RIVER LANDFORMS

Physical Geography | Undergraduate Study Notes

1. Introduction

A river is a natural stream of flowing water that moves from higher land towards a lower level, usually ultimately reaching a lake, sea or ocean. Rivers continuously shape the Earth's surface through erosion, transportation and deposition. The landforms produced by these processes are called fluvial landforms.

2. Major Processes of River Action

Erosion: Removal of rock and soil by flowing water. Main mechanisms include hydraulic action (force of water), abrasion (rock fragments scraping the bed and banks), attrition (fragments colliding and becoming smaller and rounded), and solution (dissolving soluble rocks).

Transportation: Movement of sediment by a river. Load is transported as traction (rolling), saltation (bouncing), suspension (fine particles carried in water) and solution (dissolved minerals).

Deposition: Settling of sediment when the river loses energy, commonly due to reduced velocity, a decrease in gradient, widening of the channel or entering standing water.

3. River Landforms of the Upper Course

The upper course is generally characterised by steep gradients, relatively narrow valleys and strong vertical erosion.

V-shaped Valley: A narrow valley with steep sides formed mainly by vertical erosion. Weathering and mass movement help widen the valley sides.

Interlocking Spurs: Alternating projecting ridges of resistant land that a river winds around as it follows the path of least resistance.

Waterfall: A sudden vertical or steep drop in the river channel, often formed where resistant rock overlies weaker rock. Differential erosion may cause retreat.

Gorge: A deep, narrow valley with steep sides, often formed through waterfall retreat or sustained downcutting.

4. River Landforms of the Middle Course

The middle course commonly has a gentler gradient and a wider valley. Lateral erosion and transportation become more prominent.

Meander: A bend in a river channel. Faster flow and erosion generally occur near the outer bank, while slower flow and deposition occur near the inner bank.

River Cliff / Cut Bank: The steep outer bank of a meander where erosion is concentrated.

Slip-off Slope / Point Bar: The gently sloping depositional surface on the inner bank of a meander, where sediment accumulates.

Wider Valley: Lateral erosion, weathering and mass movement widen the valley over time.

5. River Landforms of the Lower Course

The lower course usually has a low gradient, a wider channel and a large volume of water. Deposition becomes important as the river approaches its mouth.

Floodplain: A flat or gently sloping area alongside a river formed by repeated flooding and deposition of fine sediments.

Natural Levee: A raised bank beside a river channel, built by deposition of relatively coarse sediment during floods.

Ox-bow Lake: A crescent-shaped lake formed when a meander loop is cut off from the main river channel.

Delta: A depositional landform at a river mouth where sediment accumulates and the river may divide into distributaries. Delta formation depends on sediment supply and marine or lake conditions.

Distributaries: Channels that branch away from the main river, often across a delta.

6. Important Fluvial Landforms (Quick Revision)

Landform	Dominant process / key feature
V-shaped valley	Vertical erosion; narrow valley
Waterfall & gorge	Differential erosion and downcutting
Meander	Lateral erosion and deposition
Point bar	Deposition on inner bend
Cut bank	Erosion on outer bend
Floodplain	Flood deposition and channel migration
Natural levee	Deposition alongside channel during floods
Ox-bow lake	Meander cut-off
Delta	Sediment deposition at river mouth

7. Key Terms

Gradient: The slope of the river channel along its course.

Discharge: The volume of water flowing through a river cross-section per unit time.

Sediment load: Material transported by a river.

River mouth: The place where a river enters a sea, lake or another river.

Base level: The lowest level to which a river can erode; ultimate base level is commonly sea level.

8. Short Questions for Practice

- Define fluvial landforms.
- Explain the four mechanisms of river erosion.
- Distinguish between a cut bank and a point bar.
- How is an ox-bow lake formed?
- What is a floodplain?

- Describe the conditions required for delta formation.
- Differentiate between traction and saltation.

Prepared for Geography students | Introductory, exam-oriented notes