22. 06. 2021

WEATHERING

1) Define weather

Ans Weather is the atmospheric condition like air temperature, air pressure, rainfall, wind, humidity, cloud etc for a short period of time (24 hours) in a small area.

2) Define Climate

Ans Climate is the average condition of atmospheric elements like air, temperature, air pressure, rainfall, wind, humidity, cloud etc for a long period of time atleast 35 years for a vast area

3) Differentiate between weather and climate

Ans The difference between weather and climate are as follows

Weather	Climate
i) Weather is the atmospheric conditions like air temperature, air pressure, rainfall, wind, humidity etc for a short period of time (24 hrs) in a small area	i) Climate is the average condition of atmospheric elements like air temperature, pressure, humidity, rainfall, wind etc for a long period of time atleast 35 years for a vast area
ii) It is dynamic	ii) It is static.
iii) It is considered for 24 hours	iii) It is considered for 35 years
iv) Weather is for small area.	iv) Climate is for vast area like country, continent.

4) Define Weathering

Ans Weathering is the disintegration and decomposition of parent rocks in situ by the elements of weather and climate (air temperature, air pressure etc) and some atmospheric gases.

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The difference between weathering and erosion are

Weathering	Erosion
i) The disintegration and decomposition of parent rocks in situ by the elements of weather and climate (air temperature, air pressure etc) and other atmospheric agent is known as weathering	i) The process of removing away of rocks by some natural agents such as wind, water or glacier is known as Erosion.
ii) The process is associated with weathering	ii) The process is associated with transportation.
iii) It is a slow process	iii) This process is faster than weathering
iv) It is a constructive process	iv) It is a destructive process.

1) What are the different types of weathering?

The different types of weathering are

i) Chemical or Physical weathering

ii) Chemical weathering.

iii) Biological weathering

2) Differ Chemical or physical weathering.

The disintegration of parent rock into bits by the action of elements of weather and climate like air temperature and pressure, humidity etc. is known as physical weathering.

3) In what regions chemical weathering predominate?

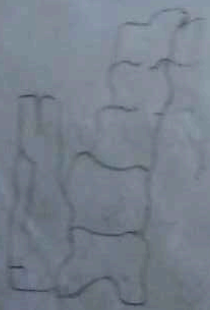
The regions in which chemical weathering predominate are

iii) Desert or Arid region
iv) Arctic or Polar region

Q) What are the different processes of mechanical weathering
A) The different processes of mechanical weathering are
i) Block Disintegration
ii) Exfoliation
iii) Granular Disintegration
iv) Frost Action

Q) Explain the process of mechanical weathering.
A) There are four types of mechanical weathering are
i) Block Disintegration.
ii) Exfoliation
iii) Granular Disintegration.
iv) Frost Action.

i) Block Disintegration - Due to high diurnal range of temperature in the arid region, the rocks are expanded (day time) and contracted (night time). Thus the cracks are developed in the well-jointed parent rock body. Gradually the rocks are break down into small rectangular blocks. The process is known as Block Disintegration



ii) Exfoliation - Exfoliation occurs in the granite rocks. Due to high diurnal range of temperature in the arid region the outer layer of the parent rock are expanded and contracted regularly. Thus the cracks are developed.

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in the outer layer and it is separated from the parent rock body in a concentric like layer of like pulling of onion. This process is called Exfoliation. It is also called the spheroidal weathering.

3) Granular Disintegration - In the heterogenous rock different minerals are present. Thus the rate of expansion and contraction are not same in different minerals so the rocks are disintegrated in different times and produces a huge sound in desert region. This process is known as Granular disintegration.

Frost Action - In the frigid zone or Arctic region, the rainwater fills up the gap in between the rock walls. During night time that water freezes the volume of ice is more than the volume of water and thus exerts more pressure to the rock walls, the deep cracks are developed inside the rocks and finally the rocks are disintegrated into smaller pieces

11) In which rock Block Disintegration rocks? occurs?
Ans Well - jointed homogeneous rock

12) In which rock Exfoliation occurs?
Ans Granite rocks

13) What is the another name of Exfoliation?
Ans Onion weathering

14) Why Mechanical weathering occur in Desert region?
Ans Mechanical weathering occur in Desert region because of high diurnal range of temperature.

15) What is meant by diurnal range of temperature?
Ans The difference between the day temperature and night temperature is known as diurnal range of temperature

16) In which region diurnal range of temperature is high?
Ans Desert region.

17) The chemical composition of rocks is unchanged in mechanical weathering. True or False and why?
Ans False because

18) Define Chemical weathering.
Ans The disintegration and decomposition of parent rock in situ by the action of atmospheric gases (like oxygen(O_2), carbon dioxide (CO_2)) and also by the elements of weather and climate are ~~atmospheric~~ air temperature, air pressure, rainfall wind, humidity, cloud etc is called chemical weathering.

19) In which climatic region chemical weathering predominate
Ans Tropical Hot

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20) What are the main factors affect the chemical weathering?

Ans The main factors affect the chemical weathering are Atmospheric gases (like O_2 & CO_2) and rainfall.

21) Difference between Mechanical weathering and Chemical weathering.

Ans The difference between Mechanical and Chemical weathering are

Mechanical weathering	Chemical weathering
i) The disintegration of parent rock in situ by the action of elements of weather and climate like air temperature, air pressure, humidity etc is known as Mechanical weathering	i) The disintegration and decomposition of parent rock in situ by the action of atmospheric gases (like O_2 and (O_2) and also by the elements of weather and climate are air temperature, air pressure, rainfall, wind etc is called chemical weathering.
ii) It takes place in Mechanical weathering breaks rock into smaller pieces without changing their composition	ii) It takes place Chemical weathering breaks down the rock forming new material
iii) It takes place in dry desert and also ~~polaroid~~ polar region	iii) It takes place in ~~humid~~ tropical humid region.
iv) Main agents of mechanical weathering are temperature, humidity, air pressure etc	iv) Main agents of chemical weathering are oxidation, carbonation, hydration and hydrolysis

22) Difference between block disintegration and granular disintegration.

Ans The differences are as follows

Block disintegration	Granular disintegration
i) Block disintegration occurs in well-jointed homogenous.	i) Granular disintegration occurs in heterogenous rock.
ii) The rocks are broken down into small rectangular blocks	ii) The rocks disintegrates into irregular shapes.

iii) The splitting of rocks along the joints into block is called block disintegration.

iv) In form of weathering where the grains of a rock become loosened and fall apart due to repeated heating and cooling as a result of temperature changes.

i) In Block disintegration parent rocks are broken down into at a time

ii) In granular disintegration parent rocks are broken down into different time period.

3) Discuss the processes of chemical weathering

Ans There are four types of chemical weathering-

i) Oxidation
ii) Carbonation
iii) Hydration
iv) Hydrolysis.

i) Oxidation - In this processes oxygen from air reacts with minerals present in iron containing rock to form oxides. when oxygen from air is added to iron, ferrous oxide turns into ferric oxides of yellowish brown rust which crumbles easily.

$$4FeO + 3H_2O + O_2 = 2Fe_2O_3 + 3H_2O$$

ii) Carbonation - The process which involves absorption of carbon dioxide from the atmosphere by minerals present in the rocks is called carbonation. limestone that is calcium carbonate changes into calcium bicarbonate when carbonic acid (carbon dioxide dissolved in water) reacts with limestone. Decomposition of limestone leads to the formation of [illegible] structure called [illegible]

$CaCO_3 + H_2O + CO_2 = Ca(HCO_3)_2$

ii) Hydration - Hydration involves absorption of water molecules. Anhydrite or calcium sulphate changes into gypsum.

$CaSO_4 + 2H_2O \rightarrow CaSO_4 \cdot 2H_2O$

iii) Hydrolysis - Hydrolysis involves formation of hydroxyls. eg. orthoclase changes into aluminate silicic acid.

$KAlSi_3O_8 + H_2O = HAlSi_3O_8 + KOH$

4) What is called biological weathering?

The disintegration and decomposition of the parent rock by the influence of living beings like human beings, animals, plants it is called biological weathering.

5) Explain the processes of biological weathering.

Biological weathering occurs in two ways

i) Bio mechanical weathering

ii) Bio chemical weathering

Bio mechanical weathering - Some times some burrowing animals makes holes in the rock body which can cause disintegration of parent rock.

Some plants or trees extend their root inside the joint of the rock. The rock gets disintegrated along the joint or crack.

Bio-chemical weathering - Some sedimentary grain of rocks get decomposed by the chemical reaction of humus that is organic matter (decayed plants and animals). Thus the rock get disintegrated into also.

26) Discuss the measures effects of weathering.
to. The measures effect of weathering are

i) The most important effect of weathering is soil formation. The weathered rock particles are again weathered and eroded and forms the layer of fine particles like sand, silt and clay. The subsoil layer is formed. Moreover the humus, bacteria and fungi are also mixed with the layers of fine particles. The process is called humification. The inorganic materials along with the organic matter produced the top soil layer. It is the most fertile layer because it contains important nutrients like nitrogen, calcium, potash, iron etc. Sometimes by the process of illuviation the minerals are deposited from the top soil layer to the sub soil layer. Thus weathering makes the soil fertile as well as deep.

ii) Minerals like bauxites are produced by weathering.

iii) Regolith which is the source of soil is also produced by weathering of rocks.

iv) Weathering of rocks reduces elevation of landforms, land area increases but the area becomes prone to earthquake.

v) Surface water and rainwater easily percolate through weathered rocks and thus underground water resource increases.

b) Regolith which is the source of soil is also produced by weathering. Due to weathering overlying the firm and solid rock of the crust there is loose unconsolidated material that is invisible residual products of weathering made of decomposed and fragmentary materials of variable thickness. This is known as Regolith.

27) Name the factors that influence the weathering.
As the factors that influence the weathering are
Climate

Parent rock
Vegetation
Topography.

Climate - Rainfall and temperature
rocks weather high temperature
can affect mechanical
the rate of chemical

Parent rock - Different
Certain types of
rock like granite
to penetrate them
they dissolve in

Vegetation - The
rocks are not
rocks are exposed
is high.

Topography - In
much severe but
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Parent rock
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Climate - Rainfall and temperature can affect the rate in which rocks weather. High temperature or diurnal range of temperature can affect mechanical weathering whereas greater rainfall increases the rate of chemical weathering.

Parent rock - Different rocks weathered at different rates. Certain types of rocks are very resistant to weathering. Igneous rock like granite weathered very slowly because it is hard to penetrate them whereas limestone is easily weathered because they dissolve in weak acids.

Vegetation - The dense forest area are less weathered because the rocks are not exposed whereas in desert region rocks are exposed thats why in desert the rate of weathering is high.

Topography - In the plain topography weathering is not so much severe but in hilly region weathering is more prominent because steep of sides of hills make water flow down them faster. Fast moving water has more energy to break down rock than slow-moving water. Therefore, more weathering is more prominent in hilly region than in plain region.

Difference between block disintegration and Exfoliation.
The differences are as follows.

Block Disintegration	Exfoliation.
i) Block disintegration occurs in well-jointed homogenous rock.	i) Exfoliation occurs in granite rocks.
In this process rocks are disintegrated	ii) In this process rocks are disin

into smaller blocks	into concentric layers.

28) Difference between oxidation and carbonation.

Ans The differences are as follows.

Oxidation	Carbonation.
i) Oxidation is the reaction of rock minerals with atmospheric oxygen.	i) carbonation is the reaction of rock minerals with atmospheric carbon dioxide.
ii) It occurs in iron containing rocks.	ii) It occurs in limestone rocks.
iii) By oxidation iron containing rock get rusted.	iii) By carbonation limestones are totally melted and form cave like structure.

29) What are Stalagmite and stalagtite ?

Ans ~~Stalagate~~ ~~Stalacite~~ Stalactite and Stalagmite are the results of carbonation. In the limestone region due to carbonation the caves like structures are developed. From the roof of ~~the~~ cave, the ~~structure~~ the remaining part of the calcium after evaporation, teeth like structures developed. These are called stalactite.

From the ground of caves another teeth like structure of calcium develops. These are called stalagmite.

Eg - These are found in the Borra caves of Andhra Pradesh in India and also found in Meghalaya Plateau region.