# Earth science and society term paper

Science, Geology



#### The paths of water through the hydrologic cycle

One of the most fundamental principles in hydrology and ecology is the hydrologic cycle. This cycle represents the process of water circulations from the oceans, atmosphere, land and back to the ocean. The energy driving the cycle is from the solar/sun and forces of gravity. The process is continuous, and is a global wide process ensuring that every water drop on earth is part of the system (Harper et al n. d).

At the beginning of the process, water from the seas, lakes, wetlands, rivers gain energy from the sun and get transferred to the atmosphere as vapor. The sun provides the energy to transfer water from oceans, lakes, rivers, wetlands, bare soil, vegetation, and vegetation to the atmosphere as a water vapor in a process called evaporation. Initially in plants, soil water rises through living plants to the atmosphere is called transpiration. The simultaneous occurrences of the two processed is called as evapotranspiration.

As the density of water in the atmospheres increases and due to force of gravity, the water fall on the earth service in the form of precipitation or rains. Some of the rainfall is intercepted by the vegetation cover. In the process, intercepted rainfall drip to the soil and some of the water evaporates back to the atmosphere again. The rain water that reaches the ground is the net rainfall. On the earth surface, portion of the water enters the soils profiles in a process called infiltration. The water that that is not infiltrated flows on the land depending on the topography and gravity. In the process of flowing, some of the water also continues to be infiltrated into the soil profiles. The flowing water gets to the river and eventually to the lake and the seas where the process starts all over again (Harper et al n. d).

#### An example of a specific food chain

Like in any other typical food chain, the main source of energy in is the sun which enables the grass manufacture its on food through the process of photosynthesis. The grass therefore becomes the producer since; it is this energy that will flow through the food chain. The grasshoppers which feed on the grass are eaten by snakes which are the secondary consumers. Hawks feed on snakes which in this chain is the tertiary consumer. All the animals in the chain get decomposed by fungi and all the energy in the nutrients is returns back to the soil for the plants (Tarbuck et al. 2008).

#### **Characteristics of food chains**

Various analyses into various food chains have shown a decrease in the number, energy and biomass occupying each tropic level in the food chain. This results in the ecological pyramid. There are three ecological pyramids, namely pyramid of numbers, of energy and of biomass. In a typical food chain, members in each successive highly tropical level are fewer in numbers. Likewise, the pyramid of energy depicts reduced amount of energy and matter transferred through food to the successive higher tropical levels. This implies that there is larger amount of energy in the form of food at the level of producers than at the primary consumers. Similarly, at the tertiary consumer level, or secondary carnivores is produces the leas a mount of energy. The pyramid of biomass in the same way indicates that ' the total weight of dry matter' in the food chain decreases as you approach the tertiary consumers or higher tropic levels (Tarbuck et al. 2008).

# Differences between geographer's and biologist's approach to the study of organisms

In study of organisms in the ecosystems, geographer's approach is different from biologist's. In the study of the organisms' distributions, geographers investigate spatial patterns and dynamics all the interrelationships between the species and the environment. While the geography is concerned with the natural non living environmental, the biologist in concerned with organisms and those features that adapt them to the environment and all elements that support life in the particular habitats (CCER, 1997).

#### **Biomes and zoogeographic regions**

A biome is geographical sections of the earth often called ecosystems, defined by similar climatic conditions as depicted by similarity in patterns of communities of animals, plants and types of souls in them. They are composed of biotic and abiotic factors. Such factors as plant structures e. g. species of trees, shrubs, and grasses; leaf sizes and shapes; plant spacing (forest, woodland, savanna), and climate define the boundaries of the biomes.

A zoogeography is region is any of the six geographical divisions of the world selected for ecological researches and studies about the distribution of nonaquatic animals. The region are also called faunal regions which consists of the Nearctic (North America), the Palearctic, the Neotropical (South America), the Afrotropical (formerly 'Ethiopean') (Africa south of the Sahara), the Oriental (Asia south of the Himalayas) and the Australasian (Australia, New Zealand and nearby islands). These regions were demarcated for studies only and not naturally defined like the biomes. **Compare/contrast the floral characteristics Desert and Tundra biomes** While the deserts are naturally hot, the tundra is usually cold. While the deserts are located around the equator, tundra is located near the poles. Both deserts and tundra experience short and minimal rainfalls of as little as 10 inches or less per year. In both livings are able to adapt accordingly, though in the deserts they adapt to hot weather conditions while in the tundra organism adapt to cold weather. In since both tundra and deserts each covers around 20% of the earth's surface (Tarbuck et al. 2008).

## The difference in soil development in adjoining soils developed on forested, sloped area versus a grassed flat area

Geographical studies have confirmed that there exists strong relationship between topography of a place the process of soil formation. For examples, areas with dry grassland depressions are normally covered by vegetation because of the water richness in soil contents thus resulting in different soil types in depression than other adjacent areas. The topography of a given place determines the amount of rate and amount of water absorbed into the soil and angle at which the sun rays strikes the surface.

Subsequently, the soil temperature and moisture is eventually affects the process soil formations. The angles of elevation or otherwise gradient of topography, affect the vegetation and the soil type and structure. For example in the British Colombia, on the sloppy mountainous regions, the climates gets warmer and less wet as the elevation decreased from the lower altitude of the mountains. Theoretically, slope affects:

• The extent of water infiltration into the soil:

- the magnitude of soil erosion, and
- Vegetation distribution.

#### What are the soil-forming factors?

Apart from topography, there are other factors that affect the process of soil formation which include the following:

- Parent material: these areunconsolidated material or the type of stratum rocks in which soil development begins at the core of the earth.
- Climate: average long time whether condition such as rainfall and temperatures
- Biota: the composition of living biotic factors such as vegetation, human activities microbes, soil animals etc.
- Topography: the element of elevation or slope or tilting.
- Time: the age of the parent materials in the process of soil formation

The interaction of these factors explains the differences in soil profile, type

or structure within and between regions.

# Explain the importance of the nature of the parent material to soil formation and type.

The nature of the parent materials largely affects both texture and the

mineral compositions of the soil.

## Continental drift and Wegener's tectonic theory of Pangaea breaking up since the time of 5 separate continents 450 million years ago.

The shapes of the continents and geological studies provide sufficient

evidence that the earth's surface was initially one piece of land mass.

Initially there was one large land mass which geologists have give n the name Pangaea. Geologists argue that mechanical and chemical processes of volcanoes and earth quakes in the earth's stratum caused weakening of the land mass which eventually led to breaking into smaller pieces of land masses. The continued process further caused the drifting further and separation to the extent of today's positioning of the continents. The drift theory allude that the movement of the land masses is only to an extent of 200Km (Van, 1994).

Contrastingly, Wegener's recent tectonic theory claims that the ach of the continent have moved for up to at least 7000km since the breakup of the Pangaea. While the theory does not provide evidence of motions, satellite measurements confirm the specific continental and regional crustal strains and stresses and the direction of movements.

The two theories therefore have common foundation and A ' compelling' piece of proof initially the earths land masses were once united as Pangaea and that they can be fitted together like pieces of a jigsaw puzzle (The Bible According to Einstein, 2004).

#### The Pleistocene and an interglacial stages

Geologic time has been somewhat difficult and complicated to describe using animal sciences even despite the availability of fossils records. Pleistocene scientifically describes a period 1. 9 million to 10, 000 years ago usually characterized recognizable changes in animal fossils. The fossils indicate extinctions or enormous environmental changes since then. Scientists believe that we are in the glacial stage and that this Pleistocene period is

Page 8

over since there has never been significant change in the species or evolution after the 10000 years ago.

All though it is not easy to sum up the actual events from each region, scientists agree that the beginning of the Pleistocene era began with an overall global cooling and the entire process is entire over. First proposed in 1839 by British geologist Charles Lyell, the Pleistocene studies explains the sequence or many of layers of rocks (Dickins et al, 1992).

Later, other geologists' researches and studies in Europe and other continents revealed that glaciations had occurred at about the same time. Some evidence of deposited strata was found in Italy. Eventually, further researchers and analysis compiled together all the evidence which confirmed that the Pleistocene was a period of great global cooling. In the period, vast glaciers and ice sheets formed at the North and South Poles and at other all high altitudes on the planet (Van, 1994).

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