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CLIMATE CHANGE AND CONSERVATION OF GEOGRAPHICAL AND ROCK CYCLE

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ABSTRACT

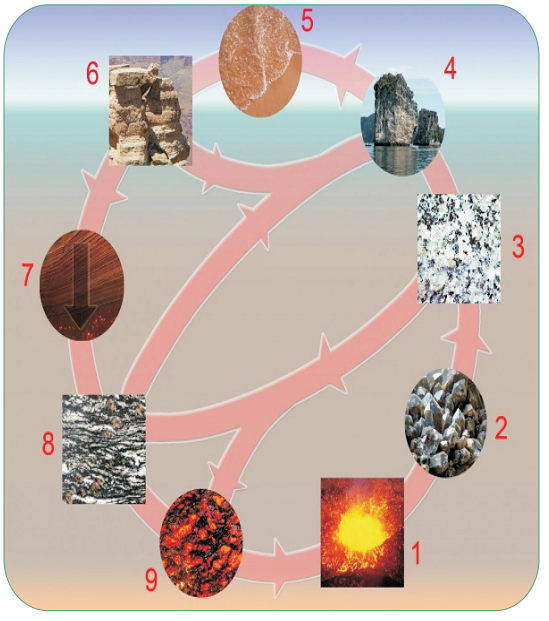
When the earth was first created, the materials that it made were so hot from the contractions that formed the planet and from the heat generated by the core that the outer layers were mostly liquid. Over time, it slowly cooled, and a hard crust formed on the outer surface. This was much like the thin layer of ice that first forms over a pond when the temperature dips below freezing. And just as there is liquid under the layer of ice, there is still liquid magma flowing under the crust. As this happened, a cycle of events began to be put into place that causes changes in the rocks that exist on the earth. This cycle is known as the rock cycle. The rock cycle is a model used to describe the creation, alteration, and destruction of the rocks that form from magma.

KEYWORDS :*Rock Cycles, dynamic, Evolving system, Ferromagnesium, Carbonates.*

INTRODUCTION=

The other two sub-cycles of the geologic cycle are the geochmiiirnl find cycle is a sequence of processes that produrnK imorphic rocks. The geochemicnl and rock cycles are clsosly related to one another and intimately related which provides the water necessary for many physical and chemical processe.

In summary, earth materials such as minerals, rocks, Soil and water as well as land forms such as ocean basins and mountain rannen are constantly being created, maintained and destroyed by internal and external processes including the biologic processes in numerous parts of the geologic cycle. Thus we see that Earth is a dynamic, evolving system, changing in a consistent pattern



according to the fundamental principle of uniformitarianism.

TYPES OF ROCKS

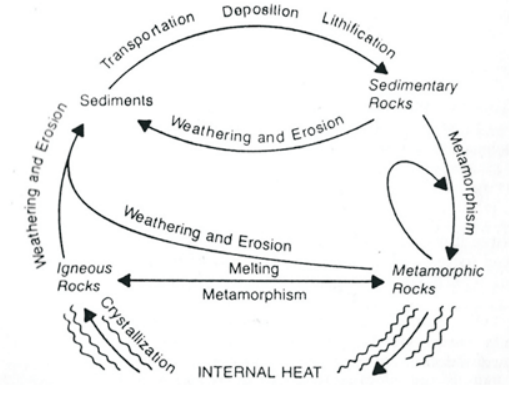
Our discussion on the generalized rock cycle has established that there are three rock families, viz. igneous, sedimentary and metamorphic.

Igneous rocks have crystallized from a naturally occurring mobile mass of quasiliquid earth material known as magma. Wheu magnm crystallizes below the earrth's surface, intrusive igneous rock is formed, e.g. granite rocks. However, extrusive igneous rocks are formed when magma reaches the surface and is blown out of a volcano or pyroclastic debris flows out as lava. Examples of igneous rocks include basaltic rocks.

Sedimentary rocks are formed when sediments are weathered, transported, deposited and then formed into rock by

natural cement, compression or other mechanism. Biochemical processes are specially significant in weathering, depositing, cementing and transporting the sediments. Two major types of sedimentary rocks are: detrital sedimentary rocks which are formed from the broken parts of the previously existing rocks and chemical sedimentary rocks, formed from chemical or biochemical processes that remove materials carried in chemical solution. The detrital sedimentary rocks include the shale, sand stone and conglomerate whereas chemical sedimentary rocks include limestone and salt. Rock salt forms when shallow seas or lakes dry up.

Metamorphic rocks are changed rocks. Heat, pressure, and chemically active fluids produced in the tectonic cycle may change the mineralogy and texture of rocks. This, in effect, produces new rocks. There are two types of metamorphic rocks, i.e. foliated rock and non-foliated rocks. Foliated rocks occur in layers like the pages of a book, e.g. slate, schist and gneiss. Non-foliated rocks occur without any preferential alignment or segregation of mineral grains, i.e. quartzite and marble.



I : Idealized diagram of the rock cycle.

Rock forming minerals -

To understand the Earth's lithosphere as part of the environment, we should be familiar with some of the physical and chemical qualities of the major minerals as they relate to soil fertility, their ability to hold water and their potential as a resource or a pollutant.

Silicates. These are the most important rock-forming minerals. The three most important rock-forming silicate minerals or mineral groups are quartz, feldspar and ferromagnesium.

Quartz. One of the single most abundant minerals in the earth's crust, this is generally a hard, resistant mineral composed entirely of silicon and oxygen. It is often white or clear, but due to impurities it may also be reddish, purple, or of any other colour.

Because quartz is highly resistant to natural processes that lead to the breakdown of most minerals, it is the common mineral in river sands and most beach sands.

Feldspars. The most abundant and perhaps the most important groups of rockforming minerals in the earth's crust these are aluminosilicates of sodium, potassium, and calcium. They are generally white, gray, or pink and are fairly hard. Feldspars are important commercial minerals in the ceramics and industries.

Feldspars wither or break down chemically to form clays, which are hydrated aluminosilicates. Clays cause many problems, but they are also very useful. For example, some clay minerals expand and contract greatly upon wetting and drying, and the resulting changes hi volume may damage structures such as houses, streets, and sidewalks. On the other hand, clays are extremely important to life. Some scientists believe that clays played a crucial role in the origin of me. Their fine internal structure, where chemical elements collect and are hold, many have provided sites where some large compounds that

were precursors to life first formed. Today the ability of clays to hold onto chemical elements necessary for life is an important factor in soil fertility.

Ferromagnesium. These minerals are a group of silicates in which the silicon and oxygen combine with iron and magnesium. Generally found as dark minerals in most rocks, they are not parti¬cularly resistant to weathering and erosional processes and therefore tend to be altered or removed relatively quickly. Common weathering products may be oxides such as limonite (rust), clays, and soluble salts. Ferromagnesium minerals, when abundant, may produce weak rocks, so caution must be exercised in evaluating construction sites for highways, tunnels, and reservoirs when these rocks are encountered.

Carbonates. From an environmental point of view, the most important carbonated mineral is calcite, which is calcium carbonate. Most calcium carbonate is formed by biological activity. Some organisms use calcium carbonate directly in bones, shells, which are then deposited. Other organisms, such as algae, induce changes in water chemistry that facilitate the precipitation of calcium carbonate. Calcite is the major constituent of limestone and marble—two very important types of rocks. Because water can weather calcite by dissolving it (putting it hi solution), both limestone and marble may have solution pits or caverns associated with them. Cavern systems may carry groundwater, and water pollution problems in urban areas over limestone bedrock are well known. Furthermore, construction of highways, reservoirs, and other structures is a problem where caverns are likely to be encountered.

Sulphides. The sulphide minerals, such as pyrite or iron sulphide (fool's gold) are sometimes associated with serious environmental problems, particularly when roads, tunnels, or mines cut through rock such as coal which contain sulphide minerals. When in contact with surface water or air, the minerals oxidize to form compounds such as ferric hydroxide and sulphuric acid. The acid water thus produced is a major problem in the coal regions of the Appalachian Mountains and other areas.

Metal oxides. Metallic elements react with free oxygen hi the atmosphere to form metal oxides. Some of our most important mineral resources occur hi this form. For example, iron and aluminium, the most important metals in our industrial society, are both mined from deposits which are oxides of these metals.

Native elements. Last group of minerals include the vaiifcmoii native elements, such as gold, silver, copper and diamonds, tfMhave long been sought as valuable minerals. The native elements pftrally occur in rather small accumulations, but occasionally are found in sufficient quantities to justify mining. As we continue to mine these valuable minerals in lower-grade deposits, the environmental impact will continue to increase.

Floral & faunal species continuity between biogeographic regions -

The organic matter of the soil supports a complex microflora and fauna and often a complex biota of higher organisms. Myriads of bacteria, protozoans, worms, crustaceans, a series of arachnids, insects and many vertebrates live in the soil. An equally varied group spend a part of their Me underground. A series of burrowing mammal's digout their dens in ground with their orifices among the large roots of trees. All these groups can be classified as follows:

1. Microflora. It includes bacterial, soil fungi and algae. Soil bacteria grow fairly well in neutral soil whereas soil fungi are found in acidic soils. The common nitrogen fixing bacteria of soil are Rhizobium, Azobacter and Clostridium. Fusarium, Anabaena, Nostoc, Microcystis and Oscillatoria are important nitrogen fixing blue green algae of soil. Symbiotic fungi live on the roots of plants where as fungi depend on the dead organic matter of the soil.

2.Microfauna. Protozoa, rotifers, mites, nematodes, copepods collectively constitute the microfauna. The size of these animals vary from 20 µ to 200µ. Protozoans like amoeba, ciliates and flagellates occur near the surface soil whereas Euglypha and Diffugia have a wider vertical distribution. Common

nematodes are Rhabditis, Diplogaster, Heterodera and Pratylenchus.

3.Mesofauna. The animals ranging in size from 200µ to 1 cm constitute mesofauna. Among insects, Collembola is the main soil insect. The termites like Reticulotermes and Odontotermes are important soil dwellers. Among the Hymenoptera, ants are the most important soil dwelling animals. Mites flourish hi the moist organic soil. Porcello and Oniscus are the common isopod crustaceans. Among Annelids, Enchytraecus and Achaeta are abundant hi organic soils.

4.Macroflora. Soil supports a wide variety of plants like herbs, shrubs and trees. Plants growing on acidic soils are called as Oxylophytes. Those growing on saline soils are called as Halophytes. Whereas the plants growing on sand are called as Psammophytes. Plants that grow on rock surface are called lithophytes whereas those which grow on rock cervices are called as chasmophytes.

Animals living in the soil are adapted to that mode of hfe. The shape of their body is either cyhndrical, spindle shaped or fusiform so as to offer the latest resistance to subteranean passage. The head tapers entirely to form the snout that helps in burrowing. The tail of soil animals is short or vestigial. Their eyes also tend to be adapted for digging.

CONCLUSION

The Hydrologic Cycle is constantly happening all around us each and every day and is an essential part of life. It is necessary so that we have shade from clouds, to water our plants with the falling rain, and for fish to swim in.

Igneous can change to Metamorphic, Metamorphic to Sedimentary,Sedimentary to Igneous or Igneous to Sedimentary. Sedimentary to Metamorphic or Metamorphic to Igneous.

All these rocks can even change straight back to their original form. In conclusion all rocks can form into anyother type of rock. With the process of melting and cooling, weather and erosion and heat and pressure. With these three processes and time the rock cycle was created.

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