Book Review

Introducing Geomorphology: A Guide to Landforms and Processes by Adrian Harvey. 2013. Dunedin Academic Press Ltd, Edinburgh. 124 pp. ISBN 978-1906716-32-5. £9.99 (pbk).

This book by Adrian Harvey is a new addition to the 'Introducing…' series from the Edinburgh-based independent publishing house Dunedin Academic Press. The book follows other recent titles, *Introducing Volcanology* (2011) and *Introducing Oceanography* (2012), giving readers an overview of Earth and environmental science disciplines in around 100 small-format pages; with new titles *Introducing Stratigraphy* and *Introducing Sedimentology* due out in early 2014.

Geomorphology is the science of landforms and landscapes and as such straddles the traditional discipline divide between geology and physical geography. Professor Adrian Harvey is well qualified to write a book *Introducing Geomorphology* as a distinguished Earth scientist with a long research career in physical geography and geomorphology. Furthermore, as a past editor-in-chief of *Geomorphology* he is extremely well informed across the subject breadth – something that comes across from the very first page. The book is aimed at those with a curiosity in the landscape or those 'contemplating a course of formal study', chiefly Higher-grade/A-Level students and interested amateurs. It is not intended as a textbook, but forms an important link between existing high-school texts and more detailed university-level books. The writing style will have broad appeal, being jargon-free yet without playing down the complexity of geomorphic systems and their importance in modern Earth science.

The book is broken down into six logical and well-structured chapters. The subject is well introduced and defined on the first page (and in the Preface). This is followed by a simple yet effective representation of geomorphic processes operating on different spatial and temporal scales (pp. 2–4). By zooming in from a satellite image to a field photograph the reader is immediately shown how timescale and spatial scale are linked in the landscape record – something that is rarely pointed out (and something as a Survey geologist I perhaps take for granted). Chapter 1 then goes on to outline the formal division of time – the geological timescale – acquaintance with which is essential for all budding Earth scientists. Rightfully, the stress in this book is on the most recent geological Period: 'It is with the Quaternary that the geomorphologist is most concerned' (p. 4). Unfortunately, the author chooses to use a curious definition of the Quaternary ('the last 1.6 million years') rather than the recently revised and widely-accepted definition of 2.6 million years before present. Glacial–interglacial cyclicity is introduced here along with a brief section on how the Quaternary is subdivided – all these key concepts are well explained. The strength of this small book is the author's ability to summarise big topics, integral to the study of the Earth's surface, accurately but succinctly. The sections on internal forces (primarily concerned with plate tectonics) and external forces (chiefly concerning climatic drivers) are excellent examples of this.

Chapters 2, 3 and 4 examine geomorphology across a range of scales – global, regional and local. This works well and forms the core of the book (pp. 16–96). This 'top down' approach also ensures that processes are dealt with as and when they are encountered in their logical place, avoiding unnecessary repetition. So, for example, sea level change and ice sheet growth/decay are dealt with in the global-scale chapter, whereas coastal erosion and glacial processes are dealt with in the local-scale chapter. The regional-scale chapter primarily covers the landscape expression of geological features, drainage basin evolution and catchment-wide erosion surfaces – some of which are quite complex issues; but all are handled in an authoritative yet digestible way. The summary maps, tables and case studies are all strong with clear cartography and good use of colour. I particularly like the fact table of world rivers (p. 29) emphasizing the true might of the Amazon, and almost worthy of a Top Trumps deck! In the local-scale chapter the author carefully and logically breaks down Earth-surface processes into systems, along traditional lines: weathering, slopes, fluvial, glacial, aeolian and coastal. These sections are all well illustrated with a wide range of photographs (taken by the author) covering examples from several continents. Compressing the whole range of terrestrial geomorphological processes and landforms into 40 small-format pages is an impressive achievement. I did note an emphasis on fluvial processes, with 15 pages devoted to fluvial systems, whereas coastal systems are given only8 pages and glacial systems only 5. But this is unsurprising and entirely forgivable given the author's research background and considerable expertise in alluvial geomorphology. My only slight technical quibbles relating to these three chapters are: the use of 'ice caps' where 'ice sheets' would be more appropriate (p. 22); the extent of ice cover at Last Glacial Maximum (LGM) (Fig. 2.3) is in need of revision in Arctic Russia where the Barents–Kara Ice Sheet is absent; the key in Figure 2.9 contains an obvious typo (<60 should read <10). Other minor, more parochial, points relate to the glaciations of the British Isles (Box 2.2): the use of '10,000 years ago' for the end of the Pleistocene (p. 24), when 11 500 years ago is more accurate; the rather simplified extent of Loch Lomond Stadial ice coverage in Scotland which could be redrawn to better match published work; and the account of 'ice melting last of all in the Spey valley 13,000 years ago' is a curious, unproven, assertion (p. 24). In Chapter 3, the Isle of Skye is strangely missing from the map of Europe (Fig. 3.12); and the LGM ice sheet limits could be tightened up around the British Isles and joined up with the Fennoscandian Ice Sheet limits across the northern

North Sea. Reference to the areas of shield rocks in Scotland (p. 47) could be more accurately extended to include all of the Archaean rocks of western Scotland stretching from Coll and Tiree to Cape Wrath, rather than just 'a small area in Assynt district and the Outer Hebrides'. These are all minor points that could be easily corrected in a second printing. The fact that these quibbles are so minor and so few underlines the overall high quality of this publication and the standard of editing.

The penultimate chapter is short, balanced but important. All 21st century students of geomorphology must be well versed in the applications of Quaternary geochronology – the area of Earth science that has seen perhaps the greatest advances over the past 20 years. Again, the summaries of relative and absolute dating techniques are all very clear and concise without being over complicated. The section on cosmogenic dating (p. 103) could be slightly more detailed and a discussion of dating uncertainties and potential pitfalls would have been good for completeness. The final chapter briefly examines the role of humans on the natural environment, a topic which is attracting more research attention every year. Whether or not 'Anthropocene studies' is a worthy sub-discipline in its own right is a moot point, but to ignore man as a geomorphic agent – given our ability to affect the lithosphere, biosphere and even atmosphere – would be not to tell the whole story.

At the back of the book are a useful Further Reading section (pp. 113–114) and an excellent Glossary, both of which add greatly to this book. The glossary and its internal indexing system, with over 200 detailed entries, is particularly valuable as a handy all-round reference tool. Although I still haven't found out the difference between scree and talus.

Strangely the only real glaring omission in this book, although not a criticism of the author or the publishers, is the absence of any underwater geomorphology. Is this perhaps a criticism of the discipline itself? The book is an introduction to 'the science of geomorphology' but in reality the subject has been historically and traditionally rooted in the terrestrial realm since its evolution from physical geology over 100 years ago. For many, geomorphology is the study of *land-surface* processes. Only in the last decade has the landscape of the seabed started to share the limelight with its older, more established, terrestrial sibling. New underwater imaging techniques show that many geomorphic systems extend offshore as drowned landscapes, whilst others have never been exposed above sea level. I would hope that one day the geomorphology of lake beds, sea beds and ocean floors may be viewed, researched and taught on an equal footing with the present-day terrestrial landscape.

In summary, *Introducing Geomorphology* is an excellent small book which covers the traditional discipline in a clear, concise and authoritative way. It is really well presented – not quite a pocket book and not quite a text book – but very useful, well crafted and comprehensive. I enjoyed reading it and would recommend it to all those who want to learn about the terrestrial landscape and how it formed.

Tom Bradwell
British Geological Survey, Edinburgh, UK
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