Environmental Geology

Lecture 2

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Rock formation minerals

- There are more than 4000 minerals known
- Only 25 are rock formation minerals
- Constitute most of the rocks of the earth's crust.
- Most of the minerals of the earth's crust fall according to their composition in one of the following groups:
- Silicates
- Oxides
- Sulfides
- Carbonates

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Rock formation minerals

- Phosphates
- Hydroxides
- Halides
- Native elements

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Rocks

- Rocks are aggregates of homogeneous substances, which are usually minerals. Some rocks consist of a single mineral only, such as limestone (which consist of calcite), but the majority consist of several minerals in varying proportions. Rocks are classified on the basis of their origin into three types, Igneous, Sedimentary, and Metamorphic.

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Igneous Rock

- Igneous rocks are solidified from molten material known as magma (or lava). Intrusive igneous rocks are solidified beneath the surface of the earth where slow cooling of the magma resulted in large mineral grains.
- Extrusive igneous rocks are simplified after emergence of the molten material from a volcano or other vent.
- The rapid cooling of the molten material (lava) results in small mineral grains or glassy material.

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Sedimentary Rocks

- Rocks which are formed by the accumulation of sediments in mater (aqueous deposit) or from air deposits. The sediment may consist of rock fragments or particles of various sizes of the remains or products of animals or plants (certain limestone and coal), of the product of chemical action or evaporation (salt, gypsum, etc), or a mixture of these materials. Some sedimentary deposits are composed of fragments blown from volcanoes and deposited on land or in water.

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Sedimentary Rocks

- A characteristic feature of sedimentary deposits is a layered structure known as bedding or stratification. Each layer is a bed or stratum . Sedimentary beds, as deposited, lie flat or nearly flat (parallel or nearly parallel to horizontal plan).

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Metamorphic Rocks

- Formed from igneous and sedimentary rocks under the influence of heat, pressure , and chemically active fluids below the surface of the earth. Sometimes the change occurs in minerals themselves, which turn into other varieties more stable in the different environment of the earth's interior.
- Sometimes the change occurs in the characters of the mineral grains as in the metamorphism of the limestone to marble, or sandstone to quartzite.
- The changes are generally occur in both the mineral composition and texture of the rock.

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Description of igneous Rocks

- 1- Color: Color of igneous rocks, depends mainly on the mineral composition.
- Igneous rocks divided according to color to:
- 1- light
- 2- medium
- 3- dark

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Description of igneous rocks

- 2- Specific gravity G
- G of igneous rock depends also on the mineral composition and it divided to
- 1-Low G<2.7
- 2- Medium G=2.7-3.0
- 3- High G>3.0

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Description of igneous rocks

- 3- Texture
- The general physical appearance of a rock as shown by the size, shape, and arrangement of the particles that make up the rock
- And it divided to:
- a- Pegmatitic
- Mineral grain are more or less equigranular (of the same size), and can be seen easily. They are generally greater than 1 cm in size (diameter).

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