

## Geological Work of Wind

### (Part-2)

#### Different types of aeolian-deposits are as follows-

- b) **Transverse dunes**- These are large asymmetrical ridges of sand that develops perpendicularly to the wind direction. Transverse dunes form when the sand supply is abundant and wind blows in a constant direction. These are relatively straight and take the form of wave-like ridges separated by alternate ridges and furrows.
- c) **Barchan dunes**- These are large asymmetrical, crescent-shaped ridges of sand having their wings closing in down wind direction. Barchan dunes forms in regions where sand supply is limited and winds are strong blowing in a constant direction. These dunes are characterized by a gentle windward side and a much steeper leeward side.
- d) **Parabolic dunes**- They are parabolic in shape, with their wings(horns) closing and pointing in the direction opposite to that of blowing winds. In other words, the convex side of the dune faces towards the down-wind side and the horns pointing in upwind direction. They are formed adjacent to beaches and commonly near blow-outs, where sand supply is abundant and wind direction is steady. These dunes are characterized by somewhat steep lee-side.
- e) **Pyramidal dunes**- These dunes are also known as star-shaped dunes. Star dunes form only in places where wind blows from varied directions over the course of a year. The **star dune** has arms that radiate out from a central pyramid-shaped mound. Hence are also called as pyramidal dunes. They form due to interface of air-waves caused by wind reflection from mountain barriers.

## Geological Work of River

### (Part-1)

**River-** A river is a large, natural stream of flowing water that carry sediments downstream, and may follow a definite. The path followed by a river is called as river valley.

#### Facts To Know

**Run-off in stream = Precipitation + Loss (Infiltration + Evaporation)**

**Discharge capacity of river/ stream = (Velocity x Channel cross-sectional area)**

### Geological Actions of River

1. Erosion
2. Transportation
3. Deposition

#### 1. Types of Erosional Processes By A River

**I. Mechanical erosion**- Takes place by the following processes-

- Hydraulic action**- It is the process of mechanical wearing of materials by the erosive action of water. As the river water moves at a high speed at steep gradients, turbulent flows are developed here, which causes loosening of rocks and soil particles along the river channel that are carried along with the flow. Maximum turbulence during flow gives maximum capacity of erosion by river water. Therefore, the maximum erosion takes place along the outer margin of a meandering stream , i.e. it is the belt of greatest turbulence. This type of erosion is strongest at rapids and waterfalls where the water has a high velocity.
- Abrasion**- This is also called as corrosion *process*. This process is evident where the river's load acts almost like sandpaper, removing pieces of rock as the load rubs against the bed & banks. This sort of erosion is strongest when the river is transporting large chunks of rock or after heavy rainfall when the river's flow is turbulent. This is the process of wearing away of the surface of bed-rock due to the rubbing of material (carried along with the flow) against the bed-rock surface. Other actions of wearing off include-cutting, scratching, grinding and polishing.

On the basis of the hardness of the transported materials and bed-rock surface, three situations may arise-

- a) when the rocks carried with the flow are hard and the bed-rock is soft, then abrasion of the bed-rock is more pronounced.



- b) when the rocks carried with the flow are hard and bed-rock is hard, then it results in polishing of the bed-rock.
- c) when the rocks carried with the flow are soft and bed-rock is hard, then the bed-rock gets least abraded, as the rocks itself erodes away.
- (iii). **Attrition**- It is the process that involves the collision of rock fragments against each other during transportation, due to which the coarser and angular rock fragments, gets eroded into finer and rounded fragments. In other words, attrition is a way of eroding the river's load, **not** the bed and banks.
- (iv). **Cavitation**- *Cavitation* is an interesting method of erosion. Air bubbles trapped in the water get compressed into small spaces like cracks in the river's banks. These bubbles eventually implode creating a small shockwave that weakens the rocks. The shockwaves are very weak but over time the rock will be weakened to the point at which it falls apart.

## **II. Chemical erosion**-Takes place by the following process-

- (i) **Corrosion**- Corrosion is a special type of erosion that only affects certain types of rocks. Water, being ever so slightly acidic, will react with certain rocks and dissolve them. Corrosion is highly effective if the rock type of the channel is chalk or limestone (anything containing calcium carbonate) otherwise, it doesn't have much of an effect.

## **Types of Erosional Features Produced By River Action-**

1. **Pot holes**- They are smooth, bowl-shaped or cylindrical hollow, generally deeper than wide, found carved into the rocky bed of a watercourse. The kettle-like small depressions in the rocky beds of the river valleys are called potholes which are usually cylindrical in shape. Potholes are generally formed in coarse-grained rocks such as sandstones and granites. Potholing or pothole drilling is the mechanism through which the grinding tools (fragments of rocks e.g., boulders and angular rock fragments) when caught in the water eddies or whirling water start dancing in circular manner and grind and drill the rock beds of the valleys like drilling machine and thus form small holes which are gradually enlarged by the repetition of the said mechanism.

2. **Waterfalls** -Waterfalls or simply falls are caused because of sudden descents or abrupt breaks in the longitudinal course of the rivers due to a host of factors e.g., variation in the relative resistance of rocks, relative difference in topographic reliefs, fall in the sea level and related rejuvenation, earth movements etc.

Two types of situations may be observed –

- i) If a hard bed is horizontal or dips gently upstream, the river will erode the softer bed partially that lies beneath the hard rock bed. Due to which the hard rock bed may form a ledge at the edge of the river valley, where from the water jumps down, falling on the lower beds with high velocity, thus forming **waterfalls**. In other words, a



waterfall may be defined as a vertical drop of water of enormous volume from a great height in the long profiles of the rivers.

ii) If a hard bed dips gently down-stream then the steepness of river bed is not very pronounced and the river passing over it forms a rapid. **Rapids** are of much smaller dimension than waterfalls.

**Cascade**- A fall that descends in a series of leaps is called as cascade.