FOREWORD

There are few countries in the world that can compete with the superlative geological resources of South Africa. Whilst it is widely acknowledged that South Africa contains several of the world’s greatest ore deposits, which have underpinned the national economy for more than a century, the tourism benefits provided by the geology are less well-known. In some of the country’s premier tourist attractions — such as the uKhahlamba-Drakensberg Mountains, Table Mountain and the Cape Peninsula, the Cape Garden Route, and the Mpumalanga Escarpment and Blyde River Canyon, which are the product of the interaction of agents of erosion with the underlying geology — the focus has previously been restricted mainly to the landscape and scenery, with little mention of the even older history recorded in the rocks. Yet, with rocks whose ages range from a few million years to more than 3 500 million years, South Africa contains arguably the greatest record of the geological evolution of our planet of any country on Earth. Making up parts of this record are rock formations that can lay strong claims to being world-class and ‘household names’ in the international geosciences community, such as the ancient Barberton Greenstone Belt, the gold-bearing Witwatersrand basin, the Transvaal Supergroup with its record of primitive early life and huge iron and manganese deposits, the giant Bushveld Igneous Complex and its ore deposits, the Karoo Basin with its unparalleled fossil record of the ancestors of dinosaurs and mammals, diamondiferous kimberlite pipes and the world’s richest hominin fossil sites around Sterkfontein. It is little wonder, then, that since the early 1990s South Africa has seen a dramatic rise in specialist geotourism, with overseas geoscience students and professionals visiting the country with the primary purpose of seeing these geological wonders for themselves. The raising of awareness of the tourism potential of this geological heritage amongst the broader public both locally and internationally has been a more recent phenomenon, but is proceeding apace on several fronts, with the creation of guidebooks for non-specialists describing the geology of individual cities, provinces, national parks and major national routes, the opening of geological and mining heritage exhibitions in museums, the training of geotourism guides and last, but not least, the declaration of several World Heritage Sites in South Africa which involve a significant, or even dominant, geological component. A seminal moment was the release in 2005 of the bestselling *The Story of Earth and Life – A southern African perspective on a 4.6-billion-year journey*, by Terence McCarthy and Bruce Rubidge that has, for the first time, presented the geological heritage of South Africa in a manner accessible to non-specialists.

In many ways, the story of the development of the Vredefort Dome and this book parallels the broader South African context. The Vredefort Dome, located in the heart of the Witwatersrand basin and close to Johannesburg, was a popular geotourism site for visiting geoscientists even whilst its origin was disputed (up until the mid-1990s). It was a popular recreational tourism venue even before this, with some of the most spectacular scenery in central South Africa, convenient access and the presence of the Vaal River the main attractions. A turning point arrived in July 1999 when the Department of Geology at the University of the Witwatersrand hosted the 62nd Annual Meeting of the Meteoritical Society. This event marked only the second time that this prestigious international conference had been held outside of Europe and North America and it provided an unprecedented opportunity for local scientists to showcase the breathtaking geological heritage of southern Africa via a series of pre- and post-conference
excursions. Amongst these, by far the most popular was to the Vredefort Dome. Given the fact that most of the conference delegates had never previously visited South Africa, an effort was made to include archaeological, historical, cultural and social commentary interspersed with the fascinating geological outcrops. Feedback from the excursion participants was unanimously enthusiastic and a joint request was made that the excursion guidebook should be published to reach a wider audience. This was realised in 2001, with the publication of Memoir 92 by the Council for Geoscience. By 2003, as the momentum built towards the listing of part of the Vredefort Dome as a World Heritage Site, public interest in the geological events that formed the Dome blossomed, and the Council began to receive numerous calls for copies of the Memoir from people wanting to visit the Dome as tourists. This was not an ideal situation, as the Memoir had been designed for a specialist geological readership. A decision was then taken to write a book that would be directed at a more general audience.

The first edition of Meteorite Impact! was published in July 2005 and coincided with the announcement in Durban by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) that the Vredefort Dome was to be listed as South Africa’s seventh World Heritage Site. The UNESCO motivation highlighted the remarkable confluence of an exceptional geological situation with an area of striking natural beauty and biodiversity endowed with an archaeological and cultural-historical heritage stretching back to Stone Age and Iron Age times. In addition to listing the principal geosites and discussing the history of geological research on the Dome, the book provided a broad introduction of geological concepts, the geological history of South Africa and southern Africa’s other impact structures, as well as a glossary to explain geological terms. A separate chapter on the archaeological, historical and botanical attractions of the Dome by subject experts was commissioned. The first edition, published by Chris van Rensburg Publications, was rapidly sold out and a second edition was released in December 2005, with the Council for Geoscience as a co-publisher. By the end of 2008 stocks of the second edition were almost sold out and Springer Publishers was approached about publishing a third edition with a view of furthering particularly overseas interest in this unique geological site.

**Foreword to the Third Edition**

The burgeoning public interest in the Vredefort Dome has both expanded the tourism infrastructure in the area and increased awareness amongst local landowners of the potential benefits of harnessing the geological heritage for tourism and educational purposes. To this end, the Tour Guide in Part II of the book has been substantially modified, with several new sites added to replace sites in the earlier editions that are less accessible from the major routes. Other additions to the text include updates on the more recent natural disasters between 2005 and 2008 that emphasise the ever-present danger to humanity posed by geological processes on our planet. The third edition has also benefitted from a slew of new Space missions to our neighbouring planets, and to asteroids and comets themselves, that have delivered both new insights into the nature of these bodies and a spectacular database of high-quality satellite images, some of which have been incorporated into this edition. With a new generation of planetary research currently underway, it is appropriate that the Vredefort Dome, acknowledged as a World Heritage Site, also remains an area of active research by the international scientific community. It is encouraging to note that the geoscientific research is now being joined by research into the archaeological, cultural-historical and natural history of the area. Together, the results of this research not only provide valuable additions to global scientific knowledge; they also have the potential to contribute to the expansion of the tourism capacity of the Dome, thereby providing economic benefits to the region. We hope that this book serves to illustrate to a wider audience the amazing treasures of this incomparable geological wonderland.

The origin of the Vredefort Dome and its unusual rock deformations have occupied the minds of some of the greatest exponents of South African and world geology over the past century. Writing this book has been a humbling experience and a timely reminder that science is a search after truth and meaning, and that it is never ending. With local and international colleagues and students, we have been fortunate to have been given the opportunity to work on this remarkable geological feature and to know that each new result is eagerly awaited by an international scientific community that recognises the wealth of information that the Vredefort Dome has to offer. As part of a broader initiative to develop awareness of the Dome, we hope that this book repays in some measure the warm hospitality and assistance of the people of the Vredefort Dome who have made us welcome in their homes and provided us with access to their land. This book is dedicated to our families — Yvonne, Carly, Elsbeth, Emma, James and Matthew — who have stoically borne our absences, working holidays and our obsessive need to continue exploring every facet of the Dome over the past two decades.

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