

*Review of*

P.G. Eriksson, W. Altermann, D.R. Nelson, W.U. Mueller and O. Catuneanu

**The Precambrian Earth: Tempos and Events**

by GIANCARLO SCALERA

If you like to read about interdisciplinary topics this book should not be missing in your library. The Precambrian Earth is the equivalent to the first three minutes in cosmology, because the aim is to read far into the depths of time using a number of different geological, geophysical and geochemistry disciplines, and finally to try to compose a coherent four-dimensional mosaic of the evolution of the early planet.

Nearly seventy authors – well-known experts in a number of disciplines from space science to Earth's interior, from cosmogony to Earth's rotation – have contributed to this magnificent thousand page book.

The early Earth is the topic of the first introductory chapter, and the spirit of this well-deserving editorial initiative is expressed in a declared intention to follow both the principle «the present is the key to the past» and its opposite «the past is the key to the present». Obviously nothing remains identical during geologic time and each section and chapter tries to highlight this and to explain the evolution of conditions and rates of processes. The editors plan is to take note of the well known tendency to controversy within the geoscientists community, and encourage a diversity of opinions. Readers are then intrigued by this approach and they will meet the difficulties of the different topics with a favourable disposition.

Most of these aims are fulfilled.

The account is given of the formation, accretion and break-up of continents throughout more than 4 Gyr of geologic time. The succession of supercontinents – Kenorland (Neoproterozoic), a southern one at 2.2-1.8 Gyr and a northern one (Laurentia) at 2.0-1.7 Gyr, Columbia (Mesoproterozoic), Rodinia (Neoproterozoic), Gondwana and Laurentia (Phanerozoic) – has provided the «tempos» on which the processes like volcanoes growth, alluvial fans deposition, superplumes activity, atmosphere evolution, orogenic periods and variations of Earth's rotation have manifested.

Geochemistry, isotope geochronology, geophysics and astronomy then worked with geology to compose a diachronic view of our planet. We certainly can learn an impressive number of new results, data, ways of interpretation and indeed the teaching purpose of this book with respect to a target of specialists willing to overcome their specialism is reached. There are, however, a few limitations: while sectional experts can enjoy this interdisciplinary course of de-specialization, people with a more general cultural background – old geologists or geophysicists acquainted with the history of the Earth sciences – could find the number of scientific parties represented in the collection of papers not fully complete. The most obvious gap is that of expanding Earth interpretation. Indeed at least three topics linked to a possible planetary expansion are incompletely tackled.

The orogens can also be interpreted as non-collisional structures. Gravitative collapse of uprising portion of crust is an alternative interpretation which has always clashed with the collisional view. Today this alternative interpretation stands hand in hand the opposite view, which never successfully demonstrated its invalidity. Only a few indirect allusions to this can be found in the text.

Williams deals with the variation of the Earth spin from Precambrian to Recent. He is the only author to explicitly quote the expanding Earth, and a section of his chapter is a test for the expansion of our planet. But he concludes by excluding this theory (indeed not a truly paradigmatic theory but fortunately an open forum) on the basis of an old argument of Runcorn, namely the increasing inertial moment of an expanding globe. This is a superficial geophysical argument because it does not take into account the possible decreasing inertial moment contribution due to the ongoing Earth inner differentiation – a process linked to the accretion of the iron solid core with release of heat needed to maintain the geodynamo in activity.

A long section of the book is devoted to paleogeography with reconstructions of the position of the continents from Rodinia time (800 Myr) to Laurentia and Gondwana accretion (500 Myr). The authors recognize an anomalous high velocity of drifting in the motion of the continents in Proterozoic, and discuss different solutions to this anomaly. However, a non-naïve reader will immediately grasp that as the rapid motion of India (or of Cimmerian terranes) does not exist on an Earth having a smaller radius, this apparent high velocity of the fragment will become higher and higher going back in geologic time. An increasing anomaly that constitutes a sort of confirmation of the reality of a smaller Earth's size.

I conclude by praising the effort to provide a panoramic view of our current knowledge of deep geologic time, and with thanks to Elsevier's editorial staff for the high quality of the book. As a matter of fact I have learned a lot of and some of it I have been able to reinterpret into a non-conventional view. I recommend this book to everyone interested in broad topics and involved in teaching in high school and university courses. The book should be considered indispensable by researchers involved in topics or frameworks at the frontiers of geosciences, and especially those treading on path at odds with plate tectonics. I invite these people to increase the fertilizing effect of «The Precambrian Earth» by combining the reading of this book with that of «Mountains» by Ollier and Pain, and «Why expanding Earth» edited by Scalera and Jacob.

## REFERENCES

- ERIKSSON, P.G., W. ALTERMANN, D.R. NELSON, W.U. MUELLER and O. CATUNEANU (Editors) (2004): The Precambrian Earth: tempos and events, *Developments in Precambrian Geology Series*, **12** (Elsevier, Amsterdam), pp. 941.