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**M. G. L. Baillie**

Queen's University Belfast

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Why the Maya calendar starts in 3114 BC: a possible explanation.

M G L Baillie

School of Geography, Archaeology and Palaeoecology

The Queen's University, Belfast

The 13 *baktun* Mayan Long Count calendar spans 3114 BC to AD 2012; each *baktun* being 144,000 days.

The calendar was probably devised by a gifted individual or group of astronomers (hereafter GIGA) in the 1<sup>st</sup> millennium BC who chose 3114 Aug 11 (proleptic Gregorian calendar equivalent) as the start date.

How or why this choice was made has long been a mystery. Evidence from the chemistry of the American GISP2 ice core may provide a simple solution.

GISP2 yielded records of ammonium ( $\text{NH}_4$ ) and nitrate ( $\text{NO}_3$ ). Plotting a combined index of  $\text{NH}_4$  plus  $\text{NO}_3$  against the original GISP2 timescale (Figure 1) is a revelation. The two highest  $\text{NH}_4/\text{NO}_3$  indices in some six millennia – between 4558 BC and AD 1427 – occur within a year of two *baktun* transitions in the Mayan calendar; namely mean ice dates 2720.4 BC cf *baktun* 1.0.0.0.0 (2719 BC), and 1142.8 BC cf *baktun* 5.0.0.0.0 (1142 BC).

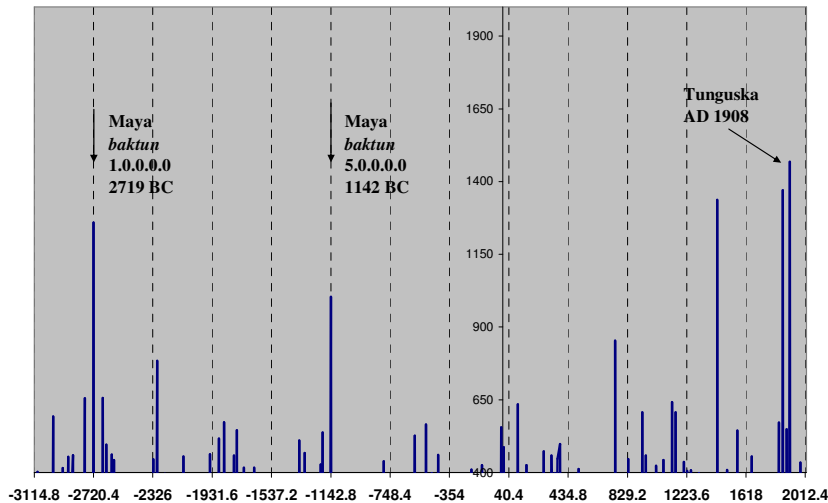


Figure 1. Index of (NH<sub>4</sub>%+NO<sub>3</sub>%) in GISP2 ice showing high values 1577 years apart at 2720.4 BC and 1142.8 BC; chemistry and dates from the ice record (Mayewski et al. 1997). Maya *baktun* changes and Tunguska (1908) are indicated.

Elsewhere it has been pointed out that NH<sub>4</sub>/NO<sub>3</sub> occurred in the GISP ice at AD 1908.48 coincident with the Tunguska impact of 30 June 1908 (Baillie 2007; Melott et al. 2010). This makes it reasonable to suggest that some real physical atmospheric phenomena (almost certainly cosmic) recorded 1577 years apart in the layer-counted ice record, may have been noticed by Maya/Olmec ancestors.

The hypothesis

The Mayan Long Count placement may be explained by a simple mechanism, namely that people witnessing Event I (around 2720 BC) initiated a *year count*. Their descendants noted a repeat Event II in 1142 BC and continued counting years thereafter.

If such a year count existed, then, at any date after 1142 BC the GIGA would have had an important fact to work with. It is believed that the Maya knew that the solar year was just less than 365.25 days. If the GIGA were aware of that year length, and of ancient lore “that two extra-ordinary sky events had occurred 1577 years apart *n* years ago” they could have deduced: 1577 years x 365.25 days = 575,999.25 days; exquisitely close to 576,000 days. The GIGA would also have been aware of numbers such as 18 x 20 = 360, the number of days in the approximate year, and 20 x 20 = 400; they may well have known that 400 x 360 = 144,000. With 1577 years as a prompt, how long would it have taken them to realize that 4 x (20 x 20) x (18 x 20) = 576,000 days?

When actually devising the calendar, the GIGA would know there had been four major divisions of time (4 x 144,000 days) between Events I (1.0.0.0.0) and II (5.0.0.0.0), and would also know the number of years (hence days) since Event II (1142 BC). Since 1.0.0.0.0 was clearly the catastrophic end of a time period, the beginning could be guessed to be 144,000 days *before* 1.0.0.0.0, namely 3114 BC. So nothing at all needs to have happened in 3114 BC for that year to become the start year of the Mayan calendar.

As to the choice of start *day* in 3114 BC: knowing that five units of 144,000 days fall between the start of the epoch and Event II (1142 BC), and knowing the number of years (*n*) since 1142 BC, the GIGA could

arbitrarily have declared that “today we are living  $(5 \times 144,000) + (n \times 365.25)$  days since the start of this epoch”. Thus, the day of the year the declaration was made would determine the start date, though this could have been tweaked using other knowledge. Deciding on 13 *baktuns* may have been dictated by other *Tzolkin/Haab* considerations, by symmetry, or by 13 being a significant number.

Referring to Figure 1 there is insufficient data to decide whether any major catastrophic event is due during 2012 (when 13.0.0.0.0 occurs). However, the large ammonium/nitrate spikes circa AD 1427 and 1861 urgently require adequate explanation. Finally, all credit to the GISP2 ice-layer counters, whose efforts appear vindicated.

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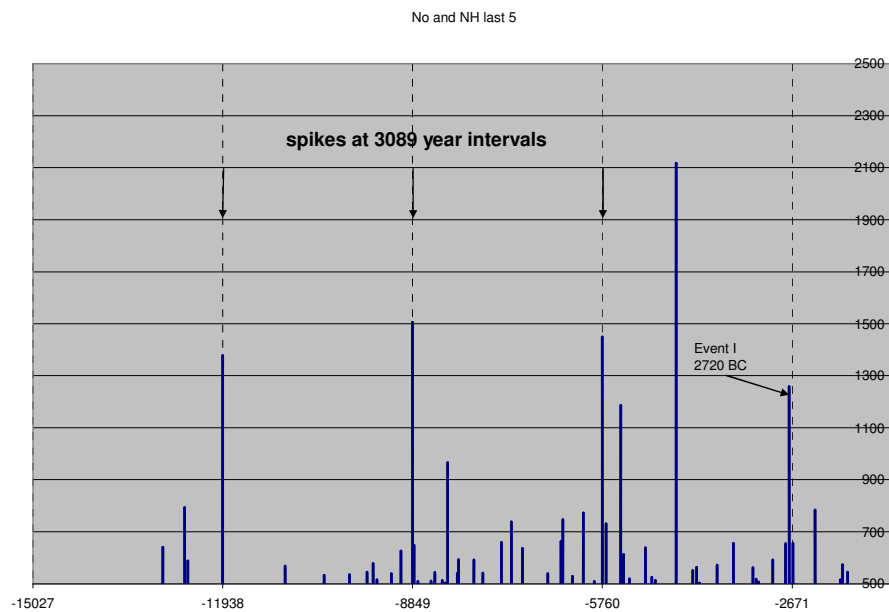
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### Additional Information

Data: GISP2 ice data is from The Greenland Summit Ice Cores CD-ROM. 1997. Available from the National Snow and Ice Data Center, University of Colorado at Boulder, and the World Data Center-A for Paleoclimatology, National Geophysical Data Center, Boulder, Colorado. The GISP2 NH<sub>4</sub>/NO<sub>3</sub> indices were produced by converting raw ammonium and nitrate values to percentages of the mean of the 5 previous values in the ice core record, and adding the resulting percentages. The horizontal scale is based on means of the top and bottom ice core dates for each sample, pre-AD 1950.

### Perspective

Identification of a possible cosmic origin for the 2720 BC and 1142 BC NH<sub>4</sub>/NO<sub>3</sub> spikes encourages investigation of the remainder of the Post Glacial GISP2 record. Figure 2 shows a continuation of the



previous plot.

Figure 2: Index of (NH<sub>4</sub>%+NO<sub>3</sub>%) in GISP2 ice showing high values 3089 years apart at 11938 BC, 8849 BC and 5760 BC; chemistry and dates from the ice record (Mayewski et al. 1997). Event I from Figure 1 is indicated.

It is immediately apparent that the first three major Post Glacial NH<sub>4</sub>/NO<sub>3</sub> spikes, at 11,938 BC, 8849 BC and 5760 BC, are spaced at 3089 year intervals. This may hint at a cosmic origin for these three peaks. It has to be noted that the 2720 BC peak is 3040 years after 5760 BC which means that an association with the preceding three cannot be ruled out. The 8849 BC spike is interesting because it is preceded in the ice

by a 15cm sample showing an anomalously large NaCl signal, perhaps hinting at an ocean impact. The enormous, apparently stochastic 4559 BC NH<sub>4</sub>/NO<sub>3</sub> deposition could span up to 4 years in the ice compared with the 3.5 months associated with Tunguska. Each of these events in the GISP2 record requires additional investigation. Unfortunately no equivalent long records are available from the European suite of ice cores, though the forthcoming NEEM Greenland chemistry record may allow confirmation of the presented events.