

# A preliminary age calibration for the post-glacial-maximum period

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In the last twenty years a number of studies have been published on the rise in global sea level since the last glacial maximum. The dates of the last glacial maximum and the change of sea level with time were based on long-age dating assumptions using a variety of methods, and fitted into the uniformitarian timeline.<sup>1</sup> Given that the glacial maximum occurred toward the end of the post-Flood Ice Age, these curves allow us to develop an age calibration to convert secular, long-age dates into dates within biblical history.

## Developing the calibration curve

Figure 1 shows the current secular view on sea-level rise since the end of the last glacial maximum. This graph was prepared by Robert Rohde from several published papers<sup>2</sup> that included data assembled from numerous other sources. The actual sea levels had been adjusted for vertical geologic motions such as continental rebound, connected with the removal of continental ice, and hydrostatic rebound, due to the increased weight of water in coastal areas. However, it is the dates on the chart rather than the sea levels that

are primarily needed for an age calibration. An analysis of the magnitude of the sea-level fall needs to be evaluated, but this is outside the scope of this article. The graph shows the last glacial maximum occurring at 22,000 years ago, when sea level was at its lowest, and the sea-level rise reaching the present level at about 7,000 years ago, all within the secular timescale.

It was the biblical Flood that provided the conditions on Earth that caused the Ice Age immediately after the Flood. The primary driver was warm oceans and a secondary factor would have been volcanic dust and aero-sols high in the atmosphere.<sup>3</sup> In his monograph on this topic Oard discusses the timing of the Ice Age, namely the time to reach glacial maximum, and the time for the ice sheets to melt back to their present size.

His ‘best estimate’ for their build-up to glacial maximum, based on a 25% depletion of solar radiation and a 12.5% decrease in the current values of the atmospheric and oceanic heat transports, is 500 years.<sup>4</sup> From energy balance considerations he found only a short time was required for the oceans to cool, and the ice sheet to melt back. The periphery of each sheet would melt first, and quickly, and the interiors more slowly. He concluded that the best estimate for the melt-back time to present size was 200 years.<sup>5</sup>

The timing of the Ice Age is tied to the timing of the Flood, which, in round figures, can be taken as about 4,500 years ago.<sup>6</sup> The Ice Age maximum would thus have been about 4,000 years ago and the oceans would have reached their current level about 3,800 years ago. Hence we equate the secular date

**Table 1.** Calibration points and factors for post-glacial-maximum period.

Point	Secular Date (ka)	Biblical Date (ka)	Calibration Factor
Present time	0	0	1.00
End of Ice Age	7,000	3,800	0.5429
Ice Age maximum	22,000	4,000	0.1818

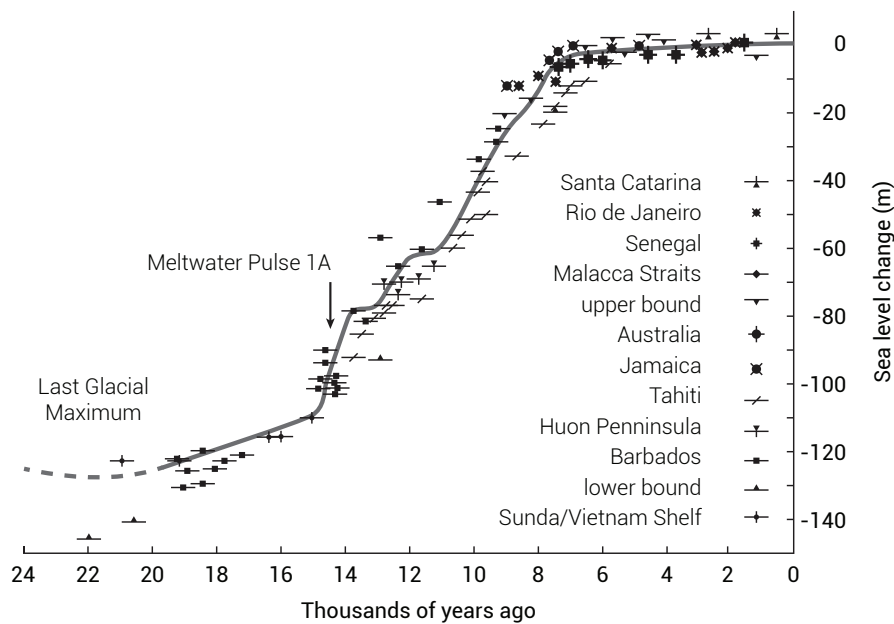


Figure 1. Long-age uniformitarian sea-level curve for the post-glacial-maximum period (after Rohde<sup>2</sup>).

for the last glacial maximum (22 ka ago) to the biblical date of 4,000 years ago. And we tie the secular date when the oceans reached their present level (7 ka ago) to the biblical age of 3,800 years ago. The 200-year period of ice melt-back results in a very tight compression of the major part of the secular timescale. This gives us three points for our calibration curve (table 1).

We would expect the secular dates to better match historical dates (and thus biblical dates) for recent history over the last 2–3 ka, and for the calibration factor to be close to 1.0 in this range. Further, we would expect the separation between the two scales to increase with increasing age due to the effects of the Flood and the Ice Age, and thus the calibration factor would diverge more greatly from 1.0. As the secular time increased into multiple tens of thousands of years we would expect the calibration factor to become smaller and smaller, tapering off into an exponential decay type of shape. Based on this we can fit by eye a reasonable calibration curve for the period, as shown in figure 2.

From the calibration factors of figure 2 we can calculate a calibration curve as shown in figure 3, which allows us to read the biblical age for the post-glacial-maximum period when we have the uniformitarian age.

### Discussion

This is a broad-brush approach to adjusting secular dates to fit in with ages based on the historical reports in the Bible. It may be claimed that the method is circular, that we have massaged the figures to get the answer that we want. This is correct, but this is the way that all dating methods work.<sup>7</sup> Every method begins with the researcher making careful measurements on samples in the present. Then he needs to make assumptions about the past, before he can calculate an ‘age’. But he does not stop there. He will then compare his result with other age information, and adjust his assumptions and interpretation until his age makes sense within its context. So, this exercise of converting secular ages to match biblical history simply follows the normal practice

of geochronology, but with the great advantage that biblical history is reliable.

The carbon-14 ( $C^{14}$ ) method is the one most widely used for the period of time back to about 40,000 years ago, and so this calibration curve would reflect the sorts of adjustments that would need to be made to  $C^{14}$  ‘dates’ in order to obtain actual dates. The need for significant correction to  $C^{14}$  dates beyond a few thousand years has been long recognized even by secular geochronologists, as Pilcher discusses:

“It is most likely that at the end of the last glaciation there were considerable perturbations of the global carbon cycle with the release of old carbon from ice, and an increase in biomass as temperatures rose. ... It is hard to believe that these changes would not have had dramatic effects on the radiocarbon levels in the atmosphere.”<sup>8</sup>

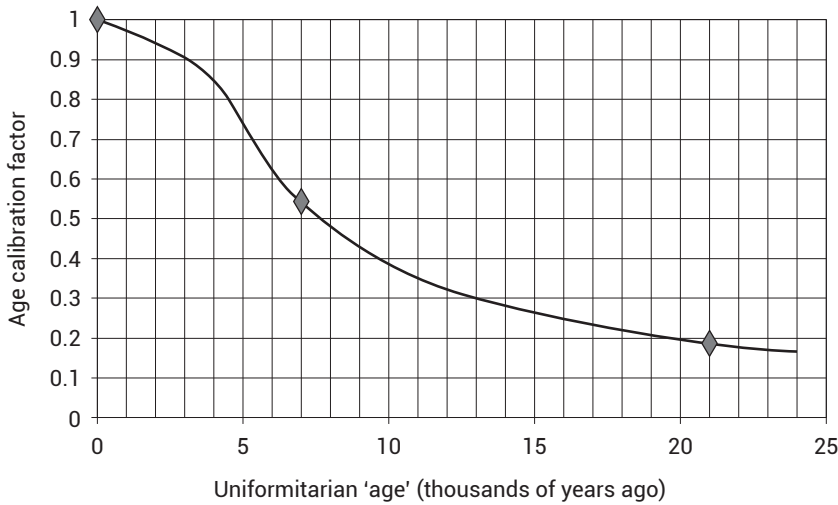
Secular geochronologists already have calibration curves for the  $C^{14}$  method to make the results agree with other methods and other information, such as dendrochronology. However, we would anticipate even larger corrections would be needed for  $C^{14}$  dating than those used by secular geochronologists because they ignore the dramatic effects of the Flood. The Flood would impact many factors, including non-equilibrium levels for  $C^{14}$  in the atmosphere immediately after the Flood, the burial of low  $C^{14}$  pre-Flood vegetation, increased volcanism after the Flood producing ‘old carbon’ in the atmosphere, revegetation of the earth after the Flood, and changes to the earth’s magnetic field affecting  $C^{14}$  production in the upper atmosphere. A useful discussion of the factors affecting  $C^{14}$  dates as they would have been impacted by the biblical Flood and

the post-Flood recovery is presented by Batten.<sup>9</sup>

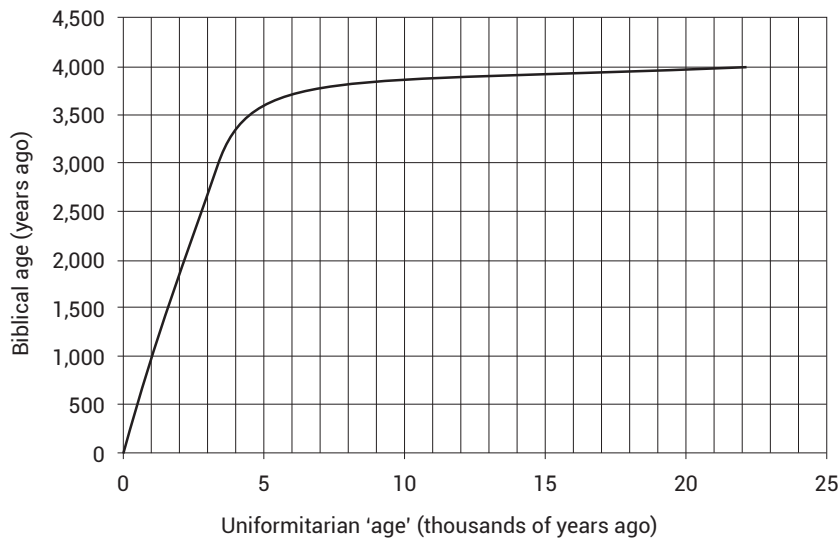
**Conclusion**

The calibration curve (figure 3) would have general application to all dates published within the secular long-age scheme because all dating methods are compared with, and calibrated against, each other in order

to obtain a consistent suite of dates. While figure 3 can be considered a general calibration curve, we would anticipate that there would be temporal and regional anomalies depending on the dating method and the study location. We will need to consult more reliable sources and obtain other information in order to refine and test the curve.



**Figure 2.** Fitted calibration factors to convert uniformitarian 'age' to biblical age for the post-glacial-maximum period. Biblical age is obtained by multiplying the secular age by the relevant calibration factor. Diamonds are calibration points from table 1.



**Figure 3.** Calibration curve to convert secular, long-age 'dates' to biblical dates for the post-glacial-maximum period. Biblical age is obtained from the secular age by reading from the graph.

**References**

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