

Did Mayans knew about Milankovitch cycles?

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Time-counting of Mayans likely fit in Mircea's Eliades schemes for „sacred time” and „eternal return”.

Astronomical climate theory is fascinating discipline which aims to explain the climatic variations occurring with quasi-periodicities lying between tens and hundreds of thousands of years (Berger, 2009). Concept first has been developed in working mode by Serbian mathematician and engineer Milutin Milanković in 1930ties (Petrovic and Markovic, 2010) thus astronomical climate theory traditionally bears his name (fig.1).

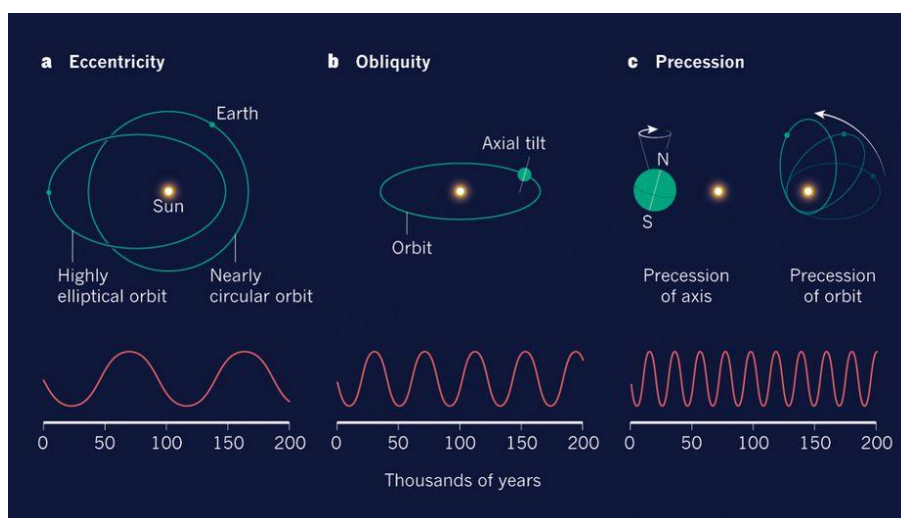


Fig. 1 Milankovitch cycles of glaciation. Credit: NASA

Explanation of Ice Ages with changing amounts of insolation of the Earth failed (Öpik, 1953) and theory somewhat fell out of favour. Work of small group of scientists does not allowed astronomical climate theory to fall out of consideration during years of doubts and after classical paper „Variations in the Earth's Orbit: Pacemaker of the Ice Ages", which *Science* magazine published in 1976, (modified) astronomical climate theory gets new traction.

Phenomenon of Ice Ages, however, is unexplained still. Fig. 2 shows us frequencies of occurrence of Ice Ages (in thousands of years) for last million years (left) in comparison with initial model of Milankovitch (right). As we see, only predicted 41 000 year cycle has good match. Astronomical climate theory needs upgrade, nobody will deny.

Higher spectral peaks of occurrence of Ice Ages in left side of fig.4 are intriguing. They could be used as markers in ancient catastrophic events based time-counting (cf. Eliade, 1971). As complexity and schistous structure of Mayan calendar system is

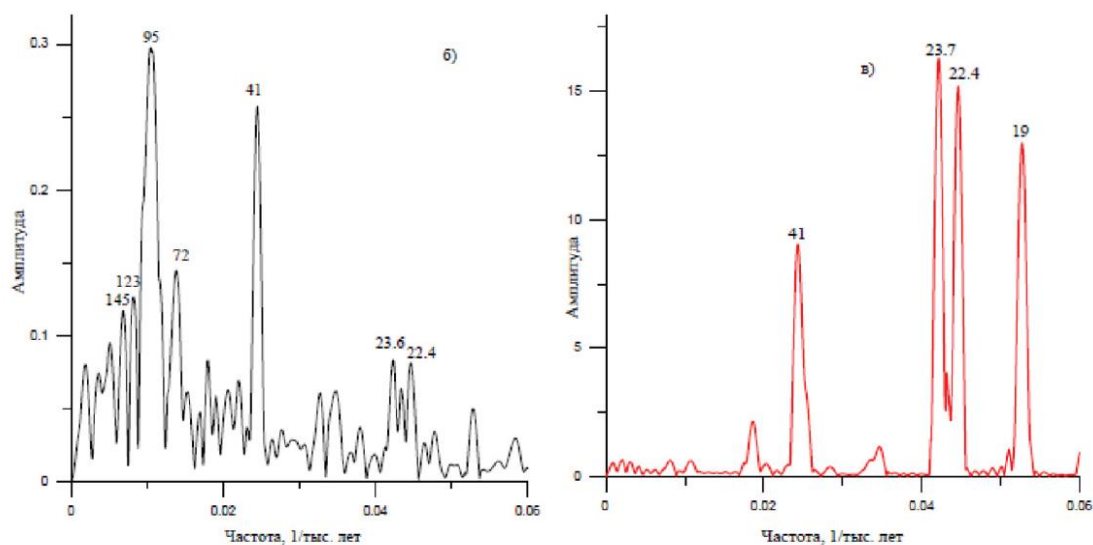


Fig.2 Very poor correlation in spectral analysis between oxygen-isotopic record LR04 (left) (Lisiecki, Raymo, 2005) and July insolation of 65°N (right) for last million years. Normalised values of LR04 are showed here with „minus” sign for better comparison. X-axis- frequency, 1/1000 of years, Y axis- amplitude. (Ice Ages has been detected indirectly.) From Bol’shakov, 2015.

known (Stock, 1998; Fuls and Wells, 2000; Persson, 2000; Paxton, 2001; Coe and van Stone, 2005; Knowlton, 2010; Bricker and Bricker, 2011; Kennett et al, 2013; Weeks et al, 2013), it was interesting to compare it with spectral peaks of Ice Age recurrence from fig.2. Important numbers in solar years in Mayan time-counting system are:

baktun 394.14 years,

13 baktuns 5125.4 years,

piktun 7885 years,

Applying mentioned numbers to higher Ice Age peaks of recurrence we obtain:

| Ice age cycle, years | Subcycle | Number of subcycles | Calculation |
|----------------------|------------|---------------------|-------------|
| 41 000 | 13 baktuns | 8 | 41 003 |
| 72 000 | 13 baktuns | 14 | 71 756 |
| 95 000 | Piktun | 12 | 94 620 |
| 123 000 | 13 baktuns | 24 | 123 010 |
| 145 000 | Baktun | 368 | 145 043 |

What generally show, that Ice Ages could be used as markers for time-counting by Mayans. Straight after Eliade: „In the homogeneous and infinite expanse, in which no point of reference is possible and hence no orientation is established, the hierophany [appearance of the Sacred] reveals an absolute fixed point, a center”.

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