

A Last Minute Tour through the Three Rock Groups

IGNEOUS



Made of random crystals formed from cooling lava or magma.
Fast cooling = small crystals
Slow cooling = large crystals



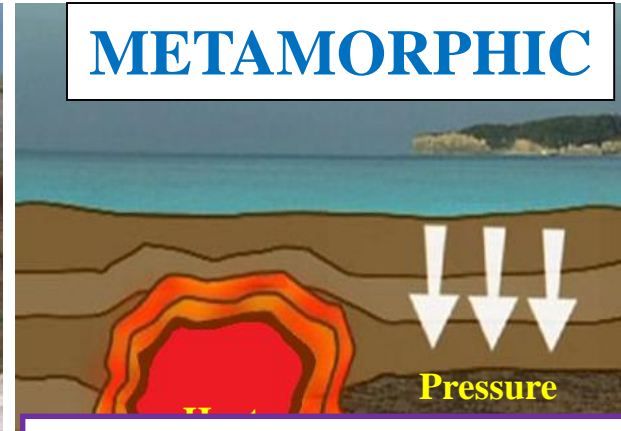
SEDIMENTARY



Made from pieces of other rocks deposited as sediment.
High energy = large particles
Low energy = small particles

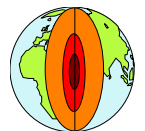
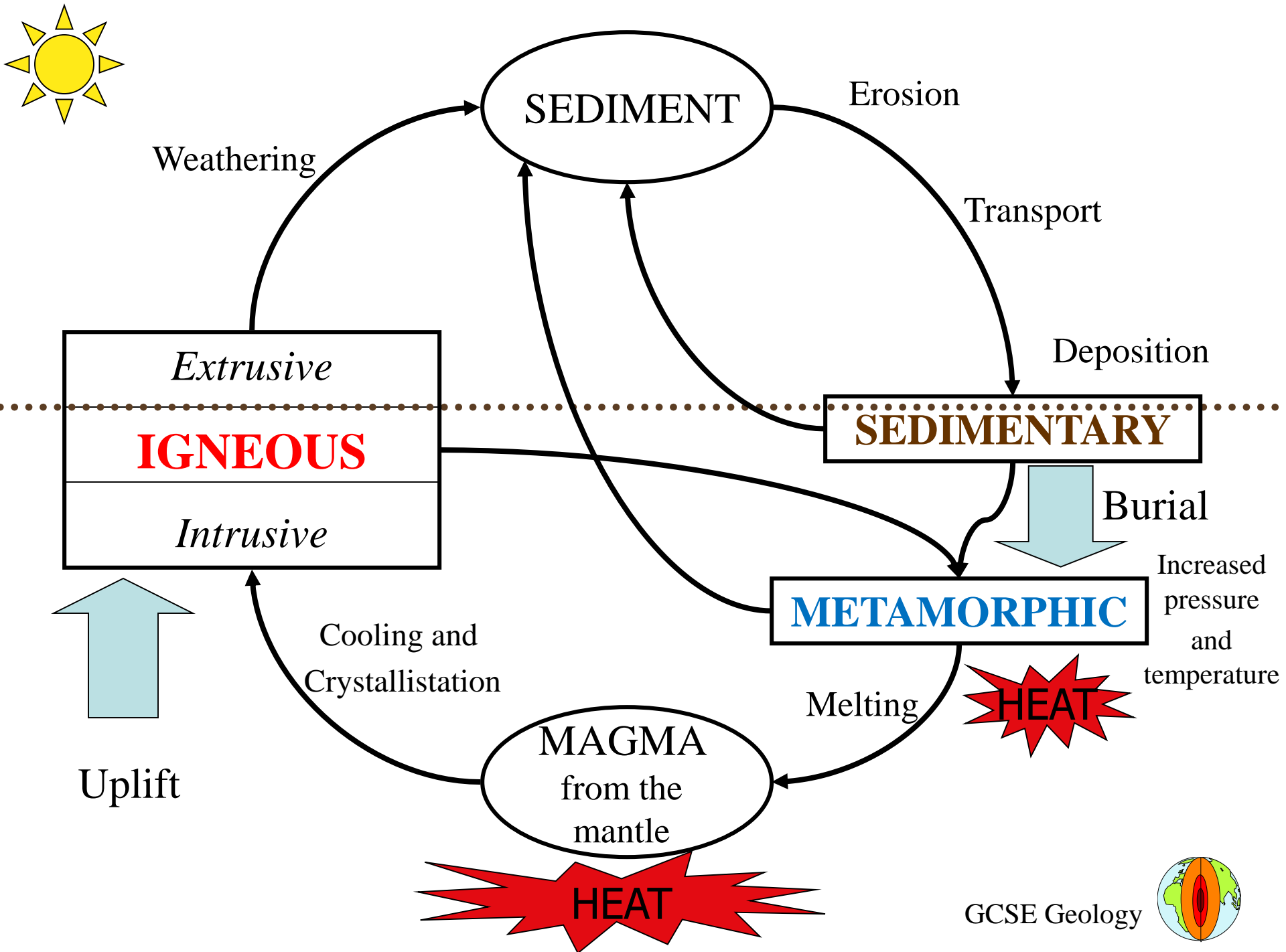


METAMORPHIC



Formed from parent rocks altered by heat and/or pressure.
Heat (thermal) = recrystallisation
Heat and pressure (regional) = Recrystallisation and foliation

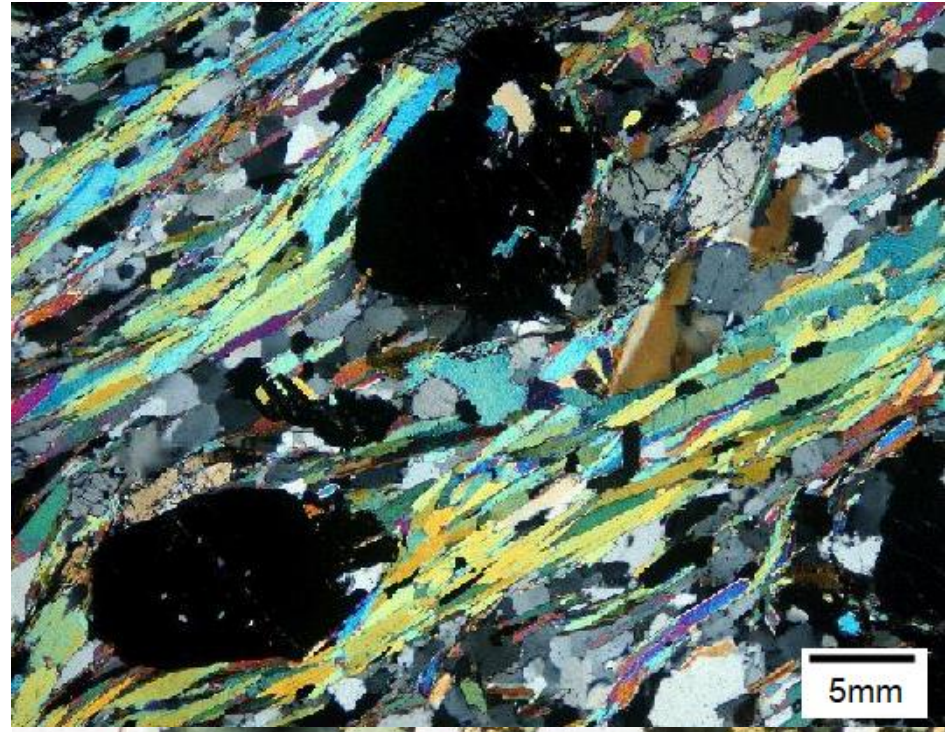




ROCK TEXTURE

Texture refers to the **size**, **shape** and **sorting** of the particles in a rock.

The rocks is made of larger, dark crystals up to 10mm in size surrounded by foliated, thin crystals in wavy layers around them. Some of these are up to 10mm in length.

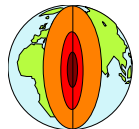


0 5
mm

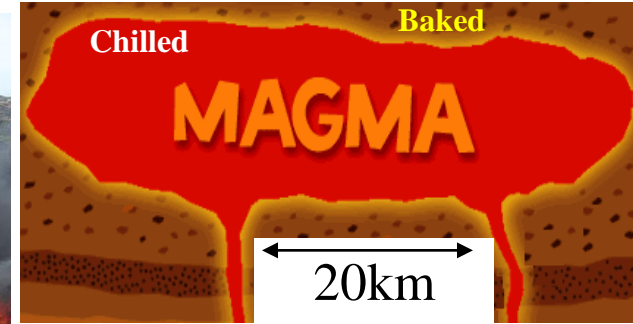
5mm

It includes:

- Grain or crystal size
- Grain or crystal shape
- Grain or crystal sorting
- You can refer to other features such as layers (foliation) or random, fossils, vesicles, minerals, interlocking and compaction

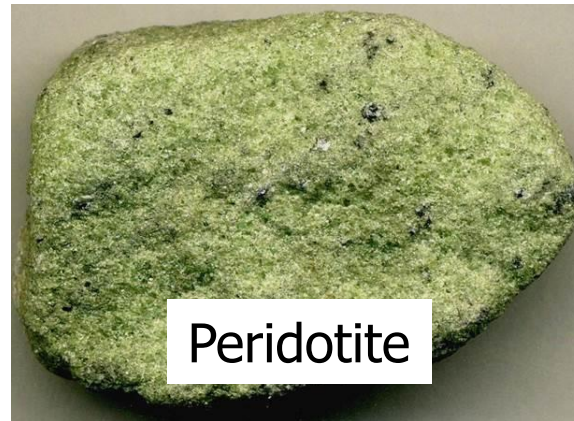


IGNEOUS ROCKS



Pluton - Granite

Random crystals cooled from **magma** or **lava**.

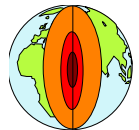


Small crystals = fast cooling (lava flows)

Medium crystals = medium cooling (dykes or sills)

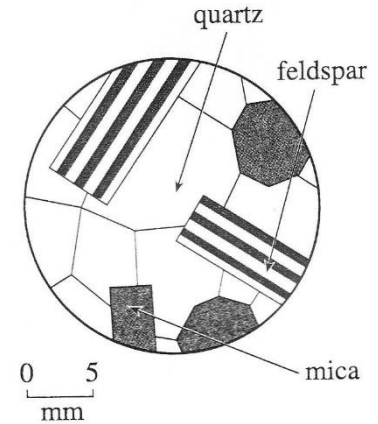
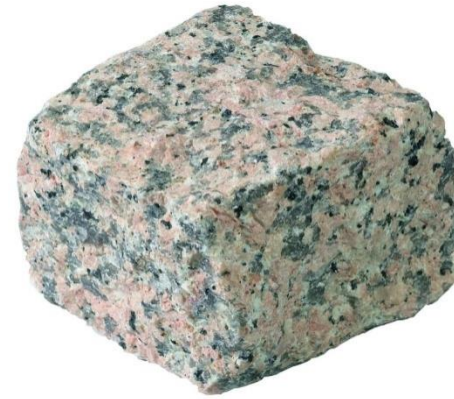
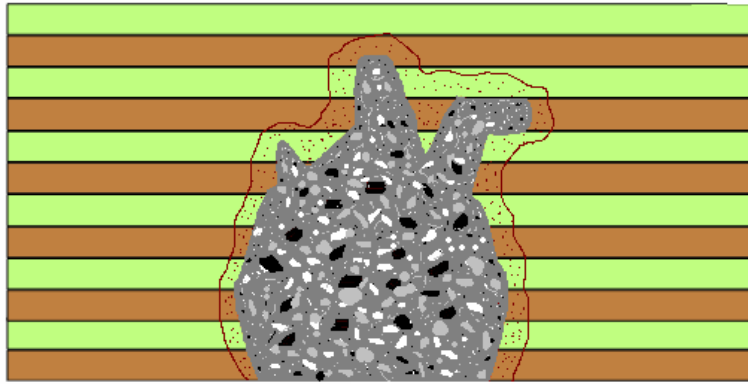
Large crystals = slow cooling (plutons)

Extrusive
Intrusive

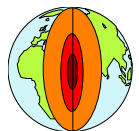
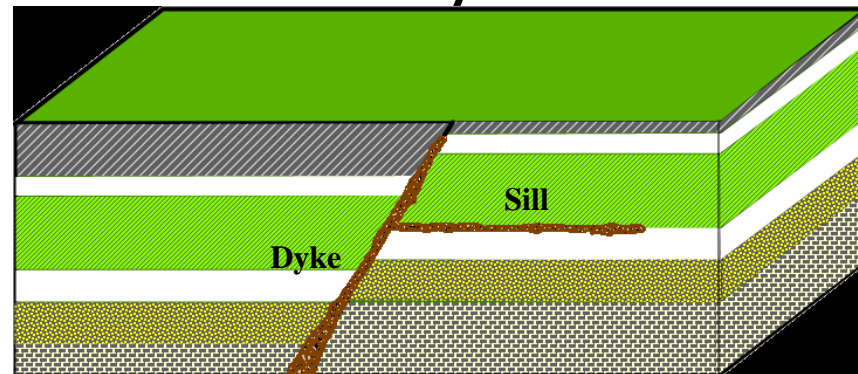


INTRUSIVE

Large intrusions are called **plutons** and cool very slowly to give **granite**.

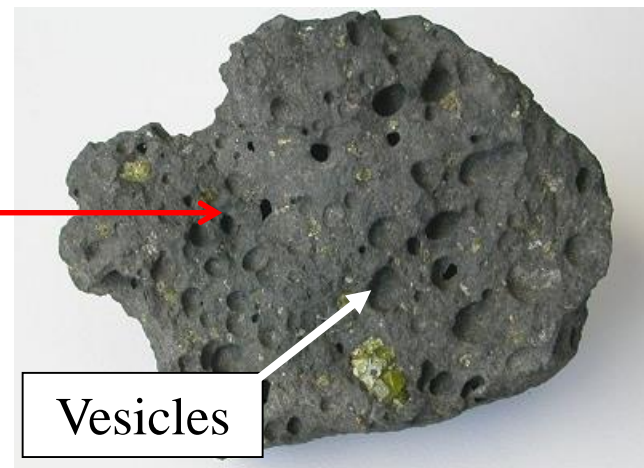


Smaller intrusions are called **dykes** (cut across the layers) or **sills** (run with the layers). They cool more quickly and have smaller crystals.



EXTRUSIVE

Lava erupting from volcanoes and cooling very quickly in air or water to form **basalt**.



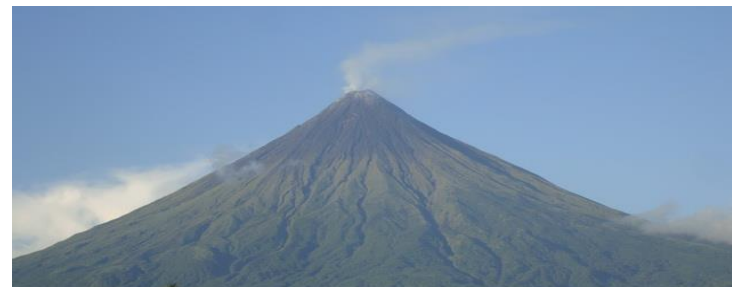
Two types of volcano:

Shield (wide, flat with runny lava - **basaltic**)

Cone (steep, sticky and gassy lava and explosive - **andesitic**)



Regular eruptions with gentle lava flows – not very dangerous (e.g. Iceland, Hawaii)

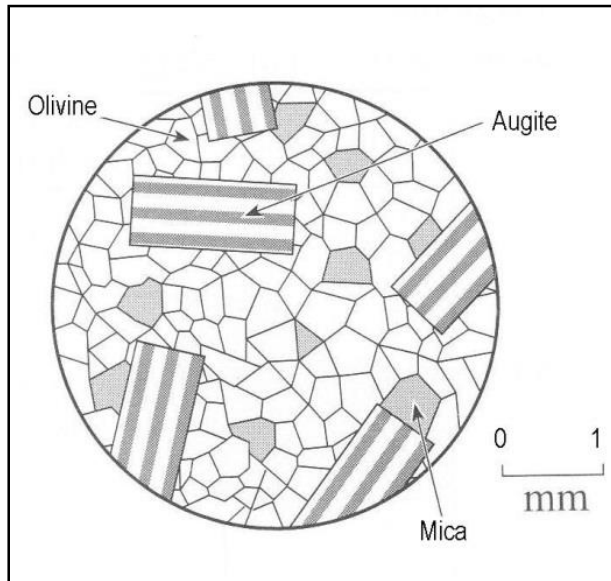


Rare eruptions with huge pyroclastic flows, ash clouds and some lava – very dangerous (e.g. Mount St. Helens, Pinatubo)

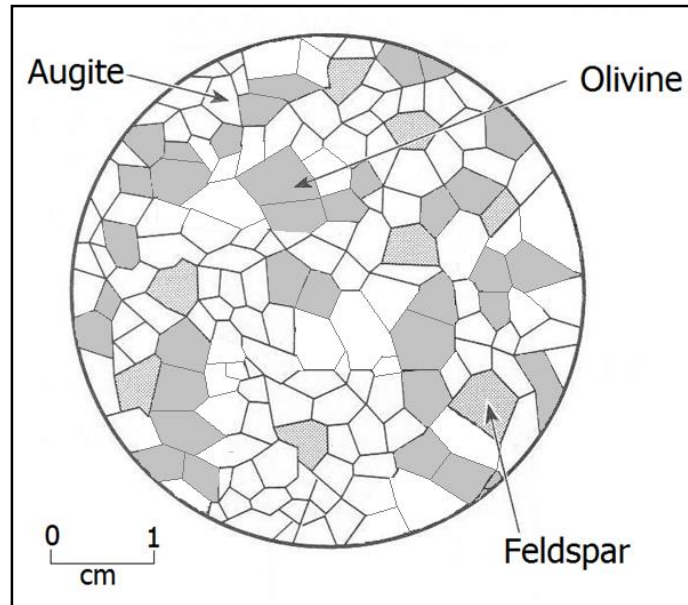
Speed of cooling determines crystal size (look at the scale!)



Andesite



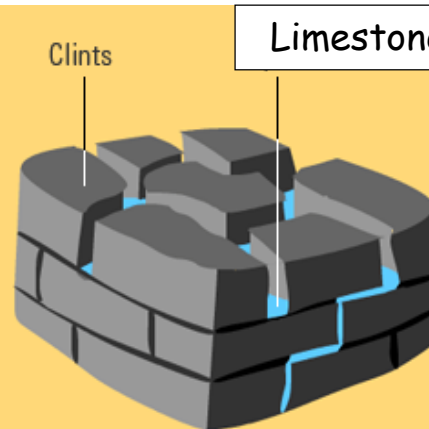
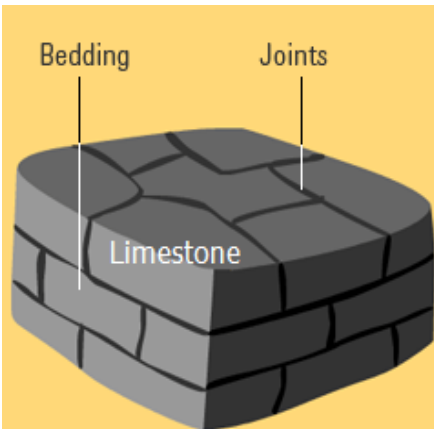
Peridotite



SEDIMENTARY

Formed from fragments (**grains**) of rocks that have been broken apart by **erosion** or **weathering**.

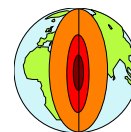
WEATHERING



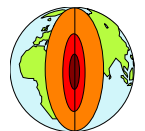
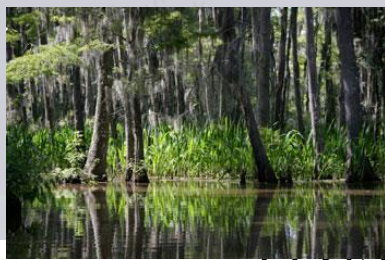
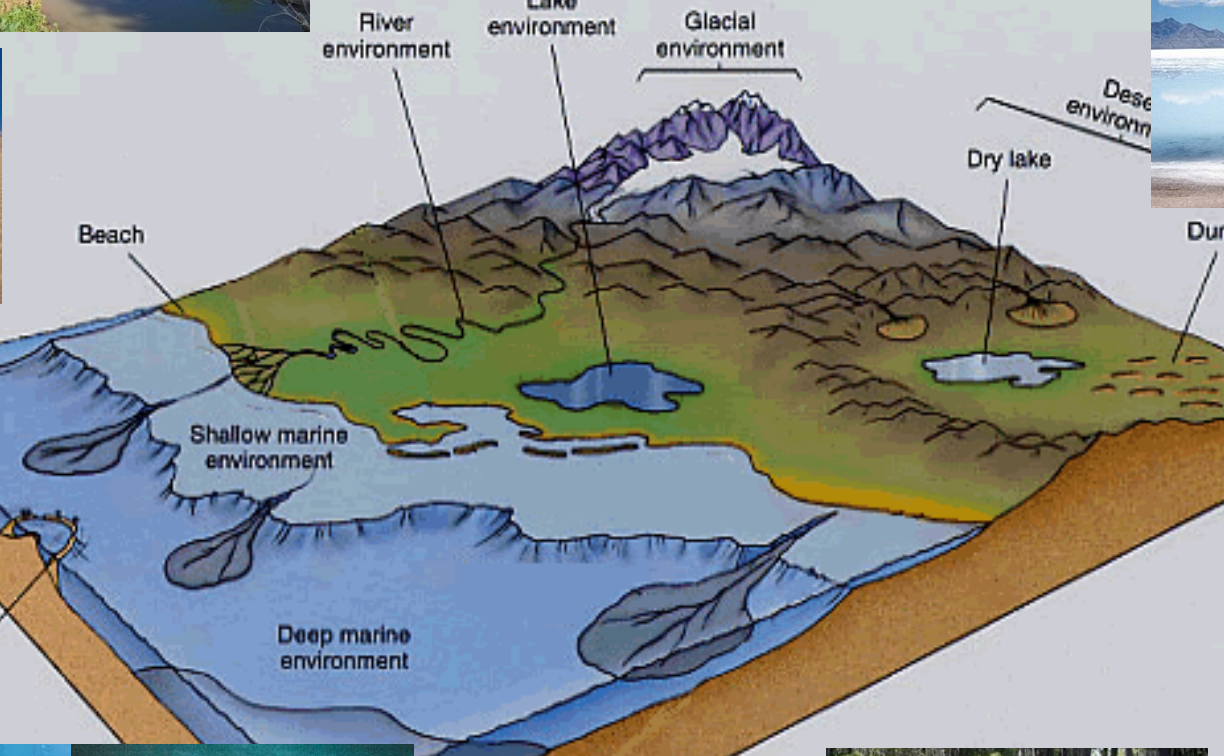
SEDIMENTARY

Formed from fragments (**grains**) of rocks that have been broken apart by **erosion** or **weathering**.

EROSION



SEDIMENTARY ROCKS



The **size of grains** depends on the **energy** of the environment of deposition.



G



Breccia or
Glacial Till



lope



Sandstone



Conglomerate



Limestone

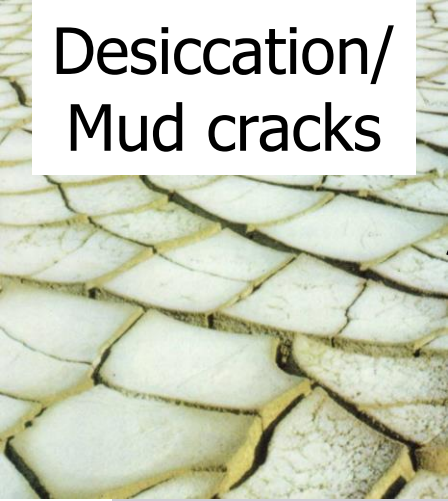


Red sandstone

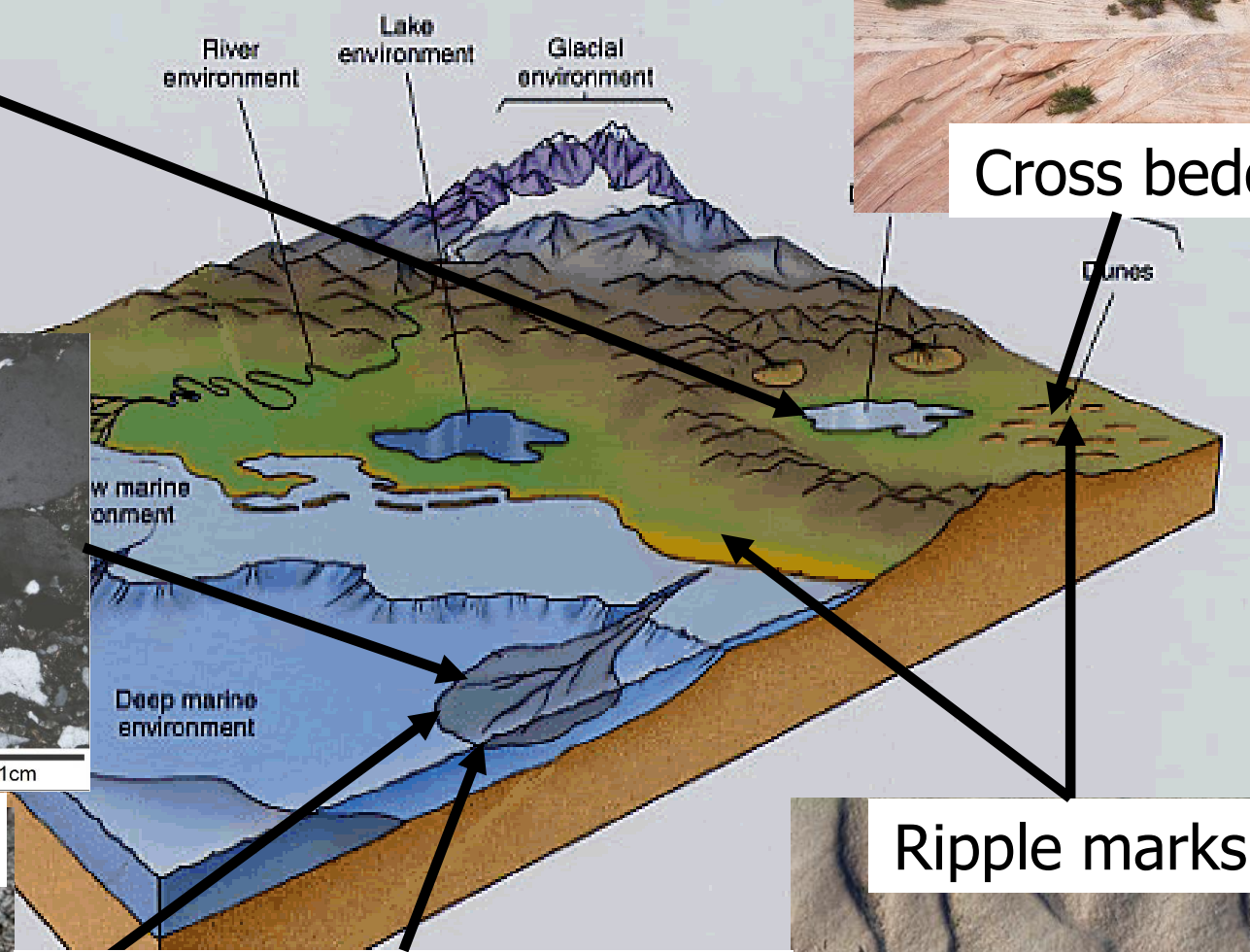


Sedimentary Structures

Desiccation/
Mud cracks



Cross bedding



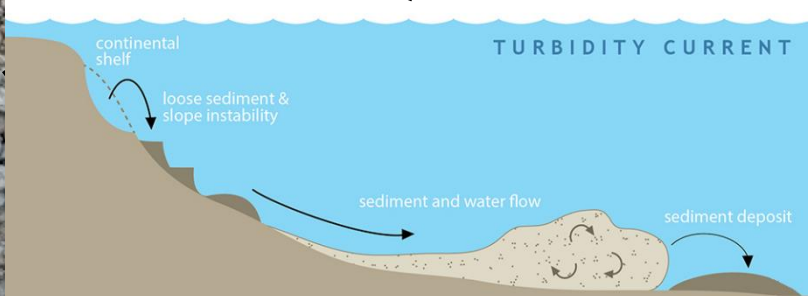
Only one environment where you can get all sizes of particles dropped together!

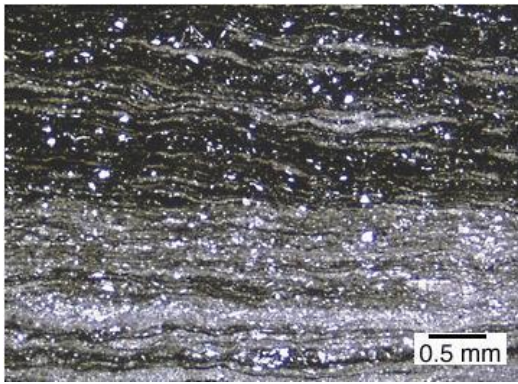


Graded bedding

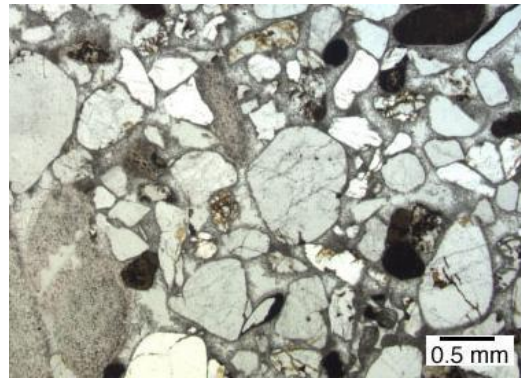


Ripple marks

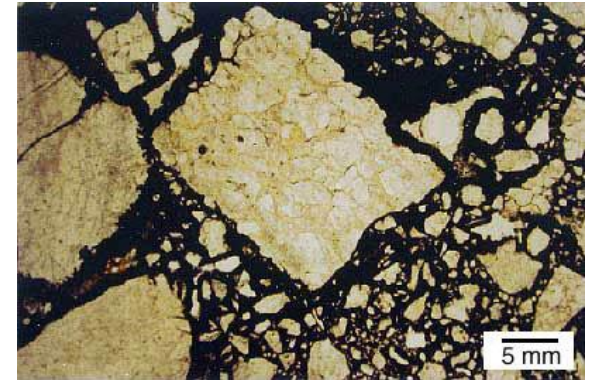




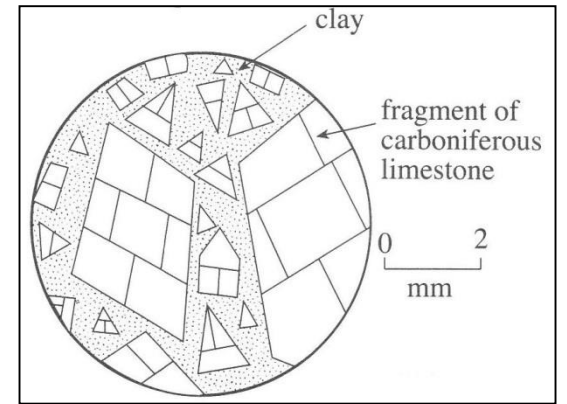
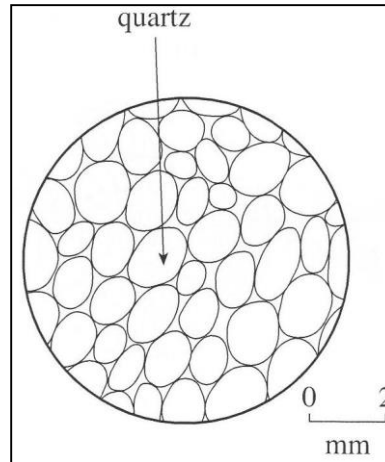
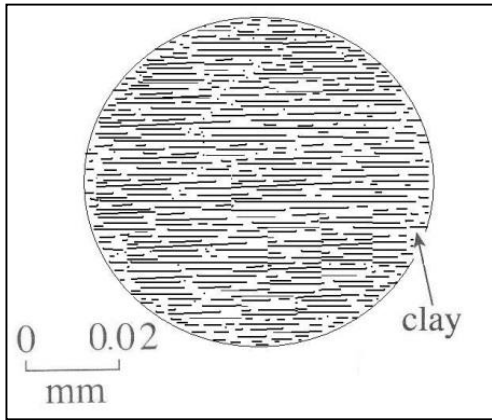
Shale



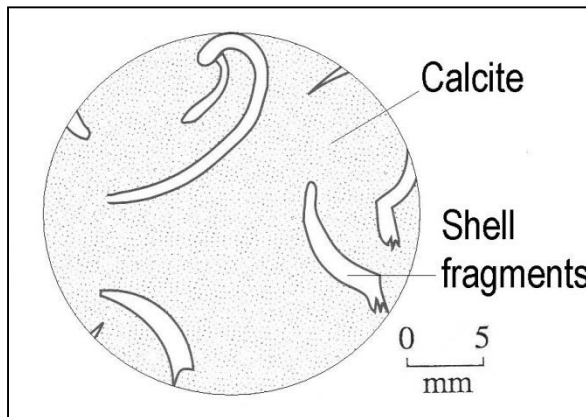
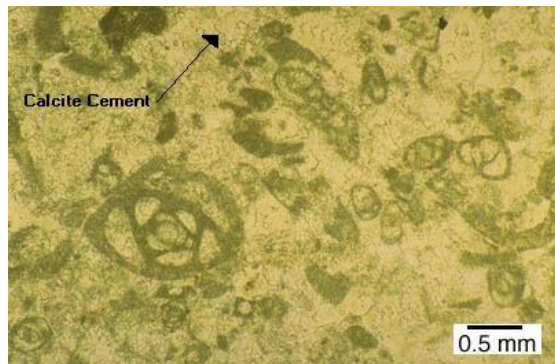
Sandstone



Breccia



Limestone



Energy of environment determines grain size (look at the scale!)

METAMORPHIC

Formed from parent rocks changed by **heat** and/or **pressure**.

Parent rock



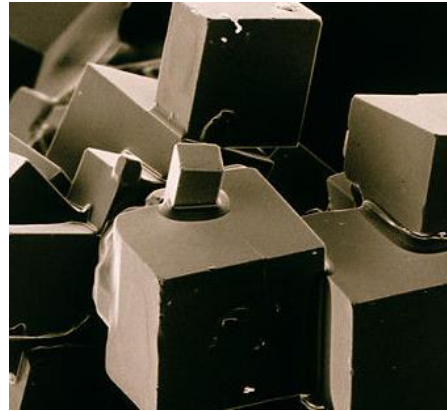
Limestone

Agent



Heat

Change



Recrystallise

Metamorphic rock



Marble



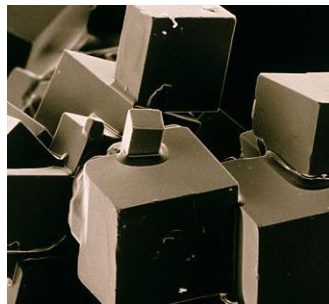
Parent rock



Agent



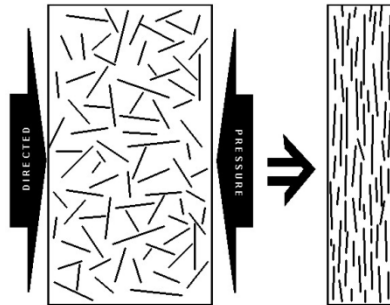
Change



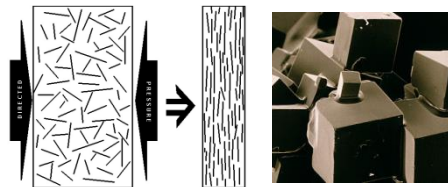
Metamorphic rock



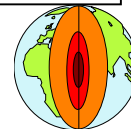
Metaquartzite
= non-foliated



Slate = cleavage

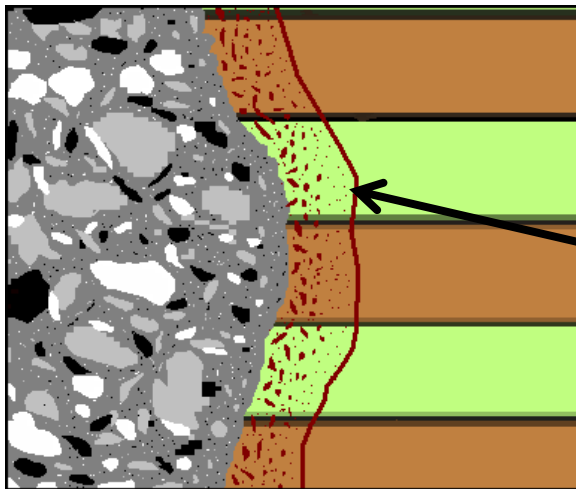


Schist = foliation



Where does this happen?

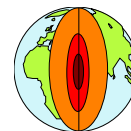
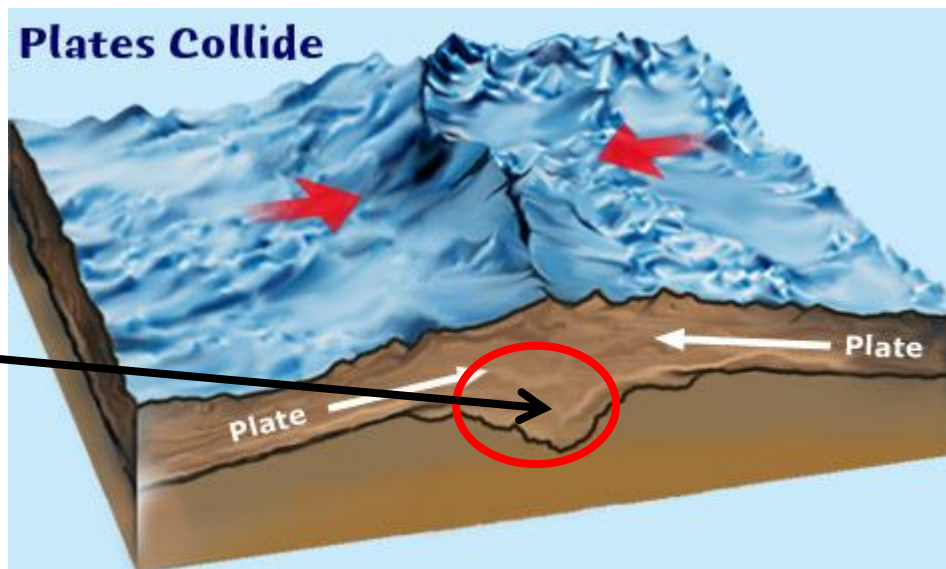
THERMAL/CONTACT



Around big intrusions of magma (plutons) in the **metamorphic aureole**. Rocks are **heated** and **re-crystallised**

REGIONAL

Deep in the crust as rocks are buried for millions of years, put under **pressure** and **heated** from below.





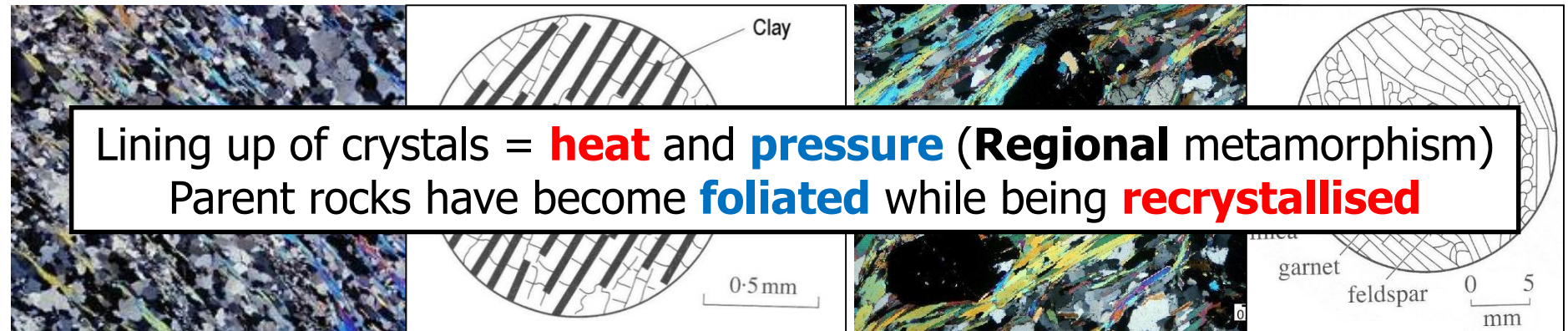
Random crystals = just **heat** (**Contact/thermal** metamorphism)
 Parent rocks has just **recrystallised**

Metaquartzite

Marble

Look for evidence of:

- Random crystals = just **heat** (**Contact/thermal** metamorphism)
- Lining up of crystals = **heat** and **pressure** (**Regional** metamorphism)



Lining up of crystals = **heat** and **pressure** (**Regional** metamorphism)
 Parent rocks have become **foliated** while being **recrystallised**

Slate

Schist

