

Hello students,

this is DSC GEC102 introduction

to petrology module name is mode

of occurrence of igneous rocks.

Part 2 module number is 5.

Here you will learn about various

modes of occurrence of igneous rocks.

There is lava flows, puy,

volcanic cones, stratovolcanoes.

Composite volcanoes and cinder cones.

Students will be able to understand puy,

volcanic cones, stratovolcanoes,

composite volcanoes, and cinder cones.

Differentiate between different

types of volcanoes.

Volcano is a vent or a fissure in

the earth's crust through which molten

lava, hot gases that is volatiles

and solid rock debris that is

pyroclasts escaped to the surface

On land or under the sea.

Hence we have a volcano which is a vent

It is a passage through which magma

travels from bottom towards the surface.

Along with this magma we have

hot gases that is volatiles also

some solidified rock particles or

rock debris which is called this

pyroclasts which escaped to the

surface on land or also under the sea.

So igneous rocks that cooled on the

surface are called as extrusive

Igneous rocks, in contrast to those rocks,

or that magma that has passed

through the crust but was unable

to come out on the surface and his

solidified within the crust has given

rise to intrusive igneous rocks.

The magma from which they are formed

may vary in composition and properties.

Viscous magma Forms massive steep side mountains

The familiar of cones of many volcanoes.

Pockets of trapped gas eventually escape,
causing violent explosions.

Hence this gas,

which is trapped in this magma when it

is at deep depths due to high pressures,

gets released on the surface,

and these gases really

cause the volcano to become

Violent. Fragments of half cook cold

rock are then thrown into the air.

Sometimes the lumps are quite large,

about 20 to 30 centimeters in length.

These are called as volcanic bombs

as this volcanic bombs descend,

they could twist and turn because

they're still hot and the soft

rock becomes spindle shaped.

Smaller particles are called as

lapilliy meaning little stones.

While the finest dust forms volcanic ash,

which falls the last.

The molten rock itself flows as a lava

and solidifies, giving off gases,

small cavities or vesicles may,

as a result,

be formed inside these rocks

giving a frothy appearance.

Pumice is a well known

example of this phenomenon.

This is a picture of volcanic bomb.

This was Liquid magma,

when it was spewed out of the volcano

due to the explosive activity,

it was thrown into the air where it

solidified as a rock and fell on the surface.

This picture shows volcanic ash

plume rising from Eyjafjallajokull

volcano on April 17th, 2010.

This is a very close picture of Pumice.

This picture shows you

The vesicles which are present in the rock,

the vesicles in the rock are so much

that this rock has solidified from a froth.

Hence this rock is mostly made

up of air and

less made up of solid.

This is the only rock that floats in water.

Volcanoes are classified as two types.

One is Fissure type,

the second one is central type.

Now in Fissure type of lava flows.

Or Fissure type of volcanoes.

The lava flows out through linear

cracks or fissures which extend

deep into the Earth's crust.

Here we will again look at the block

diagram where this is a magma chamber

which is situated at very greater depths.

This magmatic chamber has supplied magma

through the crust in the form of an

intrusive igneous rock called is dyke now.

This magma has reached onto the surface.

And it is started to flow when it

starts to flow, it forms a lava flow.

The lava is usually basic,

that is rich in Fe and Mg has a very high

temperature and is very mobile.

Hence this lava that comes out

through fissures is basic. That is made up of iron and magnesium

has very high temperatures of the

order of 1000 degrees Celsius

and hence is extremely mobile.

That means it flows like water.

It fills out all depressions in the rock on

the surface and forms lava flows.

It spreads out over vast areas in the

form of lava sheets that is flows.

Now if we consider the other

lava type which is acidic,

this lava type cannot flow

and it's very viscous.

It results in the formation of

a volcano that it is pressurized

until the pressure breaks out and

the entire magma chamber gives out magma in the form of A volcano. Fissure type eruptions are generally quiet and very little pyroclastic material or volatiles.

These types of eruptions occur in Iceland and the lava flows are almost flat or horizontal.

Younger flows erupt and solidify about older ones.

Examples lava plateau found in India.

That is Deccan and Rajmahal traps in Iceland and in Columbia River Plateau in Washington.

We will talk about volcanic cones and their types, the type of volcanic eruption determines the shape of the structure or cone that is built and by the appearance alone one can get an idea of volcanoes hazard potential.

The eruptions may be classified

as quiet type of eruptions,

and explosive type of eruptions.

The former involves a quiet and

gentle outpouring of lava that

just oozes out to pour down on

the slopes of a volcano.

The latter are the result of a

sudden release of buildup of pressure

amplified by the escape of gases and

large quantities of pyroclastic material.

Quiet type of eruptions.

We have, shield,

volcanoes,

shield volcanoes are built by gentle

outpourings of fluid lavas from

a central vent or a conduit and on

the cooling lavas from basalts.

The name is also due to the fact

that a shield volcano profile is

gently convex upwards like that of a shield

Laid on the ground.

Hence magma from the chamber
moves upwards through the cracks
in the crust and then flows
onto the surface,
causing volcanoes with gentler slopes.

This is mostly oceanic in origin.

Shield volcanoes are found in
Iceland and the Hawaiian Islands.

They are built up from the sea floor
layer upon layer to elevations
thousands of meters above sea level
acidic lavas produce steeper
cones with craters at the summits.

Such Dome shaped accumulations of lava and
pyroclastic material are called as puys.

Here we see that there is a magma
chamber that supplies magma and we
have a surficial expression in the
form of a volcano and the lava flows
on the outside forming gentler slopes.

This is a picture of Mouna Loa,

a shield volcano in Hawaii.

It indeed looks like a shield

explosive type of volcanoes are.

Stratovolcanoes or sometimes they're called,

is composed volcanoes,

explosive volcanic activity

builds stratovolcanoes,

sometimes referred to as composite cones.

There are thousands of feet high

and 10 to 20 kilometers across

at the base they have a concave

upward profile and a central vent.

Example mount was obvious in Italy

and Mount Fujiyama in Japan.

So here we have a magma chamber that

supplies magma which is slightly viscous

than the previous magma discussed.

Or the magma that forms shield

volcanoes and hence this magma in

stratovolcano has some difficulty

in travel due to which it explodes.

These volcanoes are stratified.

Thus the name stratovolcano

consisting of alternate layers of ash,

cinders and lava.

The upper steep slopes 22-30 degrees are

formed mostly of pyroclastic volcanic

ejecta and less steep lower slopes

Are composed of alternating layers

of lava and pyroclastics

caldera

These some eruptions have been so

great that large cones have simply

disappeared in the explosion.

A caldera is a large depression,

more or less circular found where the

central portion of a volcano had once been.

This is formed when the roof

of the crater collapses.

Crater is the basin shaped or funnel

shaped depression normally found

at the top of the volcanic cone.

Hence this is a volcano.

This is the crater through along

which the magma had erupted,

and later on the top of the crater
has collapsed and is formed a huge caldera.

Look at this satellite photograph

of the summit caldera on Fernandina

Island in the Galapagos archipelago.

This is the caldera that was formed.

These are the flanks of the volcano,

another picture from Crater Lake,

Oregon, United States.

Formed around 5680 BC,

this is a caldera which is formed

because of collapse of the crater.

Cinder cones are formed when bulbous

masses of lava pile up around a vent

because the lava is too thick and

viscous to flow any significant

distance from the source.

These are sometimes called volcanic

domes or plug domes and usually

grow by expansion from within.

As

the outer surface cools,

the brittle crust breaks

and tumbles down the sides.

This is an example of a

cindercone in Arizona.

These are the references that I

used to prepare this presentation.

Thank you.