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THE PROCESS OF GEOMORPHOLOGY RELATED TO SUB BRANCHES OF PHYSICAL GEOGRAPHY

Anup Dada
Department of Geography, Kabul University, Kabul, Afghanistan
Email: dada.anup@gmail.com

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ABOUT THE STUDY

One of the three major branches of geography is physical geography. Physical geography is a branch of natural science that studies the processes and patterns found in the natural environment, including the atmosphere, hydrosphere, biosphere, and geosphere. This focus contrasts with human geography, which focuses on the built environment, and technical geography, which focuses on using, studying, and developing tools to obtain, analyse, interpret, and understand spatial data (Deibert et al, 2010).

Sub-branches

Physical geography is divided into the following branches or related fields: Geomorphology is concerned with understanding the Earth's surface and the processes that shape it, both in the present and in the past. Geomorphology is divided into several sub-fields that deal with the specific landforms of different environments. Geomorphology is the study of landform history and dynamics, as well as the prediction of future changes, using a combination of field observation, physical experimentation, and numerical modelling. Geomorphology is the foundation for pedology, one of the two major branches of soil science.

Aeolian processes

Aeolian processes are concerned with wind activity and, more specifically, the ability of the wind to shape the Earth's surface. Winds can erode, transport, and deposit materials, and they are particularly effective areas with sparse vegetation and an abundance of fine, unconsolidated sediments. Although in most environments, water and mass flow mobilize more material than wind, Aeolian processes are important in arid environments such as deserts.

Biological processes

The interaction of living organisms with landforms, known as bio geomorphologic processes, can take many different forms and is likely to have a significant impact on the terrestrial geomorphic system as a whole. Biology can influence a wide range of geomorphic processes, from biogeochemical processes that control chemical weathering to the influence of mechanical processes like burrowing and tree throw on soil development, and even controlling global erosion rates through carbon dioxide balance modulation. Terrestrial landscapes in which the role of biology in mediating surface processes can be definitively ruled out are extremely rare, but they may contain important information for understanding the geomorphology of other planets, such as Mars (Goodall et al, 2009)..

Fluvial processes

Rivers and streams transport not only water but also sediment. Water can mobilize sediment and transport it downstream as bed load, suspended load, or dissolved load as it flows over the channel bed. The rate of sediment transport is determined by the availability of sediment and the discharge of the river. Rivers can also erode into rock and create new sediment, both from their own beds and by interacting with the surrounding hillslopes. In this sense, rivers are thought to be the starting point for large-scale landscape evolution in non-glacial environments. Rivers play an important role in connecting various landscape

Glacial processes

While glaciers are geographically limited, they are powerful agents of landscape change. The abrasion and plucking of the underlying rock caused by the gradual movement of ice down a valley. Abrasion creates fine sediment known as glacial flour. When the glacier recedes, the debris transported by the glacier is referred to as a moraine. U-shaped valleys are formed by glacial erosion, as opposed to V-shaped valleys formed by fluvial erosion (Javaid et al, 2020).

Igneous processes

Volcanic and plutonic igneous processes can both have a significant impact on geomorphology. Volcano activity tends to rejuvenate landscapes by covering old land surfaces with lava and tephra, releasing pyroclastic material, and forcing rivers to follow new paths. Eruptive cones create significant new topography that can be influenced by other surface processes. Plutonic rocks intruding and solidifying at depth can cause surface uplift or subsidence, depending on whether the new material is denser or less dense than the rock it displaces.

Tectonic processes

Tectonic effects on geomorphology can occur at time scales ranging from millions of years to minutes or less. The nature of the underlying bedrock fabric, which controls what kind of local morphology tectonics can shape, has a large impact on the effects of tectonics on landscape. Earthquakes can submerge large areas of land in minutes, creating new wetlands. Isostatic rebound can explain significant changes over hundreds to thousands of years, allowing erosion of a mountain belt to promote further erosion as mass is removed from the chain and the belt uplifts. Long-term plate tectonic dynamics create orogenic belts, large mountain chains with typical lifetimes of tens of millions of years that serve as focal points for high rates of fluvial and hillslope processes and thus long-term sediment production. Deeper mantle dynamics such as plumes and lower lithosphere delamination have also been proposed to play important roles in the long-term, large-scale evolution of the Earth's topography. Both can promote surface uplift via isostasy, which occurs when hotter, less dense mantle rocks displace cooler, denser mantle rocks deeper in the Earth (Kavakiotis et al, 2017).

Marine processes

Marine processes are those associated with wave action, marine currents, and fluid seepage through the seafloor. Some aspects of marine geomorphology also rely on mass wasting and submarine land sliding. Because ocean basins are the ultimate sinks for a large proportion of terrestrial sediments, depositional processes and their related forms are crucial components of marine geomorphology.

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