

19<sup>th</sup> April 2024

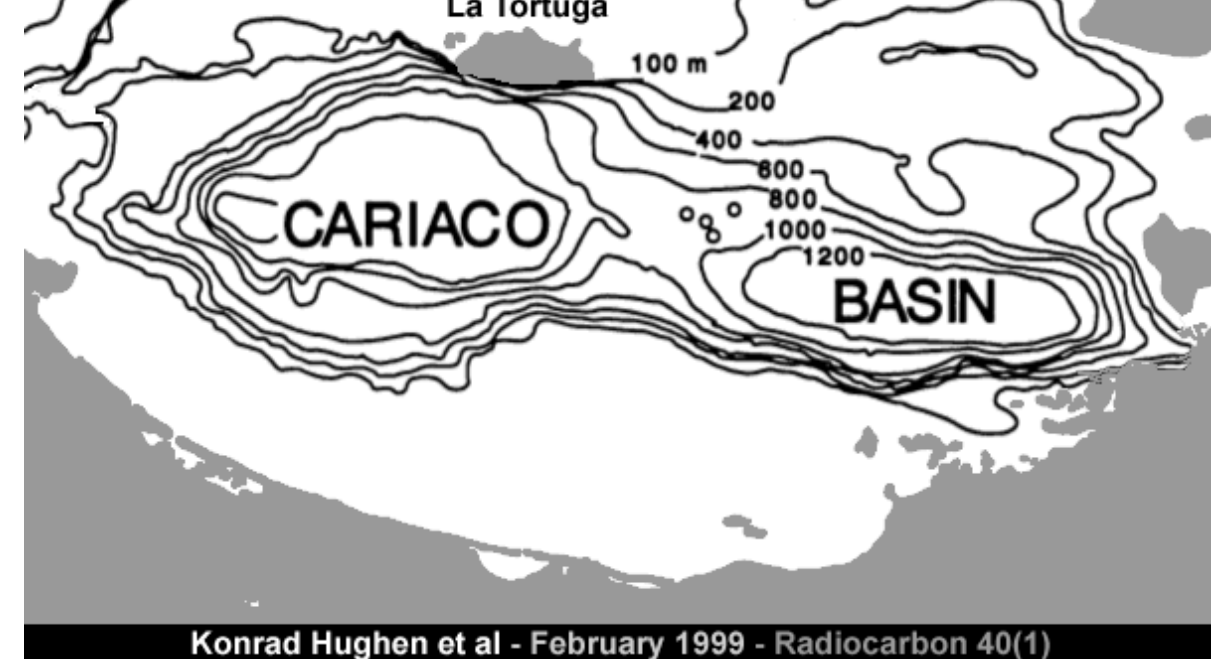
It's possible to evaluate any detailed **calibrated radiocarbon chronology** after finding the **epoch boundaries** in a summary **calibrated radiocarbon chronology** align with known **event horizons** when the **calibrated radiocarbon dates BP** are reduced by an **exaggeration factor**.



**Stratigraphy and lake-level reconstruction from Laguna Blanca, Venezuela**  
Black triangles denote calibrated radiocarbon ages  
Polissar et al. 2013

**Laguna Blanca** (8° 20' N, 71° 47' W, 1,620 m a.s.l.) is a small shallow lake in an unglaciated watershed where sediment lithology and geochemistry offer first-order proxies for changes in lake level and hence regional moisture balance.

Synchronous Interhemispheric Holocene Climate Trends in the Tropical Andes  
Pratigya J Polissar, Mark B Abbott, Alexandra P Wolfe, Mathias Vuille, and Maximiliano Bender  
Proceedings of the National Academy of Sciences 110(36) - August 2013  
<https://www.researchgate.net/publication/1255986814>



Wikimedia: Sémur, NordNordWest, and Milenoscuro

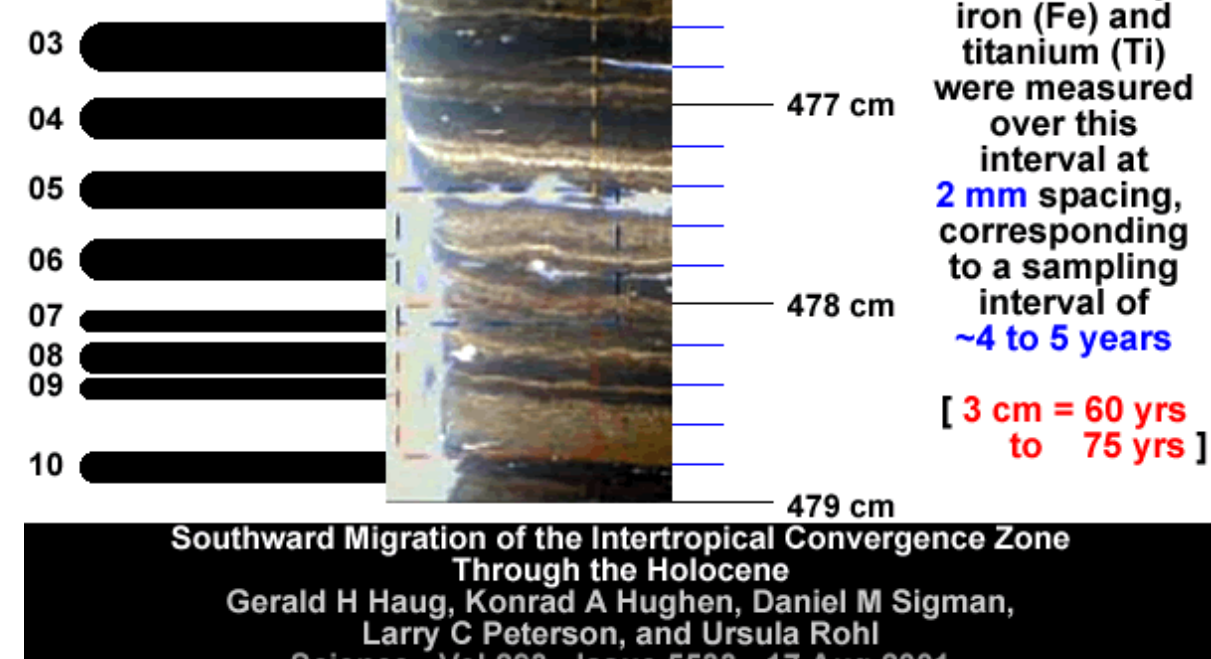
The straight science of **Leona Libby** highlights where **ecologies** and **bridges built by the inept eyes of dendrochronologists are in error** and the **easily identifiable catastrophic spikes in isotope ratios provide excellent markers** that enable a variety of chronologies to be accurately aligned and definitively dated.

The colour coded horizons in the **Laguna Blanca** lithology can easily be identified and dated. Using an **Exaggeration Factor** of the mainstream dates are reduced to produce **Adjusted Dates**. The **Adjusted Dates** align very well with previously identified event horizons and **Leona Libby's Old Japanese Cedar** chronology.

Malaga Bay - Depths of Dating  
<https://malagabay.wordpress.com/2024/04/12/depths-of-dating/>

**Cariaco Basin Chronology**

In 1997 the **calibration of radiocarbon dates** from the layered sediments of the **Cariaco Basin** was based up **wiggle-matching** with German pine dendrochronology.



Konrad Hughen et al - February 1999 - Radiocarbon 40(1)

The **Cariaco Basin** is an anoxic marine basin off the coast of Venezuela, separated from the open Caribbean Sea by shallow sills (<146 m), that possesses **varved sediments** with the potential for continuous, high-resolution AMS <sup>14</sup>C dating due to high concentrations of planktonic foraminifera ...

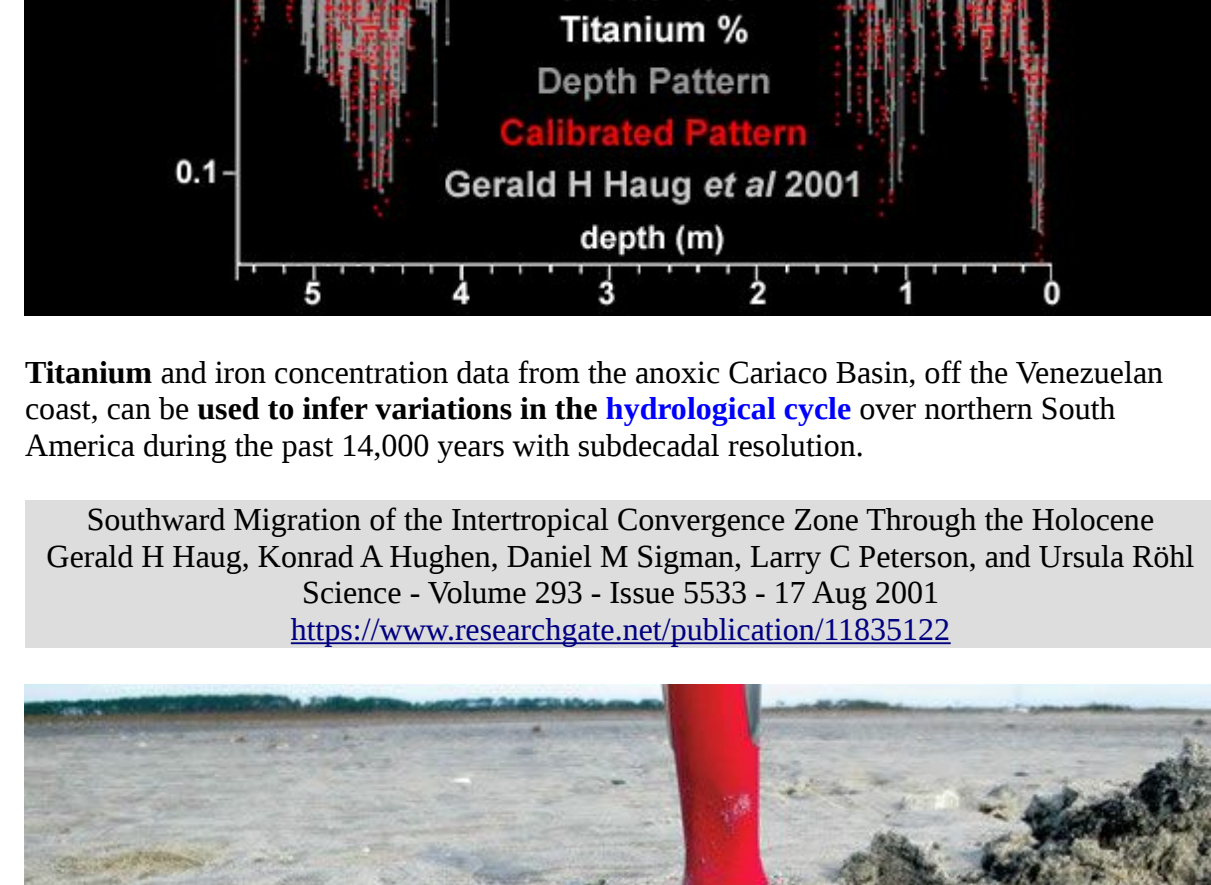
Sample ID	Depth (cm)	Varve age (yr BP)	<sup>14</sup> C age (yr BP ±1σ)	Δ <sup>14</sup> C (‰ ±1σ)	Lab code (CAMS)*
PC56-269	268-269.5	9966 (+20-20)	8920 (±70)	99.8 (+9.7-9.7)	29390
PC56-279	278-279.5	10,087 (+20-20)	8950 (±60)	111.8 (+8.5-8.5)	29389
PC56-283	283-284.5	10,234 (+20-20)	9070 (±60)	115.0 (+8.6-8.6)	27097
PC56-290	289-290.5	10,360 (+20-20)	9290 (±60)	101.5 (+8.5-8.5)	27096
PC56-295	294-295.5	10,505 (+20-20)	9380 (±70)	108.5 (+9.8-9.8)	27095
PC56-299	299-299.5	10,624 (+20-20)	9420 (±60)	119.0 (+8.6-8.6)	27094
PC56-304	303-304.5	10,751 (+20-20)	9490 (±60)	126.5 (+8.6-8.6)	27093
PC56-306	306-307.5	10,880 (+20-20)	9650 (±50)	121.6 (+7.3-7.3)	27092
PC56-311	310-311.5	11,026 (+20-20)	9550 (±70)	155.3 (+10.2-10.2)	27091
PC56-319	318-319.5	11,112 (+20-20)	9610 (±60)	159.3 (+8.9-8.9)	23406
PC56-334†	333-335	11,218 (+20-20)	8260 (±60)	389.2 (+10.7-10.7)	29388
PC56-346	345-347	11,277 (+20-20)	9990 (±60)	129.0 (+8.7-8.7)	29387
PC56-355	354-355.5	11,381 (+20-20)	10,010 (±60)	139.5 (+8.7-8.7)	23405
PC56-368	367-369	11,533 (+20-20)	10,140 (±80)	142.0 (+11.4-11.4)	29386
PC56-384	383-384.5	11,555 (+24-24)	10,070 (±60)	169.1 (+9.2-9.2)	23404
PC56-401	401-402.5	11,742 (+27-29)	10,240 (±90)	156.7 (+13.2-13.3)	22517
PC56-426	425-426.5	11,911 (+28-31)	10,160 (±60)	192.4 (+9.6-9.8)	23403
PC56-447	446-447.5	12,085 (+32-32)	10,310 (±60)	195.3 (+9.9-9.9)	23402
PC56-464	463.5-465	12,170 (+32-32)	10,320 (±50)	206.1 (+8.7-8.7)	23401
PC56-487	486-487.5	12,318 (+34-34)	10,400 (±50)	215.7 (+9.0-9.0)	23400

\*All <sup>14</sup>C analyses were made at CAMS, Lawrence Livermore National Laboratory. <sup>14</sup>C measurements are AMS dates using conventional half-life of 5568 yr and reservoir correction of 420 yr. <sup>14</sup>C and Δ<sup>14</sup>C errors are reported at 1σ. <sup>14</sup>C age of this sample is anomalously young—we have no explanation as to the cause.

The floating varve chronology was anchored to **absolute calendar age by "wiggle matching"** <sup>14</sup>C vs. calendar age variations to those measured in the **German pine dendrochronology** ...

A new <sup>14</sup>C calibration data set for the last deglaciation based on marine varves  
Konrad A Hughen, Jonathan T Overpeck, Scott J Lehman, Michele Kashgarian, John R Southon, and Larry C Peterson  
Radiocarbon Volume 40 Number 1 - February 1997  
<https://www.cambridge.org/core/journals/radiocarbon/article/new-14c-calibration-data-set-for-the-last-deglaciation-based-on-marine-varves/C094CAF5D68C00B1E1EAD99CFE8D982A>

In 2001 the **INTCAL98 radiocarbon dates** from the layered sediments of the **Cariaco Basin** was based upon the **INTCAL98 sample set** of dated tree rings, uranium-thorium dated corals, and [very ironically] varve-counted marine sediment.



**Southward Migration of the Intertropical Convergence Zone Through the Holocene**  
Gerald H Haug, Konrad A Hughen, Daniel M Sigman, Larry C Peterson, and Ursula Röhl  
Science - Vol 293 - Issue 5533 - 17 Aug 2001

Detailed age control is based on a series of 10 accelerator mass spectrometry (AMS) <sup>14</sup>C dates of the planktic foraminifer Globobulimina bulloides, all 1411 calibrated to calendar years using the **calibration** of (M. Stuiver et al., Radiocarbon 40, 1041 1998).

Southward Migration of the Intertropical Convergence Zone Through the Holocene  
Gerald H Haug, Konrad A Hughen, Daniel M Sigman, Larry C Peterson, and Ursula Röhl  
Science - Volume 293 - Issue 5533 - 17 Aug 2001  
<https://www.researchgate.net/publication/11835122>

Sample #	Depth cm	Years per Sample	Age ka BP	Date	Titanium Percentage
2381	476.00	3.00	12.458000	-10508.00	0.226670
2382	476.20	4.00	12.461000	-10511.00	0.206670
2383	476.40	4.00	12.465000	-10515.00	0.186670
2384	476.60	3.00	12.469000	-10519.00	0.183330
2385	476.80	3.00	12.472000	-10522.00	0.200000
2386	477.00	4.00	12.476000	-10526.00	0.230000
2387	477.20	3.00	12.480000	-10530.00	0.240000
2388	477.40	4.00	12.483000	-10533.00	0.233330
2389	477.60	4.00	12.487000	-10537.00	0.220000
2390	477.80	3.00	12.491000	-10541.00	0.193330
2391	478.00	4.00	12.494000	-10544.00	0.180000
2392	478.20	4.00	12.498000	-10548.00	0.176670
2393	478.40	3.00	12.502000	-10552.00	0.180000
2394	478.60	4.00	12.506000	-10555.00	0.190000
2395	478.80	4.00	12.509000	-10559.00	0.153330

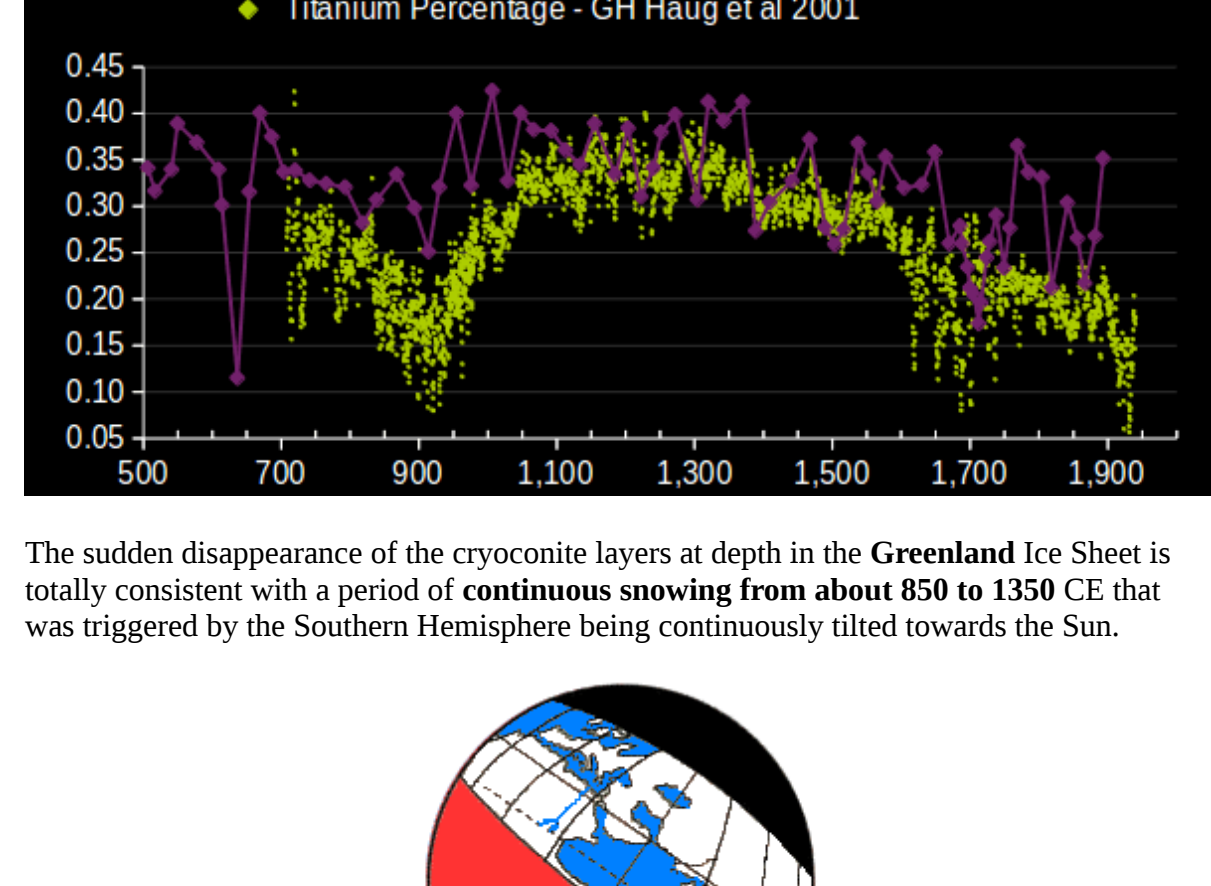
Cariaco basin trace metal data (titanium) of ODP Hole 165-1002C  
Gerald H Haug, Konrad A Hughen, Daniel M Sigman, Larry S Peterson, Ursula Röhl  
PANGAEA - 2001  
<https://doi.org/10.1594/PANGAEA.81965>

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/78D1263121EFD6B7C95A686A44D44C66D>

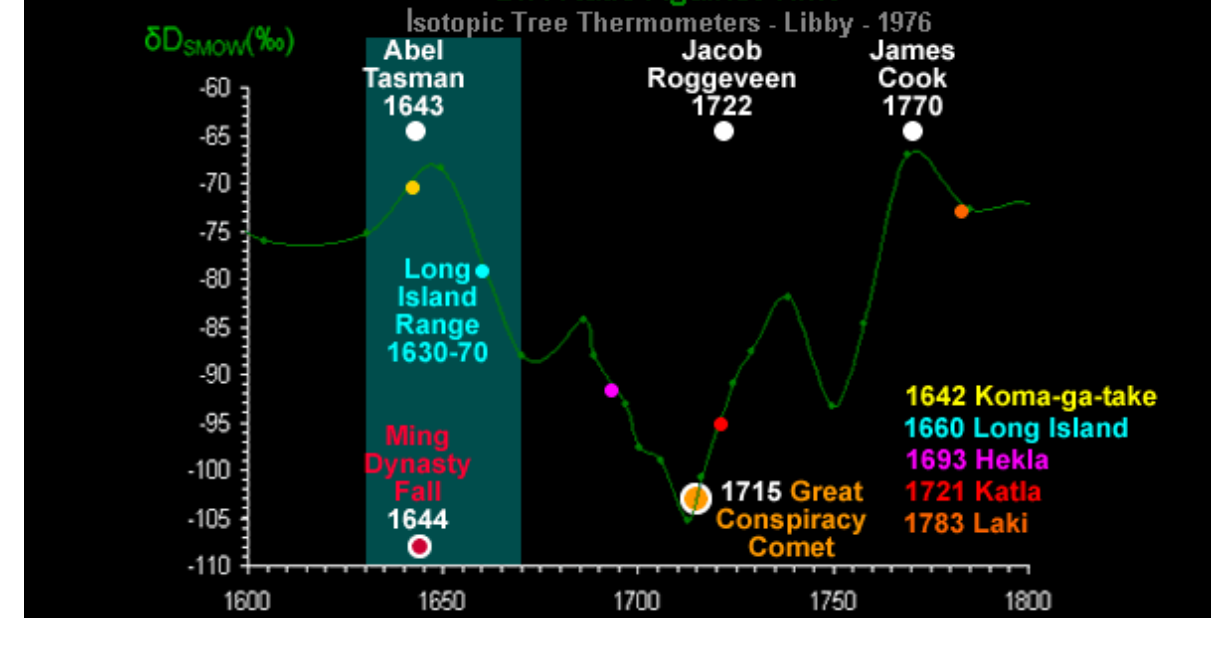
As expected: The **calibrated pattern** is laterally displaced relative to the natural **depth pattern**

Unfortunately: The **calibrated pattern** contains repetitive horizontal banding and vertical exaggerations that may [or may not] be calibration artefacts.



**Titanium** and iron concentration data from the anoxic Cariaco Basin, off the Venezuelan coast, can be used to infer variations in the **hydrologic cycle** over northern South America during the past 14,000 years with subdecadal resolution.

Southward Migration of the Intertropical Convergence Zone Through the Holocene  
Gerald H Haug, Konrad A Hughen, Daniel M Sigman, Larry C Peterson, and Ursula Röhl  
Science - Volume 293 - Issue 5533 - 17 Aug 2001  
<https://www.researchgate.net/publication/11835122>

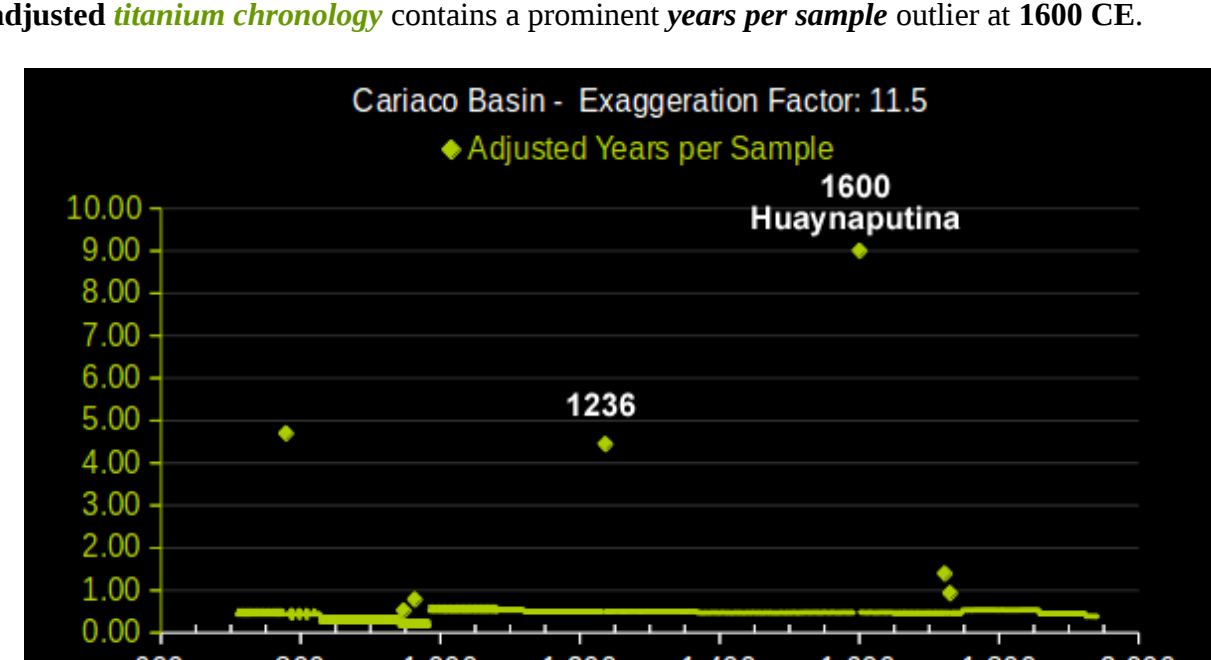


The dark layers in the heavy mineral sands of South Carolina are composed mainly of the titanium oxide minerals rutile and ilmenite  
Credit: USGS

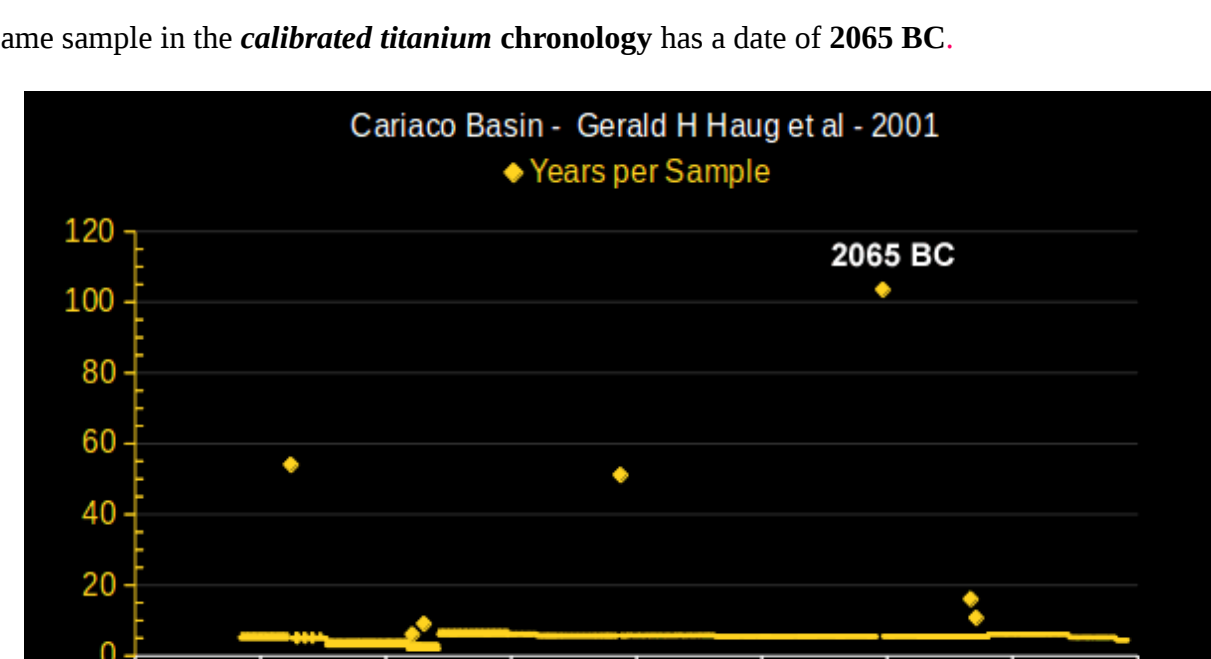
Titanium - Laurel G Woodruff, George M Bedinger, and Nadine M Piatak  
USGS Professional Paper 1802 - 2017  
<https://pubs.usgs.gov/pp/1802/pdf>

Nonetheless:

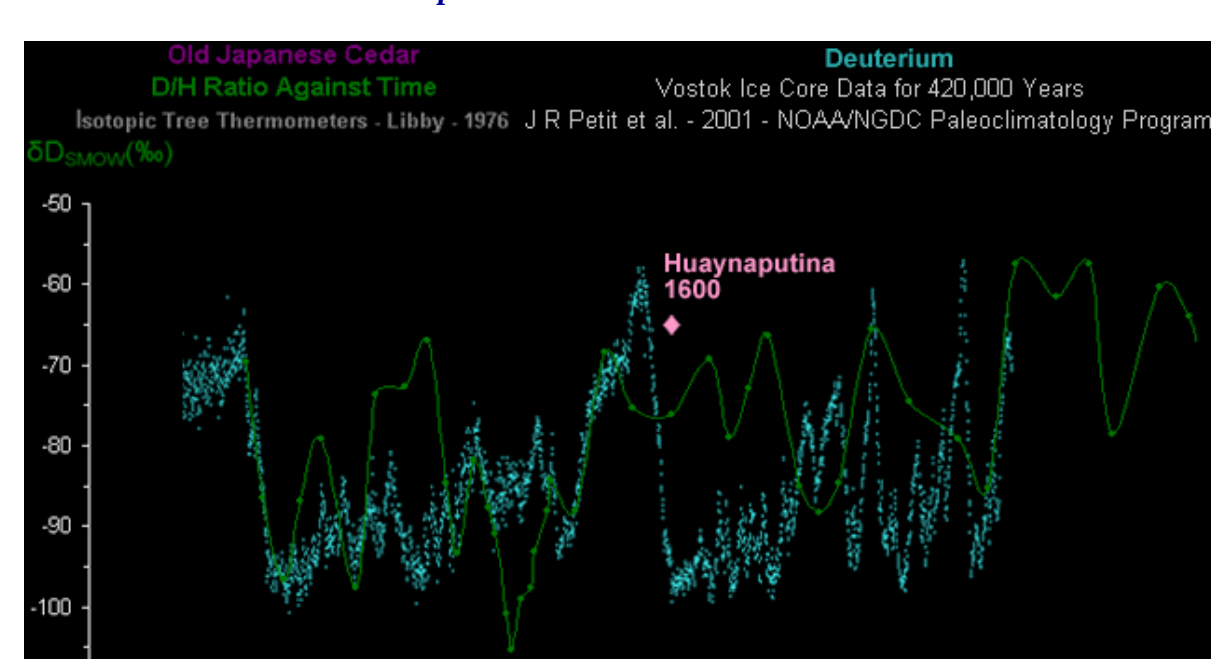
The 2001 **calibrated titanium chronology** can be **adjusted**



by applying an **exaggeration factor** of 11.5.



The period between 975 and 1400 CE of **high precipitation** in the adjusted **titanium chronology** may reflect **warming** when the Southern Hemisphere was continuously tilted towards the Sun.

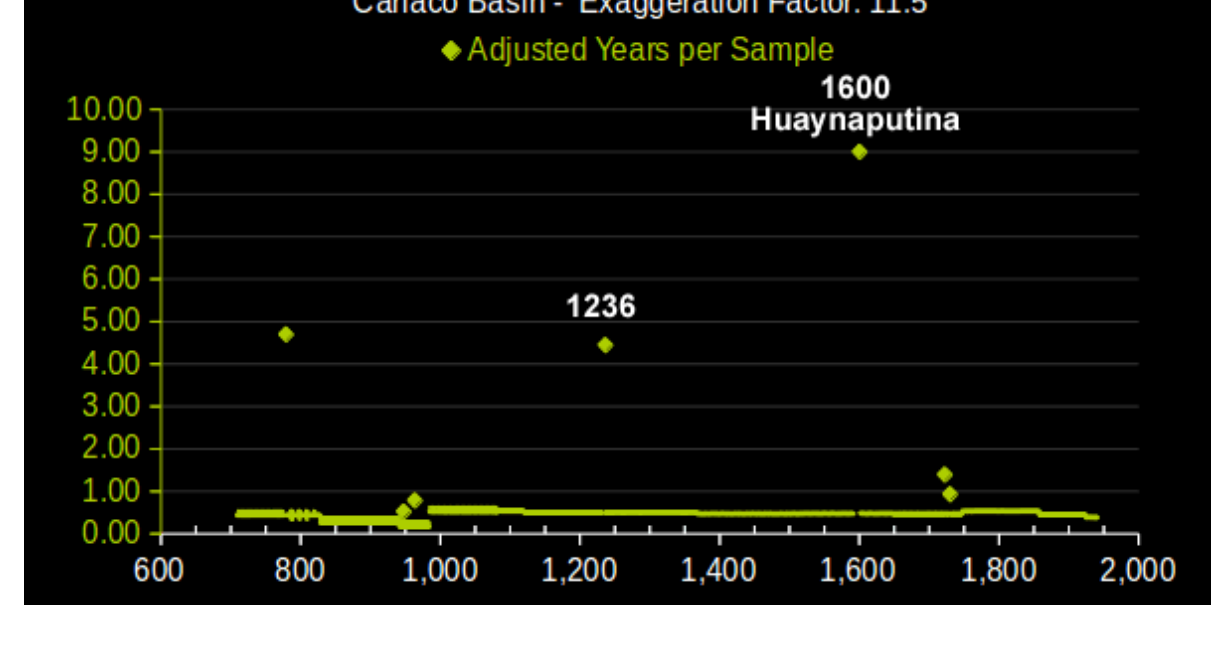


The sudden disappearance of the cryoconite layers at depth in the Greenland Ice Sheet is totally consistent with a period of **continuous snowmelt** from about 1350 CE that was triggered by the Southern Hemisphere being continuously tilted towards the Sun.



Malaga Bay - Depths of Dating  
<https://malagabay.wordpress.com/2024/04/12/depths-of-dating/>

The early onset of the **Maunder Minimum** in the adjusted **titanium chronology** is most probably associated with the **Huaynaputina** eruption of 1600.



Working backwards in time the Great Conspiracy Comet appeared in the depths of the **Maunder Minimum** which appears to have been an **enormous fragmentation event**.

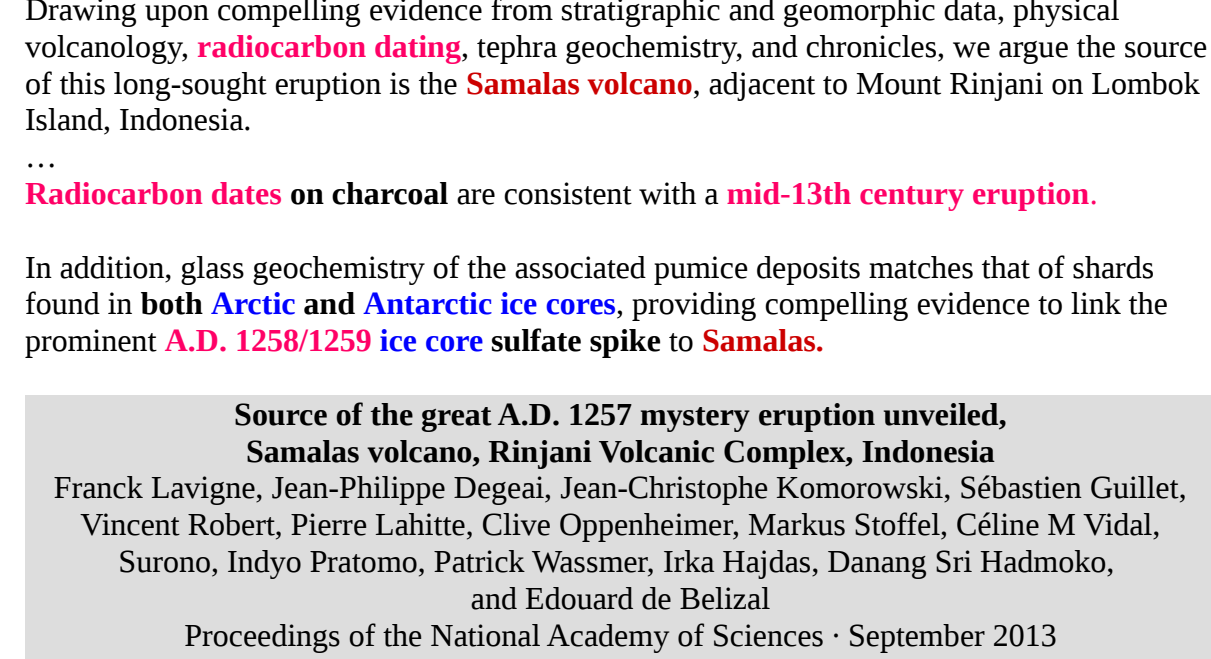
Malaga Bay - Great Conspiracy Comet  
<https://malagabay.wordpress.com/2024/02/23/great-conspiracy-comet/>

**Huaynaputina** is a volcano in a volcanic high plateau in southern Peru. ... The major **1600 eruption** had a **Volcanic Explosivity Index** of 6 and is considered to be the only major explosive eruption of the Andes in historical time. It is the largest volcanic eruption throughout South America in historical time, as well as one of the largest in the last millennium and the **largest historical eruption in the Western Hemisphere**. ... Huaynaputina's **eruptive column** was high enough to penetrate the **tropopause**. ... The total **volume of eruptive rocks** erupted ... was about **30 km<sup>3</sup>** ...

Wikipedia - Huaynaputina  
[https://en.wikipedia.org/wiki/Huaynaputina#1600\\_eruption](https://en.wikipedia.org/wiki/Huaynaputina#1600_eruption)

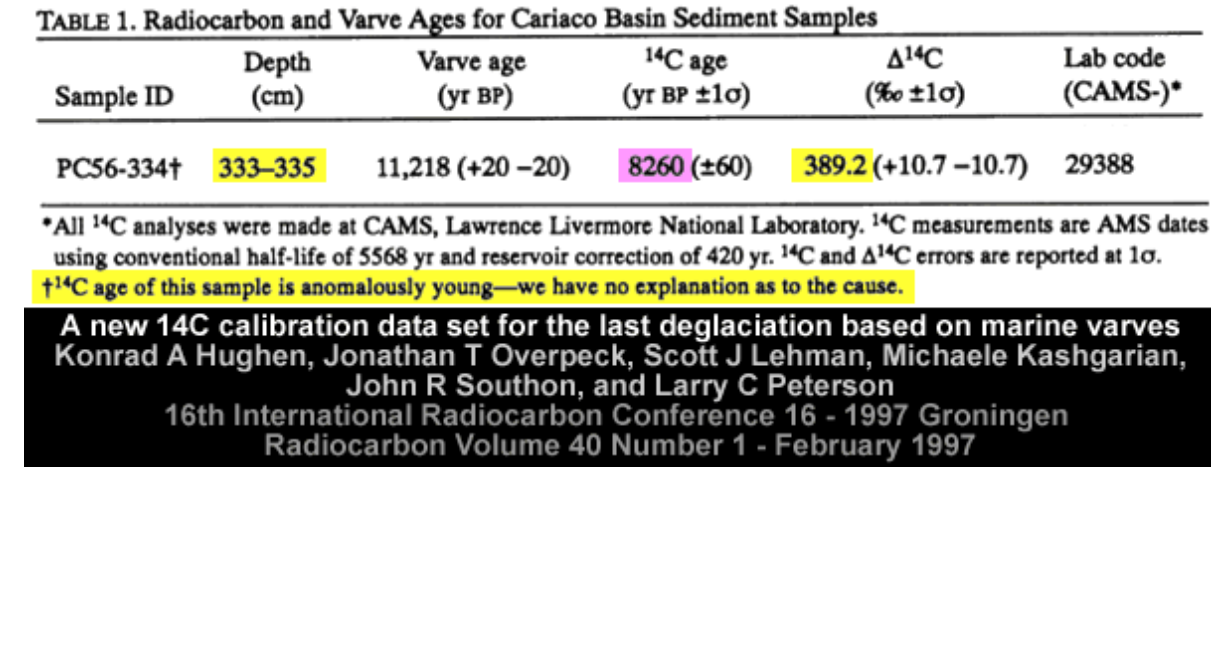
On the one hand:

The **adjusted titanium chronology** contains a prominent **years per sample** outlier at 1600 CE.



On the other hand:

The same sample in the **calibrated titanium chronology** has a date of 2065 BC.



Arguably:

The **Huaynaputina** eruption of 1600 is associated with the **opening of the Drake Passage** and the **establishment of the Antarctic Circumpolar Current**.



The 1625 regime change may [or may not] be associated with the **opening of the Drake Passage** and the establishment of the **Antarctic Circumpolar Current**.

Malaga Bay - Ptolemy's Paradigm: Antarctic Alignment  
<https://malagabay.wordpress.com/2021/03/21/ptolemys-paradigm-antarctic-alignment/>



Cape Horn - 55°58'48"S 67°17'21"W  
Wikipedia:User:Pietbarber

The **Drake Passage** is the body of water between South America's Cape Horn ... and ... Antarctica. ... In 1616, Dutch navigator Willem Schouten became the **first to sail around Cape Horn** and **through the Drake Passage**.

Wikipedia - Drake Passage  
[https://en.wikipedia.org/wiki/Drake\\_passage](https://en.wikipedia.org/wiki/Drake_passage)

Either way:

The 1236 **years per sample** outlier in the **adjusted titanium chronology** may [or may not] represent the **1257 Samalas** eruption that may [or may not] have been correctly dated.



The dating of the **1257 Samalas** eruption is based upon a very curious combination of chronologies.



Mount Samalas along with Mount Rinjani  
Wikimedia: Dhmlombok

In 1257, a catastrophic eruption occurred at **Samalás**, a volcano on the Indonesian island of Lombok. The event had a probable **Volcanic Explosivity Index** of 7. ... Samalás was part of what is now the **Rinjani Volcanic Complex**, on Lombok, in Indonesia.

Wikipedia - 1257 Samalas Eruption  
[https://en.wikipedia.org/wiki/1257\\_Samalas\\_eruption](https://en.wikipedia.org/wiki/1257_Samalas_eruption)

**Polar ice core records** attest to a colossal volcanic eruption that took place **ca. A.D. 1257 or 1258**, most probably in the tropics.

**Tree rings**, medieval chronicles, and computational models **corroborate** the expected worldwide atmospheric and climatic effects of this eruption.

Drawing upon compelling evidence from stratigraphic and geomorphic data, physical volcanology, **radiocarbon dating**, tephra geochemistry, and chronicles, we argue the source of this long-sought eruption is the **Samalás volcano**, adjacent to Mount Rinjani on Lombok Island, Indonesia.

**Radiocarbon dates** on charcoal are consistent with a **mid-13th century eruption**.

In addition, glass geochemistry of the associated pumice deposits matches that of shards found in both **Arctic and Antarctic ice cores**, providing compelling evidence to link the prominent **A.D. 1258/1259 ice core sulfate spike** to **Samalás**.

Source of the great A.D. 1257 mystery eruption unveiled, Samalás volcano, Rinjani Volcanic Complex, Indonesia  
Franck Lavigne, Jean-Philippe Degroot, Jean-Christophe Komorowski, Sébastien Guillet, Vincent Robert, Pierre Lahitte, Clive Oppenheimer, Markus Stoffel, Céline M Vidal, Surono, Indro Pratomo, Patrick Wassmer, Irka Hajdas, Danang Sri Hadmoko, and Edouard de Belizal  
Proceedings of the National Academy of Sciences - September 2013  
<https://www.researchgate.net/publication/257250072>

Incidentally:

Applying the **exaggeration factor** of 11.5 to the "we have no explanation" outlier of **8260 BP** in the 1997 **wiggle-matching calibrated Cariaco Basin chronology** produces a date of **1232 CE**.

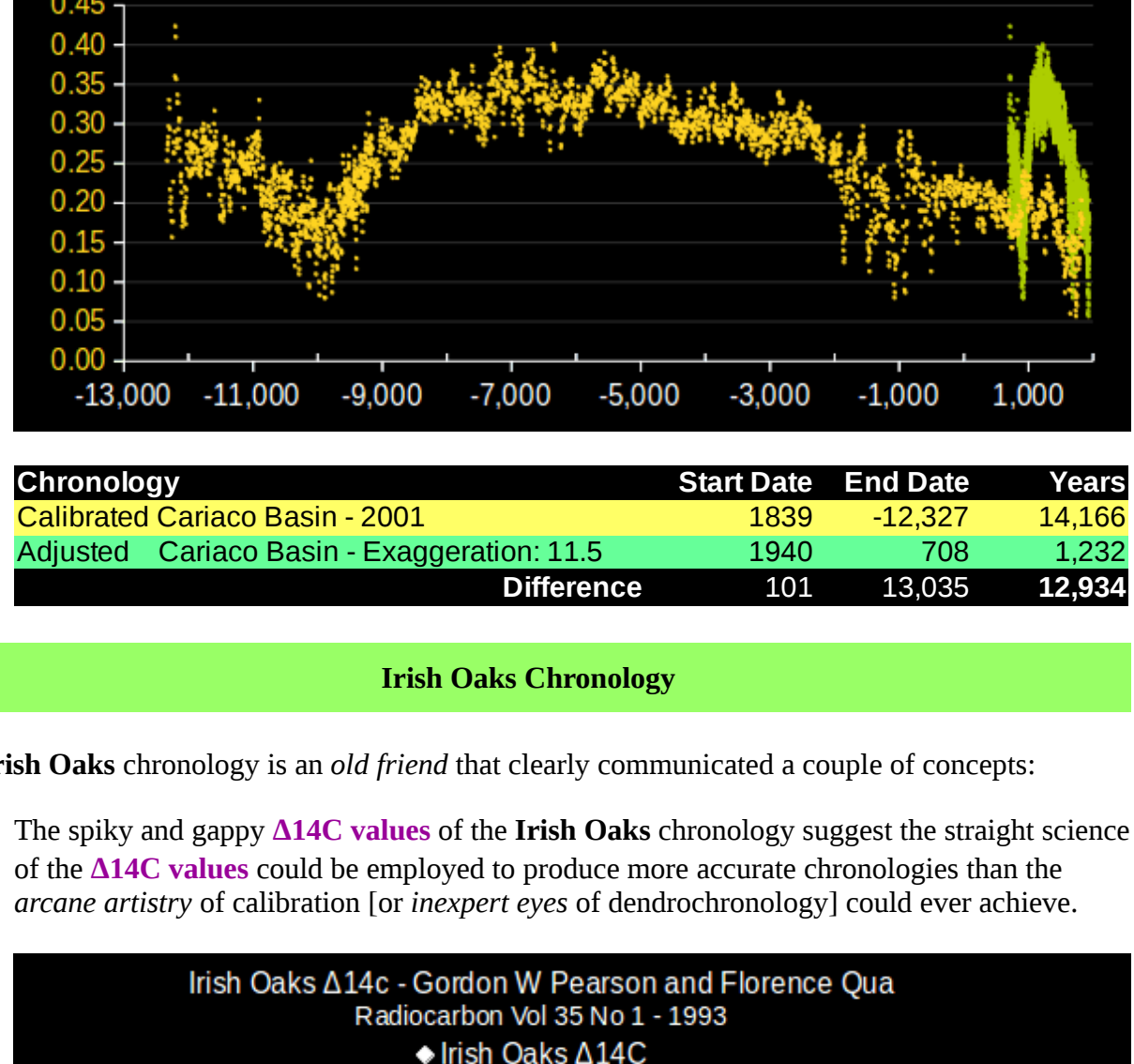
Sample ID	Depth (cm)	Varve age (yr BP)	<sup>14</sup> C age (yr BP ±1σ)	Δ <sup>14</sup> C (‰ ±1σ)	Lab code (CAMS)*
PC56-334†	333-335	11,218 (+20-20)	8260 (±60)	389.2 (+10.7-10.7)	29388

\*All <sup>14</sup>C analyses were made at CAMS, Lawrence Livermore National Laboratory. <sup>14</sup>C measurements are AMS dates using conventional half-life of 5568 yr and reservoir correction of 420 yr. <sup>14</sup>C and Δ<sup>14</sup>C errors are reported at 1σ. <sup>14</sup>C age of this sample is anomalously young—we have no explanation as to the cause.

A new <sup>14</sup>C calibration data set for the last deglaciation based on marine varves  
Konrad A Hughen, Jonathan T Overpeck, Scott J Lehman, Michele Kashgarian, John R Southon, and Larry C Peterson  
Radiocarbon Volume 40 Number 1 - February 1997

Whilst:

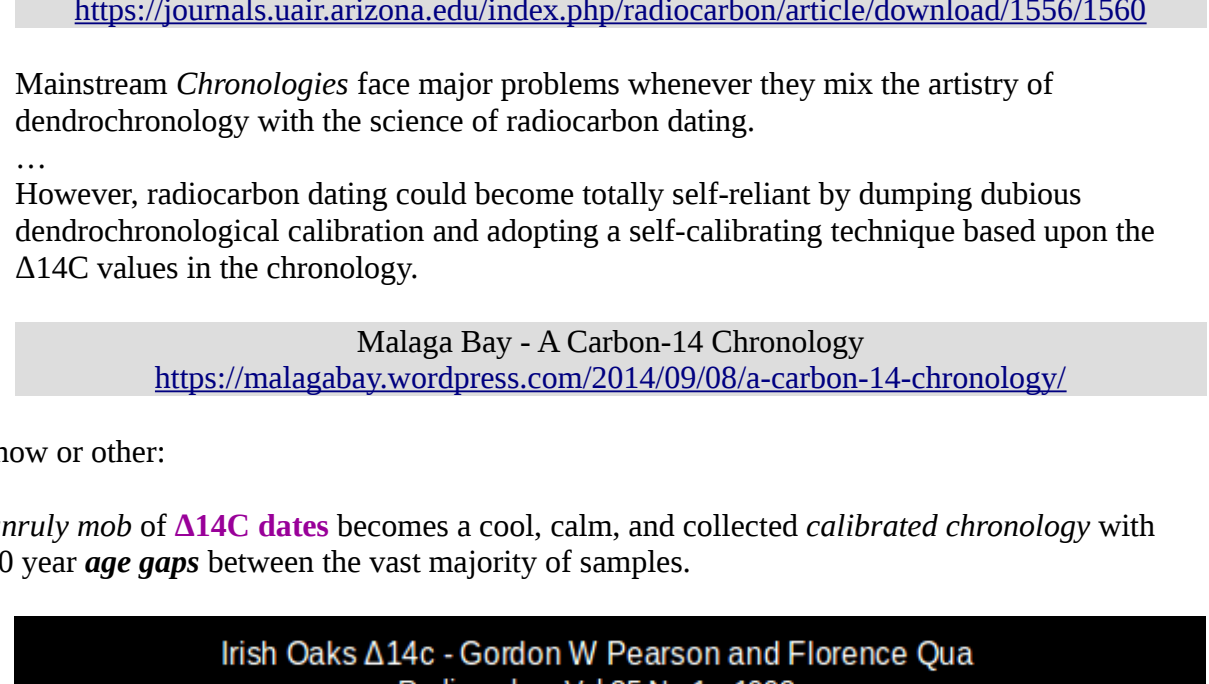
Visualizing the impact of the **11.5 exaggeration factor** produces a variety of human responses.



### Irish Oaks Chronology

The **Irish Oaks** chronology is an *old friend* that clearly communicated a couple of concepts:

**1<sup>st</sup>** The spiky and gappy  $\Delta 14C$  values of the **Irish Oaks** chronology suggest the straight science of the  $\Delta 14C$  values could be employed to produce more accurate chronologies than the arcane artistry of calibration [or *inexpert* eyes of dendrochronology] could ever achieve.



High-Precision  $^{14}C$  Measurement of Irish Oaks to Show the Natural  $^{14}C$  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>

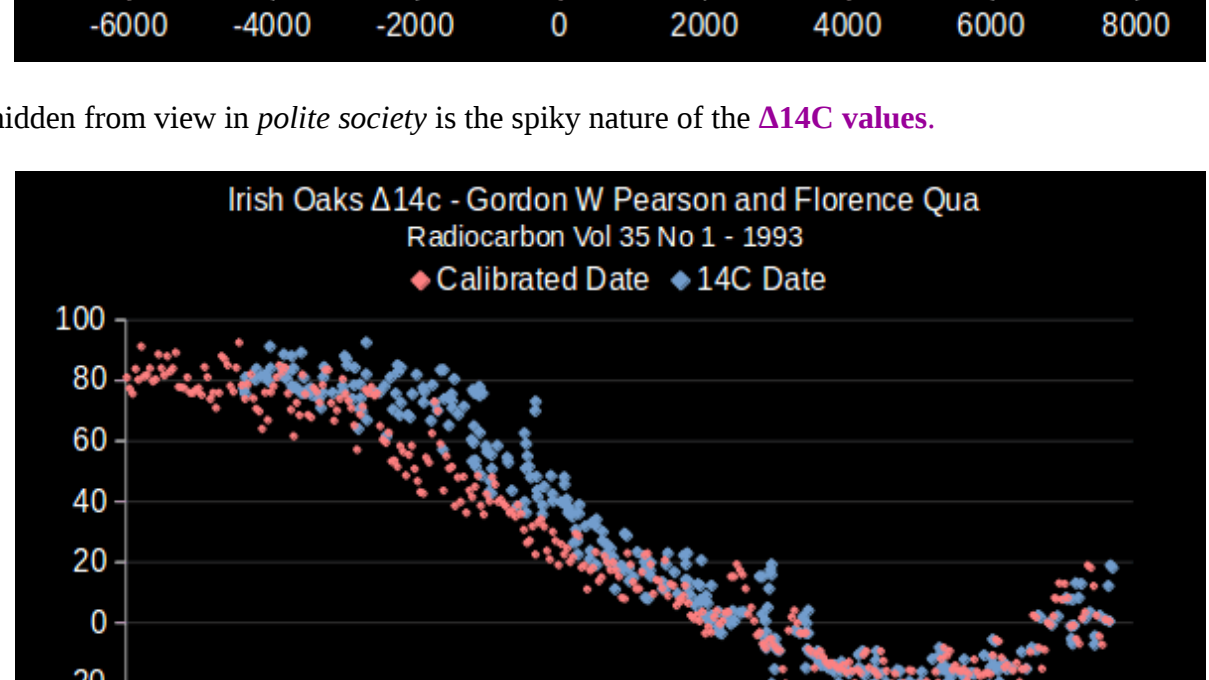
Mainstream *Chronologies* face major problems whenever they mix the artistry of dendrochronology with the science of radiocarbon dating.

However, radiocarbon dating could become totally self-reliant by dumping dubious dendrochronological calibration and adopting a self-calibrating technique based upon the  $\Delta 14C$  values in the chronology.

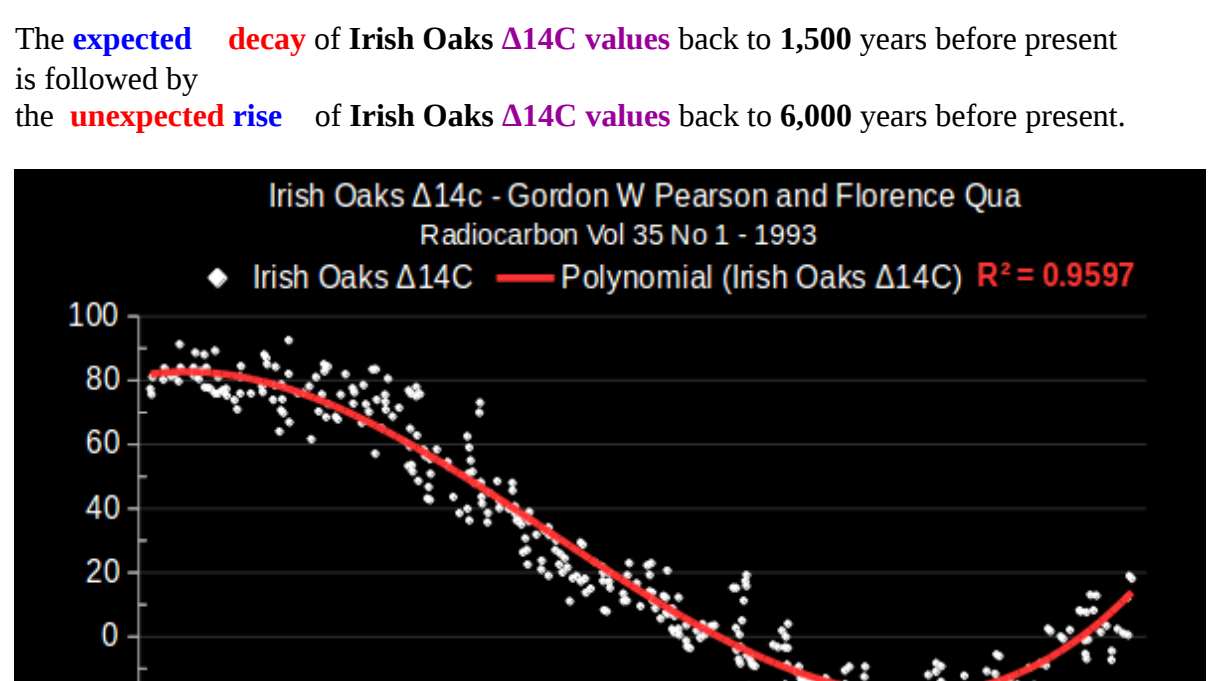
Malaga Bay - A Carbon-14 Chronology  
<https://malagabay.wordpress.com/2014/09/08/a-carbon-14-chronology/>

Somehow or other:

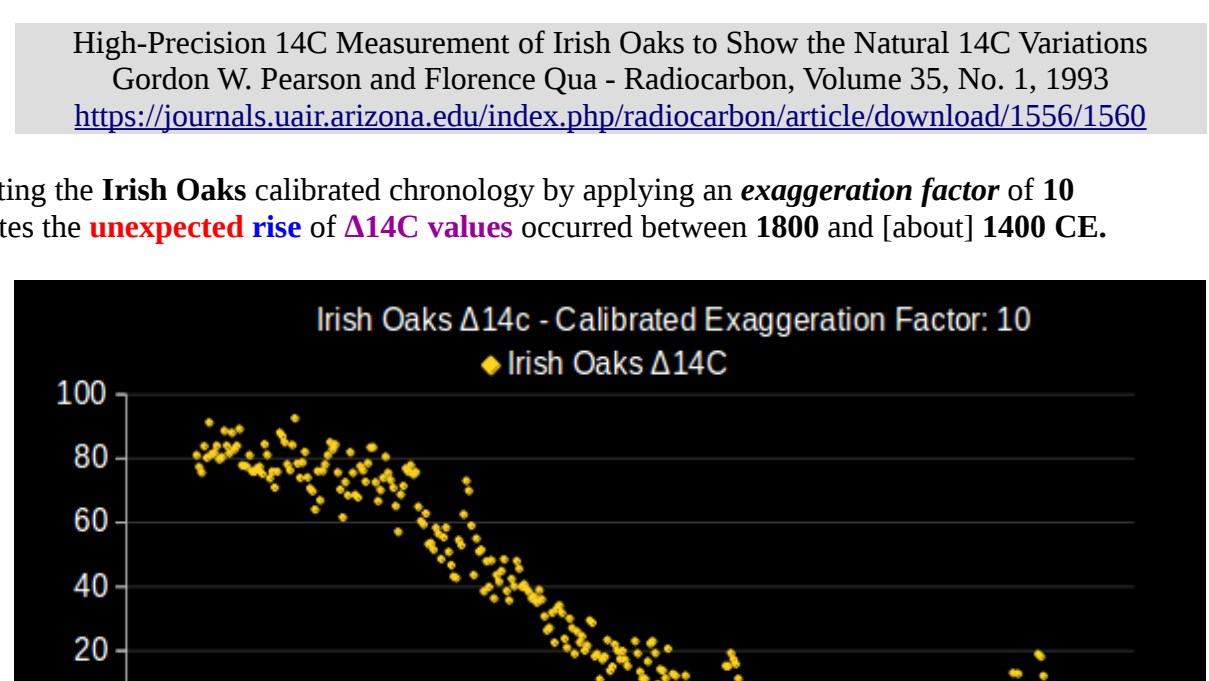
This *unruly mob* of  $\Delta 14C$  dates becomes a cool, calm, and collected *calibrated chronology* with neat 20 year *age gaps* between the vast majority of samples.



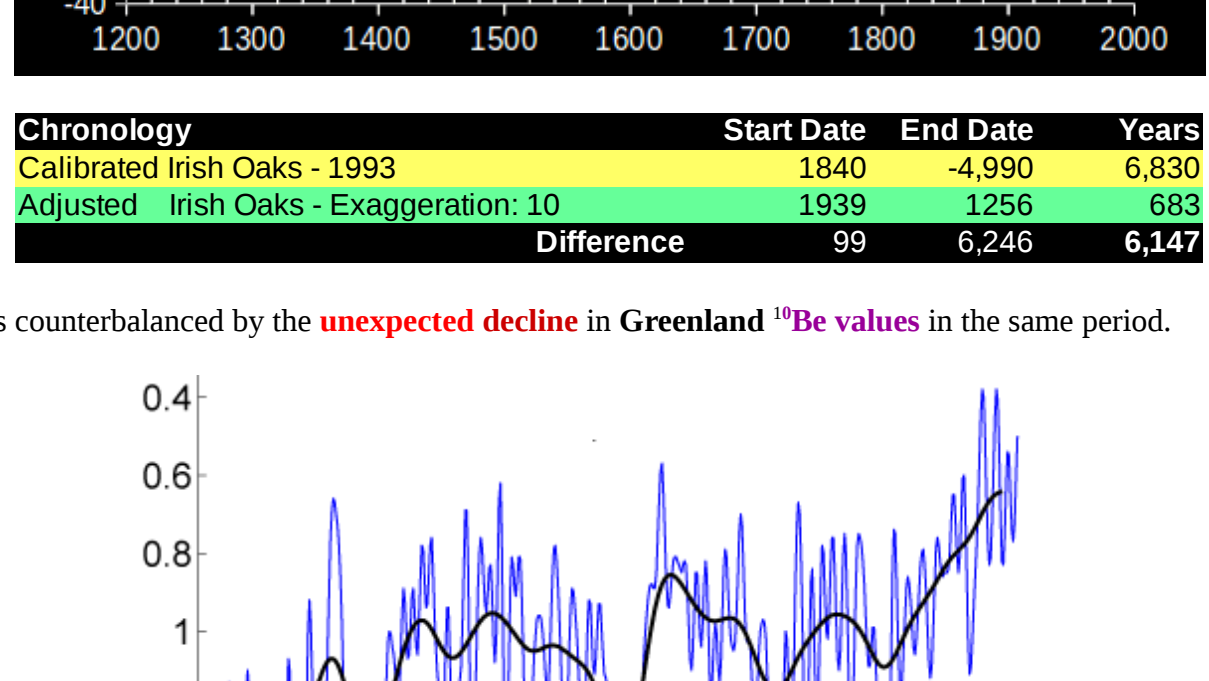
Hidden behind this neatly sequenced *calibrated chronology* lies a *chaotic crowd* of  $\Delta 14C$  age gaps.



Also hidden from view in *polite society* is the spiky nature of the  $\Delta 14C$  values.

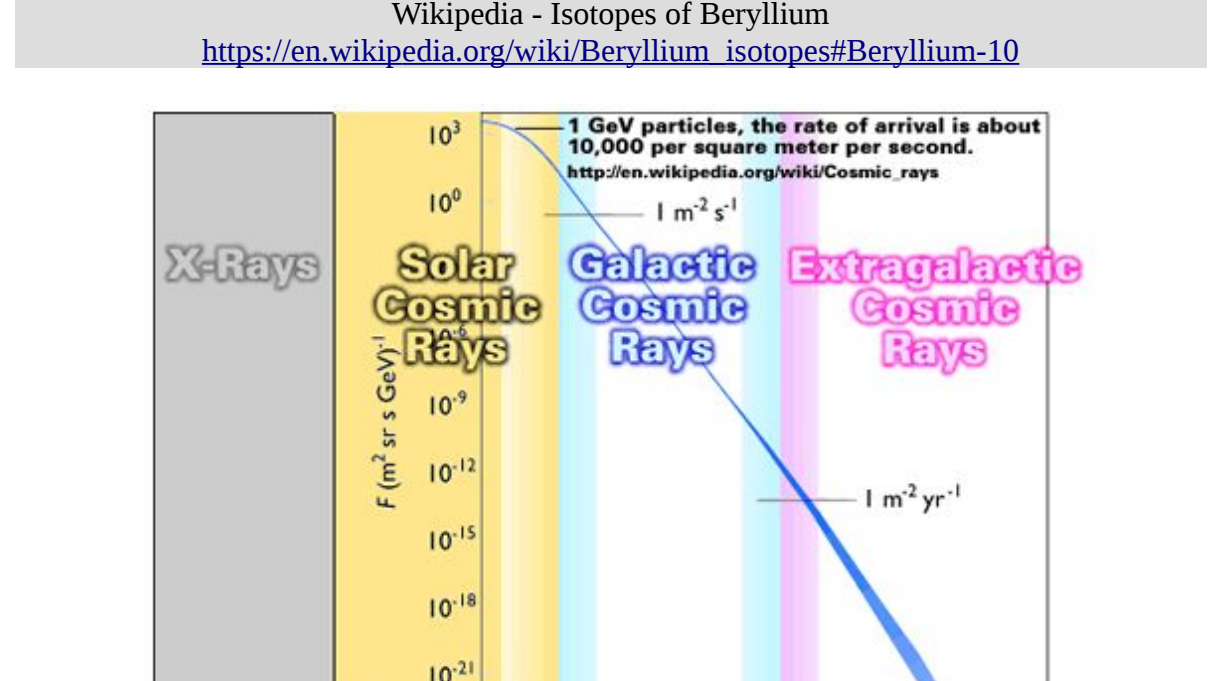


**2<sup>nd</sup>** The **expected** decay of Irish Oaks  $\Delta 14C$  values back to 1,500 years before present is followed by the **unexpected** rise of Irish Oaks  $\Delta 14C$  values back to 6,000 years before present.

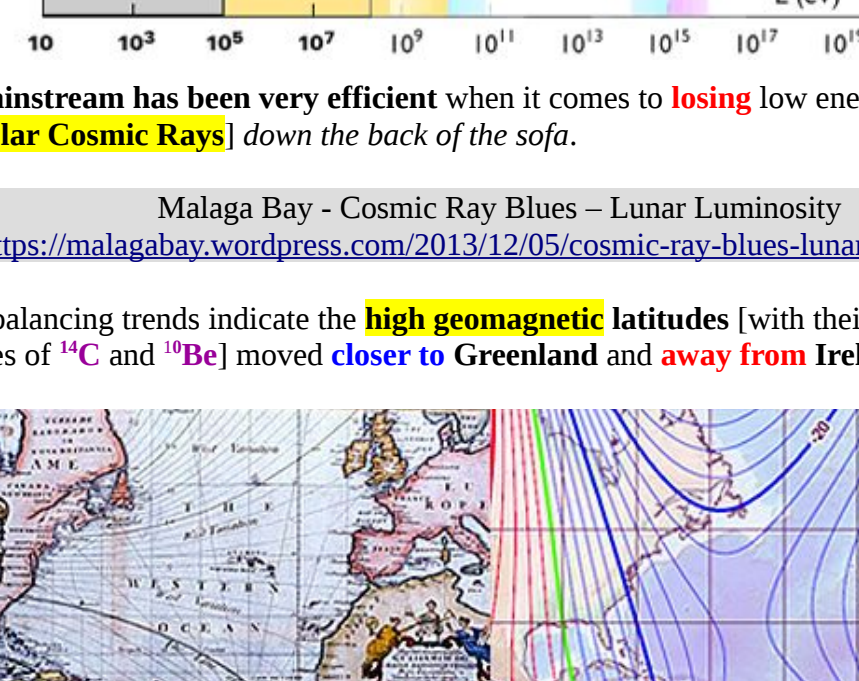


High-Precision  $^{14}C$  Measurement of Irish Oaks to Show the Natural  $^{14}C$  Variations  
 Gordon W. Pearson and Florence Qua - Radiocarbon, Volume 35, No. 1, 1993  
<https://journals.uair.arizona.edu/index.php/radiocarbon/article/download/1556/1560>

Adjusting the **Irish Oaks** calibrated chronology by applying an **exaggeration factor** of **10** indicates the **unexpected** rise of  $\Delta 14C$  values occurred between **1800** and **1400** CE.



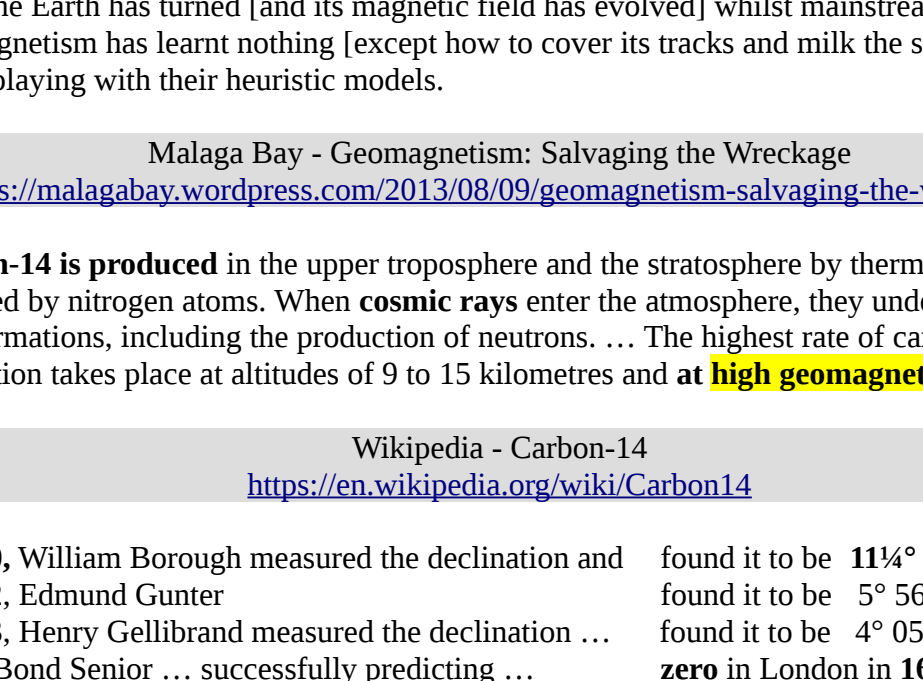
This is counterbalanced by the **unexpected decline** in **Greenland  $^{10}Be$  values** in the same period.



Solar Activity Proxy:  **$^{10}Be$  Concentration** from the Dye-3 ice core, Greenland  
 Robert A. Rohde - Global Warming Art.

**Beryllium-10** ... half-life of  $1.39 \times 10^6$  y... is formed in the Earth's atmosphere mainly by **cosmic ray** spallation of nitrogen and oxygen.

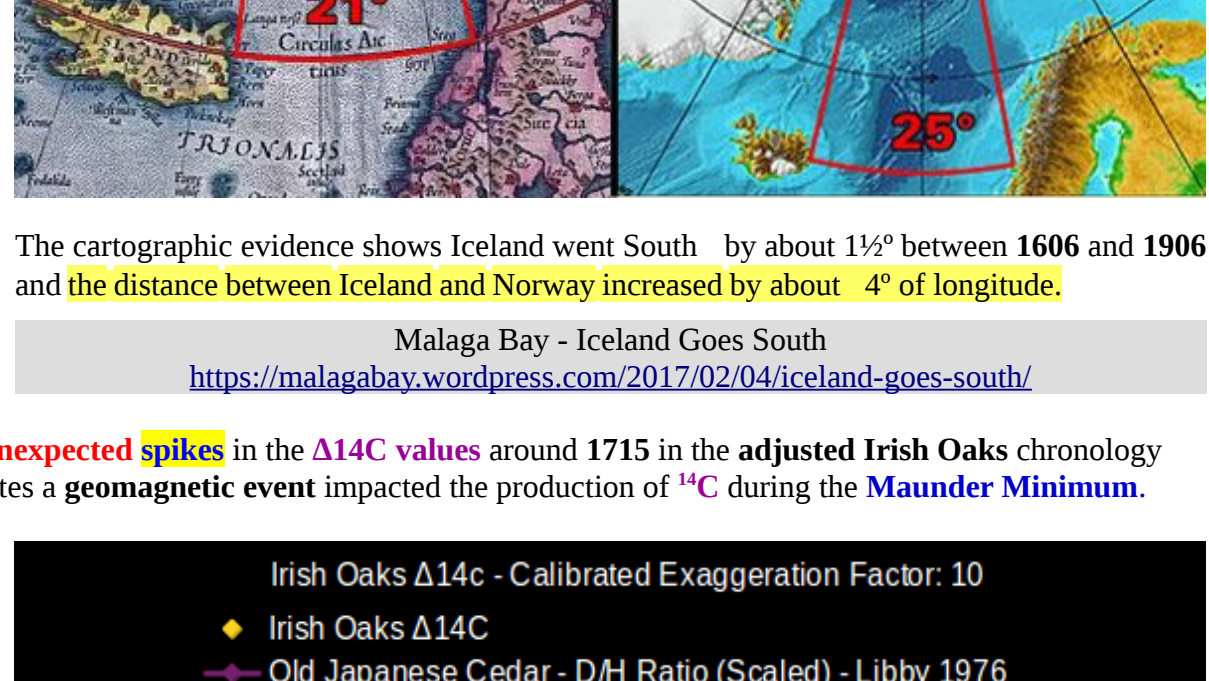
Wikipedia - Isotopes of Beryllium  
[https://en.wikipedia.org/wiki/Beryllium\\_isotopes#Beryllium-10](https://en.wikipedia.org/wiki/Beryllium_isotopes#Beryllium-10)



The **mainstream** has been very efficient when it comes to **losing** low energy Gamma Rays [aka **Solar Cosmic Rays**] down the back of the sofa.

Malaga Bay - Cosmic Ray Blues – Lunar Luminosity  
<https://malagabay.wordpress.com/2013/12/05/cosmic-ray-blues-lunar-luminosity/>

These counterbalancing trends indicate the **high geomagnetic latitudes** [away from their enhanced production rates of  $^{14}C$  and  $^{10}Be$ ] moved **closer to Greenland** and **further from Ireland** after **1400**.



Thus, the Earth has turned [and its magnetic field has evolved] whilst mainstream Geomagnetism has learnt nothing [except how to cover its tracks and milk the system] whilst playing with their heuristic models.

Malaga Bay - Geomagnetism: Salvaging the Wreckage  
<https://malagabay.wordpress.com/2013/08/09/geomagnetism-salvaging-the-wreckage/>

**Carbon-14** is produced in the upper troposphere and the stratosphere by thermal neutrons absorbed by nitrogen atoms. When **cosmic rays** enter the atmosphere, they undergo various transformations, including the production of neutrons. ... The highest rate of carbon-14 production takes place at altitudes of 9 to 15 kilometres and at **high geomagnetic latitudes**.

Wikipedia - Carbon-14  
<https://en.wikipedia.org/wiki/Carbon14>

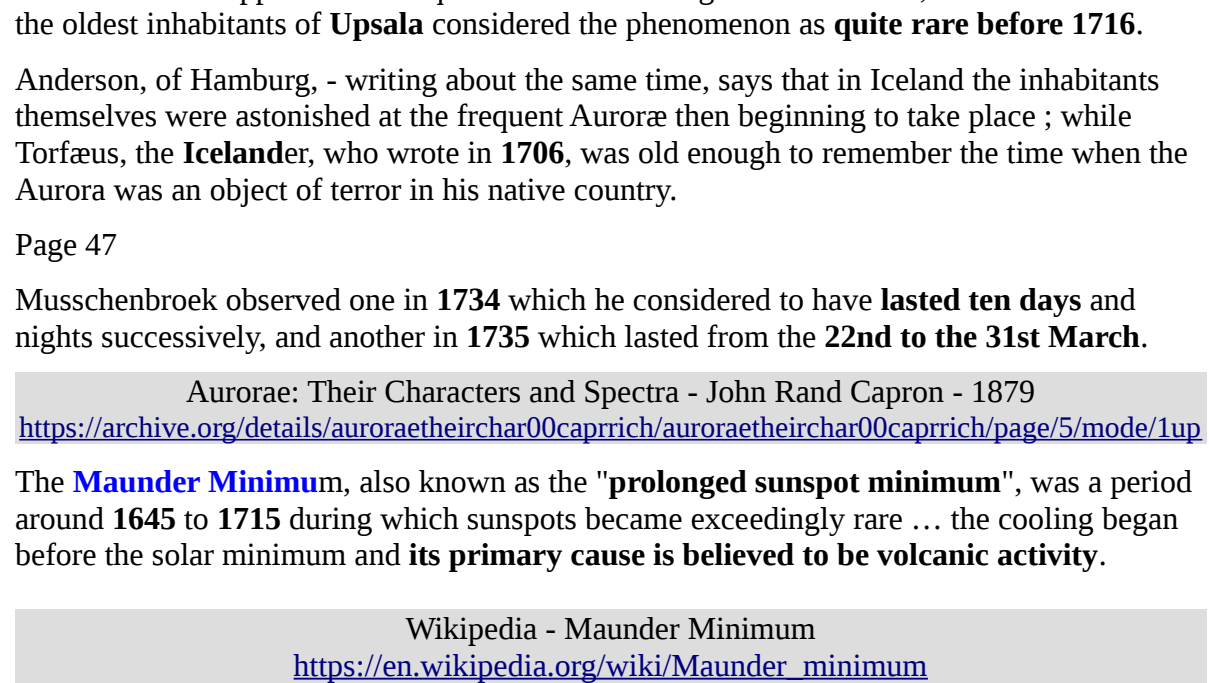
In **1580**, William Borough measured the declination and found it to be **114° NE** ...

In **1622**, Edmund Gunter found it to be **5° 56' NE** ...

In **1633**, Henry Gillibrand measured the declination ... found it to be **4° 05' NE** ...

Henry Bond Senior ... successfully predicting ... **zero** in London in **1657**

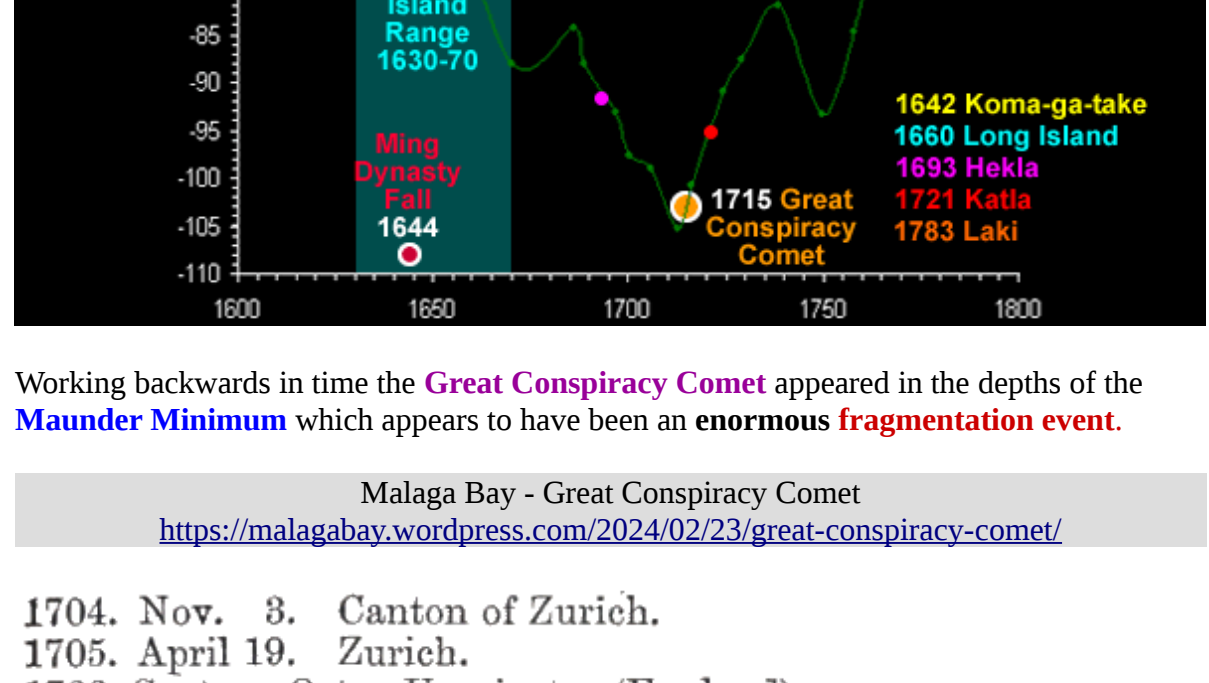
Wikipedia - History of Geomagnetism  
[https://en.wikipedia.org/wiki/History\\_of\\_geomagnetism#Temporal\\_variation](https://en.wikipedia.org/wiki/History_of_geomagnetism#Temporal_variation)



The cartographic evidence shows **Iceland** went **South** by about **1 1/2°** between **1606** and **1906** and the **distance between Iceland and Norway** increased by about **4°** of longitude.

Malaga Bay - Iceland Goes South  
<https://malagabay.wordpress.com/2017/02/04/iceland-goes-south/>

The **unexpected** **spikes** in the  $\Delta 14C$  values around **1715** in the **adjusted Irish Oaks** chronology indicates a **geomagnetic event** impacted the production of  $^{14}C$  during the **Maunder Minimum**.



Among the epochs of the **maxima of the aurora borealis** we may mention in especial the years **1615**, **1686-87**, **1707**, and **1728**, which are indicated by Mairan ...

The Aurora borealis - Alfred Angot - 1896  
<https://archive.org/details/auroraborealis00angouoft/page/96/mode/lup>

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From 1666 to 1716 no appearance is recorded in the 'Transactions of the French Academy of Sciences'; but in **1707** one was seen in **Ireland** and at **Copenhagen**; while in **1707** and **1708** the Aurora was seen in **seven** times.

The Aurora of **1716**, occurring after an interval of eighty years, which Dr. Halley describes, was **very brilliant** and extended over much country, being seen from the west of **Ireland** to the confines of **Russia** and the east of **Poland**, extending nearly 30° of longitude, and from about the 50th degree of latitude, over **almost all the north of Europe**, and in all places exhibiting at the same time appearances similar to those observed in **London**.

An Aurora observed in **Bologna** in **1723** was stated to be the first that had ever been seen there; and one recorded in the 'Berlin Miscellany' for **1797** is called a very unusual phenomenon.

Nor did Aurora appear more frequent in the Polar Regions at that time, for Cælius states that the oldest inhabitants of **Upsala** considered the phenomenon as **quite rare before 1716**.

Anderson, of Hamburg, - writing about the same time, says that in **Ireland** the inhabitants themselves were astonished at the frequent Aurora; but then beginning to take place; while Torfaeus, the **Icelandic**, who wrote in **1706**, was old enough to remember the time when the Aurora was an object of terror in his native country.

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Musschenbroek observed one in **1734** which he considered to have lasted **ten days** and nights successively, and another in **1735** which lasted from the **22nd to the 31st March**.

Aurorae: Their Characters and Spectra - John Radnor - 1879  
<https://archive.org/details/auroraetheirchar00caprich/auroraetheirchar00caprich/page/5/mode/lup>

The **Maunder Minimum**, also known as the "prolonged sunspot minimum", was a period around **1645** to **1715** during which sunspots became exceedingly rare ... the cooling period before the solar minimum and its **primary cause is believed to be volcanic activity**.

Wikipedia - Maunder Minimum  
[https://en.wikipedia.org/wiki/Maunder\\_minimum](https://en.wikipedia.org/wiki/Maunder_minimum)

This **geomagnetic event** appears to be associated with the **Great Conspiracy Comet** of **1715**.



Working backwards in time the **Great Conspiracy Comet** appeared in the depths of the **Maunder Minimum** which appears to have been an **enormous fragmentation event**.

Malaga Bay - Great Conspiracy Comet  
<https://malagabay.wordpress.com/2024/02/23/great-conspiracy-comet/>

**1704**, Nov. 3. Canton of Zurich.

**1705**, April 19. Zurich.

**1706**, Sept. or Oct. Upminster (England).

**1707**, Mar. 1. Berlin, Schenberg (Altmark, Saxony).—6th. Berlin, Schenberg, Schneeberg.

— Aug. 5. Breslau.—6th. Breslau.

— Oct. 19. Schenberg (traces of an aurora).—20th. Schenberg (traces of an aurora).—21st. Berlin, Schenberg.—26th. Schenberg.—29th. Berlin.

— Nov. 6. Berlin; Ireland.—27th. (?) Upminster.

**1708**, Aug. 9. Hereford.—10th. Hereford.—20th. London.

— Sept. 11. Jena, Halle, Leipzig, Naumburg.

**1709**, Oct. 18. Durham.—(?) (towards the end of the month.) Holstein.

**1710**, Nov. 27. Giessen, Leipzig.

**1715**, Mar. 15. Elbing and district (western Prussia).

**1716**, Mar. 15. London (very brilliant aurora); Ukraine.—16th. Utrecht; Brandenburg, Dantzig.—17th. A very widely extended aurora, visible throughout Spain, Portugal, Italy, France, England, Switzerland, the Low Countries, Austria, Hungary, Germany, Sweden, Russia, North America.—24th. Switzerland; London, Windsor.

— April 10. Wittenberg (Saxony).—11th. Paris, Valincour, Dieppe; London, Dublin.—12th. Paris; London, Dublin, Cotteslock; Dantzig.—20th, 21st, 22nd, 23rd, 24th. Dantzig.

— Nov. 16. Neuchâtel (Switzerland).

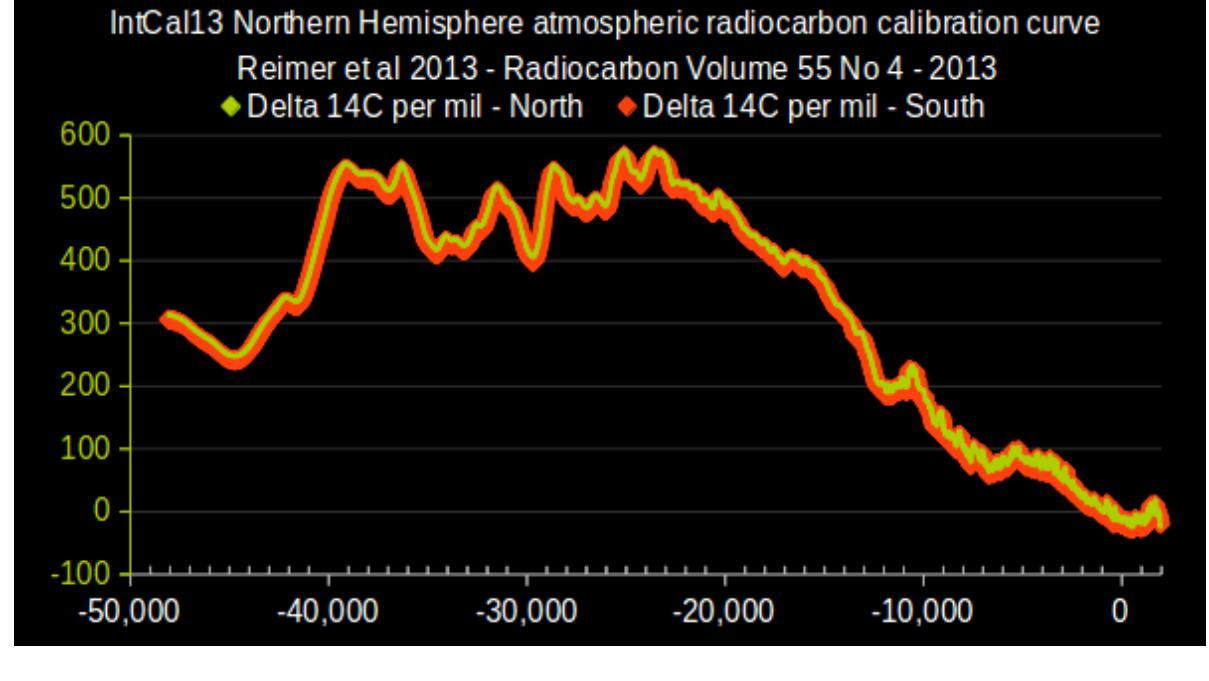
**1716**, Dec. 15. Paris.—16th. Paris.

**Catalogue of the Auroras seen in Europe Below Latitude 55° from 1700 to 1890**  
 The Aurora Borealis - Alfred Angot - 1896

The Aurora Borealis - Alfred Angot - 1896  
<https://archive.org/details/auroraborealis00angouoft/page/177/mode/lup>

... I found certain **white Streaks in the Sky**, feeming nearly Perpendicular; which whilst I considered them I knew not what to think; till looking up towards the Zenith, I perceived an **entire Canopy** of such kind of **white Striae, feeming to circle from a white Circle** of faint Clouds, about 7 or 8 degrees in Diameter, which Circle sometimes would vanish on a sudden, and as suddenly be renewed. ... The **Sky was perfectly Serene and Calm**, which seems to be one of the concomitant Circumstances attending the **Aurora Borealis** of which this was certainly a Species.

An Account of the Phenomena of a Very Extraordinary Aurora Borealis  
 Seen at London on November 10. 1719.  
 Edmond Halley  
 Philosophical Transactions of the Royal Society  
<https://archive.org/details/philtrans08152040/mode/lup>



TLEs generally last anywhere from less than a millisecond to more than 2 seconds.

... Sprites are large-scale electrical discharges which occur **high above a thunderstorm cloud**, or cumulonimbus, giving rise to a quite varied range of visual shapes.

They normally are colored reddish-orange or greenish-blue, with **hanging tendrils** below and arcing branches above.

They can also be **preceded** by a **reddish halo**, known as a **sprite halo**.

Wikipedia - Transient Luminous Event  
[https://en.wikipedia.org/wiki/Transient\\_luminous\\_event](https://en.wikipedia.org/wiki/Transient_luminous_event)

The portion of the atmosphere most important to us and which affects us most is the troposphere, which from fig. 6.2 can be seen to terminate at the tropopause between 6km and 18km up. Curiously enough, we also find that the temperature neither decreases nor increases constantly (shown as wavy broken line), but fluctuates as we ascend through the various atmospheric layers, so that at a certain altitude, at 29km for instance, the temperature is -60°C, whereas at a height of 80km it is +10°C. Somewhere between these two temperatures, therefore, there is a layer where the temperature is +4°C.

According to my calculations there are at least four such levels where the temperature equals +4°C, at altitudes of about 3.5km, 7.7km, 85km and 175km.

Living Energies - Callum Coats - 2001  
<https://archive.org/details/callum-coats-living-energies-viktor-schubertgers-brilliant-work-with-natural-energy-explained-2001/page/89/mode/lup>  
 Malaga Bay - Atmospheric Science: Callum Coats Condenser  
<https://malagabay.wordpress.com/2014/07/26/atmospheric-science-callum-coats-condenser/>

It also appears the long list of factors influencing **radiocarbon dating** just got longer:

age at death, altitude, body part, **calibration**, catastrophes, climate, contamination, errors, geomagnetic events, hard water, hemisphere, human activity, **human beliefs**, islands, isotopic fractionation, latitude, **longitude**, sea water, species, upwelling, and volcanoes.

### INTCAL13 Calibration Curve

Another *old friend* is the **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>

**Significant additions** to the datasets used for **INTCAL13** include non-varved marine **foraminifera** data, and U-Th dated **speleothems**.

Wikipedia - Radiocarbon Calibration  
[https://en.wikipedia.org/wiki/Radiocarbon\\_calibration#Construction\\_of\\_a\\_curve](https://en.wikipedia.org/wiki/Radiocarbon_calibration#Construction_of_a_curve)

A **really great** feature of **IntCal13** is the separate Northern and Southern Hemispheres curves.



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



Enough said.

As always:

Review the evidence and draw your own conclusions.

