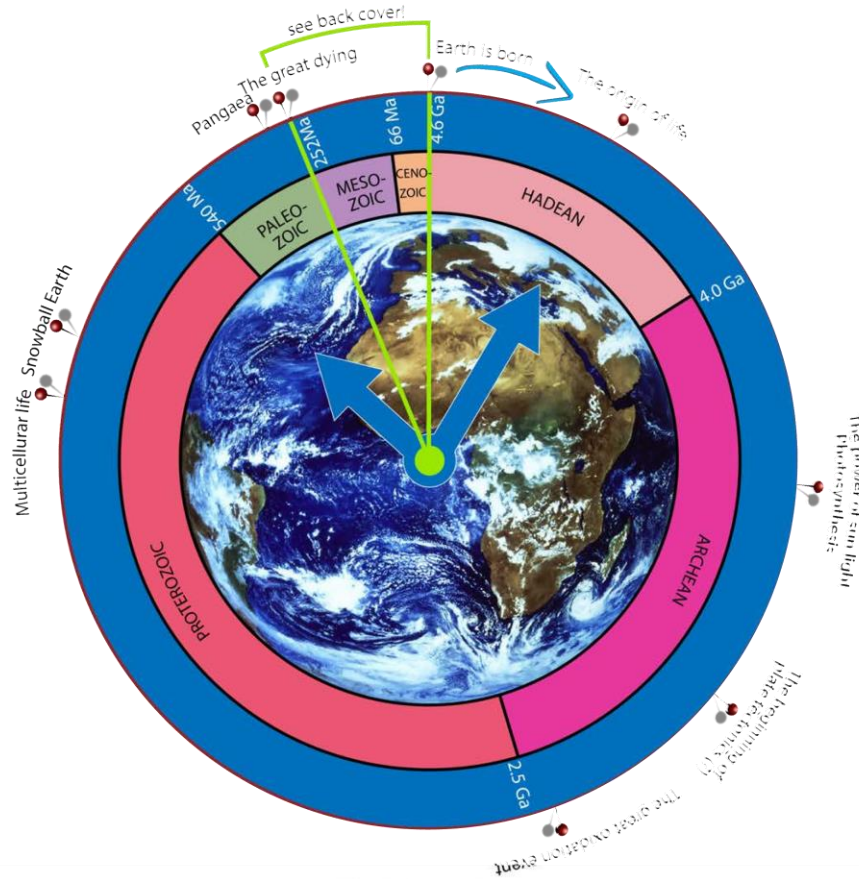




European Geosciences Union  
GIFT – Geosciences Information For Teachers



GIFT 2018

MAJOR EVENTS THAT SHAPED THE EARTH

Vienna, Austria, 9-11 April 2018

# Welcome to the 25th GIFT Workshop!

80 Teachers from 26 Countries

And for the first time Albania and The Republic of the Philippines!

**First Message:** don't stay only with teachers from your own country! MIX with teachers from other nations!(starting this afternoon! As I will tell you in a minute)

**Take home message:** stay in contact with GIFT teachers you have met, via email or social media!

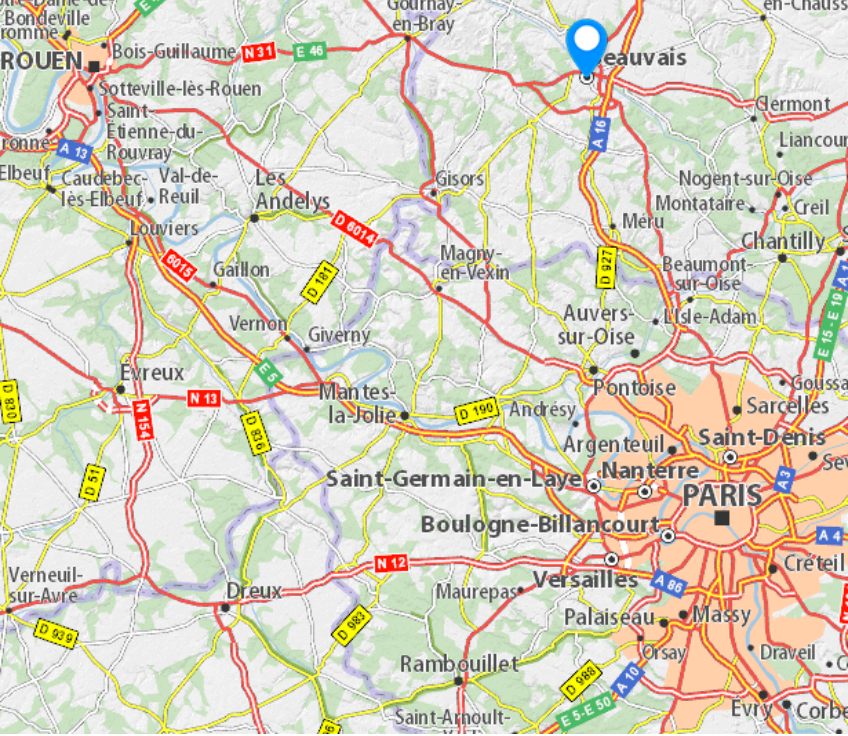
On page 2 of the brochure, you have a list of the 25 biggest turning points in the Earth's history.

We clearly cannot examine all of them in this workshop, so we have selected 8 major events that have shaped the Earth, they are presented here, in chronological order, by speakers who are among the greatest scientists in their fields. These scientists are very enthusiastic about explaining to you their understanding of the events that shaped the Earth.

We hope that the choice we have made will be useful to all of you, as teachers of Earth Sciences, Chemistry, Physics, Biology, geology or Geography in your classroom lessons.

# Major Events that shaped the Earth

1st: how (and when) did the Earth form?





Irish Archbishop James Ussher (1596-1650)      4004 B.C, at  
9:00 am on October 23,

Johannes Kepler (1571 – 1630)      3993 BC

Isaac Newton (1643 – 1727)      3998 BC



Auguste Lucien Vérité  
(1806 – 1887)

*Vérité = Truth in French!!*

Clock built in three  
years  
1865-1868

In a few minutes Marc Chaussidon will tell us that the Earth was created from cosmic dust about  $4.56 \cdot 10^9$  years ago, based on sophisticated isotope analyses: an enormous progress has been done in the last 500 years!

Rapporting this to 1 year, the length of 500 years would be **3.45 seconds!**

This shows very clearly the enormous difference between « human » time and « geologic » time



# Major Events that shaped the Earth

2nd: how (and when) did life appear?

ΓΙΑΘΙΚΑΠΟΛΙΤΙΚΑΤΕΧΝΙΚΑ

ΟΡΓΑΝΟΝΦΥΣΙΚΑΒΙΟΛΟΓΙΚΑΨΥΧΟΛΟ

ΟΡΓΑΝΟΝΦΥΣΙΚΑΒΙΟΛΟΓΙΚΑΨΥΧΟΛΟΓ



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

2016

HELLAS

1,00 €

ΙΑΘΙΚΑΠΟΛΙΤΙΚΑΤΕΧΝΙΚΑ

# ESPERIENZE

Intorno alla Generazione

## DEGL'INSETTI.

F A T T E

DA FRANCESCO REDI

Accademico della Crusca,

E DA LVI SCRITTE IN VNA LETTERA

ALL'ILLVSTRISSIMO SIGNOR

CARLO DATI.

*Della Spezieria*

*Terza Impressione.*

*di Camald.*

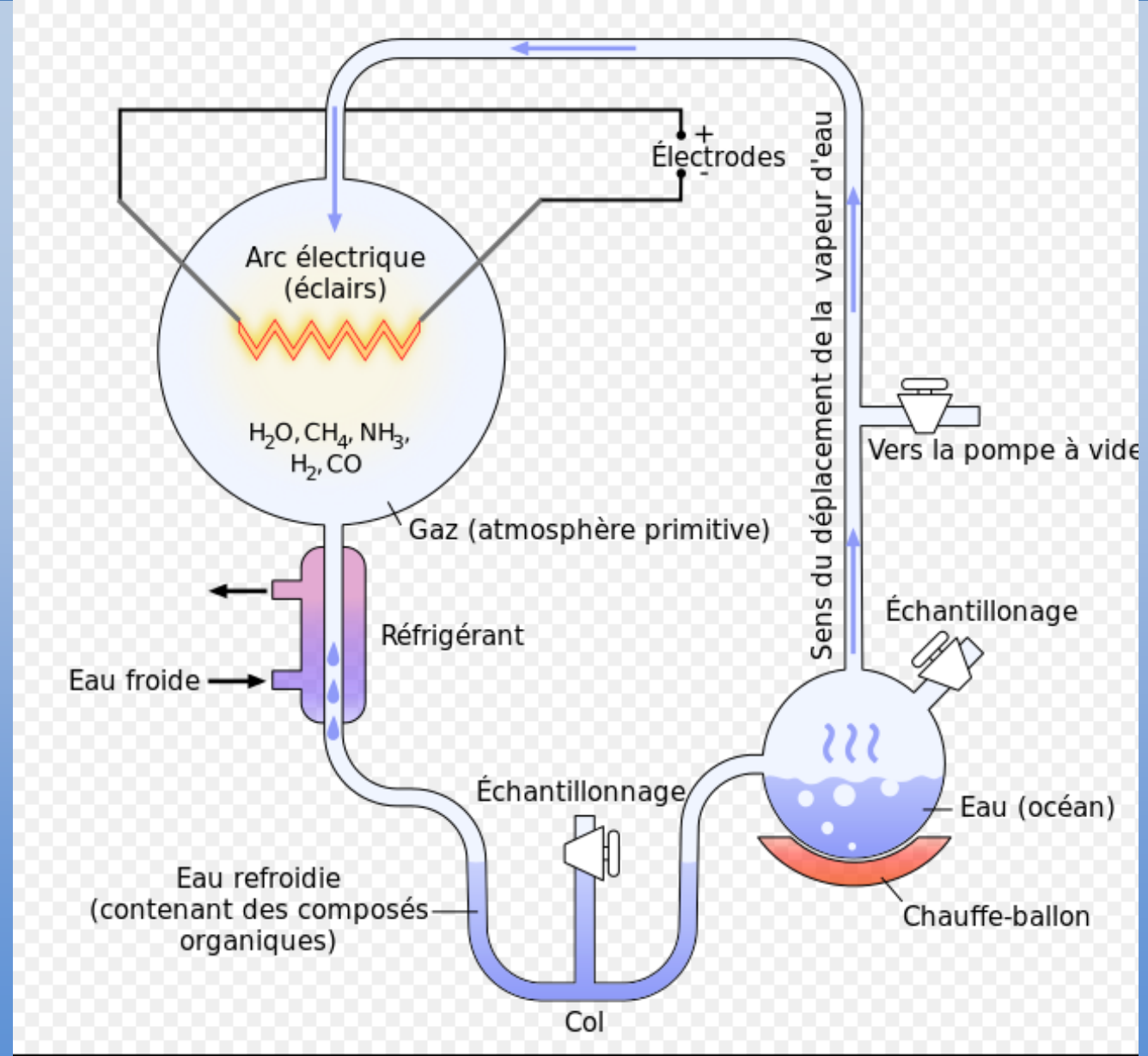


In Firenze per Francesco Onofri Stampator' Arciuescouale

Con licenza de' Superiori. 1674.



Miller-Urey experiment (1953) → first evidence that organic molecules needed for life could be formed from inorganic components.

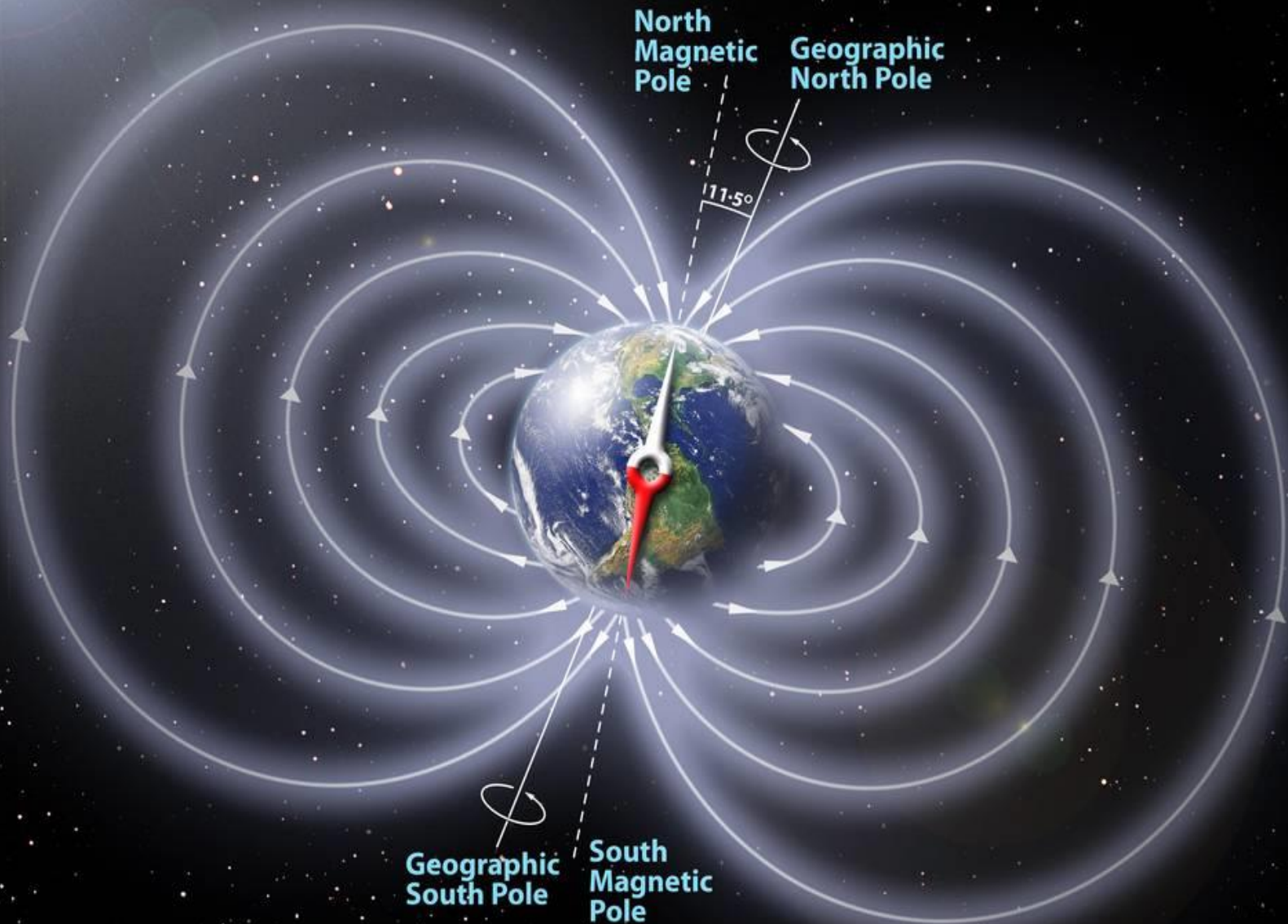


Steve Mojzsis will tell us about.....

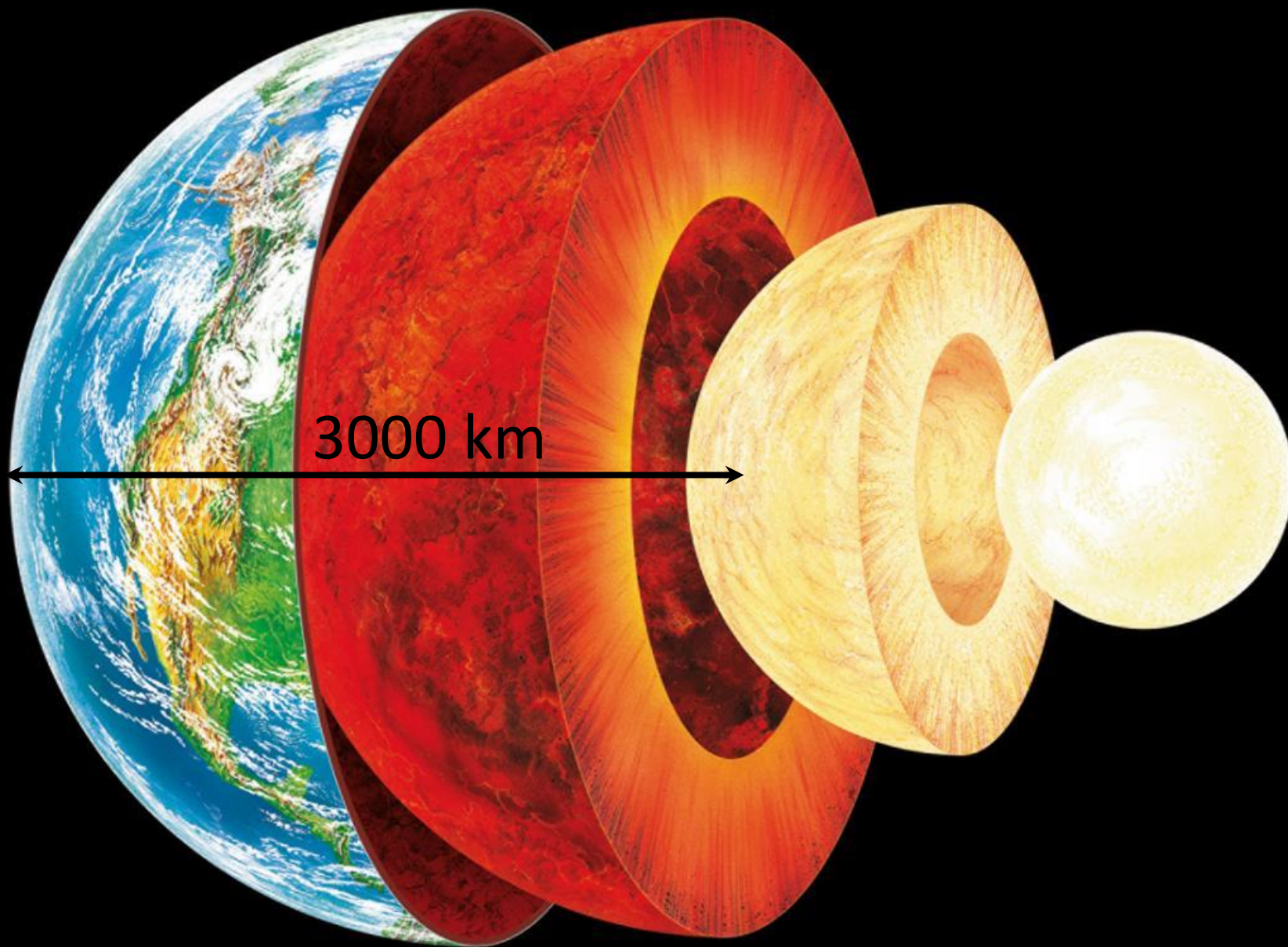
# Major Events that shaped the Earth

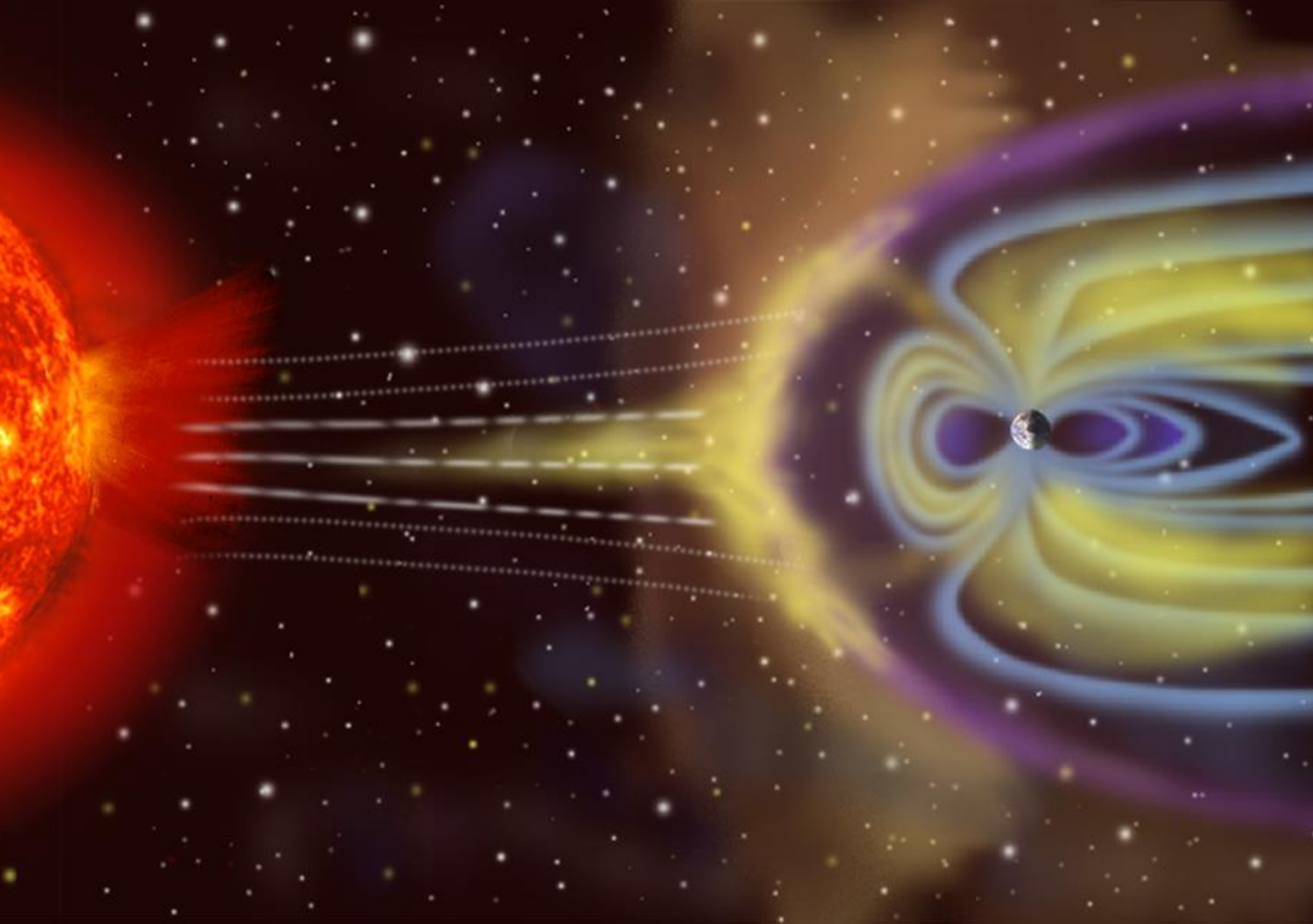
3rd: when did the geomagnetic field appear and did it have an influence on life on the Earth?

# The Earth's Magnetic Field



Which are the main characteristics of the present day geomagnetic field?





John Tarduno will share with us his latest results on the early geomagnetic field!



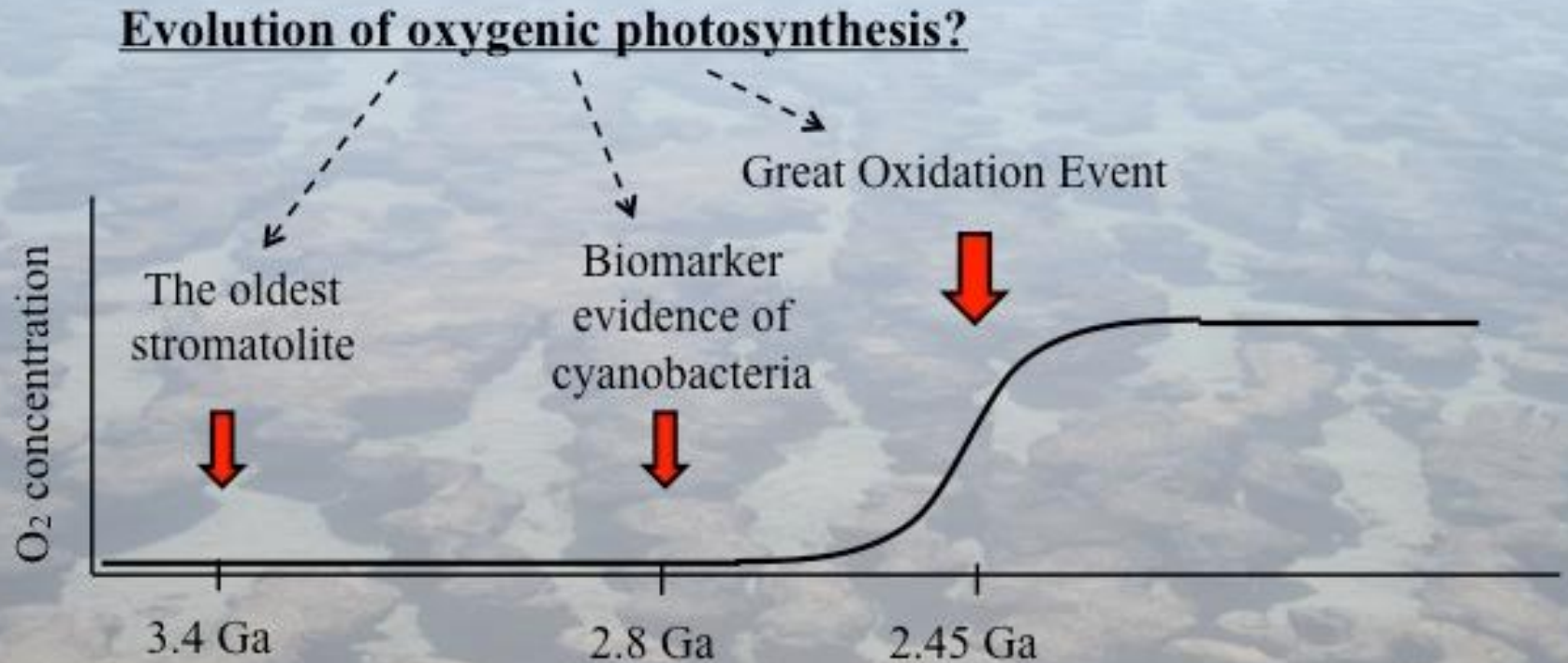
# Major Events that shaped the Earth

4th: the evolution towards an oxidizing atmosphere: the Great Oxidation Event (GOE)

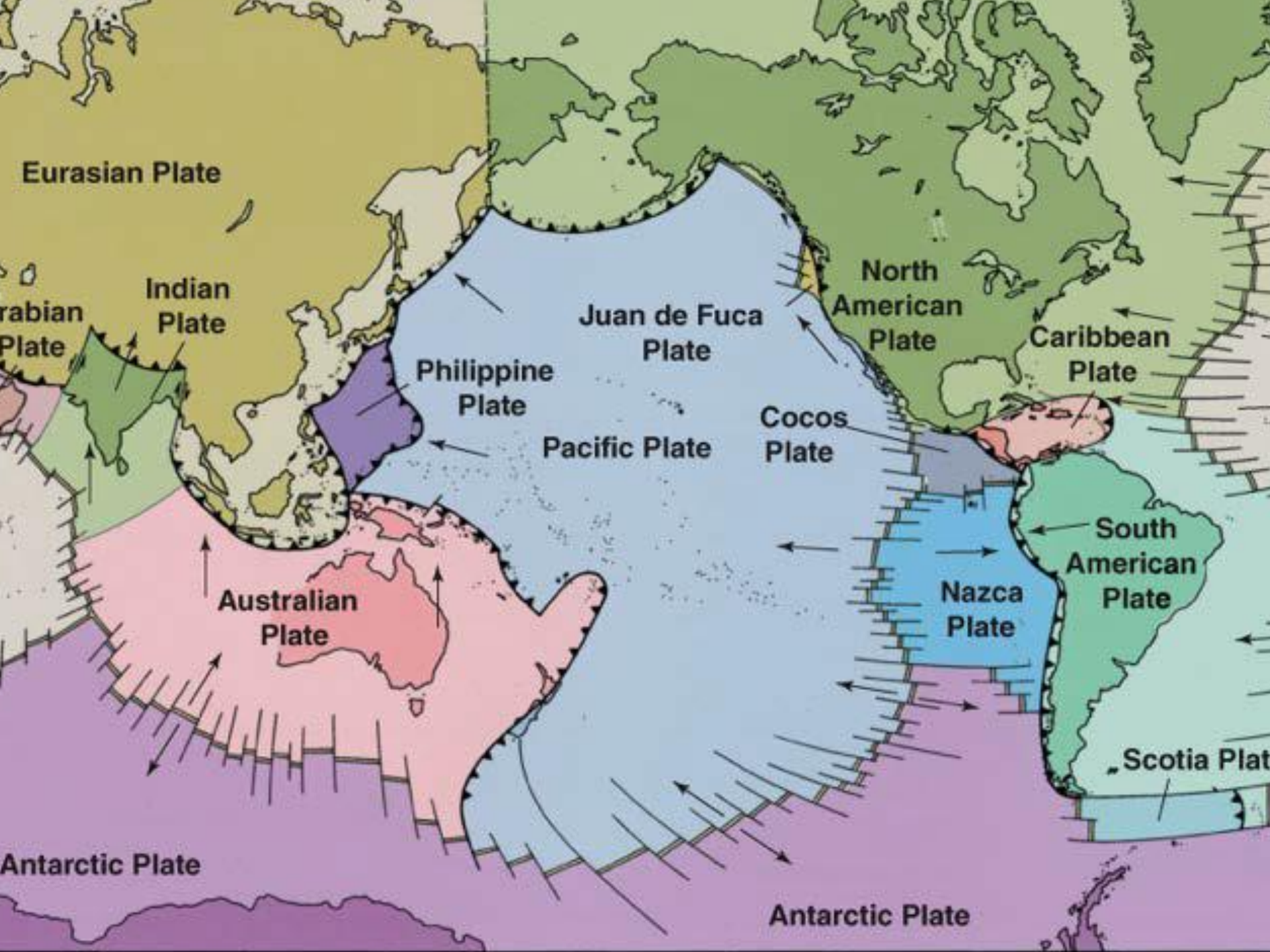


Vivid red rocks and soils of the Australian Pilbara region (2.5 Billion years), are emblematic of the Great Oxidation Event (GOE). The red color indicates iron being oxidized. (Photo: A. Anbar)

The oxygenation of the Earth is considered to have been started by the oxygenic photosynthesis of cyanobacteria.



Ariel Anbar will tell us about this major change in atmospheric composition



# Major Events that shaped the Earth

5th: when did plate tectonics start?

where will we be in 225 million years?

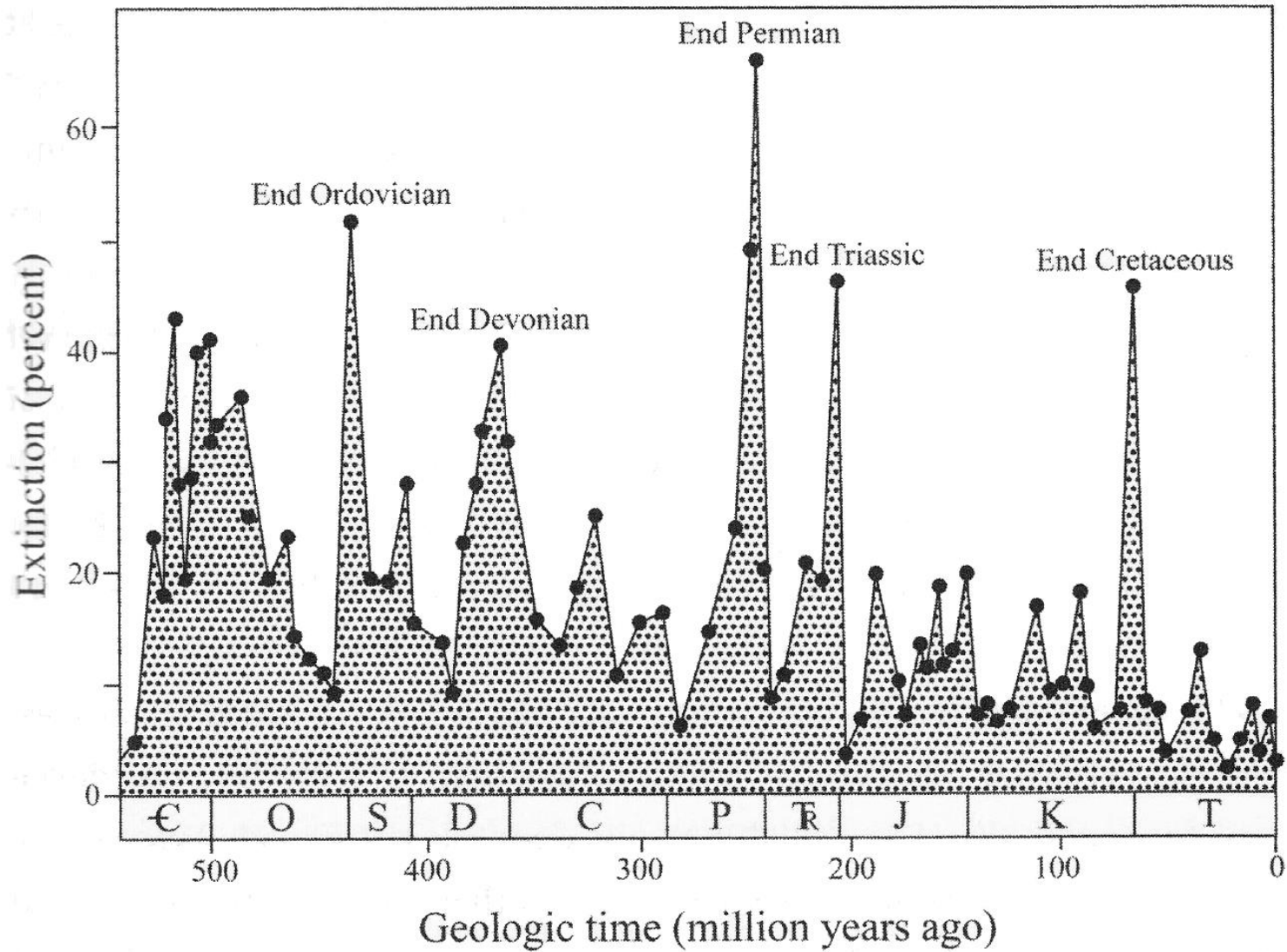
# Major Events that shaped the Earth

5th: when did plate tectonics start?  
where will we be in 225 million years?

Massimo Mattei & Isabelle Ansorge

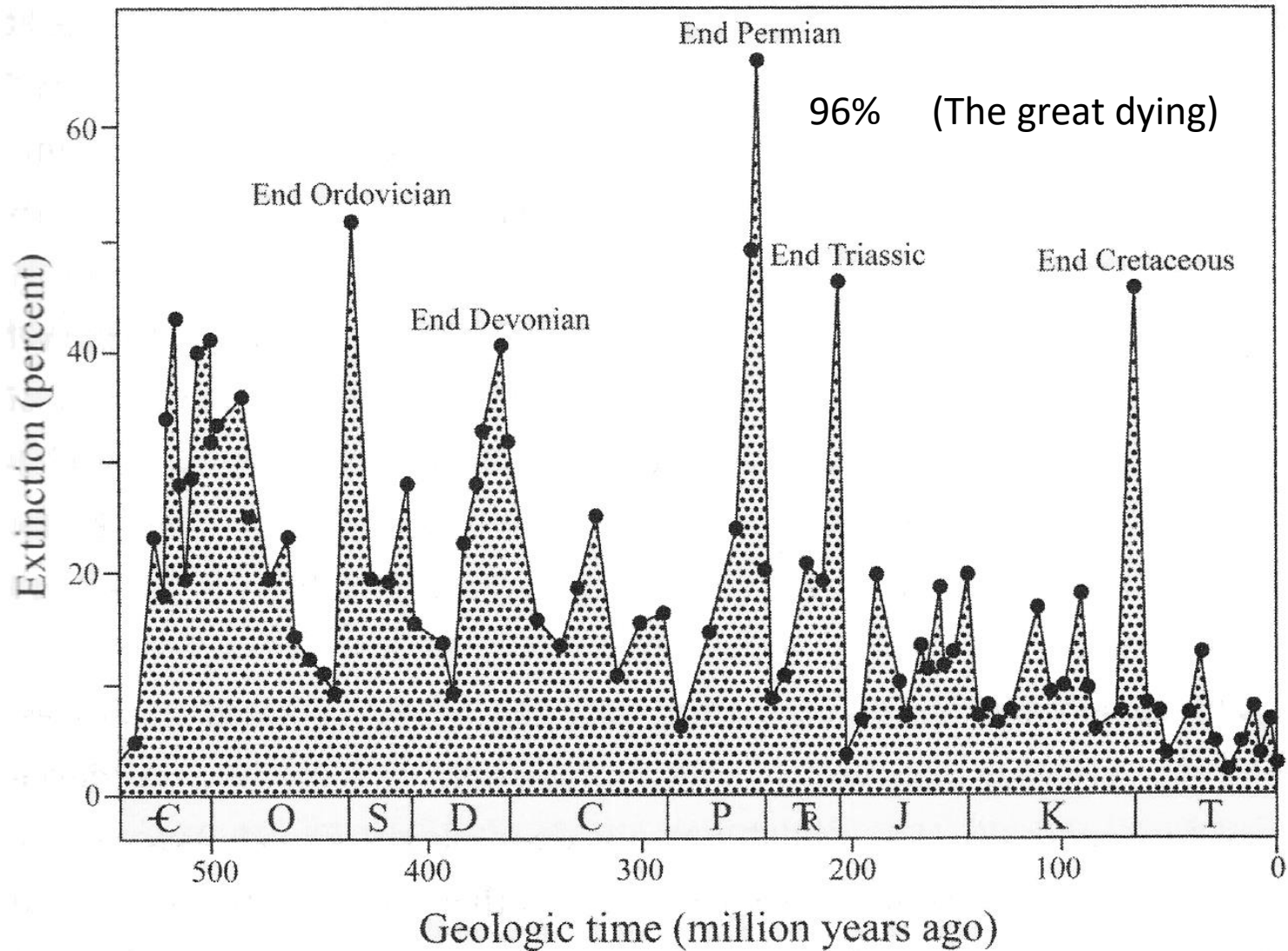
# Major Events that shaped the Earth

6th: mass extinctions



*Sepkoski, 1982*





David Raup's rarefaction method

*Sepkoski, 1982*

# Periodicity of Oxygen escape from the Earth during geomagnetic reversals: Implications to mass extinction

Yong Wei<sup>a,b,c,\*</sup>, Zuyin Pu<sup>b</sup>, Qiugang Zong<sup>b</sup>, Weixing Wan<sup>a</sup>, Zhipeng Ren<sup>a</sup>, Markus Fraenz<sup>c</sup>, Eduard Dubinin<sup>c</sup>, Feng Tian<sup>d,e</sup>, Quanqi Shi<sup>f</sup>, Suiyan Fu<sup>b</sup>, Minghua Hong<sup>a</sup>

<sup>a</sup> Key Laboratory of Ionospheric Environment, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beituchengxilu #19, 100029, Beijing, China  
<sup>b</sup> School of Earth and Space Sciences, Peking University, 100871, Beijing, China  
<sup>c</sup> Max-Planck Institute for Solar System Research, 37191, Katlenburg-Lindau, Germany  
<sup>d</sup> National Astronomical Observatories, CAS, 100012, Beijing, China  
<sup>e</sup> Center for Earth System Sciences, Tsinghua University, 100084, Beijing, China  
<sup>f</sup> Shandong Provincial Key Laboratory of Optical Astronomy and Solar-Terrestrial Environment School of Space Science and Physics

# The 13 million year Cenozoic pulse of the Earth

Jiasheng Chen<sup>a,b,c</sup>, Vadim A. Kravchinsky<sup>b,\*</sup>, Xiuming Liu<sup>a,c</sup>

<sup>a</sup> School of Geographical Sciences, Fujian Normal University, Fuzhou 350007, China  
<sup>b</sup> Department of Physics, University of Alberta, Edmonton, Alberta T6G 2E1, Canada  
<sup>c</sup> Key Laboratory of Western China's Environmental Systems, Research School of Arid Environment & Climate Change, Lanzhou University, Lanzhou 730000, China

Monthly Notices  
of the  
ROYAL ASTRONOMICAL SOCIETY  
MNRAS 454, 3480–3484 (2015)

# Periodic impact cratering and extinction events over the last 260 million years

Michael R. Rampino<sup>1,2,3\*</sup> and Ken Caldeira<sup>4</sup>

<sup>1</sup> Department of Biology, New York University, New York, NY 10003, USA  
<sup>2</sup> Department of Environmental Studies, New York University, New York, NY 10003, USA  
<sup>3</sup> NASA, Goddard Institute for Space Studies, 2880 Broadway, New York, NY 10025, USA  
<sup>4</sup> Carnegie Institution for Science, Department of Global Ecology, 260 Panama Street, Stanford, CA 94305, USA

# 1 ge... reversals since 100

Alain Mazaud\*, Carlo Laj†, Laurent de Sèze & Kenneth L. Verosub†§

\* Laboratoire de Stratigraphie (LA 319), Université de Paris, Tour 15-16, 4 Place Jussieu, 75230 Paris, Cedex 5, France  
† Centre des Faibles Radioactivités, Laboratoire mixte CNR 91190 Gif-sur-Yvette, France  
‡ Service de Physique des Solides et Résonance Magnétique, CEN-Saclay, 91191 Gif-sur-Yvette Cedex, France

It is estimated that 96% of the species died out at the end of the Permian, and this is the nearest that that life has ever come to total annihilation.

Moreover it is estimated that more than 99 percent of all the species that have ever lived on Earth are gone forever.

What's more, species don't always die out one at a time as isolated cases: they often disappear during mass-extinctions events in which large numbers of existing species go extinct suddenly.

It is difficult to see how Darwin's ideas of extinctions caused by competitions could explain mass extinctions

# Major Events that shaped the Earth

6th: mass extinctions

David Bond and Christian Koeberl

# Major Events that shaped the Earth

## 7th: The anthropocene:

Popularized by Paul J. Crutzen (Nobel Prize Laureate & GIFT speaker!) who regards the influence of human behavior on Earth's atmosphere in recent centuries as so significant as to constitute a new geological epoch.



Reinhold Leinfelder will tell us how the future of the Earth is now in our hands

# Major Events that shaped the Earth

8th: how observations from space changed our knowledge of the planet

## Sentinel-6/Jason CS to monitor sea-level





# Major Events that shaped the Earth

8th: how observations from space changed our knowledge of the planet

Francesco Sarti and Chris Stewart

In addition:

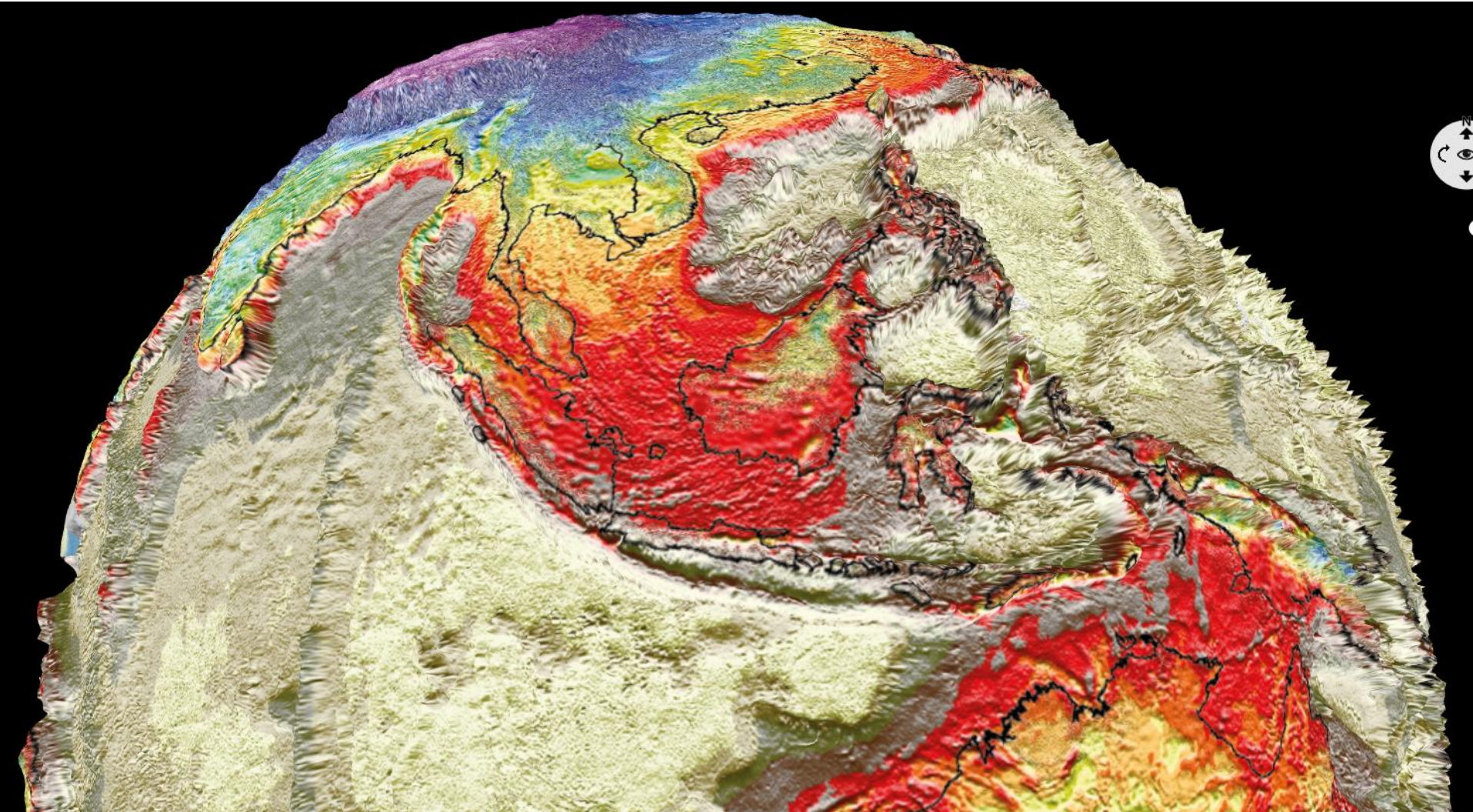
Barbara Ferreira will tell you this morning of the program « Planet Press » a new bitesize press releases for kids, parents and educators to get to grips with the latest geoscientificresearch highlights

Chris King, Diane Carrer and Jérémy Camponovo willhave some classroom experiments for you this afternoon

Francine Bondex and Eric Bataillou will take us on a virtual tour of the Antarctic islands

Maja Sojtaric, Henry Patton and Alun Hubbard, will explore the other pole with us

Manuel Pubellier and Serge Riazanoff will introduce you to VtWeB, a new site for teaching geology



Visit the stand for the Commission of the Geological Map of the world!

Finally, Glaiza Reobilo, Hélder Pereira and Carlo Laj will invite you for an oceanographic cruise in the Philippine waters in the South China Sea on board the R/V Marion Dufresne!



An almost daily contact will be made via email or visio conferences!  
And in addition a video, available to all the teachers who ask for it  
will be available in a few months after the cruise

As you can judge yourself, many persons, not only from the Committee on Education of EGU, have given their time and energy to the preparation of this Workshop!

We all hope that you'll enjoy it and most of all that it will be useful in your teaching.

**But we also expect something from you!**

We would like to continue to offer teachers the opportunity to attend GIFT and similar workshops, but **this depends upon us being able to show our sponsors (and first of all EGU!) that teachers have used the GIFT information and science didactics in their daily teaching**, or as inspiration for new ways to teach science in their schools.

## Therefore we ask you:

1. To fill in the evaluation forms as soon as possible and email them back to us

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## Therefore we ask you:

1. To fill in the evaluation forms as soon as possible and email them back to us
2. Make a presentation of your experience at GIFT to a group of your teaching colleagues sometime after you return from EGU
3. Send us reports and photographs about how you have used the GIFT information in your classrooms.
4. Diffuse the information about GIFT workshops as much as possible

**Reports in English, please!**

And finally an answer to the frequently asked question:

**Can I come again to the GIFT workshop?**

Every year, we welcome 10-15 % of teachers who have already attended GIFT once in previous years.

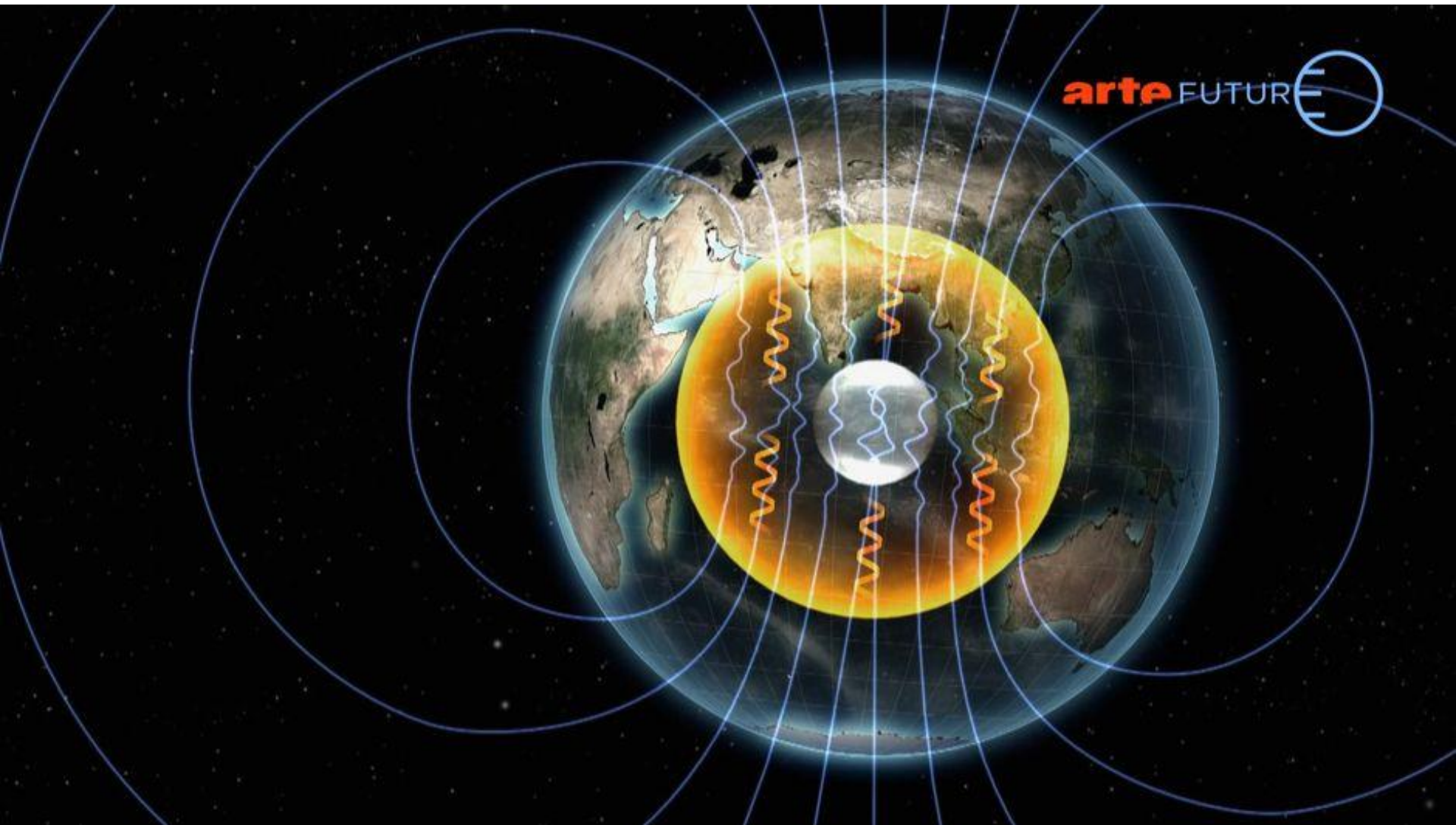
**These teachers are selected among those who have given us the reports and have contributed to spreading information about GIFT workshops!**

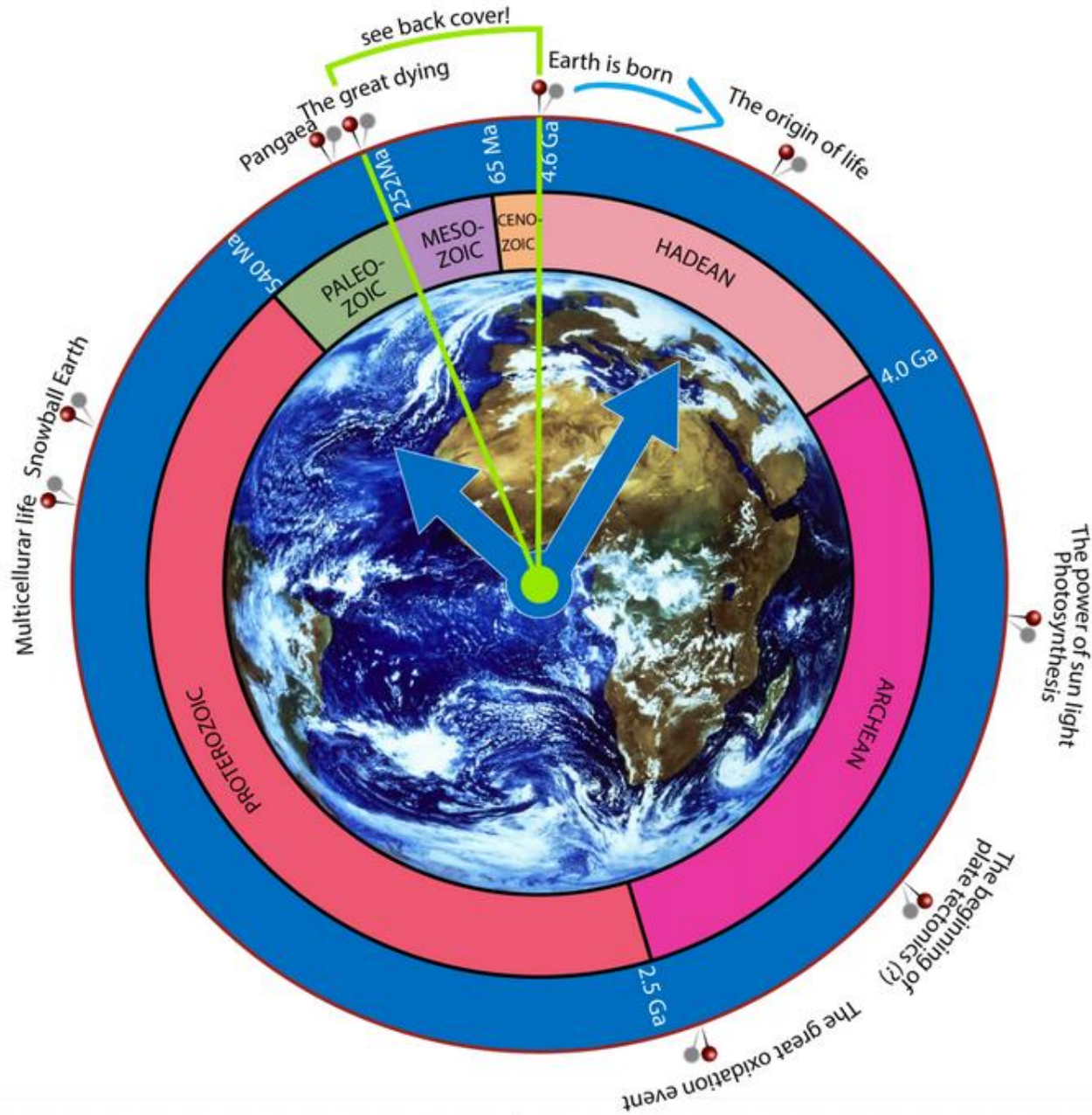
In addition, please bear in mind that we usually do not accept more than one teacher from one particular school in the same year.

Enjoy the 2018 - GIFT Workshop!

The Committee on Education of EGU







**GIFT 2018**

**MAJOR EVENTS THAT SHAPED THE EARTH**





Stromatolites growing in Hamelin Pool Marine Nature Reserve, Shark Bay in Western Australia.  
May contain Cyanobacteria .

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