



Geomorphology

Ten reasons why it is important

What is geomorphology?

There is rising concern about the changing global environment. The threats of climate change and species extinctions are commonly highlighted, but what about changes to physical landscapes? Understanding how landscapes operate and change is important to enable a deeper understanding of the Earth system and better environmental management.

Geomorphology is the science that studies the origin and development of landforms — such as mountains, valleys, sand dunes and caves — and how those landforms combine to form landscapes. Figure 1 shows how geomorphological studies can vary in terms of size and timescale. Examples include analyses of landform shapes, monitoring of the processes that shape landforms (for example, flowing water, ice and wind), and characterisation of changes that occur in response to phenomena such as tectonic and volcanic activity, climate and sea-level change, and human activities. Research may focus on reconstructing past processes and landform changes, or understanding present-day processes and landform changes, or anticipating future changes.

How are geomorphological studies undertaken?

Geomorphology has its own intellectual heritage but draws on other sciences, particularly physical geography, geology and ecology. Traditional geomorphological research includes field observation, description and measurement but also physical experimentation (for example, in small field plots or using laboratory flumes).

The traditional approaches are now commonly combined with satellite and drone images, computer-based models, and increasingly sophisticated field and laboratory techniques to quantify rates and timescales of landform change. It is now possible to view, measure, age and model a variety of landforms and landscapes on Earth and other planetary surfaces (for example Mars) in ways that were unimaginable even 20 years ago.

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Why is geomorphology important?

Figure 2 shows 10 main reasons why the study of geomorphology is important. In addition to explaining how landscapes have developed, function and change, there is growing recognition of the importance of geomorphology and geomorphologists in contributing to many different aspects of environmental investigations and management.

The UK Environment Agency, for example, employs geomorphologists on a wide range of projects, including river restoration. Elsewhere, engineers use knowledge of erosional and depositional processes to improve assessments of hillslope stability, or to predict channel changes along rivers where infrastructure developments are planned. Planetary scientists apply insights gained from study of the Earth's landscape processes to interpret planetary surfaces. Ecologists are interested in understanding the complexity of the physical landscape — so-called 'geodiversity' — as this can influence species diversity.

In many cases, geomorphological considerations are essential for enabling a comprehensive approach to environmental investigations and achieving sustainable environmental management.



Figure 2 The importance of geomorphology



Figure 1 Geomorphological studies cover multiple spatial and temporal scales, from microbes to meanders to mountains

- a In the Kalahari Desert, Botswana, filamentous cyanobacteria form thin crusts and help to stabilise the surfaces of wind-blown sand dunes
- b The catchment of the sinuous Afon Elan (Elan River) in the Elenydd/Cambrian Mountains, Wales, is carefully managed to ensure a supply of clean water to Birmingham
- c The receding Mueller Glacier in Aoraki/Mount Cook National Park, South Island of New Zealand, has left large volumes of debris (for example lateral moraines) and a series of expanding lakes

FURTHER READING

For more information, download the free colour booklet entitled '10 reasons why geomorphology is important' from the British Society for Geomorphology: www.tinyurl.com/pp6wwwvx.

The British Society for Geomorphology aims to advance the science of geomorphology by providing a community and services for those involved in geomorphological teaching, research or practice, and by promoting wider understanding of the discipline. Its website provides access to other educational resources: www.tinyurl.com/2p9arknu.

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