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(Received: August 12, 2019; Revised accepted: August 13, 2019)

<https://doi.org/10.18814/epiiugs/2019/019021>

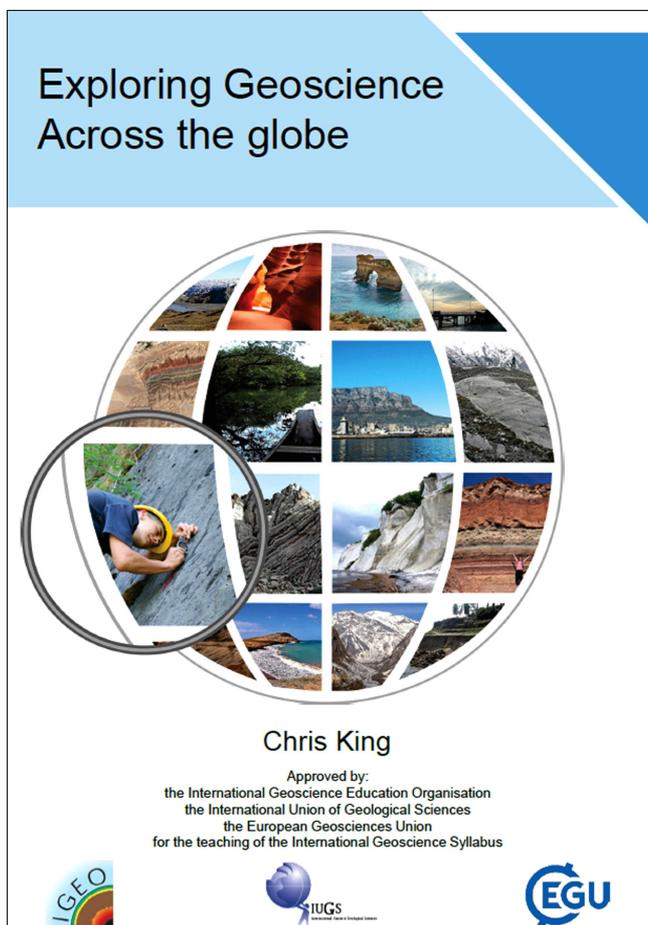
Exploring Geoscience Across the Globe

Chris King on Behalf of the International Geoscience Education Organisation (IGEO)

First published: 2019

ISBN: 978-1-9996264-0-2

Published at: <http://www.igeoscienced.org/teaching-resources/geoscience-text-books/>



Exploring Geoscience Across the Globe by Chris King is a recently published online textbook that can be freely downloaded from the IGEO website at: <http://www.igeoscienced.org/teaching-resources/geoscience-text-books/>. The textbook, published with the approval of the International Union of Geological Sciences (IUGS) and the European Geosciences Union (EGU), is focussed on the International Geoscience Syllabus which covers all that an able sixteen-year-old student should know and understand about Earth science on leaving school.

This syllabus is published at: <http://www.igeoscienced.org/activities/international-geoscience-syllabus/> and is also included as an appendix to the book.

Chris King, an internationally renowned geoscience educator, teaches geoscientific methods, knowledge and understanding with great enthusiasm. This book, a testament to Chris' skills as a teacher and writer, is presented in an interesting, clear, easily understandable and engaging style. An effort has been made to make the book as jargon-free as possible. The publication includes a glossary of terms used and it is helpful that each of these terms is shown in bold near where it first appears and is defined in the text. The publication is greatly enhanced by the inclusion of a wide range of supporting photographs, diagrams, maps, graphs and tables.

The book stresses that geoscience is the scientific study of our whole planet and so it not only covers most branches of geology such as geochemistry, geophysics, palaeontology, hydrogeology, petrology, plate tectonics and engineering geology but it also includes elements of meteorology, oceanography, environmental science, soil science and planetary geology. *Exploring Geoscience Across the Globe* was produced to support teachers across the world in teaching the International Geoscience Syllabus and in recognition of the fact that in many countries, geoscience textbooks available for teachers in schools are often inadequate, and in other countries are non-existent. It is pleasing to note that material additional to the syllabus is also included in the book. This material, presented in more than 60 'interest boxes', provides interesting details and introduces various case studies.

The order of the seven chapters in the book directly reflects the International Geoscience Syllabus. There are seven chapters dealing with: Earth as a Changing System; Earth as a System within the Solar System (within the Universe); Earth as a System which has Changed Over Time; Earth's System as Interacting Spheres; Earth's System producing Resources; Human/Earth System Interactions; and Earth's System Explored through Fieldwork and Practical Work.

Chapter I looks at the whole Earth system and deals with the water cycle, the rock cycle and the carbon cycle. This chapter makes clear the differences between processes and products and explains the meanings of terms like fluxes, stores and residence times. It also makes clear the energy sources involved and explains how sunlight, which provides

the energy for photosynthesis, is the original source of most of the energy that drives the water cycle and the surface processes of the rock cycle.

Chapter 2 begins with the 'big bang' theory, covers the origins of the solar system and details the parts of the solar system. This chapter not only provides information about the solar system but also gives details of the planets, dwarf planets, belts of asteroids and comets in the system. There is also information about Sun, Earth and Moon interactions and explanations about daylight, the seasons, phases of the Moon and eclipses.

Changes in the Earth system over time are covered in Chapter 3 which begins by explaining methods used in relative dating and making clear the differences between laws and principles. This section also includes useful illustrations of the typical fossils found in rocks of different ages. Absolute dating of geological events is briefly outlined and there is a final section that refers to the different rates of geological processes.

Nearly half of the book is taken up by Chapter 4 which explains the whole Earth system as many sub-systems: geosphere, hydrosphere, atmosphere and biosphere. In the geosphere context this chapter covers Earth materials and properties (i.e. minerals, rocks, fossils and soil), Earth processes (including surface processes, rock-forming processes and deformation processes), the structure of the Earth, and plate tectonics (including summary of the evidence supporting plate tectonic theory). The hydrosphere section deals with continental water and oceanic water, covering continental water supplies and contamination and seawater composition, tides and large-scale circulations of fluids on the planet. The penultimate section briefly covering atmospheric composition, flow and change is helpfully illustrated with satellite images. In the final section of the chapter the focus is on the biosphere and how it has had major effects on the evolution of the planet. This section includes links to the fossil record and the evidence of mass extinctions.

Chapter 5 outlines the natural resources used by humans and summarises the materials extracted for use from the geosphere, hydrosphere, atmosphere and biosphere. There are more detailed explanations about how bulk raw materials are used in construction and industry. Metals, industrial minerals and fossil fuels are also covered. There is further information about the prospecting methods that can be used as well as the environmental protection policies now employed to protect areas from the effects of extraction and remediation policies in force once extraction ends. Power supplies, including fossil fuels and renewable energy sources, are introduced and the book shows how world power consumption from different sources has changed since the 1960s with a global move towards renewable energy resources.

Natural hazards (e.g. volcanic eruptions, earthquakes, tsunami and

landslides) and environmental issues such as erosion, changes in drainage, waste disposal, pollution, mining and quarrying and burning fossil fuels are clearly dealt with in Chapter 6. The section on natural hazards is detailed and covers the causes and effects of natural hazards as well as information about monitoring and forecasting methods and hazard protection measures. This chapter concludes with an interesting section about the impact of geoscience on the course of human history. Examples cited include the ancient and recent water wars in the Middle East and the volcanic activity that ended Minoan civilisation.

Chapter 7, the closing chapter, outlines the specialisms of geoscientists. It explains the methods used by geoscientists to observe and record the recording geoscientific features and outlines how geoscience observations and investigations are used and developed into models and maps.

This excellent book is well-written and illustrated and is recommended as a valuable source of up-to-date information for school students and their teachers. It will also be useful to those beginning undergraduate studies in geoscience and to authors of science and geography textbooks.

Final note: This 'international version' of the textbook is an open source, free-to-download resource for use anywhere in the world. The core text is illustrated by photographs selected from across the globe and geoscience educators across the globe have been invited to take this core text, translate the text and add photographs and/ or 'geoscience interest boxes' for their own country, region or city to produce an *Exploring Geoscience* textbook for their own regions.



Maggie Williams is an Honorary Visiting Senior Fellow in the School of Environmental Sciences at the University of Liverpool. Before joining the University, she taught Geology and Geography in secondary schools and sixth form colleges in the UK and she has a strong association with the Earth Science Teachers' Association and has served as Treasurer, Newsletter Editor, Assistant Magazine Editor, Chair and Special Projects Manager in this organisation. Her academic research focuses on understanding the significance of hiatus surfaces in assessing the degree of stratigraphic condensation; her pedagogic research centres on the development of problem-solving activities and other activities to enhance students' understanding of 3-dimensional spatial relationships. She has published more than 60 articles and papers and has received the Distinguished Service Award of The Geological Society of London and election to Honorary Life Membership of the Earth Science Teachers' Association.