# The Trace-Fossil Record of Major Evolutionary Events. Volume 1: Precambrian and Paleozoic, & Volume 2: Mesozoic and Cenozoic

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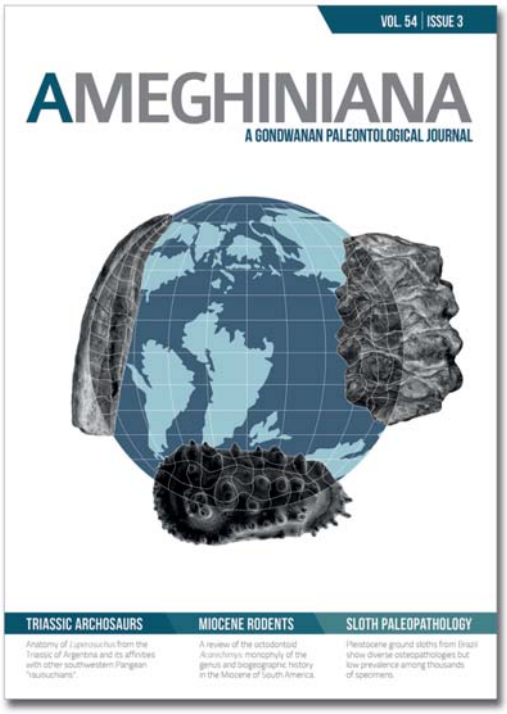


# THE TRACE-FOSSIL RECORD OF MAJOR EVOLUTIONARY EVENTS. VOLUME 1: PRECAMBRIAN AND PALEOZOIC, & VOLUME 2: MESOZOIC AND CENOZOIC

*M. Gabriela Mángano and Luis A. Buatois (Eds.)*. 2016. 358 pp. (Vol. 1) and 485 pp. (Vol. 2.). Topics in Geobiology, 39 and 40. Springer, Dordrecht Heidelberg, Germany. ISBN-978-94-017-9599-9 (vol. 1) and ISBN 978-94-017-9596-8 (vol. 2).

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**THE TRACE-FOSSIL RECORD OF MAJOR EVOLUTIONARY EVENTS. VOLUME 1: PRECAMBRIAN AND PALEOZOIC, & VOLUME 2: MESOZOIC AND CENOZOIC.** *M. Gabriela Mángano and Luis A. Buatois (Eds.).* 2016. 358 pp. (Vol. 1) and 485 pp. (Vol. 2.). Topics in Geobiology, 39 and 40. Springer, Dordrecht Heidelberg, Germany. ISBN-978-94-017-9599-9 (vol. 1) and ISBN 978-94-017-9596-8 (vol. 2).

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*"The Trace-fossil Record of Major Evolutionary Events"* is a new book about ichnology edited by M.G. Mángano and L.A. Buatois (both from the Department of Geological Sciences, University of Saskatchewan, Canada) which precedes other already recognized "ichnological books": Buatois *et al.* (2002) (in Spanish) and Buatois and Mángano (2011). These previous books were focused on the interactions between the activities of organisms and substrates (bioturbation and bioerosion) in a spatial, environmental and temporal context, whereas in the new book the authors emphasize the relation of ichnology with the different evolutionary events that have occurred throughout the history of life, *i.e.* its role in evolutionary paleoecology.

The thematic distribution of the book is organized in two volumes: Volume 1, entitled *'Precambrian and Paleozoic'*, is divided in seven chapters (1 to 7), contains 358 pp., 109 figures and 5 tables; Volume 2, named *'Mesozoic and Cenozoic'*, has 9 chapters (8 to 16), with 485 pp., 93 figures, and 7 tables. A total of thirty-three authors, including the two editors, have participated in the sixteen chapters of these two volumes.

In the first volume, Minter *et al.* (Chapter 1) revise the conceptual and methodological framework currently used in ichnology (*e.g.*, characteristics of trace fossils, ethologic categories, ichnofacies model and ichnofabric approach), which is synthesized in excellent tables and figures for a better understanding. Chapter 2, by Buatois and Mángano, goes into the controversial ichnofauna of the Ediacaran period, providing information on ecosystems during the development of life before the Phanerozoic Era. In Chapter 3, the same authors discuss the importance of the ichnological record during the Cambrian explosion from a chronological and paleoenvironmental viewpoint. Chapter 4, by Mángano *et al.,* reviews the ichnological aspects (ichnodiversity and ichnodisparity) during the most significant evolutionary radiation in the Earth's history: the 'Great Ordovician Biodiversification Event'. The authors present the different patterns of environmental colonization, as well as changes in burrowing and boring behaviors on different sedimentary paleoenvironments. Chapter 5, by Minter *et al.* and entitled "Prelude to Continental Invasion", examines the organism-sediment interaction and how quickly new ecospaces were occupied during the Ediacaran, Cambrian, and Ordovician. Once the land was colonized, in Chapter 6, Minter *et al.* continue with the analysis of the terrestrial trace-fossil record from Silurian to Permian. Trace fossils exhibit the gradual establishment of continental ecosystems (*e.g.*, river channels, overbanks, lakes and deserts) with the subsequent exploitation of this new infaunal ecospace. Along the final chapter of this volume (Chapter 7, by Hofmann) is reviewed the end-Permian mass extinction and is evaluated the large-scale consequences of such collapse.

The second volume (entitled *"Mesozoic and Cenozoic"*) begins with Chapter 8 by Barras and Twitchett. These authors examine the marine and terrestrial ichnological record across the Triassic-Jurassic boundary. Along Chapter 9, Buatois *et al.* carry out an exhaustive evaluation of the bioturbation and bioerosion activity during the event known as Mesozoic Marine Revolution. The authors review and discuss the trace fossils (*i.e.*, about their behavioral, infaunal, environmental and/or paleogeographic changes) present in Mesozoic and Cenozoic marine environments. Bernadi *et al.* (Chapter 10) review the Mesozoic record of vertebrate ichnology in order to compare it with the radiation of vertebrates during this era. Particularly, they review the importance of Mesozoic reptilian tracks from the standpoint of its paleogeography, paleoenvironment, and paleobiology. Chapter 11, by *Buatois et al.,* looks into the body- and trace-fossil record of Mesozoic lacustrine environments and contributes to a better understanding of this major evolutionary

event, the so-called 'Mesozoic lacustrine revolution'. In Chapter 12, Labandeira *et al.* review both the continental record of interactions between plants and arthropods, as well as the marine invertebrate trace fossils during the end-Cretaceous extinction. Chapter 13, by Genise *et al.*, provides an extensive characterization of revolutions on paleosol ichnofaunas and an extensive review of the ichnofacies model in terrestrial settings. Kaprovickas and Vizcaíno (Chapter 14) analyze the Mesozoic–Cenozoic record of mammal footprints with their respective evolution, emphasizing on the radiation of mammals that occurred in South America during the Cenozoic. Chapter 15, by Lockley *et al.*, shows the ichnological record of hominids. The authors' review goes from the tracks found in Laetoli (Africa, *ca.* 3.6 Ma) to those left on the Moon or even Mars by robotic vehicles. In the final chapter (16) of the second volume, Buatois and Mángano discuss the organism-substrate interactions throughout geologic time and evolutionary radiations. They try to identify recurrent trends and patterns in evolutionary paleoecology.

In summary, this excellent new contribution of Mángano and Buatois is highly recommendable because it emphasizes the importance of fossil traces throughout the different geological eras and complements the understanding of life's evolution on Earth.

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