Welcome students.

This module is part of first year

BSc in the subject of geology.

For the second semester.

With paper title,

introduction to petrology

with course code, GEC, 102.

Name of the module is classification

of igneous rocks Part 2.

Model number is 12,

my name is Dattaraj Jawdekar

I work as assistant professor

at Government College of Arts,

Science and Commerce, Sanquelim.

Outline of the topic is

classification of igneous rocks.

After completing this module,

students will be able to classify the

igneous rocks based on silica content,

mineral content and the mode of occurrence.

Classification based on silica content.

The igneous rocks can be

divided into 4 basic categories

depending on the silica content.

The silica content is obviously

determined chemically.

The first term under under

this classification is acidic.

Acidic rocks are the ones

that have more than 65%.

silica content.

The intermediate ones have

55 to 65% silica content.

The basic rocks have 44.

To 55% silica content and ultra Basic

ones have less than 44% silica content.

These terms, acidic and basic,

should not be confused with acids and

bases of the chemical sciences.

In this slide.

We have a solid igneous rocks.

In the acidic igneous rocks,

the course is essential mineral.

In all, the Excel igneous rocks you

will have quartz greater than 20%.

In this top row you will see the

variation between different feldspars.

So here you get the percentage of.

part off.

The total feldspar.

Remember it is not the percentage

of alkali feldspars in the rock.

It is the percentage of alkali

felspar between the different

feldspar that we have.

That is plagioclase feldspar as well.

Let us start with the acidic igneous rocks.

The platonic rock that is the one

that has the coarse grain size.

And if it has more than 66% of

alkali feldspars such as orthoclase.

That rock is granite.

If the same granite.

Has a medium green size

indicating its hypervisor origin.

Then it will be called as microgranite.

Some textbooks even refer to

this as granite porphyry.

If the same material.

Extrudes out on the surface in form of lava.

Then the term that we use is rhyolite.

So I like to look at the lava flows.

Grenades will occur as deep

seated magmatic bodies.

Such as batholoth, it's.

If the Grey Knight has slightly higher

percentage of plagioclase feldspar.

Such so that the percentage of alkali

feldspar varies between 33 to 66%,

then the term that we use is adamellite.

And if the percentage of alkali

feldspar is less than 33%,

that means this rock is dominated

by the plagioclase feldspars.

Of course, course is always there.

Then this rock will be called as granodiorite.

The hypabyssal are micro

adamellite and microgranodiorite,

respectively. Terms such As for porphyry

as prefix are always used as synonyms.

There will connect varieties are

rioda site and a site respectively.

This is the classification table

of the intermediate igneous rocks.

In the intermediate igneous rocks,

the quartz is less than 20%.

It means quartz is not an

essential mineral anymore.

It may be present,

or it may not be present if it is present,

its its dominance will be less than 20%.

Here the feldspar variation.

Is similar to the one that we

saw in the previous slide.

When the rock has greater

than 66% alkali feldspar,

and if the percentage of

quartz is less than 20%.

Then the Plutonic variety

is called as syenite.

The hypabyssal variety that is

medium green variety of the same.

Rock is micro syenite.

Also referred to as syenite porphyry.

Though volcanic variety of this,

the one that occurs is lava flows is trachyte.

When the percentage of alkali

feldspar falls in between 33 to 66%.

Then the Platonic variety of intermediate

igneous rocks is called as monzonite.

Hypabyssal variety of that same rock

is micro monzonite.

andesite.

When the percentage of alkali

feldspar is less than. 33%.

Then the Plutonic variety of

this rock is called as diorite.

The hypabyssal variety is called

as microdiorite and the volcanic

variety is called as diorite.

So this completes the intermediate

igneous rocks.

One thing that you should remember is that.

In these rocks you will find the

accessory minerals such as biotite,

hornblende and even pyroxenes in a

much larger. Mount, then the then.

Not acidic igneous rocks.

Next comes the basic igneous rocks.

The basic igneous rocks are classified

based on the variation of the mafic

minerals such as clinopyroxene,

orthopyroxene or olivine.

The Platonic basic igneous rock that has

clinopyroxene and calcic plagioclase

as the essential minerals. Is gabbro.

The basic igneous rock that has ortho

pyroxene in place of clinopyroxene

with an essential Ca Plagioclase.

The name that we use is Norite.

If that orthopyroxene is

replaced with olivin,

that is the rock is dominated by olivine

plus calcic plagioclase combination.

Then the term that we use is troctolite.

The hypabyssal variety of this rock is

dolerite, which has medium grain size.

And volcanic variety is basalt.

Several additional terms can be used here,

such as if olivine is present.

In greater percentage in gabroo then it

may be also called as olivine gabbro

and such variations are possible.

Next comes the ultrabasic igneous rocks.

The ultrabasic igneous rocks are

characterized by an absence of the

plagioclase.

Igneous rocks will be completely

dominated by the Fe Mg rich mineral

suggest by pyroxenes. And olivines.

And ultrabasic igneous rock.

By pYROXENES as the essential minerals

is called is pyroxenite..

The ultrabasic this rock with

pyroxene plus olive in in its chemical

composition is called as peridotite.

The ultrabasic igneous rock.

That is completely made up of olivins,

and there were ideas is called dunite.

We do not get any volcanic

and hypervisor variety of.

Ultrabasic igneous rocks. However.

Some records of the past of some 1-2

or more billion years Old Rocks show

a very interesting ultrabasic igneous

rocks that we have named Komatiite.

In the present we do not get

formation of komatiite on the Earth.

However it was present in the past.

The acidic igneous rocks.

Will not have any feldspathoids.

If the feldspathoids. are present,

that same rock cannot be called as acidic

cause presence of feldspathoids. will

mean that courts will be absent. So.

The rocks that have feldspathoids in

them can at the most be intermediate.

In that case, name of the feldspathoids..

It can be used as prefix.

For example, if.

Any feldspathoids.,

such as nepheline,

is present in a syenite.

Then that same rock will be

called as nepheline syenite

instead of a simple syenite.

For this topic, I have referred to

principles of petrology by GW tyrrel and

introduction to igneous and metamorphic

petrology by John D Winter. Thank you.