GEOGRAPHY

SECOND TERM NOTE/ SCHEME OF WORK FOR SS 2

INSTRUCTION: All students must print the second term note and must be attached to the previous term

WEEK TOPIC

1 Action of Running Water (Last term)

2. Action of Wind in the desert (last term)

3 Action of Waves (last term

4. Mass Movement

5. Karst topography

6. Weathering

7. Temperature

8. Rainfall

9. Map Reading

10. Map Reading

11. Map Reading

12. REVISION/EXAMINATION

WEEK FOUR

TOPIC: MASS MOVEMENT

Mass movement can be defined as the movement of weathered materials (regoliths) on slope under the force of gravity. It can also be referred to as the movement of rock materials from one place to another under the influence of gravity.

Factors Affecting Mass Movement

These are factors that affect mass movement:

Gradient of the slope

Human activity

Natural and weight of materials

Pressure of lubricating moisture

Presence of vegetation

1. GRADIENT OF THE SLOPE: The gradient of the slope is one of the most important factors that affects mass movement. For example, rock materials move faster in steep slopes or hilly areas than in gentle slope.

2. HUMAN ACTIVITIES: The activities of man like construction, farming/agriculture, grazing, mining on the slope of mountains or highlands to promote or reduce the movement of rock materials.

3. NATURE AND WEIGHT OF MATERIALS: it is noted that the loose rock materials tend to move faster than tightly held materials, i.e. the heavier the weight of the materials, the slower the movement.

4. PRESSURE OF LUBRICATING MOISTURE: The presence of lubricating moisture like rain water, ice etc, tends to produce, promote or increase the movement of rock materials down the slope.

5. PRESENCE OF VEGETATION: The presence of vegetation can either increase or reduce the movement of rock materials.

TYPES OF MASS MOVEMENT

There are two main types of mass movement

Slow movement

Fast movement

1. SLOW MOVEMENT: They are more effective in areas of chemical weathering. There are three most important which are (i) Soil creep (ii) Tallus creep (iii) Solification

SOIL CREEP: It is a slow, almost unnoticeable continues movement of weathered materials down a slope under the influence of gravity. It operates on a very gentle slope and the speed of the movement would be as slow as 1cm per year. This movement is aided by water which acts as a lubricant which enables rock materials to creep over each other. Alternative wetting and drying, heating and cooling of soil etc. are other factors that influence soil creep. Soil creep can be noticed when fence or trees bend towards the direction of movement of the soil in a gentle slope, electric and telegraphy pole are titled, vertical rock layers are covered down slope, leaning on tree trunks and down slope, bulging of walls and fences soil accumulated behind walls which may collapse as a result of the soil erosion.

TALUS CREEP: This is less perrasive thin soil creep. Talus creep is the movement of angular rocks down moderately through steep slopes. Large talus creep move enmass especially in mountainous region where freeze – thaw action is frequent.

SOIL SLOPE: This is a slightly faster movement usually are raging 5cm and 1m a year on moderate slopes. It occurs on temperature and polar regions. During the winter, the whole ground is frozen. In the summer, the surface layers thaws while the ground is still frozen. The saturated top soil may now begin to move on active layer over the frozen sub soil.

2. FAST MOVEMENT – TYPES

i. Land slide (ii) Rock fall (iii) Earth flows and mud flows

LAND SLIDE: This takes place when large quantities of loosed surface rocks and soil suddenly slide down and the steep slope such as a cliff face, a valley’s side or embankment. Landslides are caused by the lubricating acting action in water and pull off gravity. The actions that help to produce a land slide are the undercutting of the base of steeps slope by a river or sea or by human action. They are often triggered off by an earthquake or by prolong erosion

ROCK FALLS: This refers to a mass of rock which falls from a steep cliff. This type of mass wasting is the most rapid of it. When this continues for a long period of time, the broken rock coils at the base of the slope in mould

EFFECTS OF MASS MOVEMENT

It can lead to loss of farmland

It can lead to displacement of settlement

It can cause destruction of transportation network

It can lead to tilting of electric and telegraphy poles

It can cause the damage of rivers

It leads to loss of soil fertility

DIFFERENCES BETWEEN EROSION AND MASS MOVEMENT

1. Erosion is the gradual removal of the topsoil while mass movement is the movement of loose rock materials down slope.

2. Agents of erosion are running water, winds, waves and glaciers while that of mass movement entails the force of gravity.

3. Erosion involves scratching, polishing, pushing and plucking of loosed rock surfaces while mass movement involves creeping, flowing, sloping, sliding and falling.

WEEK 5

WEATHERING

Weathering is the breaking down or dissolving of rocks on the surface of the Earth. The process of weathering breaks down and removes material from the coastlines. Weathering wears away exposed surfaces over time. There are many types of rocks and some are more vulnerable to weathering than others. Weathering is also the first step to producing soils, as the angular or harsh edges of rocks become rounded and smaller in size. The tiny bits of weathered material sometimes mix with plants, animal remains, bacteria and other organisms to create soil. A single type of weathered rock creates infertile soil, whereas weathered materials from different rocks produces more fertile soil

TYPES OF WEATHERING

The three types of weathering are:

1) Mechanical weathering

2) Chemical weathering

3) Biological weathering

 Biological Weathering

Biological weathering is the weakening and wearing away of rock by plants, animals and microbes. For example, plant roots can enter a small crack in a rock and then as the root grows larger the crack in the rock gets larger. This weakens the structure of the rock until it eventually breaks away

 CHEMICAL WEATHERING

Chemical weathering is when the molecular structure of rocks and soils are changed, therefore becoming weaker and eroding away. Examples of chemical weathering are

I) Solution: Chemical weathering is usually a result of rain or saltwater being slightly acidic. Sometimes coastlines are made up of rocks such as limestone or chalk and these types of rock can be affected by the acid in the water which then dissolves the rock over time.

Ii) Carbonation: An example of this is carbonic acid which is only a weak acid but is really effective at dissolving limestone. When carbonic acid seeps through limestone underground, it can create huge cracks or even open up lots of little caves.

III) Oxidation: Another type of chemical weathering involves rocks that contain iron. These rocks rust due to a process call oxidation. Rust is created by the interaction of oxygen and iron with water. As the rust expands it can weaken the rock and break it apart! This image below shows an example of rust.

iv) Hydration. This is the most important chemical weathering process. Hydrogen in water react with minerals in the rocks, instead of the water dissolving the mineral, it combines to transform it into a new form eg is Feldspar changes into residual clay deposits known as Kaolinite.

 MECHANICAL

Mechanical weathering is sometimes called physical weathering, and it describes the process of rocks crumbling. Water is the key agent in mechanical weathering. Temperature changes are also a main agent in mechanical weathering. The main type of mechanical weathering is

1) Freezing and Thawing

Freeze-thaw weathering is when rocks have holes (this is also called porous) and water is able to pass through the rocks. If water is able to pass through the rock it is called a permeable rock. Freeze-thawing happens when water goes into a crack in the rock and then freezes when the temperature drops below freezing. The frozen water then expands, widening the rock. The ice then melts when the temperature rises again and the water makes its way further into the cracks in the rock. The process then repeats over and over again until the rock completely breaks apart.

2)Temperature changes is Another type of mechanical weathering is a process called thermal stress. This is when changes in temperature cause rocks to expand and contract. Rocks expand in the head and contract in the cold. The process repeats over and over again and weakens the rock more each time. This is common in areas such as rocky deserts where the temperature changes drastically from day to night

3) Alternate wetting and drying Another type of mechanical weathering is when materials such as clay which are porous are near rocks. The clay will absorb lots of water and expand, eroding the harder rock around it. It shrinks when is dry. Alternate swelling and drying will lead to breakdown

4)Action of plants and animals. Animals also play a part as an agent of weathering. Animals that live or roam underground, such as moles, might also break apart rock and soil. Some animals also dig and trample rock that is above ground, causing the rocks to crumble o

break away. Plants roots penetrate the root and lead to break down

Factors Affecting weathering

1) Climate: Element like rainfall and temperature are the major factors affecting weathering

2) Types of Rocks: Rocks consist of different minerals, some are resistant to weathering while others are not.

3) Relied: Weathering are faster on a steep slope than on a gentle slope

4) plants and animals. The action of plants roots and animals like rodent has great influence on weathering.

WEEK 6

KARST TOPOGRAPHY (LIMESTONE REGION)

MEANING:

Limestone region refers to a large stretch of land occupied by limestone which possesses a unique type of topography. Limestone is a sedimentary rock of organic materials made up of calcium carbonate. They are derived from accumulation of corals and shell in the sea. When magnesium is present it is termed DOLOMITE. Chalk is a very pure form of limestone, white and rather soft.

 CHARACTERISTICS OF KARST TOPOGRAPHY

1. SOLUBILITY: Limestone is in soluble but is made soluble by the action of rain

water which dissolves carbon dioxide to form a weak acid which in turn acts upon it (limestone) to make it soluble.

2. ABSENCE OF LUXURIANT VEGETATION COVER: There is complete absence of thick vegetation cover in limestone region.

3. ABSENCE OF SURFACE DRAINAGE: Most surface water flow for a short distance and disappears underground due to easy permeability of the region

4. JOINTS AND RUGGED TOPOGRAPHY: Limestone regions are well jointed, and stony with broken landscape

5. DRY SURFACE: Due to easy penetration of water in limestone regions, all valleys are usually dry. Water on meeting hard rock underground may reemerge below the limestone as spring or Resurgence.

6. PRESENCE OF DEPRESSION: Limestone regions contain depression of varying sizes and depth.

 SURFACE FEATURES OF KARST REGION

1. GRIKES: Grikes is a surface feature in a limestone region. It is formed as a result

of progressive widening of cracks or joints by solution form limestone pavement. Such enlarge pavements or joints are called grike

2. CLINTS: Clints are surface features of isolated and rectangular block which exist between the joints or grikes.

3. SWALLOW HOLES OR SINK HOLES: These are also surface features; they are small depression carved out by solution.

UNDERGROUND FEATURES

1. CAVES AND CAVERNS: These are underground features of limestone region. There are large underground spaces formed as a result of the sinking and flowing of water into the limestone through joins and bedding planes.
2. LIMESTONE GORGE: This has vertical sides formed when the roof of an underground RESURGENCE OR SPRINGS: These results from water sinking into the underground. When the water meets hard rock underground it reemerges below the limestone to form spring or resurgence.

3) STALACTITES: They are found in caves and they grow up, downwards and may dis-stalagmite to form to form pillars. There are sharp slender and downward growing pinnacles that hang from the roof of the caves.

4)STALAGMITES: These are also underground features of limestone region. There are formed when water drips down stalactite to the floor; evaporation then occurs while calcium is deposited, leading to the formation of stalagmite. They are shorter, fatter and more rounded.

5)PILLAR: Natural pillar is formed by the joining of the stalactite hanging from the roof to the stalagmite growing from the floor of the cave.

 DIFFERENCES BETWEEN STALACTITE AND STALAGMITE

1. Stalactite hangs on the cave roof while stalagmite grows from the floor of the cave.

2. Stalactite is needle-shaped feature while stalagmite is thicker than the stalactite.

3. Stalactite grows downward towards the floor of the cave while stalagmite grows upward towards the roof of the cave.

4. Stalactite joins the upward growing stalagmite while stalagmite meets the downward growing stalactite to form pillar.

5. Stalactites are formed by the leftover of calcium carbonate from the roofs of the Cave while stalagmites are formed by the drops from the stalactites.

IMPORTANCE OF KARSTS TOPOGRAPHY

i. Limestone region provides limestone which is an essential raw material which is often used as building materials or quarried for the cement industry. In Nigeria, limestone deposits at Ewekoro, Sagamu, Nkalagu, Calabar and Sokoto are used for the cement industries.

ii. Limestone is used for the smelting of iron and tin; for example, in the Ruhr valley of Western Germany, limestone which is used as flux, is got and used in the iron and steel plant of the region. iii. Limestone region support the growth of poor grass and short turfs for the grazing

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WEEK 7

TEMPERATURE

This is defined as the degree of hotness or coldness of a place.

 Factors that influence the temperature of a place

 1) Latitude 2. Altitude 3. Continentality 4. Ocean Currents and Winds 5. Slope, Shelter and Aspect 6. Natural Vegetation and Soil.

Latitude. Due to the earth’s inclination, the mid-day sun is almost over­head within the tropics but the sun’s rays reach the earth at an angle outside the tropics. Temperature thus diminishes from equatorial regions to the poles

 Altitude: Since the atmosphere is mainly heated by conduction from the earth, it can be expected that places nearer to the earth’s surface are warmer than those higher up. Thus temperature decreases with increasing height above sea level. This rate of decrease with altitude (lapse rate) is never constant, varying from place to place and from season to season. But for all practical purposes, it may be reckoned that a fall of 1°F. occurs with an ascent of 300 feet or 0.6°C. per 100 meters. It is usually more in summer than in winter.

3. Continentality: Land surfaces are heated more quickly than water surfaces, because of the higher specific heat of water. In other words, it requires only one-third as much energy to raise the temperature of a given volume of land by 1°F. as it does for an equal volume of water. This accounts for the warmer summers, colder winters and greater range of tem­perature of continental interiors as compared with maritime districts.

4. Ocean Currents and Winds: Both Ocean currents and winds affect temperature by transporting their heat or coldness into adjacent regions. Warm Current increases the temperature of the adjacent coast land while Cold currents also lower the summer temperature, particularly when they are carried landwards by on-shore winds. Warm air to temperate coasts, especially in winter.

 5. Slope, Shelter and Aspect: A steep slope experiences a more rapid change in temperature than a gentle one. Mountain ranges that have an east- west alignment like the Alps show a higher temper­ature on the south-facing ‘sunny slope’ than the north- facing ‘sheltered slope’.

6. Natural Vegetation and Soil: There is a definite difference in temperature between forested regions and open ground. The thick foliage of the Amazon jungle cuts off much of the in-coming insolation and in many places, sunlight never reaches the ground. It is, in fact, cool in the jungle and its shade temper­ature is a few degrees lower than that of open spaces in corresponding latitudes. During the day trees lose water by evapotranspiration so that the air above is cooled. Relative humidity increases and mist and fog may form. Light soils reflect more heat than darker soils which are better absorbers. Such soil differences may give rise to slight variations in the temperature of the region. As a whole, dry soils like sands are very sensitive to temperature changes, whereas wet soils, like clay, retain much moisture and warm up or cool down more slowly.

 LAPSE RATE... This is the decrease in air temperature as one ascends into the atmosphere. For every 100m of ascent, temperature decreases by O.65°C or by 6.5°C for every 1000M of ascent Class work/calculation

 TEMPERATURE INVERSION

This is defined as the increase in temperature with increasing altitude. lt is the opposite of lapse

rate. Temperature could be lower at sea level especially in valleys enclosed by mountain

WEEK 8

TYPES OF RAINFALL

There are three main types of rainfall namely

1) The orographic

2) The Convectional

3) the cyclonic of Frontal

 OROGRAPHIC OR RELIEF

 Mode of formation

Rainfall occurs when warm moist air that has been blowing over bodies of water is forced to rise on reaching physical barriers such as highlands. The rising air cools at about 1 degree Celsius per 100 metres and condenses when relative humidity is at around 100%. The water droplets formed in water vapour clouds eventually grow heavier as more and more condensation occurs until gravity pulls them down to the Earth as rain. The side of the mountain that is continually subjected to the prevailing winds is called the windward side. The opposite or leeward side is where the dry air descends after its moisture has been released in the form of rain showers.

Characteristics

-It is associated with mountainous region

-windward area has rainfall while leeward has little or no rainfall

-it is characterized with ascending and descending air

-Rain shadow is experiences at the Leeward side

CONVECTIONAL RAINFALL

Mode of Formation occurs over land that is subjected to the Sun's intense heat. Terrestrial radiation coming form Earth's surface heats up the lower levels of the atmosphere. This warm air (sometimes called thermals) begins to rise through the atmosphere at speeds of up to 25 metres per second due to its low pressure until it reaches a level where it starts to cool adiabatically. On reaching saturation point water droplets form in clouds, eventually leading to rainfall. Convectional rainfall can become intense if there is steady stream of warm rising air to fed a cumulonimbus cloud.

 Characteristics

-It is Short lived and characterized with heavy wind, lightning and thunder

-Rain fall within limited area

-the sky became clear immediately after the rain

-it rain usually in the afternoon

-it is called cumulo-nimbus

FRONTAL OR CYCLONIC

Mode of Formation

Rainfall occurs at the boundaries of two air masses of varying temperatures and densities. One air mass is usually forced upwards and over the other and this instability leads to the development of showers, following the rising, cooling and condensation process. Often at a cold front the lighter warm air is pushed over the heavier and denser cold air mass. However, at times a mass of warm air moves faster than the colder air thereby vertically displacing it at the boundary. There are several permutations of cyclonic weather when warm and cold air masses interact differently.