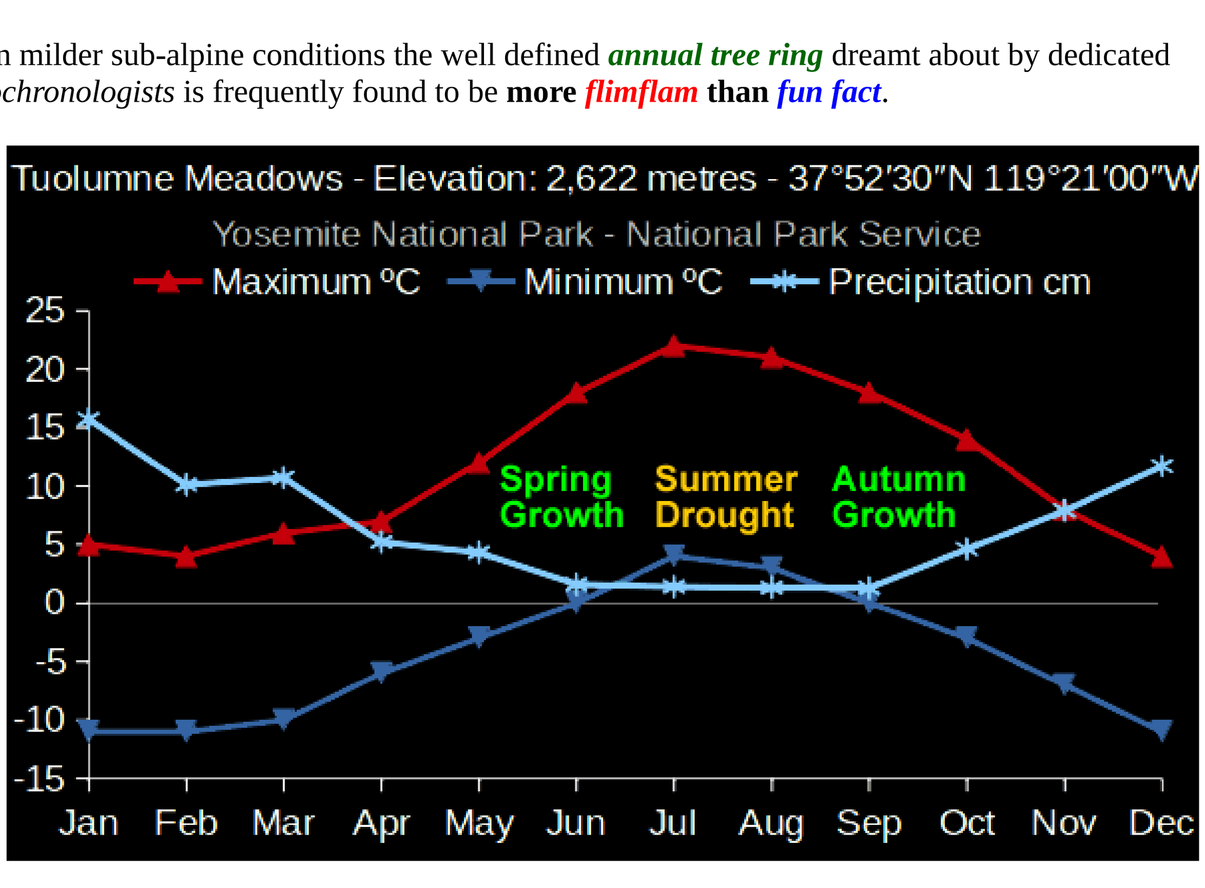
Mount Barcroft - Elevation: **3,884 metres** - Source: PRISM Climate Group													
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Mean daily maximum °C	-3.3	-4.8	-2.8	-1.0	3.2	11.2	15.3	14.7	10.0	5.2	0.4	-3.8	3.7
Daily mean °C	-7.9	-9.4	-7.8	-6.2	-2.8	3.6	7.4	6.8	4.3	0.0	-4.5	-8.2	-2.1
Mean daily minimum °C	-12.7	-14.1	-12.8	-11.3	-8.7	-3.9	-0.4	-0.9	-1.5	-5.2	-9.4	-12.6	-7.8
Average precipitation mm	86	81	78	43	34	18	25	25	12	38	21	73	534

Wikipedia - White Mountains (California)
https://en.wikipedia.org/wiki/White_Mountains_(California)

Alpine plants are **adapted to** the **harsh conditions** of the alpine environment, which include **low temperatures**, **dryness**, **ultraviolet radiation**, **wind**, **drought**, **poor nutritional soil,** and a **short growing season**.

Wikipedia - Alpine Plant
https://en.wikipedia.org/wiki/Alpine_plants

Even in milder sub-alpine conditions the well defined ***annual tree ring*** dreamt about by dedicated *dendrochronologists* is frequently found to be **more *flimflam* than *fun fact***.



Weather - Yosemite National Park
National Park Service - United States Department of the Interior
https://www.nps.gov/yose/planyourvisit/weather.htm

Coordinates: **37°30′50″N** 119°35′54″W
Elevation: **1,750-2,050 m**

Mariposa Grove … in the southernmost part of **Yosemite National Park** … is the largest grove of **giant sequoias** in the park, with several hundred mature examples of the tree. … The giant sequoia named ***Grizzly Giant*** is between **probably 1900–2400 years old** …

Wikipedia - Mariposa Grove
https://en.wikipedia.org/wiki/Mariposa_Grove

This should be **very *old news*** for the *dendrochronologists* in *academia*.


Ponderosa Pine - Yosemite National Park
Flickr: Jodie Wilson from Mountain View, USA

Pinus ponderosa, commonly known as the **ponderosa pine** … **western yellow-pine** … is a very large pine tree species … **native to mountainous regions** of western North America … it only grows **below 1,300 m** elevation … but is most common below 800 m. …

Wikipedia - Pinus Ponderosa
https://en.wikipedia.org/wiki/Pinus_ponderosa

The saga begins when the *father* of dendrochronology, A E Douglass, hypothesised in **1909** that the **tree rings** of the **yellow pine** (**Pinus ponderosa**) "**are likely to form a measure of the precipitation**" and that "individual rings of the trees are extremely well marked and leave no doubt whatever as to their purely annual or seasonal character".
…
Ten years later, in **1919**, A. E. Douglass stated that "in wet regions the rings show a very evident relation to solar radiation through sun-spot numbers" and emphasised that

> "**in dry regions the rainfall is a much more obvious cause of variations in the rings of trees**".

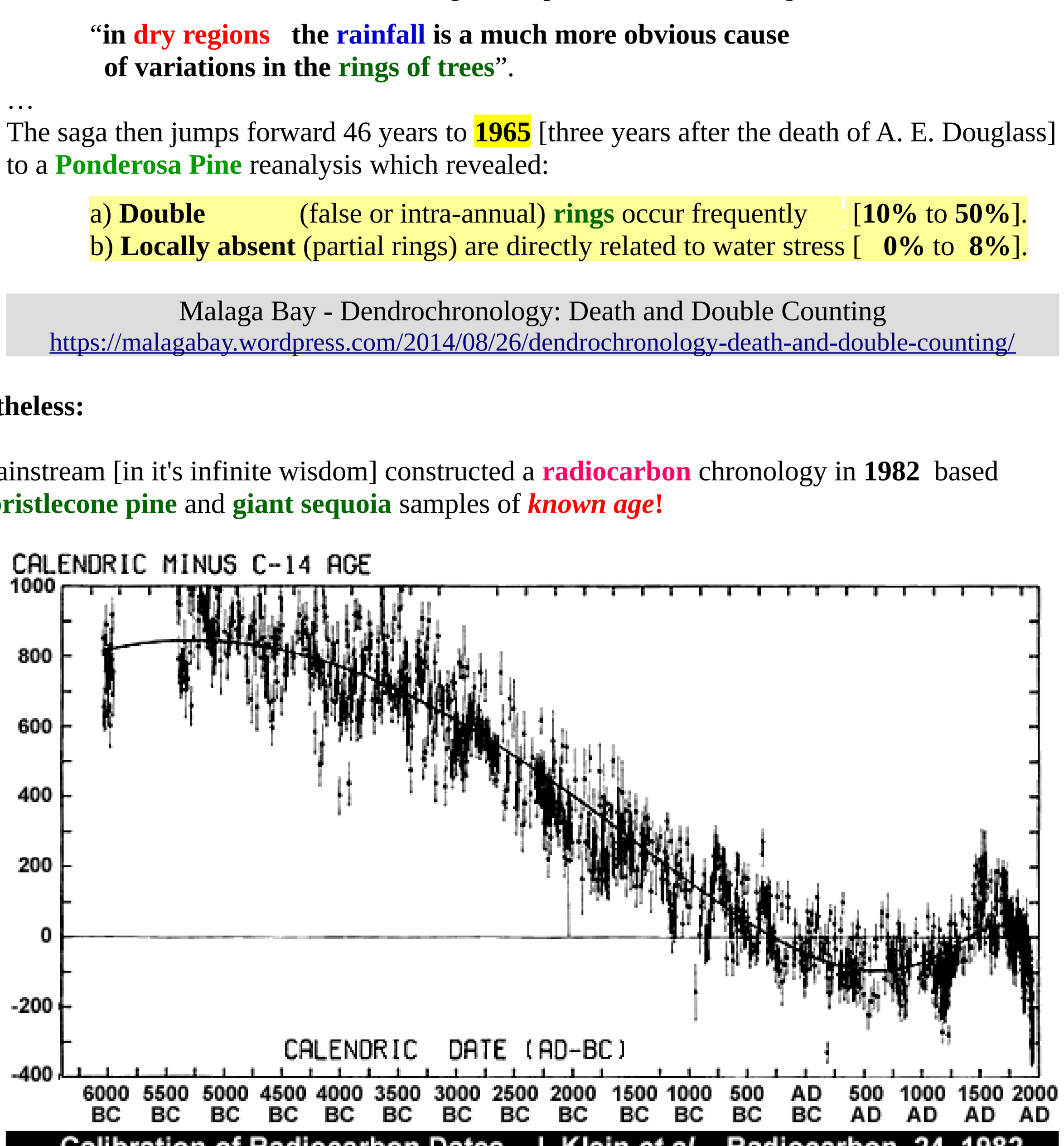
…
The saga then jumps forward 46 years to **1965** [three years after the death of A. E. Douglass] to a **Ponderosa Pine** reanalysis which revealed:

> a) **Double** (false or intra-annual) **rings** occur frequently [**10%** to **50%**].
> b) **Locally absent** (partial rings) are directly related to water stress [**0%** to **8%**].

Malaga Bay - Dendrochronology: Death and Double Counting
https://malagabay.wordpress.com/2014/08/26/dendrochronology-death-and-double-counting/

Nevertheless:

The mainstream [in it's infinite wisdom] constructed a **radiocarbon** chronology in **1982** based upon **bristlecone pine** and **giant sequoia** samples of ***known age*!**

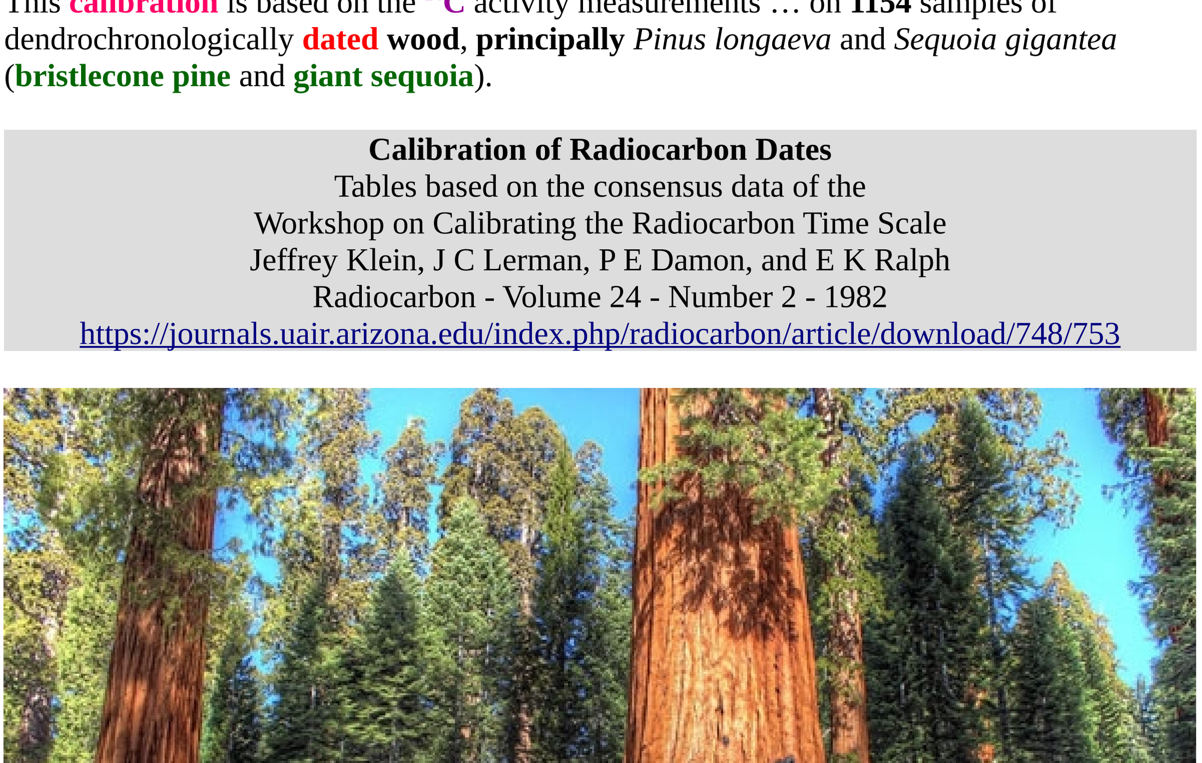


Calibration of Radiocarbon Dates - J. Klein *et al.* - Radiocarbon, 24, 1982

A **calibration** is presented **for** conventional **radiocarbon ages** ranging from 10 to 7240 years BP and thus covering a calendric range of **8000 years** from **6050 BC** to **AD 1950**. Distinctive features … include … an improved data set consisting of **1154 radiocarbon measurements on samples of known age** …
…
Dendrochronologically **dated wood** has proved to be an **ideal material** … and currently **all radiocarbon calibrations** are **based on** measurements of ^{14}C activity in **wood**.

The **longest chronology** extant is that of the **bristlecone pine**, resulting from the efforts of Schulman (1956) and Ferguson (1969; 1970; 1972).
…
This **calibration** is based on the ^{14}C activity measurements … on **1154** samples of dendrochronologically **dated wood**, **principally** *Pinus longaeva* and *Sequoia gigantea* (**bristlecone pine** and **giant sequoia**).

Calibration of Radiocarbon Dates
Tables based on the consensus data of the
Workshop on Calibrating the Radiocarbon Time Scale
Jeffrey Klein, J C Lerman, P E Damon, and E K Ralph
Radiocarbon - Volume 24 - Number 2 - 1982
https://journals.uair.arizona.edu/index.php/radiocarbon/article/download/748/753

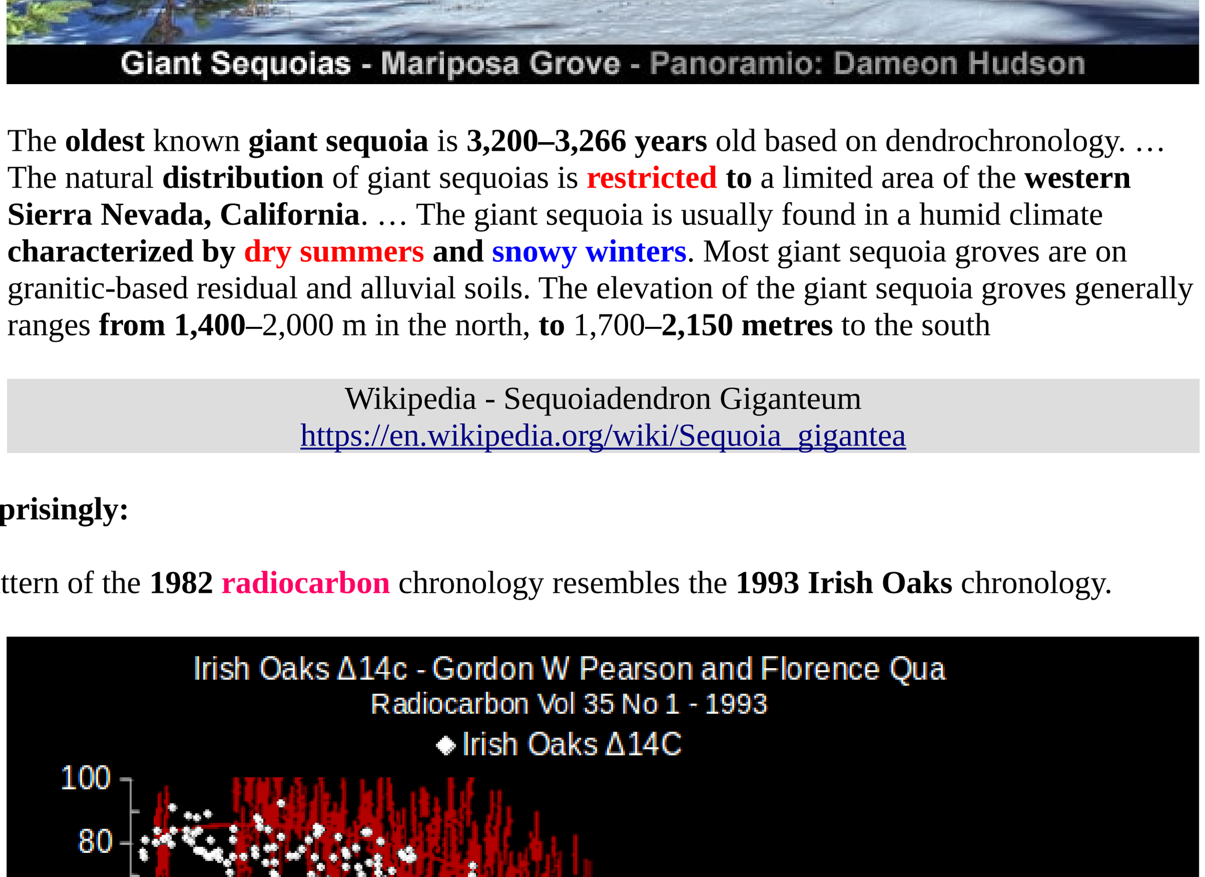

Giant Sequoias - Mariposa Grove - Panoramio: Dameon Hudson

The **oldest** known **giant sequoia** is **3,200–3,266 years** old based on dendrochronology. … The natural **distribution** of giant sequoias is **restricted to** a limited area of the **western Sierra Nevada, California**. … The giant sequoia is usually found in a humid climate **characterized by dry summers and snowy winters**. Most giant sequoia groves are on granitic-based residual and alluvial soils. The elevation of the giant sequoia groves generally ranges **from 1,400**–2,000 m in the north, **to** 1,700–**2,150 metres** to the south

Wikipedia - Sequoiadendron Giganteum
https://en.wikipedia.org/wiki/Sequoia_gigantea

Unsurprisingly:

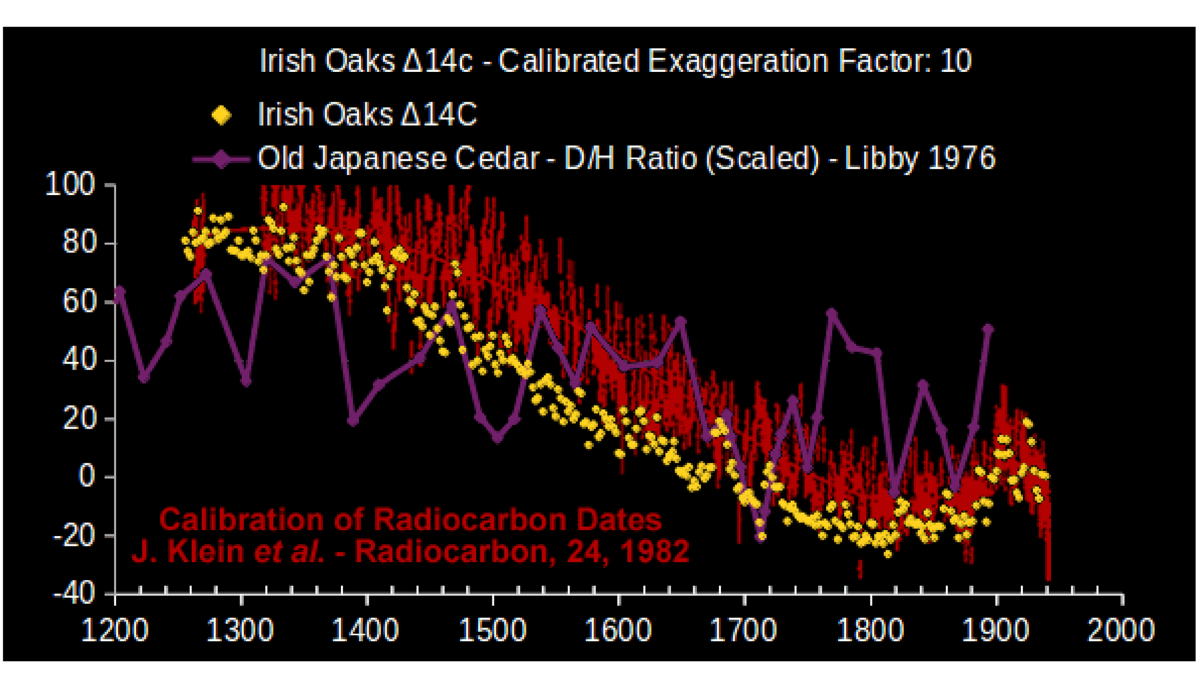
The pattern of the **1982 radiocarbon** chronology resembles the **1993 Irish Oaks** chronology.



High-Precision 14C Measurement of Irish Oaks to Show the Natural 14C Variations
Gordon W. Pearson and Florence Qua - Radiocarbon, Volume 35, No. 1, 1993
https://journals.uair.arizona.edu/index.php/radiocarbon/article/download/1556/1560

Therefore:

A simple rule of thumb is to divide the ***ancient age*** of a **bristlecone pine** or **giant sequoia** by **10**.

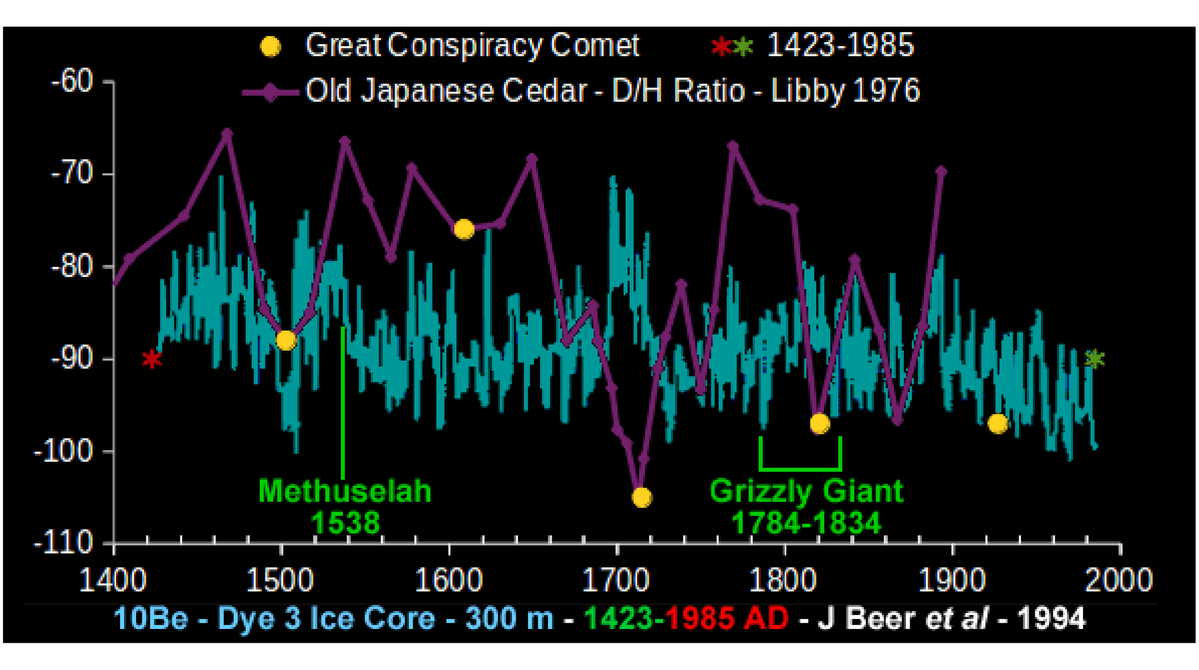


Adjust the **Irish Oaks** calibrated chronology by applying an ***exaggeration factor*** of **10.**

Malaga Bay - Time Slice
https://malagabay.wordpress.com/2024/04/19/time-slice/

Applying this rule of thumb to the **Methuselah** and **Grizzly Giant** trees suggest they sprouted into life soon after the **Maunder Minimum** style events triggered by the **Great Conspiracy Comet**.

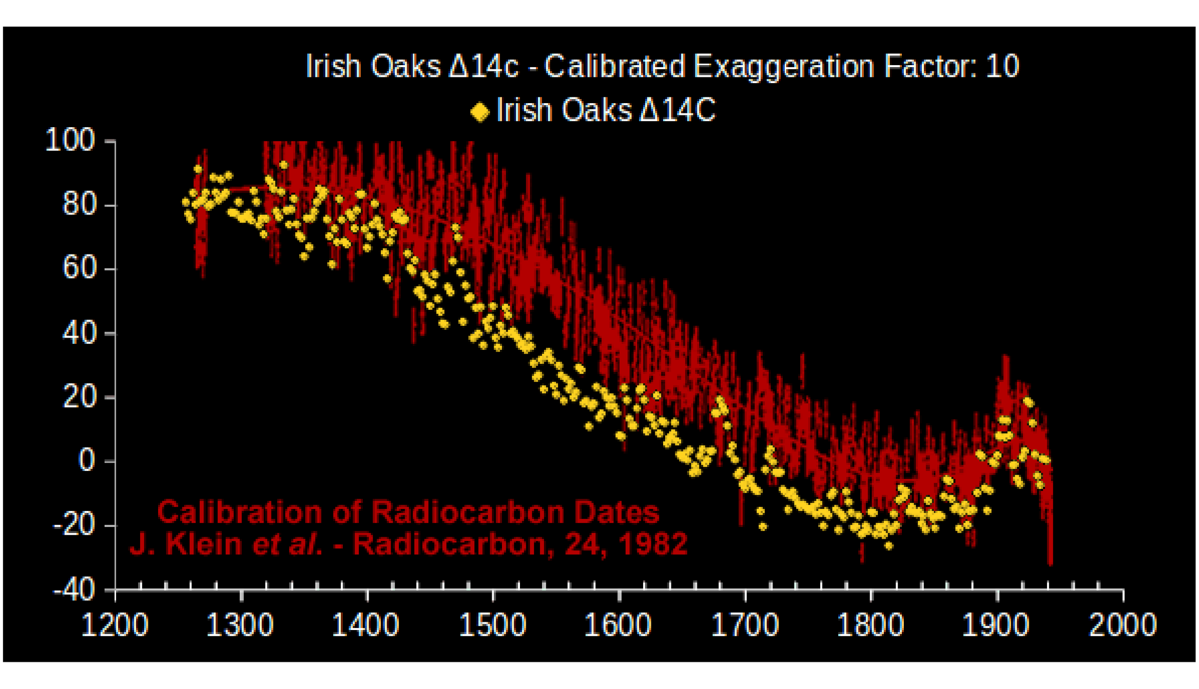
Tree Species	Tree Example		Official Age Years	Official Age Start Date	Exaggeration Factor	Revised Start Date
Bristlecone Pine	**Methuselah**		4855	-2831	10	**1538**
Giant Sequoia	**Grizzly Giant**	From	1900	124	10	**1834**
		To	2400	-376	10	**1784**



Between **1503** and **1821** Londoners endured some **very cold winters** and enjoyed some **Frost Fairs**.
With the remnants of the **Great Conspiracy Comet** causing a **Mini Maunder Minimum** in **1821**.

Malaga Bay - Hats Off for Juerg Beer
https://malagabay.wordpress.com/2024/05/03/hats-off-for-juerg-beer/

The **diminished** levels of **^{14}C** in the 1993 **Irish Oaks** chronology reflect it's lower altitude trees in more northerly latitudes with their **diminished** levels of solar radiation and **diminished** levels of **^{14}C** production in the atmosphere and *in-situ* within the trees.



Belfast	**54°35′47″N**
White Mountains	**37°35.0′ N**


Irish Oak aka Quercus petrea - Wikimedia: Nikanos

Irish Oak … is a species of oak tree native to **most of Europe** and into Anatolia and Iran.

Wikipedia - Quercus Petraea
https://en.wikipedia.org/wiki/Quercus_petraea

Nitrogen-14 [natural abundance: 99.6%] is **the source of** naturally-occurring, radioactive, **carbon-14**. Some kinds of cosmic radiation cause a nuclear reaction with nitrogen-14 **in the** upper **atmosphere** of the Earth, creating carbon-14, which decays back to nitrogen-14 with a half-life of 5700 ± 30 years.

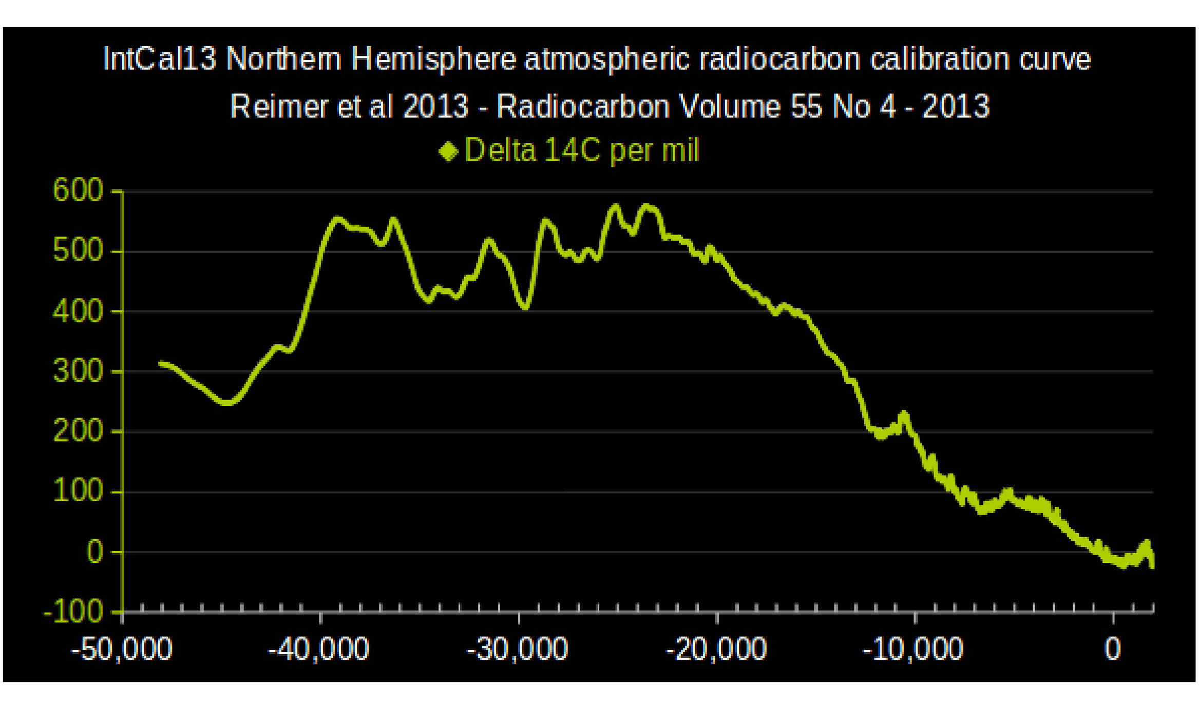
Wikipedia - Isotopes of Nitrogen
https://en.wikipedia.org/wiki/Nitrogen-14

Nitrogen (N) is an **essential** nutrient **for plants** and plays a fundamental role in their growth, development, and overall productivity. It's a primary component of amino acids, proteins and enzymes, nucleic acids, chlorophyll, and many other vital plant molecules.

Nitrogen's Role in Plant Growth and Development
OMEX - 17 October 2023
https://omexcanada.com/blog/nitrogens-role-in-plant-growth-and-development/

This tale of the grossly inflated age of the **Methuselah** tree contains a very unexpected ***twist***.

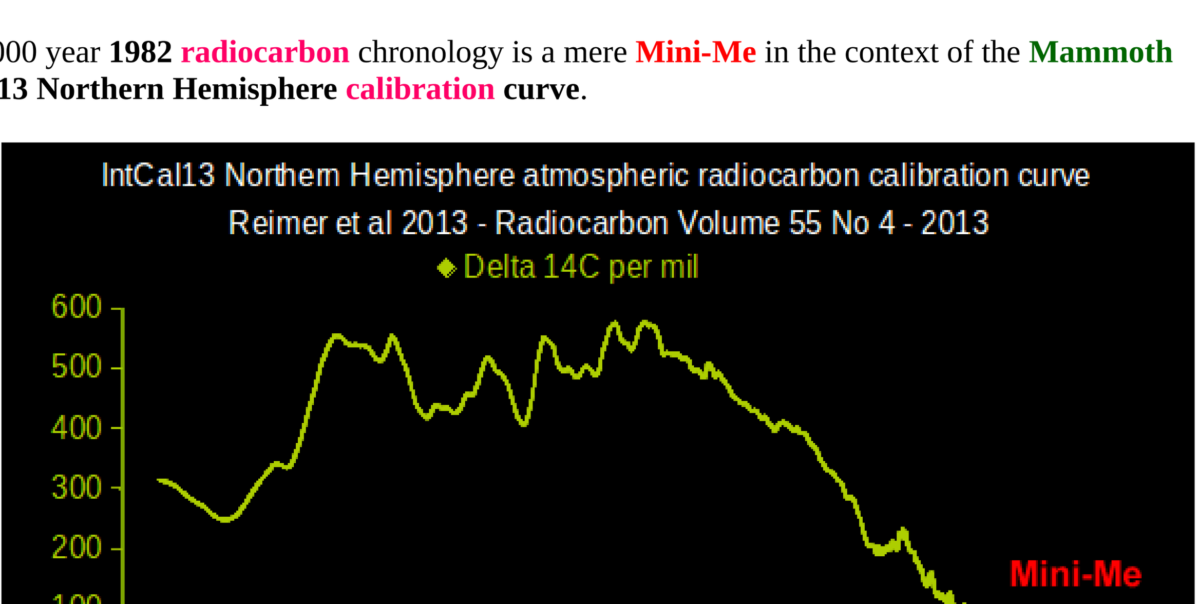
For all it's 8,000 year *grandeur* the **1982 radiocarbon** chronology shrinks into insignificance in the context of the **Mammoth IntCal13 Northern Hemisphere calibration curve**.



IntCal13 Supplemental Data
Reimer *et al* - Radiocarbon - Volume 55 Number 4 - 2013
https://web.archive.org/web/20150316084220/http://www.radiocarbon.org/IntCal13.htm
Northern Hemisphere atmospheric radiocarbon calibration curve
https://web.archive.org/web/20150316084220/http://www.radiocarbon.org/IntCal13%20files/intcal13.14c
Southern Hemisphere atmospheric radiocarbon calibration curve
https://web.archive.org/web/20150316084220/http://www.radiocarbon.org/IntCal13%20files/shcal13.14c

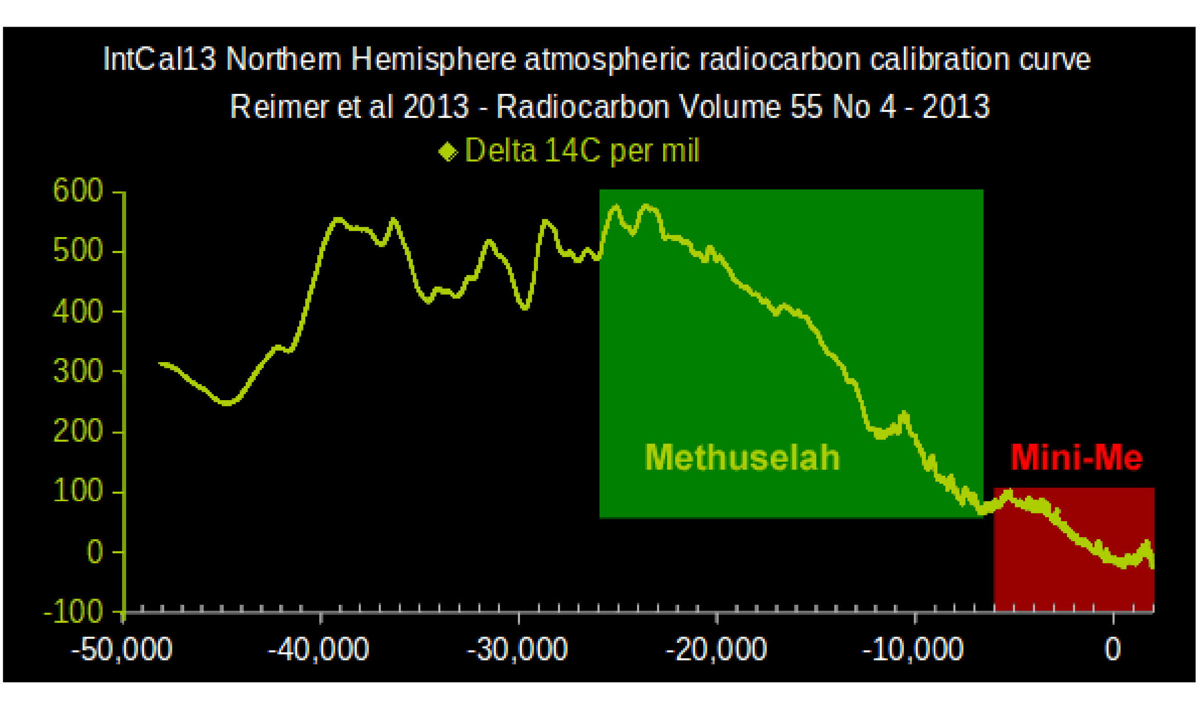
More graphically:

The 8,000 year **1982 radiocarbon** chronology is a mere **Mini-Me** in the context of the **Mammoth IntCal13 Northern Hemisphere calibration curve**.



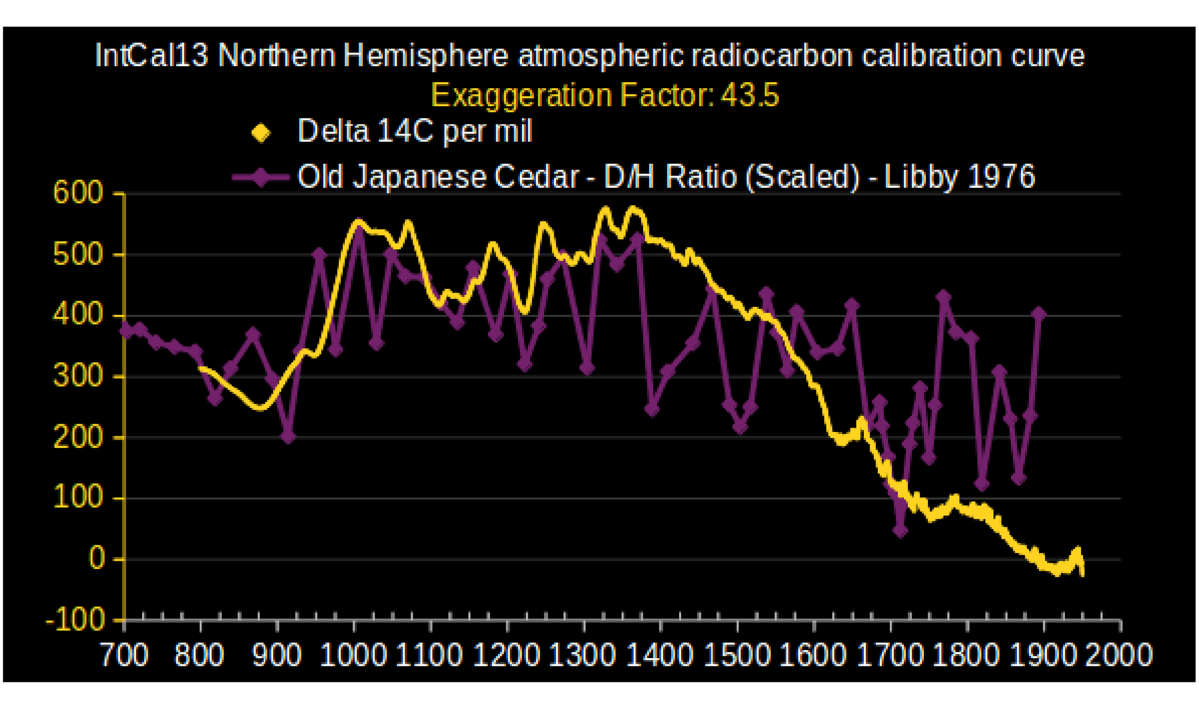
More seriously:

The **Mammoth IntCal13 Northern Hemisphere calibration curve** has [somehow or other] bolted onto the **Mini-Me** chronology a grossly inflated **Methuselah clone** chronology that in reality represents exactly the same period of time as the **Mini-Me** chronology i.e. about 1250 to 1950 CE.



And finally:

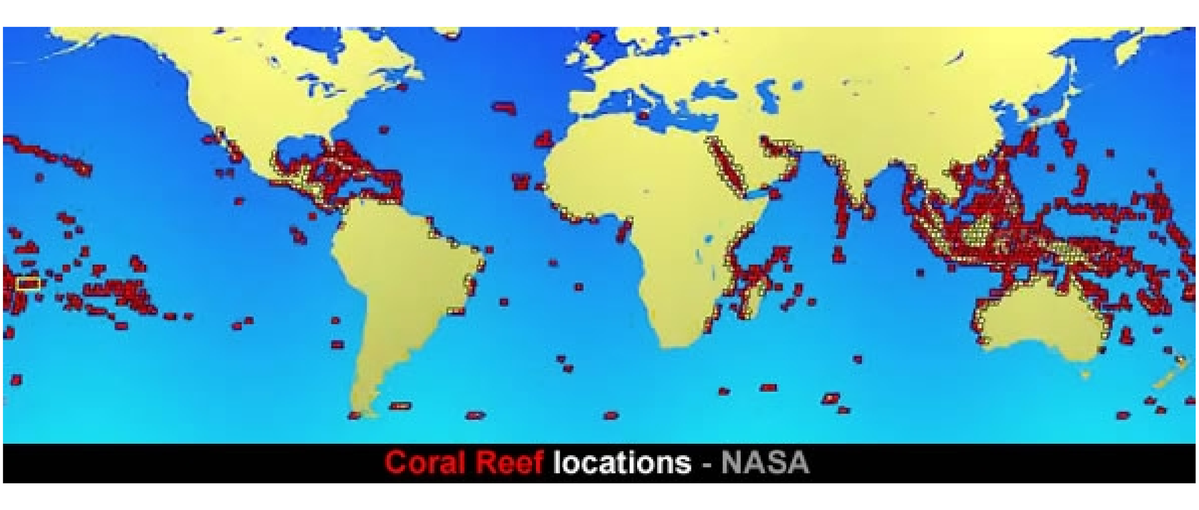
The **whole** [surreal] **shebang** sinks back towards reality when a **43.5** *exaggeration factor* is applied.



Another ***really great*** feature of **IntCal13** is you get to use an **exaggeration factor of 43.5**.

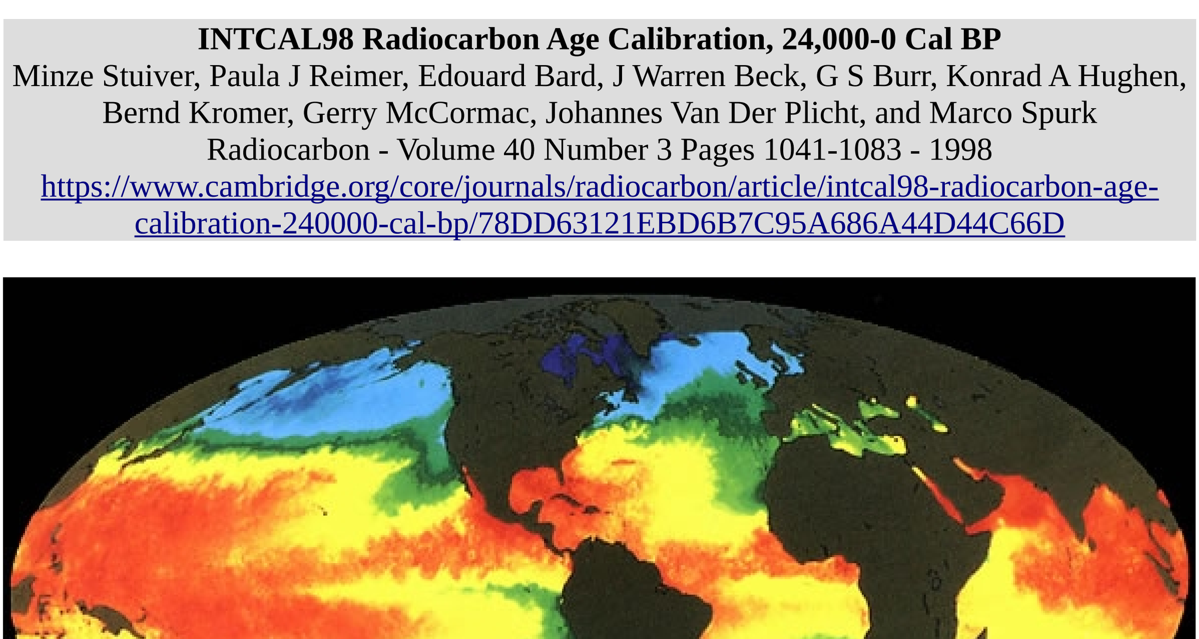
Malaga Bay - Time Slice
https://malagabay.wordpress.com/2024/04/19/time-slice/

The most likely explanation for the grossly inflated **Methuselah clone** chronology is the inclusion of **corals** from **tropical oceans** with their **higher** levels of solar radiation and **higher** levels of **^{14}C** production in the atmosphere and *in-situ* within corals.


Coral Reef locations - NASA

The focus of this paper is the conversion of **radiocarbon ages to calibrated (cal) ages** for the interval **24,000–0 cal BP** (Before Present, 0 cal BP = AD 1950), **based upon** a sample set of dendrochronologically dated tree rings, uranium-thorium dated **corals**, and varve-counted marine sediment.

INTCAL98 Radiocarbon Age Calibration, 24,000-0 Cal BP
Minze Stuiver, Paula J Reimer, Edouard Bard, J Warren Beck, G S Burr, Konrad A Hughen, Bernd Kromer, Gerry McCormac, Johannes Van Der Plicht, and Marco Spurk
Radiocarbon - Volume 40 Number 3 Pages 1041-1083 - 1998
https://www.cambridge.org/core/journals/radiocarbon/article/intcal98-radiocarbon-age-calibration-240000-cal-bp/78DD63121EBD6B7C95A686A44D44C66D

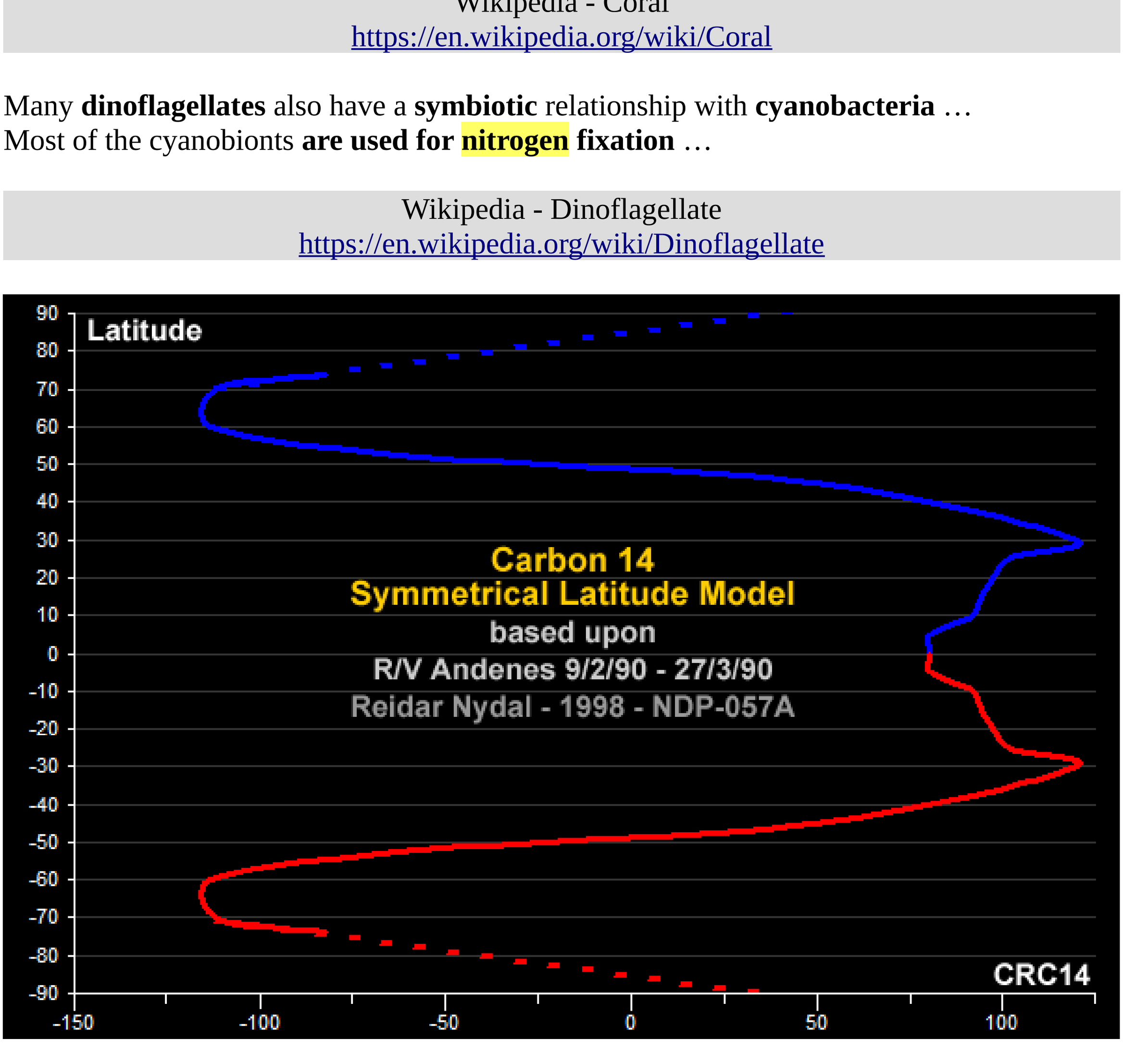


Coral species include the important reef builders that **inhabit tropical oceans** and **secrete calcium carbonate** to form a hard skeleton.
…
Although some corals are able to catch plankton and small fish using stinging cells on their tentacles, **most corals obtain the majority of their energy and nutrients from photosynthetic** unicellular **dinoflagellates** of the genus Symbiodinium that live within their tissues.

Wikipedia - Coral
https://en.wikipedia.org/wiki/Coral

Many **dinoflagellates** also have a **symbiotic** relationship with **cyanobacteria** …
Most of the cyanobionts **are used for nitrogen fixation** …

Wikipedia - Dinoflagellate
https://en.wikipedia.org/wiki/Dinoflagellate



CRC14 is the ^{14}C value expressed as ^{14}C in per mille. ^{14}C is corrected for isotopic fractionation using ^{13}C (DC13), and for radioactive decay relative to the ^{14}C reference standard (NIST).

Carbon-14 Measurements in Surface Water CO2 from the Atlantic, Indian and Pacific Oceans, 1965-1994
Reidar Nydal - NDP057A - March 1998
https://www.ncei.noaa.gov/access/ocean-carbon-acidification-data-system/oceans/

Malaga Bay - Carbon 14 - Seeing the Light
https://malagabay.wordpress.com/2014/05/31/carbon-14-seeing-the-light/

Either way:

Review the evidence and draw your own conclusions.