

# Sedimentary Structure

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# INTRODUCTION

- Sedimentary structure are those structure formed during sediment deposition.
- The sedimentary structure are phenomenon of macroscopic scale and we can watch them in the openings and big specimens.
- They are visible tanks to changes of textural features and mineralogical composition.

# Classification

- Morphologic Classification : It is based on the form or geometry and place of occurrence of sedimentary structure.
- Genetic classification : It is based on the process, involved in the formation or sedimentary structure.

# PHYSICAL STRUCTURES(PRIMARY)

Formed at the time of sedimentation

## A. BEDDING GEOMETRY

Arrangement of sedimentary rocks in beds or layers of varying thickness and character.

### 1.Lamination:

Beds less than 1cm is called as laminae.They are characterised by fine Grained sediments.



## 2.Wavy Bedding:

- . Bedding characterized by undulatory bounding surfaces.  
There is less regular stacking of beds





## B. BEDDING OF INTERNAL STRUCTURES:

### 1. Cross bedding:

Cross bedding is the product of the migration of a mega ripple or sand wave. It may vary in thickness from 3mm to 30 m.



## 2. Ripple Bedding:

Ripple produces a small scale cross bedding on migration. When a current flowing over a bed of sand reaches a certain velocity, sand particles begin to move and rippling appears on the surface of the sand





### 3. Growth bedding:

Growth bedding is applied to stratification produced by the insitu activity of organisms or by chemical precipitation on surfaces of accumulation.



## 4.Graded bedding:

Sedimentary units marked by a gradation in grain size from coarse to fine, upward from the base to the top of the units.



## C. BEDDING PLANE MARKINGS :

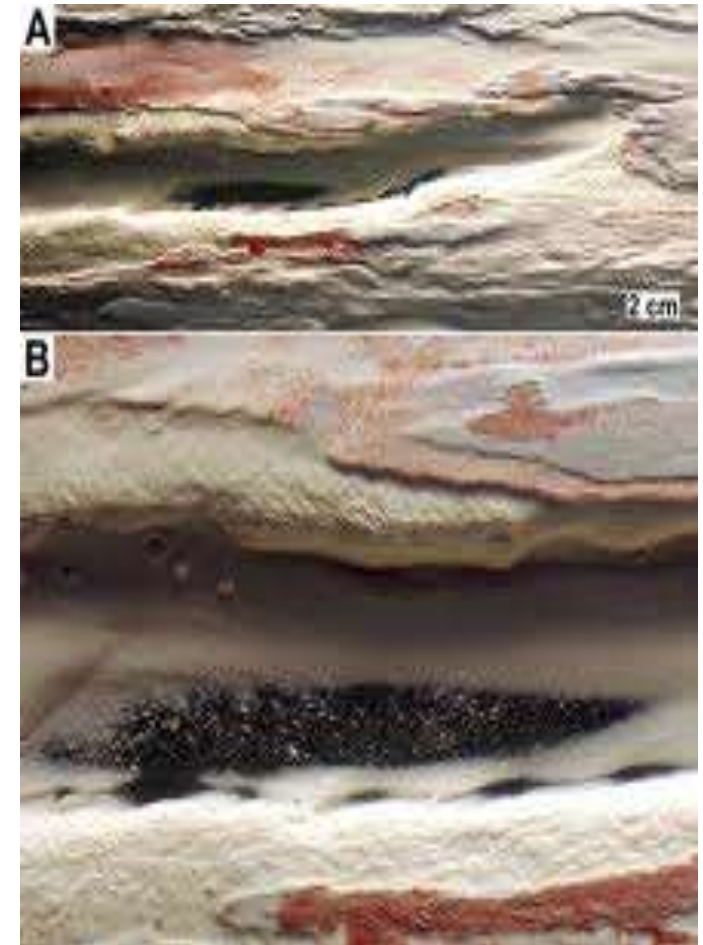
When beds separate readily along bedding planes, the surfaces produced commonly display various markings and structures.

### SOLE MARKS:

These are markings found on the lower side of the beds.

#### 1. Scour marks:

- ◎ They are mainly due to the mercy of current action. They are produced by cutting or scoring action of a current of water flowing over the bottom.



## 2.Tool marks:

- ◎ These differ from scour marks in being produced by object carried by the flow interacting with the bed rather than the flow itself.





## SURFACE MARKS:

Markings present on the surface of beds

### 1.Mud cracks:

Due to the loss of water by drying on exposure, some irregular polygonal fractures are present on the surface of beds.





## 2.Pits and Prints:

- ◎ Rain, hail, and spray impressions are small circular to ellipsoidal pits formed in wet mud .
- ◎ These marks indicate environment or on shore environment of depression.



## D.DEFORMED STRUCTURES :

Gravitational displacements may occur during sedimentation or shortly there after, which deform or alter the depositional structure.

### 1.Load casts:

These are the structures produced by sinking of heavier into lighter sediments.



## 2. Ball and pillow structures:

A structure found in sandstone and some limestone characterized by hemispherical or kidney shaped masses resembling balls and pillows.



# CHEMICAL SEDIMENTARY STRUCTURES

The structures formed by chemical processes such as oxidation, reduction, precipitation and evaporation, etc.

Formed by the action of solutions.

## 1. stylolites:

These are irregular surfaces of one side fit into sockets of like dimensions on the other. In cross section stylolite surface resembles a suture.





## 2.Nodules:

A nodule is generally spherical or irregularly rounded in shape. These are typically solid replacement bodies of chert or iron oxides forms during diagenesis of sedimentary rock.





### **3.Concretions:**

It consists of round or irregular masses of more resistant rock formed as a result of precipitating around a core material usually of fossil or grain of different composition.



## C. COMPOSITE STRUCTURES:

### 1. Geodes:

Geodes are essentially rock cavities or vugs with internal crystal formations or concentric banding. The exterior of the most common geodes is generally limestone or related carbonate rock while the interior contains quartz crystals and or by chalcedony deposits.



## 2. Septaria:

These are large size ranging from 10 to 100 cm, distinctly oblate, nodules characterized by a series of radiating cracks that widen towards the center and dies out near the margin that is crossed by a series of cracks concentrate with the margin.



# BIOGENIC STRUCTURES

These are formed as a result of direct or indirect effect of organic activity.

It means a laminated structure composed of particulate sand, silt and clay sized sediments, which has been formed by the trapping and binding of detritus sedimentary particles by an algal mat.





## Trace fossils:

These are records of life and events that took place in-situ during or soon after the deposition of sediments.

They include foot prints, crawling marks, tracks, trails and burrows





# Applications

- They reflect upon the nature of the environment during sedimentation.
- The style and orientation of ripple marks may also be used as an indicator of which direction the water was flowing at the time of sedimentation.
- Biological structures are useful in places to determine stratigraphic order in a vertical overturned sequence.

# CONCLUSION

- The formation of sedimentary structures involves the cooperative operations of processes like weathering, erosion, transportation and deposition of sediments as well as solution and precipitation and also the accumulation of organic remains.
- The sedimentary structures are large scale features and the study of them help us to understand the environment of deposition, ancient life activities, stratigraphic order of beds, palaeo-current flow direction, etc.

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- Blatt, Middleton, Murray: ORIGIN OF SEDIMENTARY ROCKS. Prentice hall (U.S.A.), 2002, P 127-193

## WEBSITES

- [www.wikipedia.com](http://www.wikipedia.com)
- [www.britanicaonline.com](http://www.britanicaonline.com)
- [www.geology.about.com](http://www.geology.about.com)



The background of the image is a close-up photograph of parched, cracked earth. The soil is a dark, brownish-yellow color, and the cracks are deep and irregular, forming a complex, interconnected pattern across the entire surface. The lighting is somewhat uneven, with brighter areas in the center and darker shadows in the crevices of the cracks.

*Thank you*