

# Introduction - Evidence for a 62 +/- 3 Ma Cycle in Bio-Diversity on Earth, caused by big Impact Events

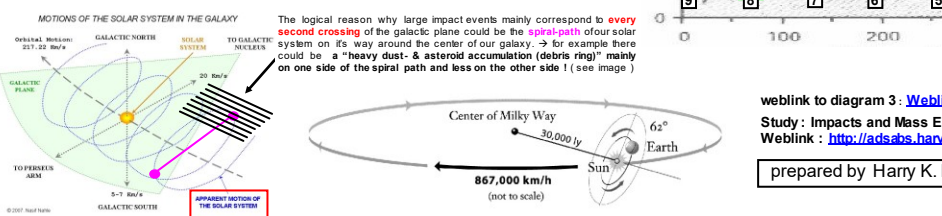
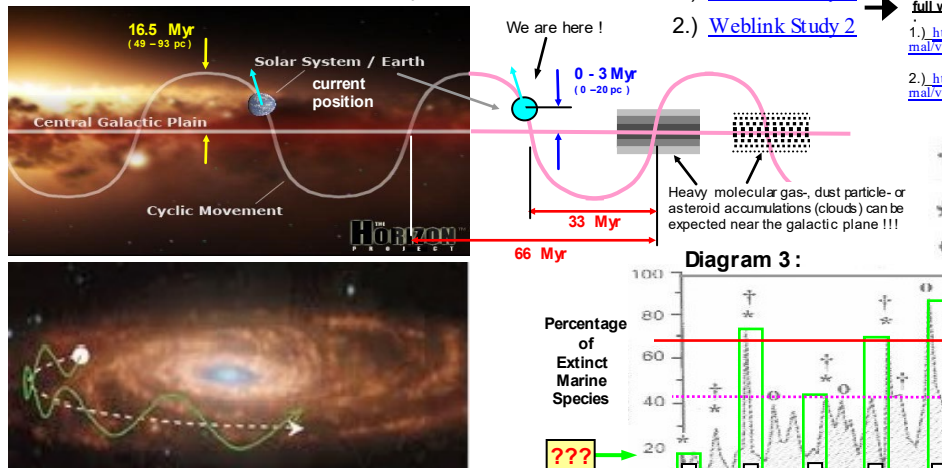
There is strong analytical evidence for a **62 +/- 3 Ma** cycle in Fossil Diversity ( or **Bio-Diversity** ). Sharp cuts in the bio-diversity on Earth clearly occur within **approx. 20 Ma (Myr) long extinction periods**. These sharp cuts all happen within the declining phases of the **62-Ma (Myr) cycle** ( → see sin-wave diagram 1c ).

Currently we live at the end of such an extinction period or declining phase of the 62-Ma cycle which is still going on for another 3 to 5 million years !! But it is obvious that there wasn't a similar sharp cut yet, in the current cycle, if compared with the past 8 cycles !

Note that in 6 of the past 8 cycles **at least 70%** of all marine species became extinct !!! ( diagram 3 ). And in all 8 cycles the minimum percentage of extinct species was 40 %. However the current cycle doesn't show any cut in **Bio-Diversity** worth mentioning !! Have we just been very lucky ?, or is the cause of the sharp cuts in bio-diversity just a bit late in the current cycle which is still going on ?? Note : In cycles 5 and 8 a sharp cut occurred right at the end of each cycle ! ( corresponds to eruptions & craters in Diagr. 2 )

There are indicators in diagram 2 & 3 that the sharp cuts in bio-diversity may be caused by periods of large impact events. Note in **Diagram 2** the 5 large eruption events ( which could have been caused by big impacts ), which occurred within or very close to cycles 1 & 5-8, and the two large impact events in cycle 5 & 8 ! → also see **Diagram 3** ! **It would be important to produce a more extensive and precise diagram to the age and size of large impact events & large eruption events with information to age tolerances !**

The most plausible cause for the 62 +/- 3 Ma period "Big impact cycles" is **the periodic crossing of the galactic plane by our Solar System**. The galactic plane may be full of debris (asteroids & comets) similar to the debris in Saturn's Ring-plane. The **62 +/- 3 Ma** Bio-Diversity cycle is in good agreement with the **66 +/- 6 Ma** period for the vertical oscillation of our Solar System about the plane of our galaxy ! Note that it seems that the last crossing of the galactic plane occurred **≤ 3 Ma ago** !, which is approx. 5 to 7 Ma after mid of the calculated extinction cycle !! → **see weblinks** : 1.) [Weblink Study 1](#)



## "Cycles in Fossil Diversity"

by Robert A. Rohde and Richard A. Muller

Web link to Study : <http://muller.tbi.gov/papers/Rohde-Muller-Nature.pdf>

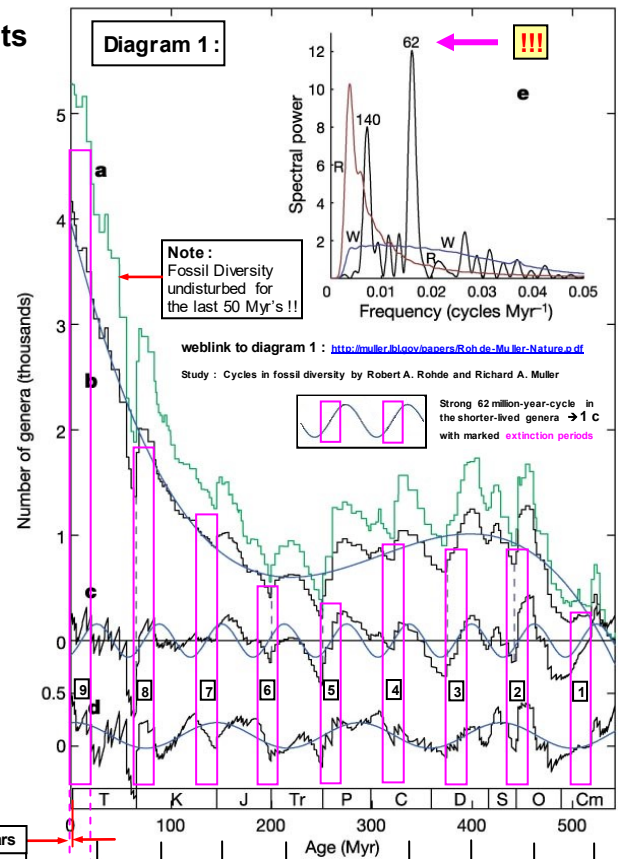
**Diagram 1e** : Shows the Fourier Spectrum of the short-term variations of the bio-diversity on Earth. The Fourier Spectrum is dominated by a **strong spectral peak with period 62 +/- 3 Myr**. The **sin wave** corresponding to this cycle is shown in **Fig. 1c** where it accounts for 35% of variance.

**Diagram 1e** also shows a second spectral peak with period 140 +/- 15 Myr.

**The 62-Myr cycle is very significant.**

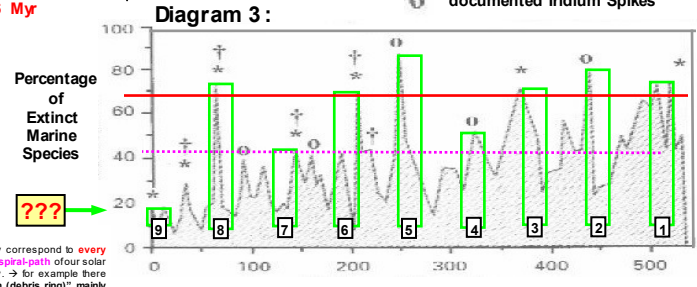
By contrast the 140 Myr cycle can plausibly result from random processes.

Although no explanation exists, the 62-Myr cycle is not a subtle signal. It is evident even in the raw data (Fig. 1a), dominant in the short-lived genera (Fig. 2) and strongly confirmed by statistical analysis. It implies that **an unknown periodic process has been having a significant impact on Earth's environment** throughout the Phanerozoic. The author considers the following physical processes : periodic comet showers triggered by a companion star or a planet X or by the oscillations of our solar system up- and down the galactic plane every 52-74 Myr or by periodic crossings of spiral arms, or periodic mantle plume cycles & volcanism cycles, or longterm solar cycles.



- full web-addresses
- <http://www.nature.com/nature/full/416/6903/403>
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- 3 - extinction period left ~ 3 - 5 million years
- 2 - extinction period approx. 20 million years
- 1 - fossil diversity cycle 62 +/- 3 million years



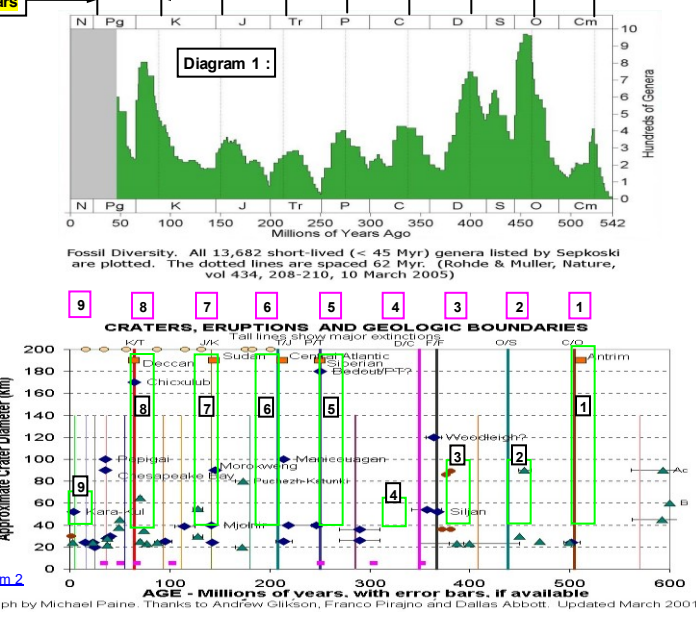
weblink to diagram 3 : [Weblink Diagram 3](#)  
 Study: Impacts and Mass Extinctions by Michael R Rampino :  
 Weblink : <http://adsabs.harvard.edu/full/1996ENR...26P...72..441R>

prepared by Harry K. Hahn , 29-9-2013

## Diagram 2 :

- CRATERS - CLOSE
- ERUPTIONS - CLOSE
- Crater - other
- Eruptions - other
- Devonian/Carboniferous
- Carboniferous/Permian
- Permian/Triassic
- Triassic/Jurassic
- Early/Middle Jurassic
- Jurassic/Cretaceous
- Albian/Albian
- Campanian/Turonian
- Cretaceous/Tertiary
- Paleocene/Eocene
- Eocene/Oligocene
- Oligocene/Miocene
- Early/Mid Miocene
- Miocene/Pliocene
- Proterozoic/Cambrian
- Pre D.
- Cambrian/Ordovician
- Ordovician/Silurian
- Silurian/Devonian
- Frasnian/Famennian
- IMPACTS - NO CRATER
- LUNAR SPHERULES

weblink to diagram 2 : [Weblink Diagram 2](#)



Graph by Michael Paine. Thanks to Andrew Glikson, Franco Pirajno and Dallas Abbott. Updated March 2001