Core units: Key understandings – Years 7–8
Illustration 2: Scale in physical geography

The search for explanation

When geographers examine landforms at the micro scale they are more prone to search for explanations concerned with processes such as weathering, erosion, transport and deposition. They carefully examine weathered rocks, the movement of materials in a stream channel and the cross-sectional profile of the build-up of beach sand. Knowing that coarser materials are deposited adjacent to the riverbanks in a levee system and that finer materials are found towards the floodplain makes it comparatively simple to set up a field study exercise to examine this phenomenon. Examining theoretical evidence about the operation of processes in a meander bend, and drawing a sketch map of the observed behaviour of the stream, may also be beneficial. Examining the shape of weathered rock at the base of a slope, whether it tends to be rounded or sharp-edged, will tell something about the weathering process. However, transferring this knowledge to explanations focused on landforms at larger scales is still difficult.

As geographers study landforms at larger scales they are more prone to describe rather than account for landform evolution, to speculate about landform formation, and to reconstruct the past histories of landforms. At the global scale, the speculation may become even more evident. This is sometimes based on current weather sequences, past climate reconstructions, projected climate change and current spatial distribution (patterns). At this scale, chaotic elements assume more importance.

Consider, for example, the processes at work in a stream system. It is often accepted that the turbulent flow of water within a stream reaches a state of dynamic equilibrium at a more local scale where the various parameters of the stream bed, its width, height, cross-sectional area and degree of roughness arrive at a stable situation. These parameters, in turn, affect the spacing of pools and riffles and meander loops in the stream. However, it is the nature of fluid mechanics that, as scale is increased, there is more likelihood of random events and chaotic patterns emerging. The steady state lurches from stable to unstable behaviour. The biophysical world behaves in unpredictable, inconsistent and non-deterministic ways. Focused curiosity should be aroused in Year 8 students but oversimplified explanations of landforms should be avoided.

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