

Examrace

Competitive Exams: Sedimentology

Get top class preparation for UGC right from your home: Get [detailed illustrated notes covering entire syllabus](#): point-by-point for high retention.

Sedimentary rocks are made by the accumulation of particles of older rocks, either as clasts (chunks of rocks) or as mineral grains, chemically or biogenically precipitated. Clastic sedimentary rocks are principally classified on the basis of grain size and then further divided in terms of mineralogy. One of the most important things sedimentary rocks can tell us about is palaeoenvironments-ancient environments. This is done by looking at the sedimentary structures and the fossils contained within the rocks. They are also an important resource for oil, gas and coal. This article concentrates on clastic sedimentary rocks. The carbonate tutorial for more information on a chemically precipitated sedimentary rocks.

Classification

Classification of sedimentary rocks is based principally on grain size. Grain size is measured in millimetres and is the approximate diameter of a single grain. There are several aids for estimating grain size in the field as well as more sophisticated aids when using thin sections of sedimentary rocks under a microscope. The table below gives the grain sizes and names of the common sedimentary rocks.

NB: A conglomerate has rounded clasts, a breccia has angular clasts.

Classification of clastic sedimentary rocks based on grain size.

Diameter (mm) -Sediment Name-Rock Type

- Greater than 256-Boulder-Rudaceous-Conglomerate or Breccia
- Between 256 and 64-Cobble
- Between 2 and 64-Pebble
- Between 2 and 0.625-Sand-Arenaceous Sandstone
- Between 0.625 and 0.0039-Silt-Argillaceous siltstone
- Less than 0.0039-Clay-Claystone or mudstone

Textures

Textures in sedimentary rocks depend on the type of grains making up the rock.

- Roundness-the degree of rounding of a grain. Not to be confused with sphericity. Grains can be angular to well rounded. A well rounded grain has generally traveled further before deposition.

- Sphericity-degree to which grain is a perfect sphere. Does NOT depend on roundness.
- Sorting-the amount of different sized grains in a rock. Ranges from very poor to well sorted.
- Matrix or cement-the finer grains in a rock (matrix) or a chemical precipitate (cement) holding the rock together. Common cements are calcite or quartz.
- Competence-the "toughness" of a rock.

Other properties of a sedimentary rock are porosity and permeability. The ability to store fluid (e. g. Oil, gas or water) is the porosity. The porosity is expressed as a percentage and depends on the amount of pore space in the rock. The ability to allow a fluid to pass through a rock is the permeability. Fluid can pass through using cracks, fissures or space between grains. A high porosity rock can have a low permeability if the pore space does not connect in three dimensions

Structures

The structures in a rock tell us a great deal about the palaeoenvironment. This is where one of the great sayings in geology comes in use:

"The present is the key to the past" -the law of uniformitarianism

This essentially means if we can understand what processes occur today, for example, the forming of ripples in a tidal mud, then these principles can be applied to the geological record. Below are some examples of sedimentary structures and what formed them.

A way-up structure tells us which way up the bed was originally deposited. Graded bedding usually occurs with the coarse grains at the bottom. If you find some graded bedding with coarse grains at the top, then the bed has probably been tectonically turned upside down (e. g. By folding).

Cross Bedding (or stratification). The entire dune as around a metre in height. These cross beds were formed in a shallow fluvial environment, which can be determined using the relatively poor sorting of the sandstone.

Mudcracks formed from the drying out of mud and then preserved in the rock. The scale on the left shows centimetres and inches.

Developed by: [Mindsprite Solutions](#)