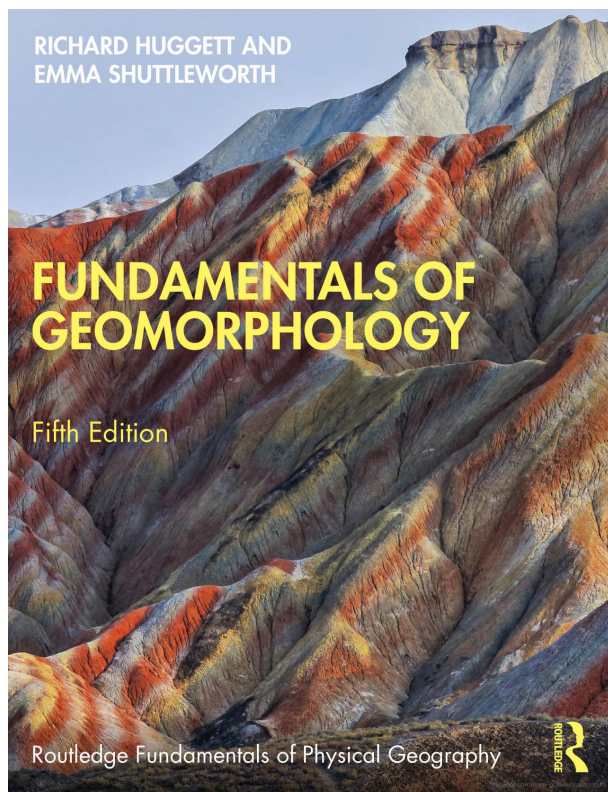


Fundamentals of geomorphology (5th edition), by R.J. Huggett & E. Shuttleworth, 2023. Routledge, Taylor & Francis Group, 624 pages. Paperback: price \$ 39.42, ISBN 978-1032169637.



Geomorphology is a specialised discipline within the earth sciences, focused on the study of earth's surface morphology and encompassing both continental and submarine terrains. It investigates landforms across a range of spatial scales, from planetary structures to microforms, by analysing their hierarchical organisation and increasing structural complexity. The primary aim of geomorphology is to identify and explain mechanisms of surface-shaping processes, reconstruct past and measure contemporary morphogenetic processes, assess their controlling factors, as well as evaluate current and future dynamics of landscape transformation.

Modern geomorphology is rapidly evolving into an interdisciplinary, data-driven and globally relevant field. Today, geomorphologists actively contribute to climate science, natural hazard man-

agement, planetary exploration and environmental sustainability. Understanding the mechanisms behind surface transformation is essential for forecasting the effects of extreme phenomena such as floods, landslides and erosion – impacts that can be significantly mitigated by incorporating geomorphological constraints into spatial planning.

Geomorphology is taught within the frameworks of geography, geology and environmental science programmes. It also serves as an auxiliary discipline in soil science and geoarchaeology. Effective teaching of geomorphology requires well-prepared textbooks that meet both didactic and research-oriented needs. The availability of such resources is considerable, with numerous authors in various languages producing works of high educational potential. One such publication is *Fundamentals of geomorphology* by Richard Huggett and Emma Shuttleworth, affiliated with the University of Manchester (United Kingdom). The authors have ample experience in both geomorphological research and academic instruction, and the fifth edition of their book offers a contemporary synthesis of current geomorphological knowledge.

Fundamentals of geomorphology provides a systematic introduction to the field, from theoretical and system-based foundations, through detailed explanations of endogenic and exogenic processes, to the evolution of landscapes over geological time. The textbook is divided into four main parts.

Part I, entitled *Introducing landforms and landscapes*, outlines the scope, historical development and methodological approaches of geomorphological research, presenting tools and techniques used in the discipline. It explores the geomorphic system and dynamic interactions between internal and external processes that shape landforms. This section adopts a systems approach, linking geomorphology with the lithosphere, atmosphere, hydrosphere and biosphere. It also introduces the concept of the Anthropocene, emphasising the significant geomorphic role played by living organisms, including humans.

An analysis of Part I reveals that the inclusion of synthetic issues in this introductory section may be challenging for beginners and could be more effectively placed after the coverage of foundational geomorphic processes (e.g., in Part III). One example is the topic *Denudation and global climate*, which presupposes an understanding of weathering, leaching, erosion and sediment transport mechanisms. Similarly, the chapter *Life and humans as geomorphic agents*, which discusses anthropogenic landforms, might be better placed further on in the text. Topics such as *Applied geomorphology* would also benefit from being introduced after morphogenetic processes and landform types are addressed, thereby allowing for a more targeted discussion of the preservation of significant landforms for both scientific and heritage purposes.

Part II: *Endogenic forces* focuses on internal earth processes: tectonic plate movements and the formation of tectonic and volcanic landforms. The authors emphasise that endogenic factors provide the overarching framework for geomorphic activity and, in many cases, directly result in the formation of landforms, such as volcanic, plutonic and structural forms.

Part III: *Exogenic processes* is the most extensive section of the book. It covers surface-shaping processes driven by flowing water, ice and meltwater, wind, the sea, as well as karst and planetary processes. It highlights the intricate interactions between earth's geospheres. This section comprises ten chapters, addressing weathering, regolith and soil formation, hillslope dynamics, fluvial systems, glacial and glaciofluvial systems, periglacial environments, aeolian systems, coastal and submarine landscapes, karst systems and extraterrestrial geomorphology.

The chapter structure is logical, being organised according to process types, their controlling factors, mechanisms and erosional and depositional outcomes. Case studies from various global regions enrich the narrative. Nonetheless, certain topics, such as karst and periglacial geomorphology (e.g., fluvial action), are presented in a condensed manner. Similarly, the discussion of continental glaciation within the chapter *Glacial system* lacks references to marine isotope stages and a deeper analysis of glacial erosion, deposition and meltwater processes.

Part IV: *Deep-time perspectives* consists of a single chapter dedicated to the long-term evolution of landscapes and geomorphic processes on a geological time scale, considering the interplay between climate, erosion, tectonics and human activity.

One of the most valuable aspects of *Fundamentals of geomorphology* is its structured presentation of the

development of modern geomorphological thought - from the classical Davisian erosion cycle to contemporary process-response and systems-based approaches. The authors successfully introduce the reader to the concept of the geomorphic system as a dynamic, open system functioning through energy and matter fluxes and subject to feedback mechanisms. Topics such as dynamic equilibrium, geomorphic thresholds, magnitude and frequency of events, as well as temporal scales of morphogenetic processes, from seconds to millions of years, are thoroughly explored. The authors conceptualise geomorphology as part of a broader earth system, involving the lithosphere, hydrosphere, atmosphere, biosphere and human influences, with a strong focus on system interconnectivity (e.g., climate effect on erosion and material transport). Landscapes are treated as complex systems with nonlinear behaviour, feedback loops and emergent properties, replacing deterministic or static equilibrium models with concepts such as self-organised criticality, fractal geometry and chaos theory.

The dominant approach in Huggett and Shuttleworth's *Fundamentals of geomorphology* is the process-response model. Other approaches, such as those based on morphometrics, palaeogeography and conservation, are present but serve a supplementary role. Special attention is devoted to process geomorphology, emphasising the analysis of contemporary active morphogenetic processes interpreted through the lens of physical, chemical and biological laws.

The authors also highlight the integration of geomorphology with the plate tectonics theory and climate science, underscoring the influence of large-scale geodynamic and climatic systems as primary forces shaping planetary surfaces. This holistic perspective renders the book not only a comprehensive academic textbook but also a valuable synthesis of the current state of geomorphological knowledge. A notable emphasis is placed on the quantitative transformation of the field, from descriptive approaches to mathematical modelling, computer simulations and statistical analysis. From the standpoint of technological innovation, this tome emphasises the relevance of geomorphometry, GIS, remote sensing, LiDAR and satellite imaging, which facilitate high-resolution mapping and real-time landscape monitoring. However, the treatment of these methods is relatively general, and the coverage of advanced quantitative modelling, digital terrain analysis and remote sensing tools may not prove sufficient to advanced users.

Similarly, topics such as principles of geomorphological mapping, the impact of climate change

on geomorphology, tectonic geomorphology and biogeomorphology are mentioned, yet not explored in depth. The text also lacks an in-depth analysis of the sediments composing various landforms. Given that sediment analysis is fundamental to geomorphology, both as a product of geomorphic processes and a factor influencing further landform evolution, this omission is especially noteworthy.

One of the most commendable strengths of Huggett and Shuttleworth's textbook is its strong pedagogical design. Key theoretical concepts are introduced with sufficient depth; for example, the discussion of equilibrium and feedback within geomorphic systems enhances students' understanding of landscape dynamics as nonlinear and often self-regulating. The book serves both as a resource for academic teaching and for self-directed learning. Although not exhausting all specialised topics, it does act as a bridge between general textbooks and the more advanced scientific literature.

A notable feature of the present tome is its modular structure, allowing chapters to be assigned independently in themed or focused courses. Each chapter contains a mini-abstract with learning objectives, global case studies, key concepts, summaries and review questions. This fifth edition is richly illustrated with over 200 full-colour figures, photographs, tables and informative diagrams, which significantly aid comprehension. The digital version (available through platforms such as VitalSource) offers additional functionality including text highlighting, note-taking, search tools and

practice questions. Each chapter ends with recommendations for further reading, and the book includes an extensive glossary of key terms, although definitions are sometimes overly simplified (e.g., the definition of lava).

The book stands out for its clear language, rich illustrative material, thoughtful structure and up-to-date content, including coverage of the Anthropocene and planetary landscapes. The authors comprehensively present geomorphic processes, landform types and contemporary research approaches, framing geomorphology as a systems science essential to addressing global environmental challenges.

The fifth edition of *Fundamentals of geomorphology* by Huggett and Shuttleworth can be recommended as an excellent knowledge base for students of geography, geology and environmental sciences. It is also useful for educators, practitioners and specialists in related fields. For a more advanced study, the textbook should be supplemented with specialised literature items.

In conclusion, this publication is a modern, well-written and thematically structured geomorphology textbook, distinguished by its interdisciplinary approach, topical relevance and high didactic value.

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