

Sedimentary rocks

The sedimentary rocks are formed due to aggregation and compaction of sediments. The sediments and debris derived through the disintegration and decomposition of the rocks by the agents of weathering and erosion are gradually deposited in water bodies. Thus layers after layers of sediments and debris are regularly deposited. Continuous sedimentation increases the weight and pressure and thus different layers are consolidated and compacted to form sedimentary rocks. Some important example of sedimentary rocks are Limestones, sandstones, dolomites, gypsum, salt rock, Loess etc.

Characteristics of sedimentary rocks:

The primary characteristics of sedimentary rocks are

1. These rocks are formed of sediments derived from the older rocks, plants and animal remains and thus these rocks contain fossils of plants and animals. The age of the formation of a given sedimentary rock may be determined on the basis of the analysis of the fossils to be found in that rock.
2. Sedimentary rocks are found over the largest surface area of the globe. However, these rocks constitutes only 5% of the composition of the crust, whereas the remaining 95% of the crust is composed of igneous and metamorphic rocks.
3. The deposition of sediments of various types and sizes to form sedimentary rocks takes place in certain sequence and system.
4. Sedimentary rocks contain several layers or strata but these are seldom crystalline rocks.
5. Sedimentary rocks may be well consolidated, poorly consolidated, or even unconsolidated depending upon the nature of cementing elements and rock forming minerals.
6. Layers of sedimentary rocks are seldom found in original and horizontal manner. The layers are generally deformed due to lateral compressive and tensile forces.
7. ***Sedimentation units or layers in sedimentary rocks having a thickness of greater than one centimeter are called beds.*** The upper and lower surfaces of a bed are called bedding planes or bounding planes.
8. These rocks are characterized by different sizes of joints. These are generally perpendicular to the bedding planes.
9. Most of the Sedimentary rocks are permeable and porous but a few of them are also impermeable and non-porous. The porosity of the rocks depends upon the ratio between the voids and the volume of a given rock's mass.

Classification of sedimentary rocks:

1. On the basis of the nature of sediments:

(a) Mechanically formed or clastic rocks:

Previously formed rocks are subjected to mechanical or physical disintegration and thus the rocks are broken into fragments of different sizes. These fragments are transported and deposited at suitable places by different agents like running water, wind, sea waves etc. These fragments are further broken down to finer particles due to their mutual collision during their transportation. These materials after deposited and consolidated in different water bodies form clastic sedimentary rocks. Example: Sandstone, silt, shale clay, conglomerates etc.

(b) Chemically formed sedimentary rocks:

Running water contains chemical materials in suspension. When such chemically active water comes in contact with the country rocks in its way, soluble materials are removed from the rocks. Such materials are called chemically derived sediments. These chemical materials after being settled down and compacted and cemented form chemical sedimentary rocks. Example: gypsum and salt rocks.

(c) Organically formed sedimentary rocks:

The sediments derived from the disintegration or decomposition of plants and animals are called organic sediments. These sediments are being deposited and consolidated form organic sedimentary rocks. Example: Limestones, Dolomites, Coals, Peats etc.

2. On the basis of Transporting agents:

Based on major transporting agents sedimentary rocks are classified as follow

(a) Argillaceous rocks:

These rocks are formed in water areas. The Marine Argillaceous rocks are formed due to deposition and consolidation of sediments in the oceans and seas mainly in their littoral zones. Example: sandstones, limestones, dolomites, and chalk etc. Lacustrine argillaceous rocks are formed due to deposition and consolidation of sediments in lake environment. Generally the sediments are deposited at the floor of the lake. Fluvial argillaceous rocks are formed due to deposition of sediments in the riverine environment. The sediments may be deposited on the beds of the river and in the flood plains.

(b) Aeolian sedimentary rocks:

These rocks are formed due to the deposition of sands brought down by the wind. Pre-existing rocks are greatly disintegrated due to mechanical weathering in the hot and dry regions. This process results in the formation of immense quantity of sands of different sizes. The wind deposits these particles at various places. The particles are further comminuted into fine particles due to attrition during their transportation from one place to other. Continuous deposition of sands results in the formation of different layers but these layers are not well consolidated. Sometimes there are no layers in such sedimentary rocks. Example of aeolian sedimentary rocks is **Loess**.

(c) Glacial rocks:

These rocks are formed due to the deposition of glacial drifts. Glacial drifts are the materials deposited by glaciers. Depending upon the deposition condition, glacial rocks are further classified as lateral moraines, medial moraines, ground moraines and terminal moraines.

Sample questions:

1. Write a short note on sedimentary rock.
2. Write five characteristics of sedimentary rocks.
3. How do the clastic rocks form?
4. Give one example of aeolian sedimentary rock.
5. Classify sedimentary rocks on the basis of nature of sediments.

References:

1. Physical Geography, Savindra Singh, Pravalika Publications