**Lab 6—Erosion, sedimentation, and sedimentary rocks**

**WHAT ARE SEDIMENTARY ROCKS?**

“Sedimentary rocks are formed from pre-existing rocks or pieces of once-living organisms. They form from deposits that accumulate on the Earth's surface. Sedimentary rocks often have distinctive layering or bedding. Many of the picturesque views of the desert southwest show mesas and arches made of layered sedimentary rock.

**“Common Sedimentary Rocks:**

Common sedimentary rocks include sandstone, limestone, and shale. These rocks often start as sediments carried in rivers and deposited in lakes and oceans. When buried, the sediments lose water and become cemented to form rock. Tuffaceous sandstones contain volcanic ash.

“Clastic Sedimentary Rocks:

Diagram

Description automatically generatedClastic sedimentary rocks are the group of rocks most people think of when they think of sedimentary rocks. Clastic sedimentary rocks are made up of pieces (clasts) of pre-existing rocks. Pieces of rock are loosened by weathering, then transported to some basin or depression where sediment is trapped. If the sediment is buried deeply, it becomes compacted and cemented, forming sedimentary rock. Clastic sedimentary rocks may have particles ranging in size from microscopic clay to huge boulders. Their names are based on their clast or grain size. The smallest grains are called clay, then silt, then sand. Grains larger than 2 millimeters are called pebbles. Shale is a rock made mostly of clay, siltstone is made up of silt-sized grains, sandstone is made of sand-sized clasts, and conglomerate is made of pebbles surrounded by a matrix of sand or mud.

**“Biologic Sedimentary Rocks:** Biologic sedimentary rocks form when large numbers of living things die.

Chert is a example for this type of rock, and this is one of the ways limestone can form. Limestone can also form by precipitating out of the water.” (USGS, 2019b)

CLASSIFICATION OF SEDIMENTARY ROCKS

|  |  |  |  |
| --- | --- | --- | --- |
| **Type** | **Composition** | | **Rock Name** |
| **SILICICLASTIC**  *Formed from broken pieces of weathered rock (clasts).* | rounded cobbles and pebbles (clasts larger than 2 mm), sand, silt, and clay-sized grains | | Conglomerate |
| angular cobbles, pebbles  (clasts larger than 2 mm),  sand, silt, and clay | | Breccia |
| sand-sized grains (clasts between 2 mm and 1/16 mm) | Grains almost all quartz | Quartz Sandstone |
| Significant amounts of K-feldspar grains | Arkose |
| silt-sized grains  (0.004 mm to 1/16 mm) | | Siltstone |
| mixed silt and clay, smooth, hard, breaks into thin chips | | Shale |
| clay-sized grains (smaller than 0.004 mm), smooth, clayey texture | | Claystone |
| **CHEMICAL**  *Crystals within rock formed by inorganic precipitation.* | CARBONATE  *Composed of carbonate minerals such as calcite and dolomite.* | Calcite | Limestone |
| Dolomite | Dolomite/Dolostone |
| Calcite mud, microcrystalline limestone | Micrite |
| Calcite that has precipitated out of groundwater—banded | Travertine |
| Calcite, contains visible shell and skeletal fragments | Fossiliferous  Limestone |
| Calcite, almost entirely shell and skeletal fragments | Coquina |
| Calcite, composed of ooids | Oolitic  Limestone |
| Calcite, micro-skeletal fragments | Chalk |
| EVAPORITE | Gypsum | Rock Gypsum |
| Halite | Rock Salt |
| **BIOGENIC**  *Forms as the result of an accumulation of organic material* | densely compacted organic material and plant fragments, typically black in color | | Bituminous Coal |
| silica (quartz), composed of microorganisms called diatoms | | Chert |

**Lab Exercise: Sedimentary Rock Identification**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Depositional Environment: High or Low Energy? How did the rock form?** |  |  |  |  |  |  |  |  |
| **Rock Name** |  |  |  |  |  |  |  |  |
| **Textural and Other Distinctive Properties—Grain Size/Grain Type** |  |  |  |  |  |  |  |  |
| **Sedimentary**  **Rock Type** |  |  |  |  |  |  |  |  |
| **Sample Number** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **Sample Number** |
|  |  |  |  |  |  |  |  | **Sedimentary**  **Rock Type** |
|  |  |  |  |  |  |  |  | **Textural and Other Distinctive Properties—Grain Size/Grain Type** |
|  |  |  |  |  |  |  |  | **Rock Name** |
|  |  |  |  |  |  |  |  | **Depositional Environment: High or Low Energy? How did the rock form?** |

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