

SEDIMENTARY ROCKS :-

All those rocks which have been formed due to consolidation, compaction of sediments derived from any pre-existing rocks due to mechanical, chemical or organic processes is called sedimentary rocks. Sedimentary rocks occur in layers and frequently contain fossils.

Formation of S.R. → The formation of sedimentary rocks takes place in three stages :-

1) Weathering and Erosion :- During weathering and erosion, the pre-existing rocks and their constituent minerals are broken down. The material thus produced is called the "sediments". The sediments are usually transported and deposited in areas of accumulation by the action of water. During transportation the sediments are roughly sorted and deposited according to size. Bigger rock fragments such as gravel settle first, sands are next in order and clays are deposited in the last.

2) Transportation :- 1) solution 2) suspension 3) saltation.

3) Sedimentation :- The process of accumulation of sediments at a site of deposition is called "sedimentation".

Lithification & Diagenesis

Lithification is a process by which soft and loose sediments are converted into hard rocks. This process is also called "consolidation". During this process many physical changes occur, and the process is called diagenesis. It includes -

(I) compaction → compaction occurs when the weight of overlying layers compresses the sediments below. As the grains of sediments are pressed closer and closer together, there is considerable reduction in pore space and volume. Fine grained sediments, such as clays are consolidated more effectively.

(II) Cementation → when water circulates through the pores of coarse grained sediment, dissolved min. matter is precipitated between the grains which causes cementation. The most common cementing materials are silica, CaCO_3 , Iron Oxides and clay minerals.

(iii) **Recrystallization** :- Although most sedimentary rocks are lithified by compaction, cementation or a combination of both, some are consolidated chiefly by the recrystallization of their constituents. Chemically formed rocks ~~or~~ such as limestone, dolomites, salt and gypsum are the examples of the rocks consolidated by recrystallization.

* Classification

The sediments from which sedimentary rocks are formed, may be divided into two major groups -

(A) Clastic Sediments

(B) Non clastic Sediments

(A) Clastic Sediments →

These are broken fragments of pre-existing rocks ranging in size from minute clay particles to very large boulders, clastic rocks are formed by the mechanical accumulation of grains of clastic sediments. Depending upon the size of constituent grains, the clastic rocks are classified into three groups :

(1) **Rudaceous Rocks** → These rocks are formed by accumulation of bigger rocks fragments such as gravels pebbles and boulders. If the grains are rounded, the rocks is called **conglomerate** and if they are angular the rocks is termed as **breccia**.

Boulder ($> 256\text{mm}$), Cobble (16 to 256mm)

Pebbles (10 to 16mm), Gravel (2 to 10mm)

(2) **Arenaceous Rocks** → These rocks are composed almost entirely of sand grains. When individual grains are rounded, the rock is called Sandstone and grit if the grains are irregular.

Sand (0.1mm to 2mm)

(3) **Argillaceous Rocks** → These rocks are made up of very fine grained sediments. Shale and Mudstone are typical argillaceous rocks, which are composed of claysized sediments.

silt (0.02 to 0.1mm), Clay ($< 0.02\text{mm}$)

⑧ Non clastic sediments →

Those sediments which are formed by chemical precipitation of minerals from water or by accumulation of animal and plants. They are classified into two groups -

Chemically

- carbonate
- salt rocks
- ferruginous
- siliceous

- organically
- Biochemical (shell)
- organic carbonaceous (coal)

(1) Chemically formed Rocks →

These rocks are formed when mineral matter in solution is precipitated from water. Such sediments are derived from the dissolution of materials from older rocks and subsequent transportation of dissolved chemical substances into a sea or lake. These are classified as follow :-

(I) Carbonate Rocks →

Limestone and dolomites are the most abundant carbonate rocks. They are formed by the chemical precipitation of calcium carbonate from sea water.

(II) Salt Rocks →

Evaporation is the major process involved in the deposition of chemical precipitates. The salt deposits formed by the evaporation of saline ~~water~~ lakes are called the Evaporites. The principle minerals of these deposits are chlorides, sulfates of Na, K, Mg, and Ca.
eg. - Rock salt, Gypsum, anhydrites. etc.

(III) Ferruginous Rocks →

This group includes those rocks which are formed by the chemical precipitation of Iron oxides. Such rocks contain a high proportion of Fe bearing minerals such as siderite, Hematite, Pyrite etc.

(IV) Siliceous Rocks →

Siliceous rocks are formed when silica is precipitated from water. eg. flint, Chert, Jasper, Agate.