

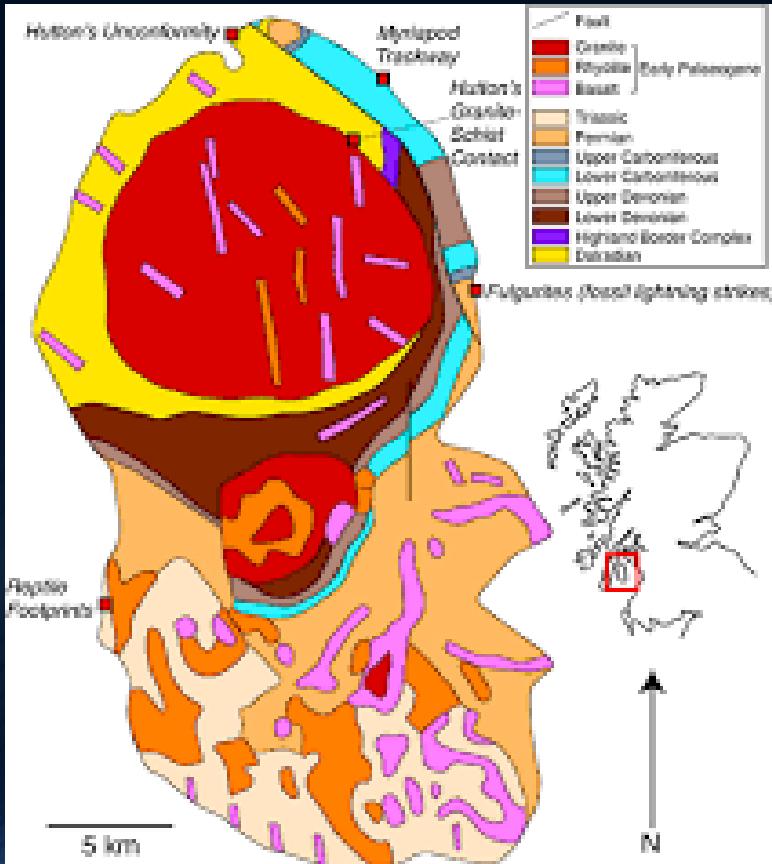
Isle of Arran

Over sea
without going
overseas !

Breaking apart
Coming together
Travelling through time

One of the best Geosites
in the Uk"
Geological Society of
London

Arran, Our Playground!



- Arrans rocks span 550m.y.
- Arran's rocks get younger towards the South
- Arran is split by a major fault?

An Island of Contrasts, Cut & Shunt

NORTH ARRAN



SOUTHERN ARRAN

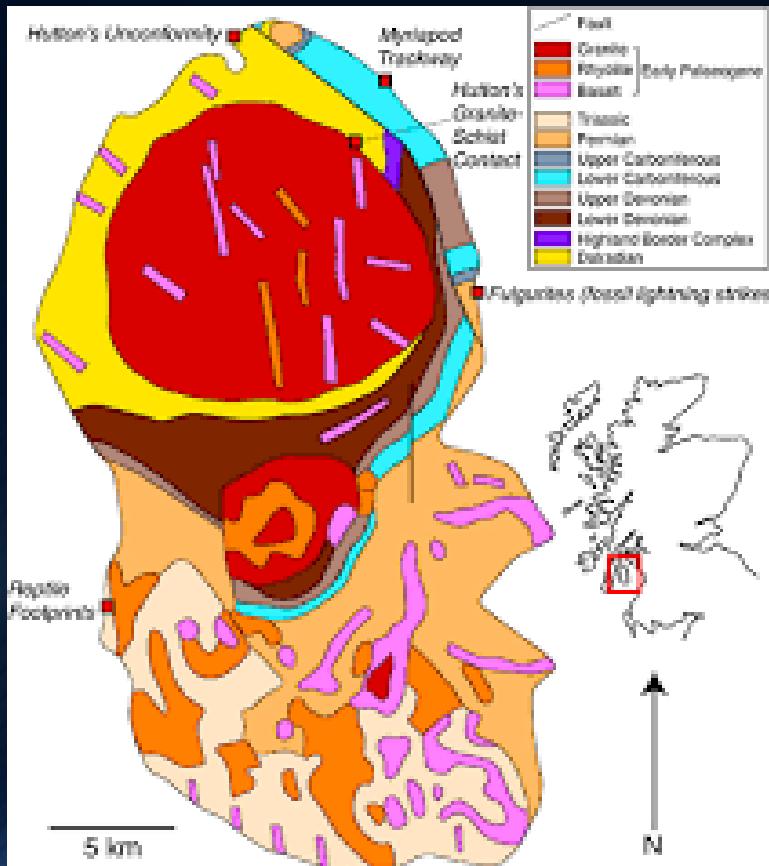


H.
B.
T.

North Arran



The North of Arran



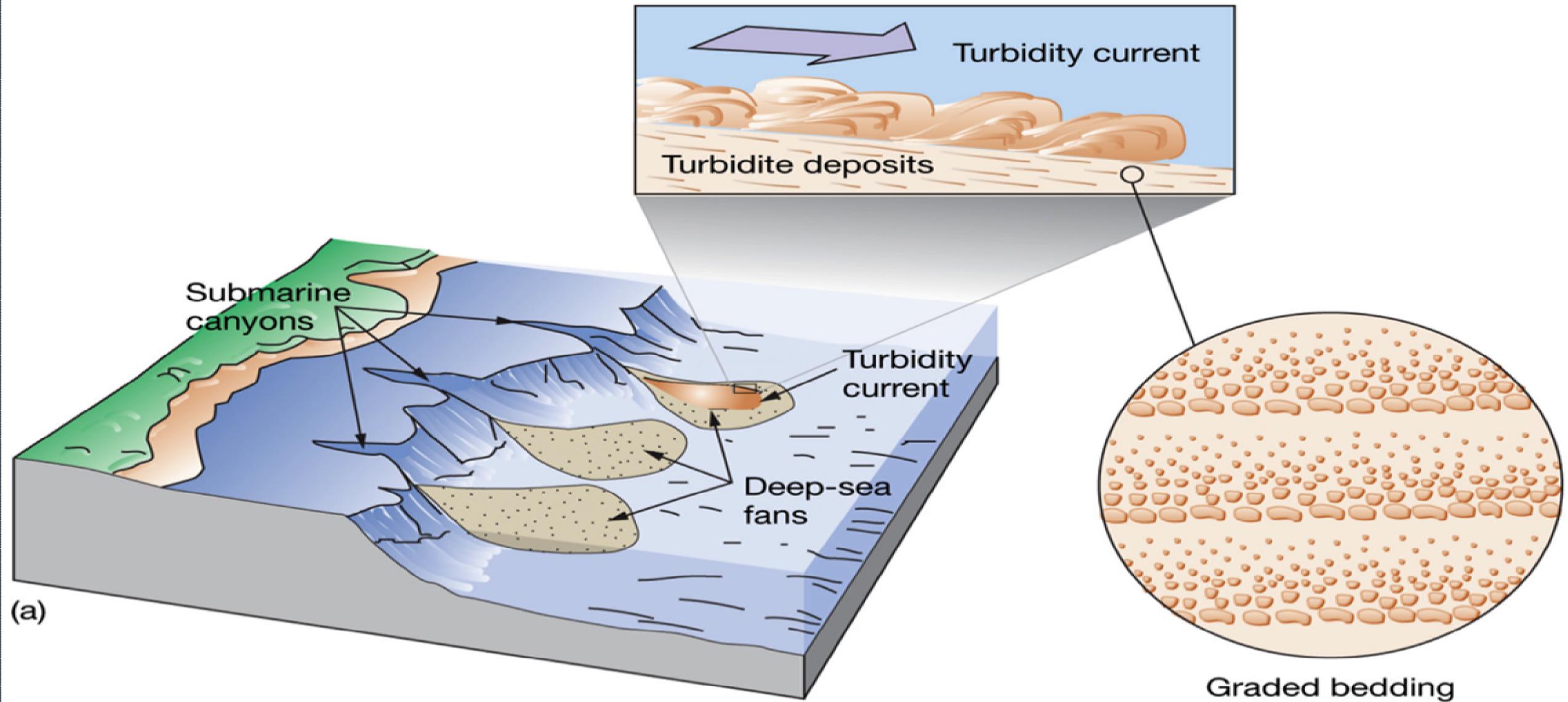
- Arran's oldest rocks are Cambrian in age
- They are the younger part of a group known locally as the Dalradian.
- This group was deposited as sediments over a 200m.y period
- The rocks were deposited in an area between the Great Glen Fault and the Highland Boundary Fault

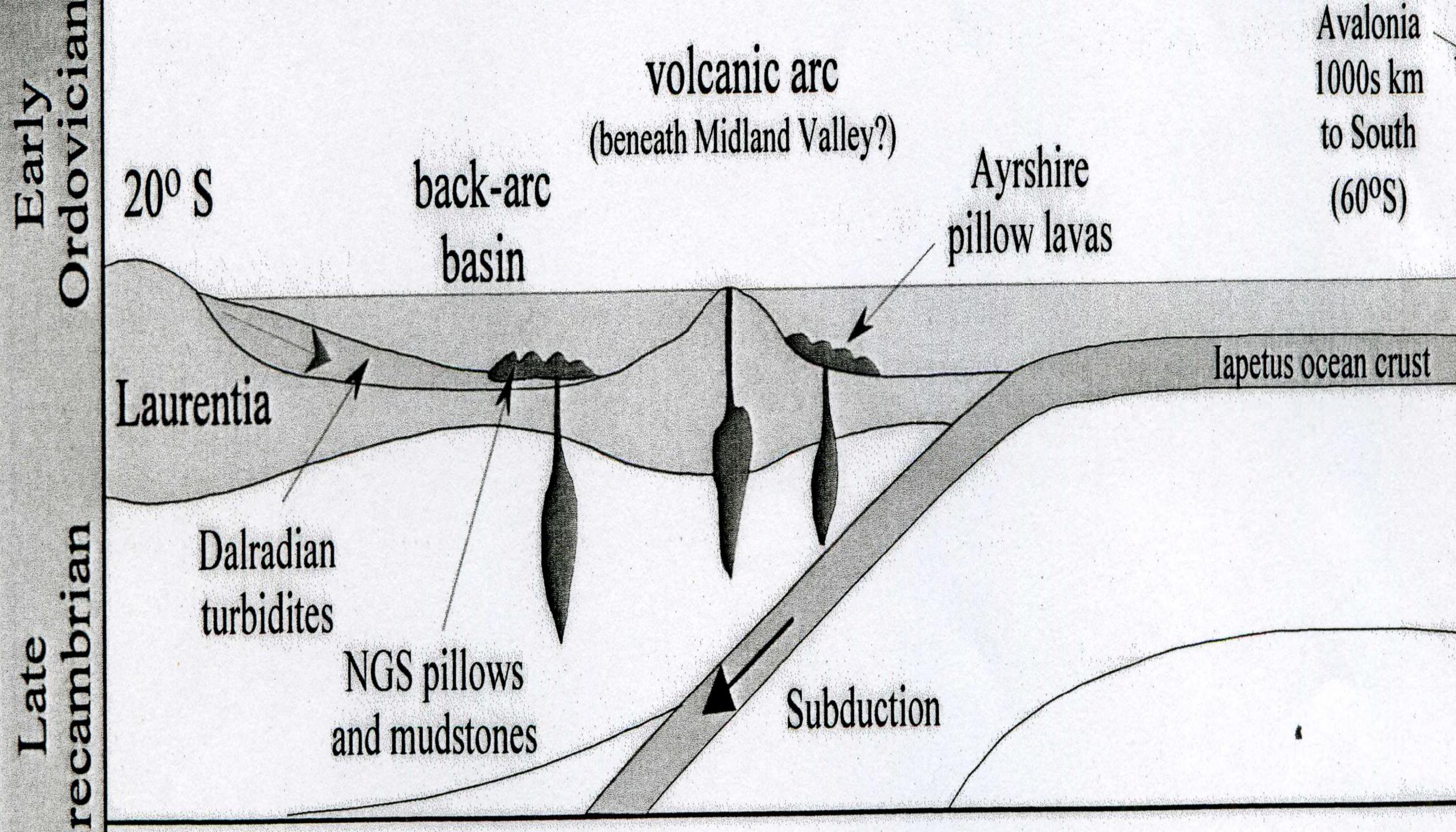


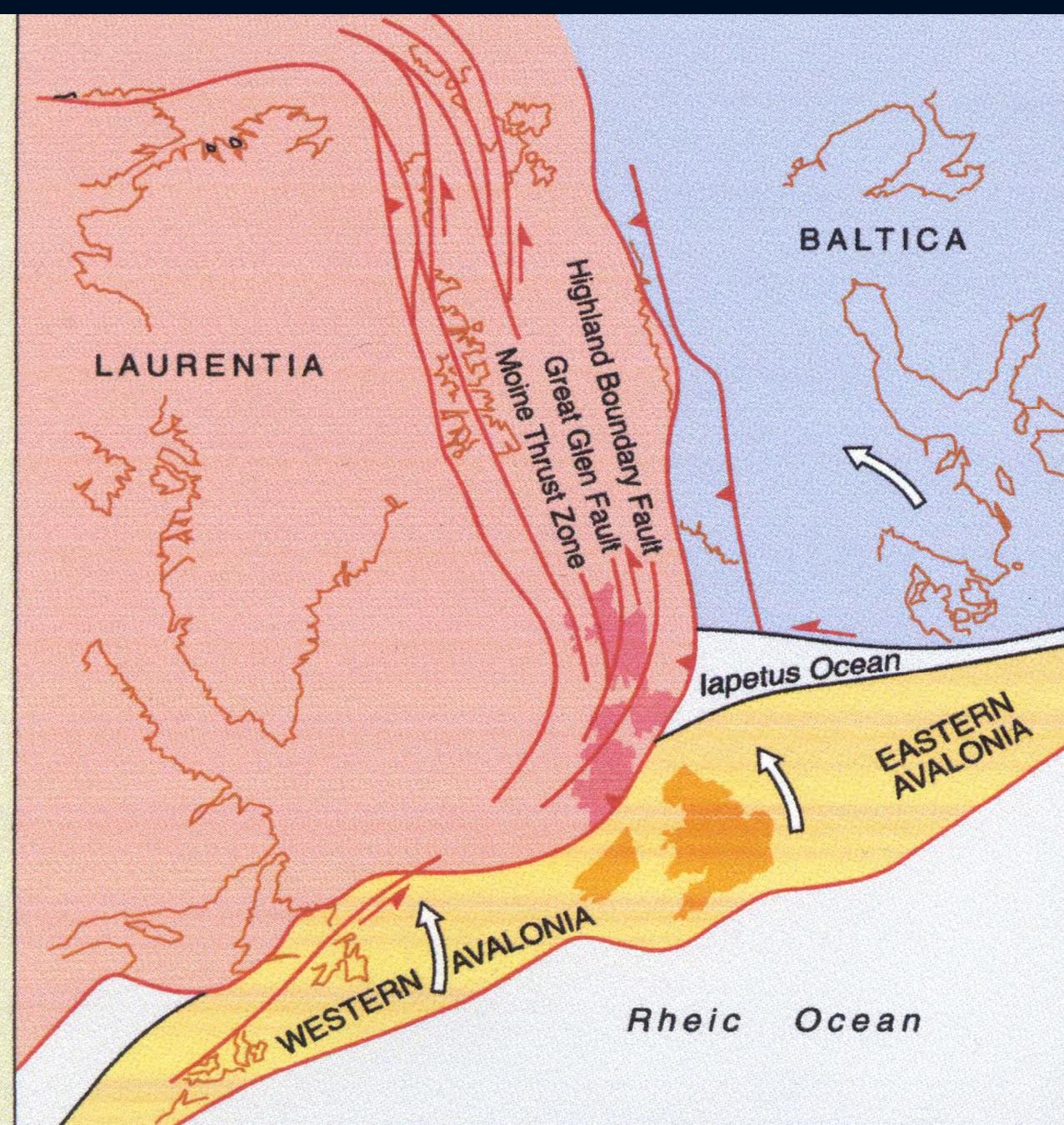
Graded Bedding

formed by turbidity flows

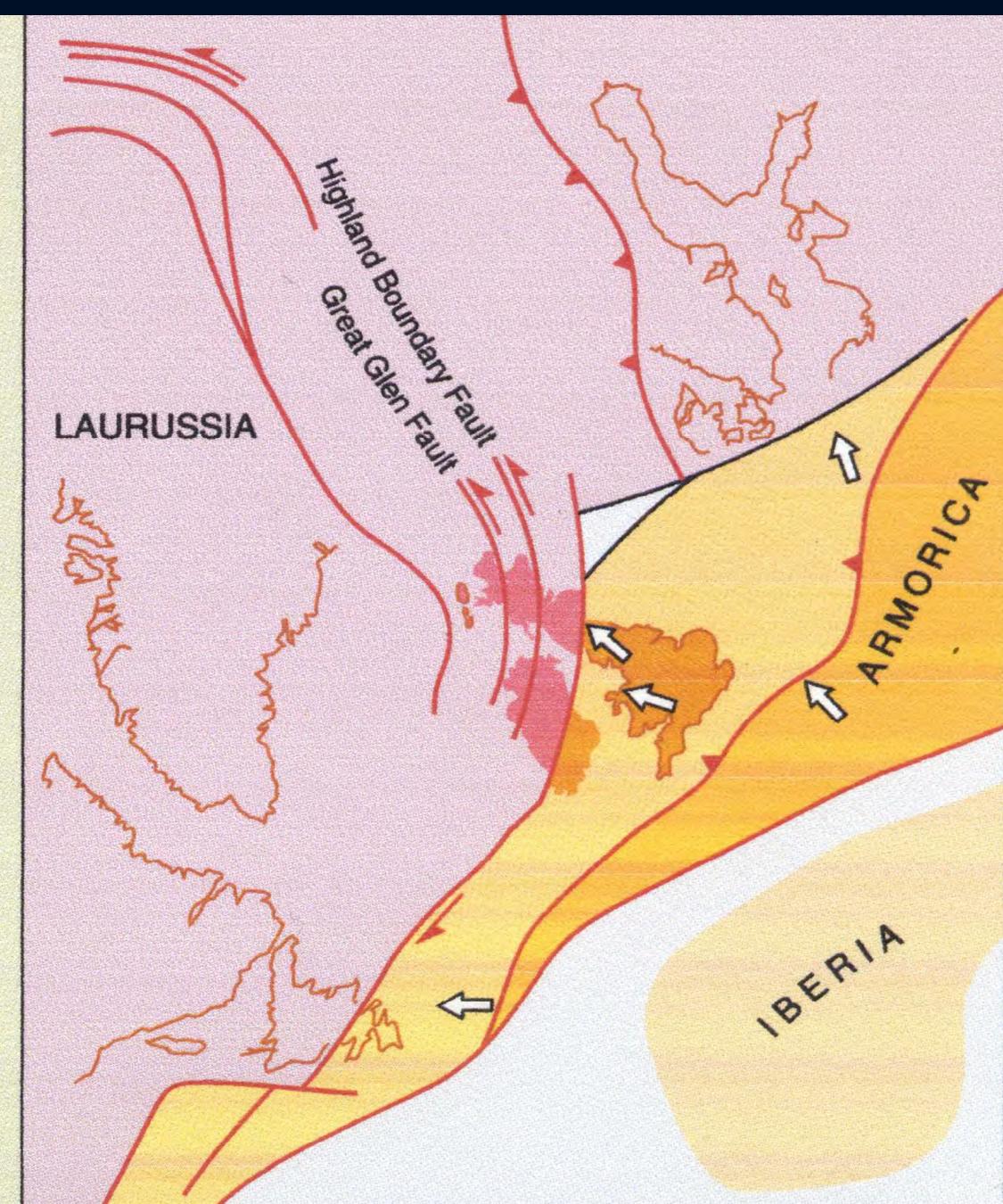
This Our Oldest Rocks





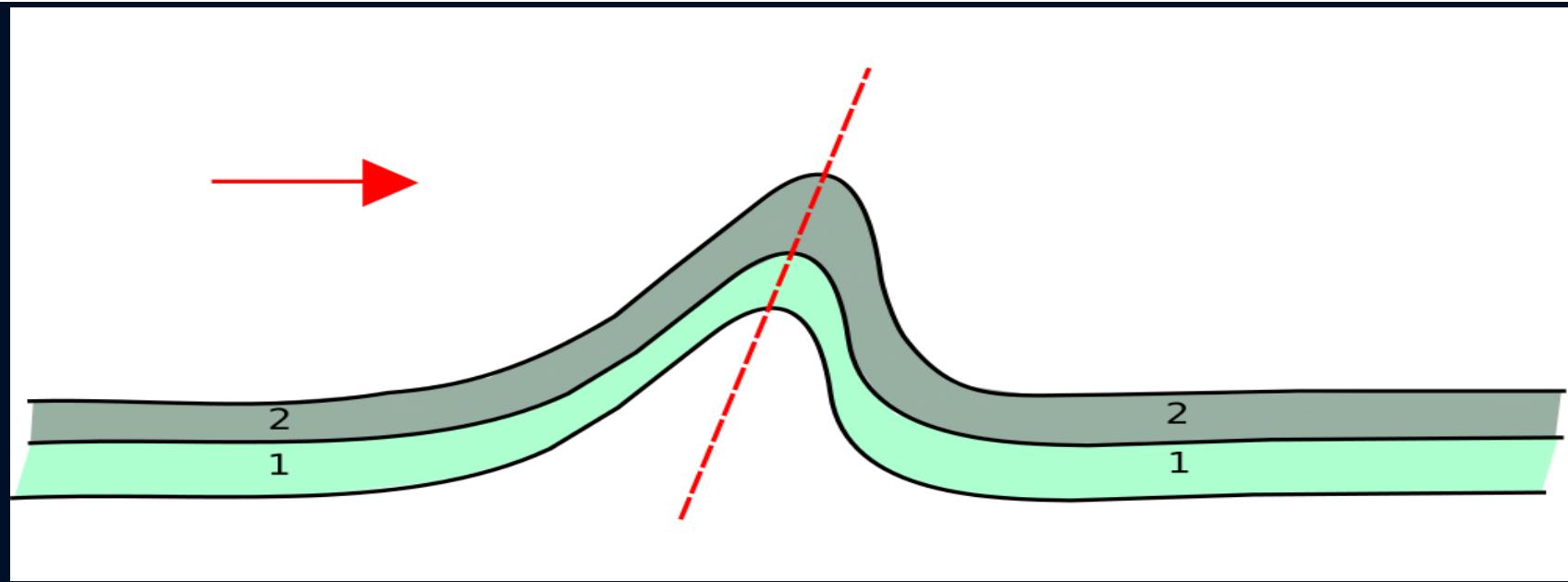
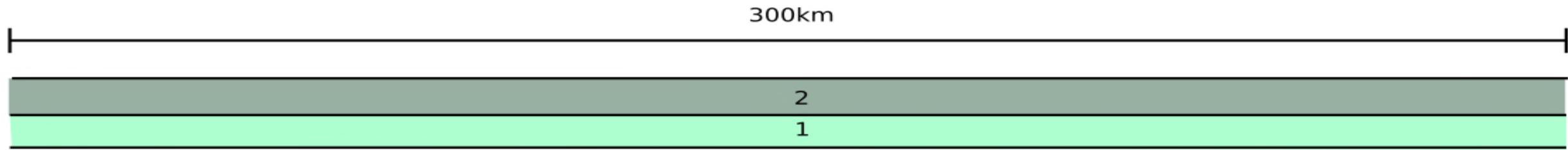


(a) 420 Ma



(b) 400 Ma

The Grampian Orogeny



Evidence of Compression



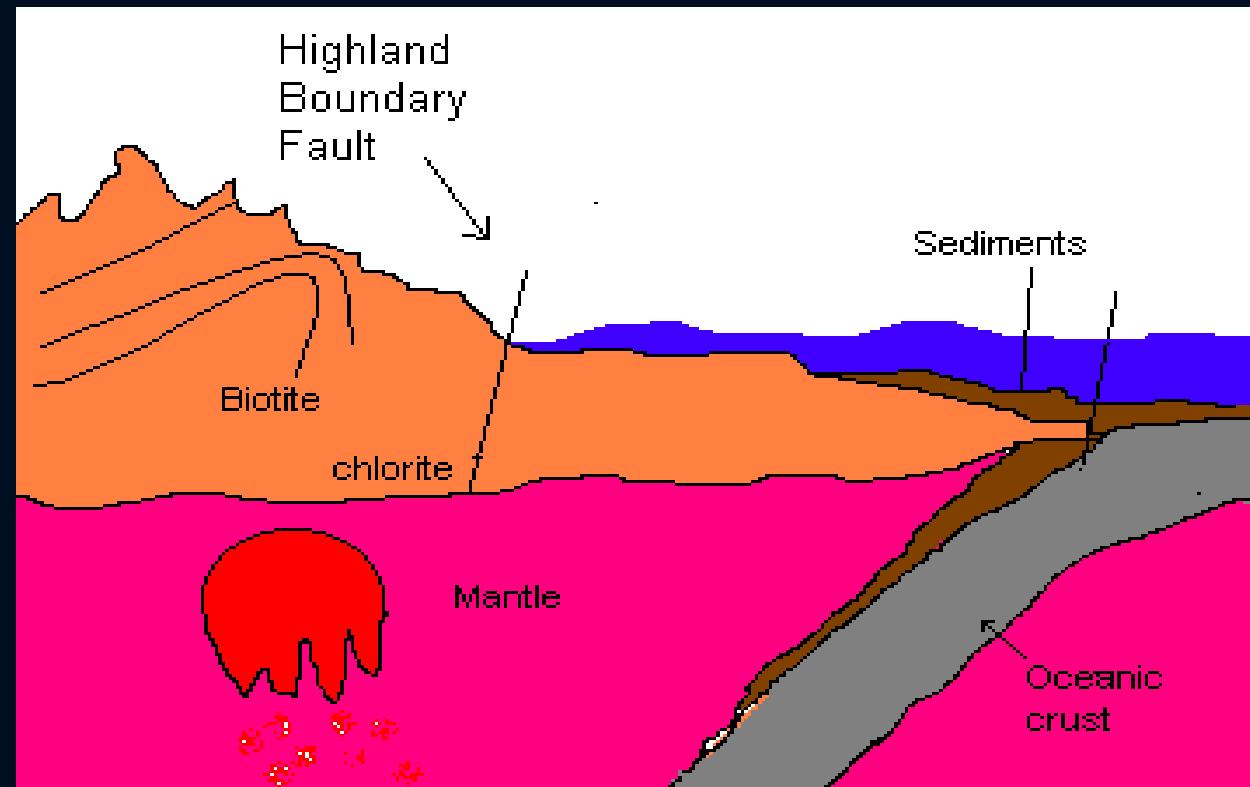


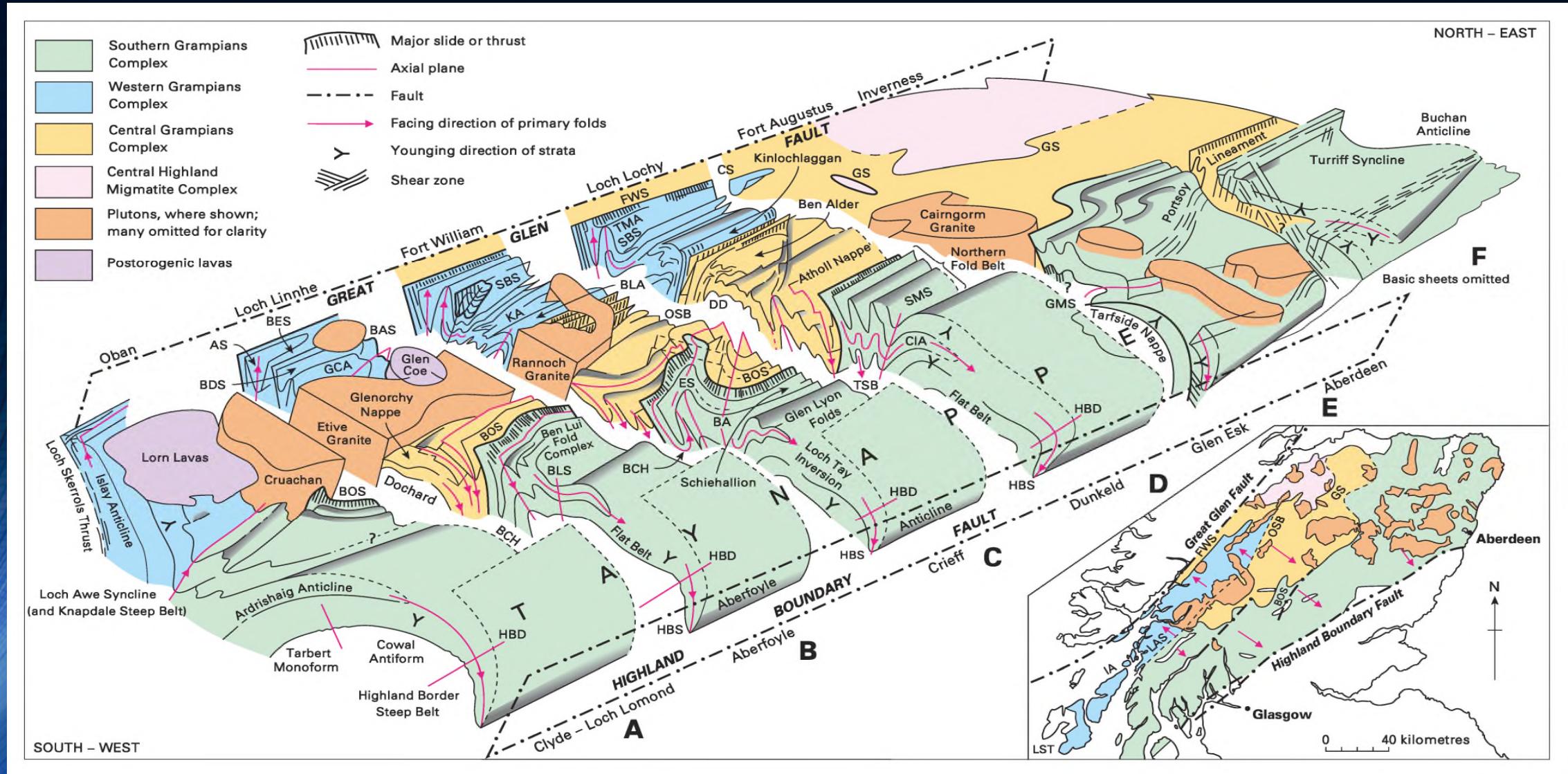
Arran's roots lie with the Caledonian Orogeny

When the Laurentian plate collided with the Avalonian plate the Dalradian sands, silts and muds were metamorphosed over a large area to become, slates, phyllites and schists

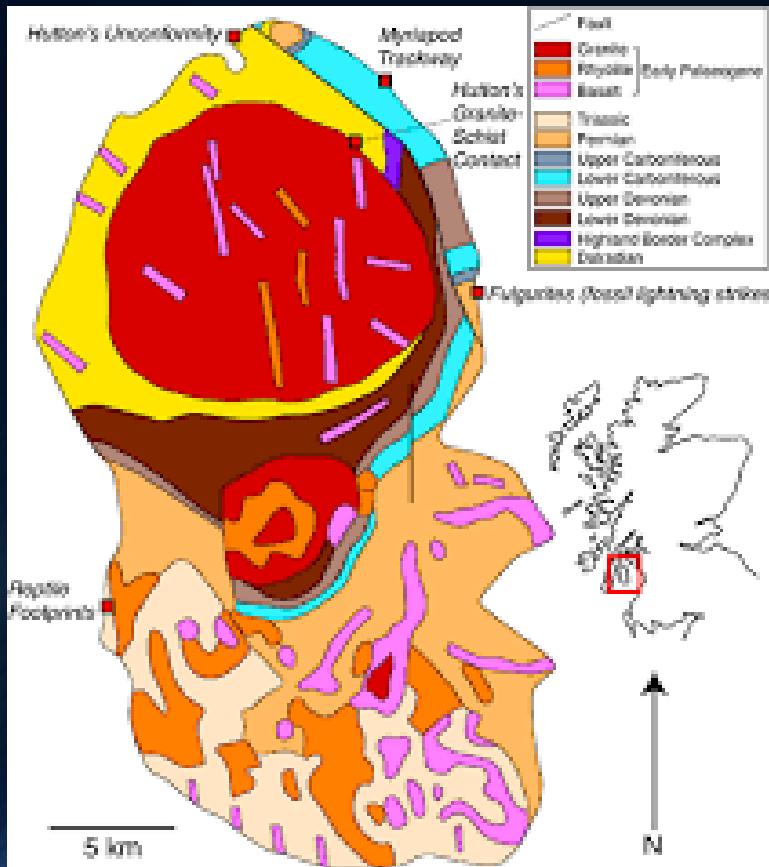
The collision caused shortening and thickening of the local crust

As the plates came together the descending slab melted in part and granites were intruded



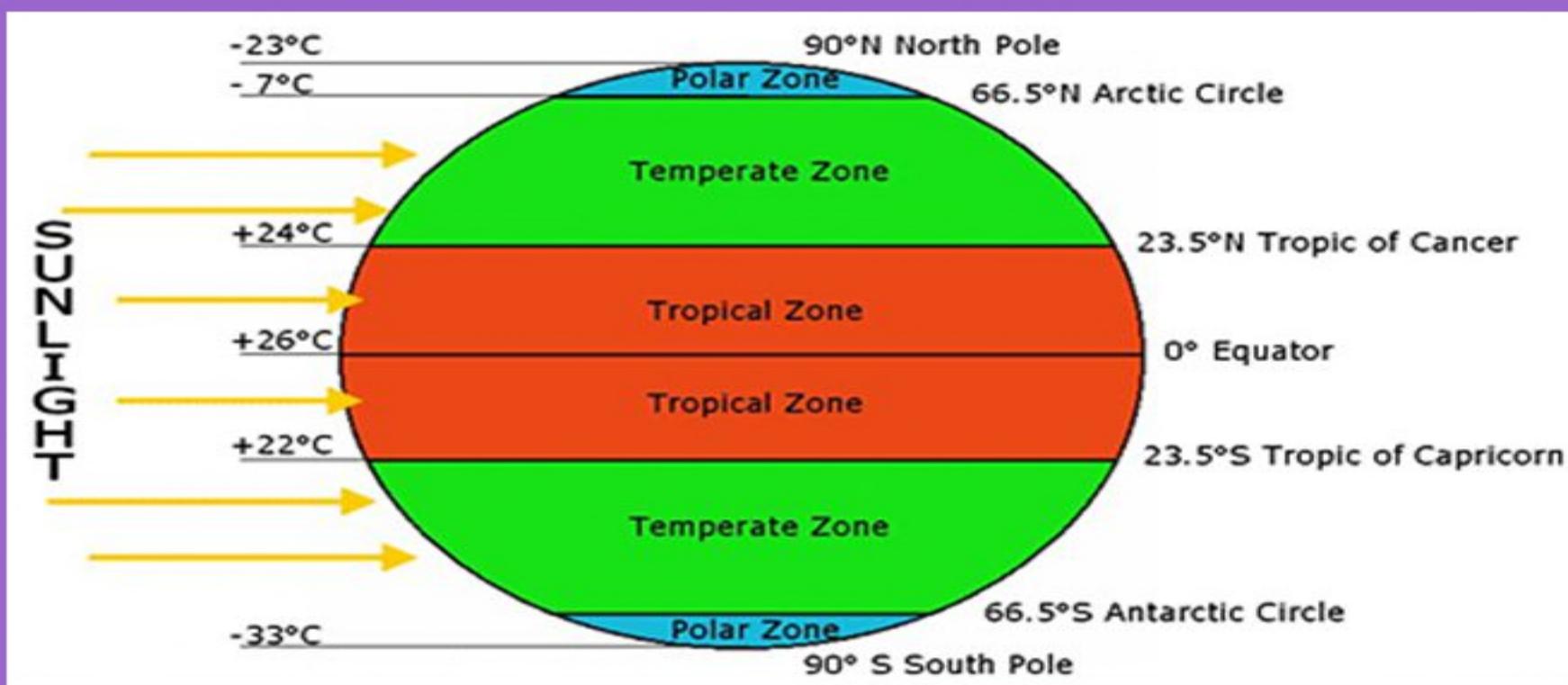


The Midland Valley Terrane



- Devonian
- Carboniferous
- Permian
- Triassic
- Tertiary

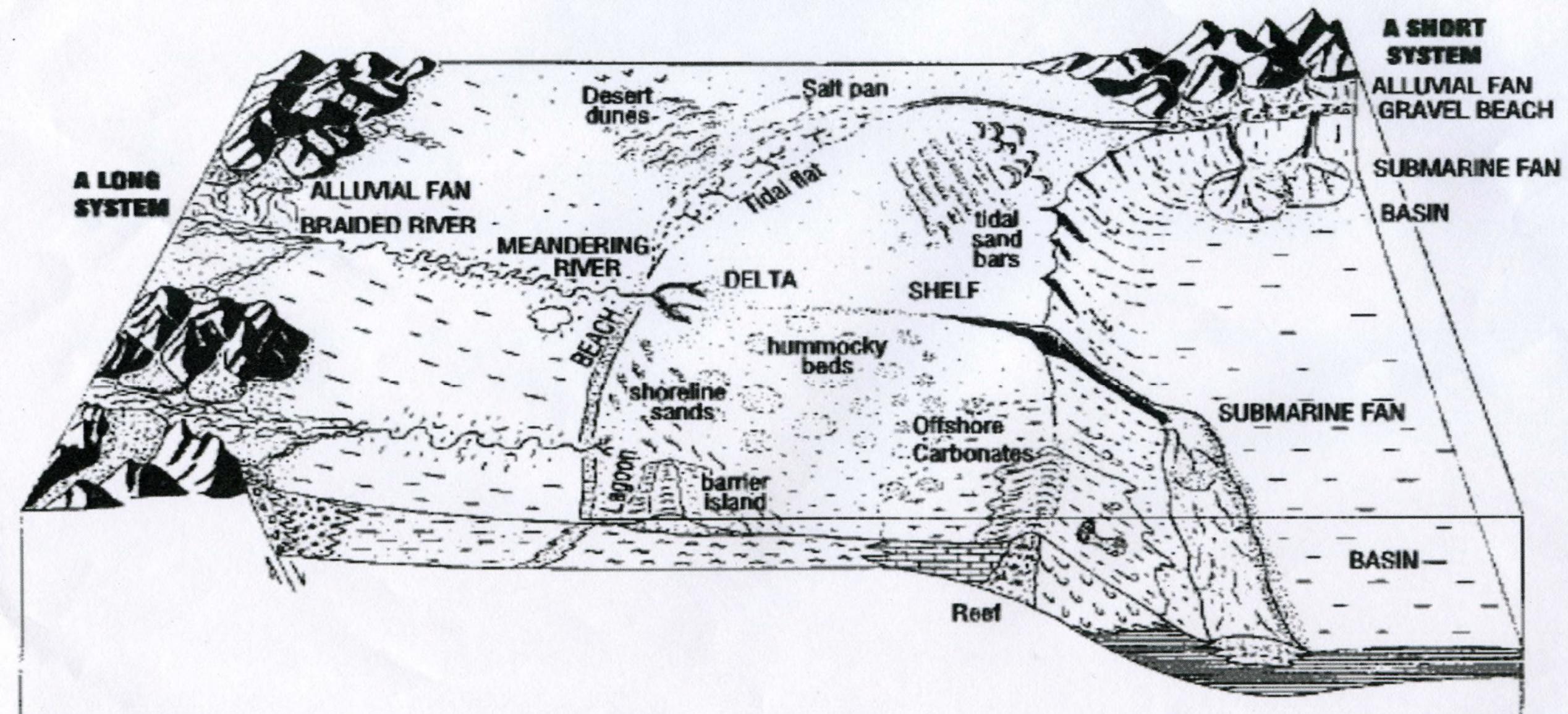
Climate Zones



The three major climate zones on the Earth are the polar, temperate, and tropical zones. Temperatures in these three climate zones are determined by angle of sun's rays and are marked by latitudes into zones.

Sedimentary Environments

A conceptual model of the Earth's environments
coarse



Devonian braided stream and fanglomerate deposits





Moulds of
Carboniferous tree
roots in Seat Earth

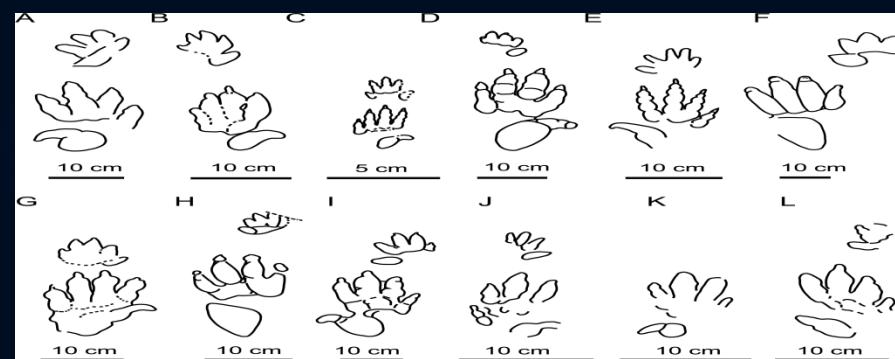
Evidence of Life







Chirotherium (hand beast)



Evidence of Changing Environments





Interesting Structures!



Hot Stuff! 50% of the island is Palaeogene and Igneous!



A Composite Sill or rock sandwich composed
of both mafic and felsic components

Drumadoon Sill





Arran Dyke Swarm at Kildonnan



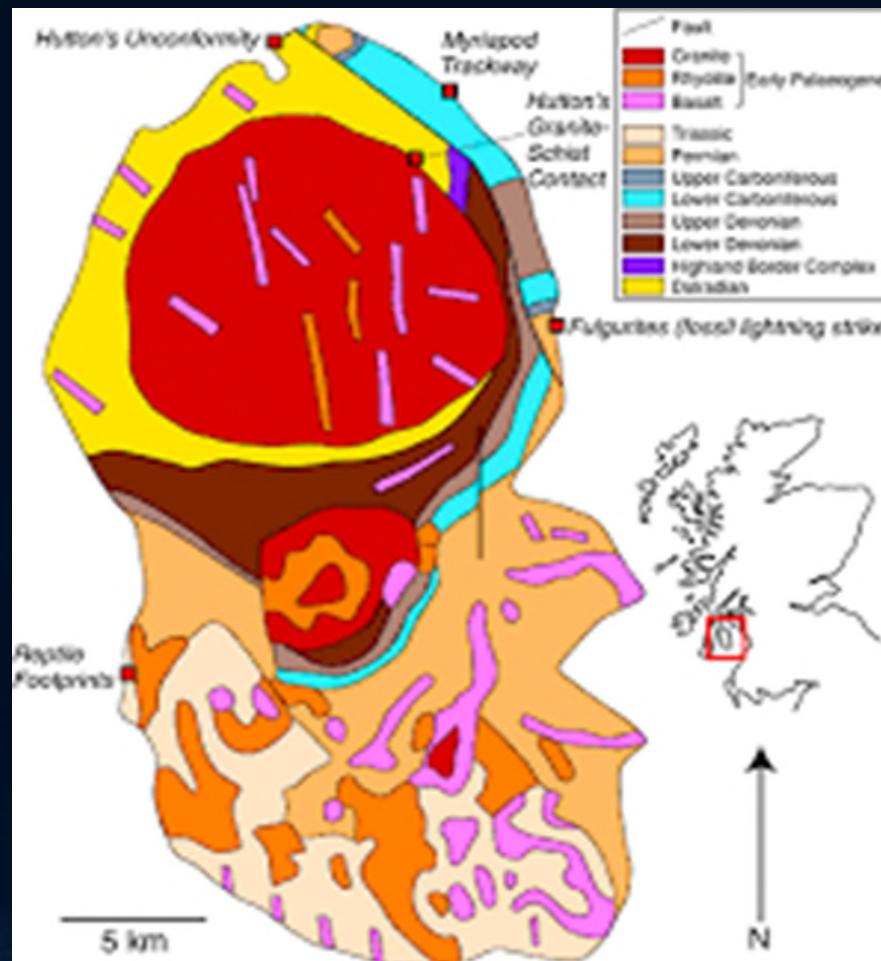
The granite diapir and the “Sleeping Warrior”







Central Igneous Complex." Arran's Volcano"

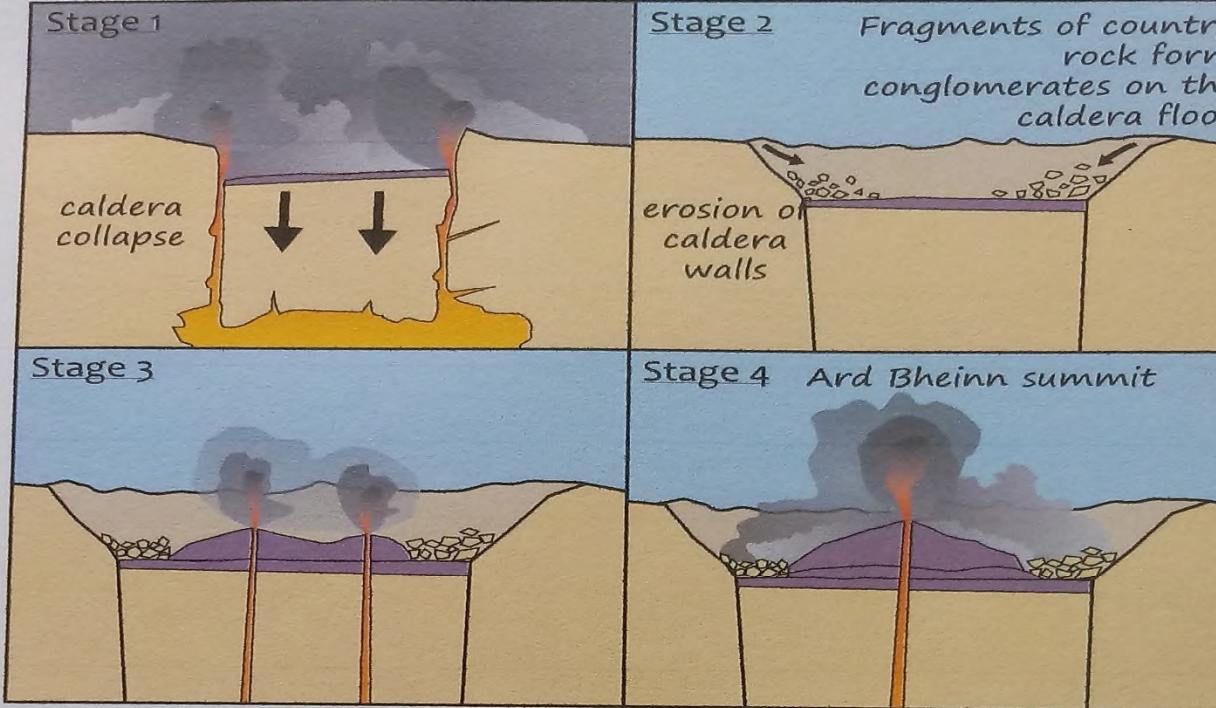


1. Highly explosive volcanic eruptions emptied the underlying magma chamber and resulted in the collapse of the overlying rocks into a caldera, or 'crater'.

A mixture of ash and rock fragments that were ejected from one of the many volcanic eruptions within the CAIC.



3. At least four, short lived, volcanic vents ejected ash, and rocks which formed layers of volcanic material on the caldera floor.

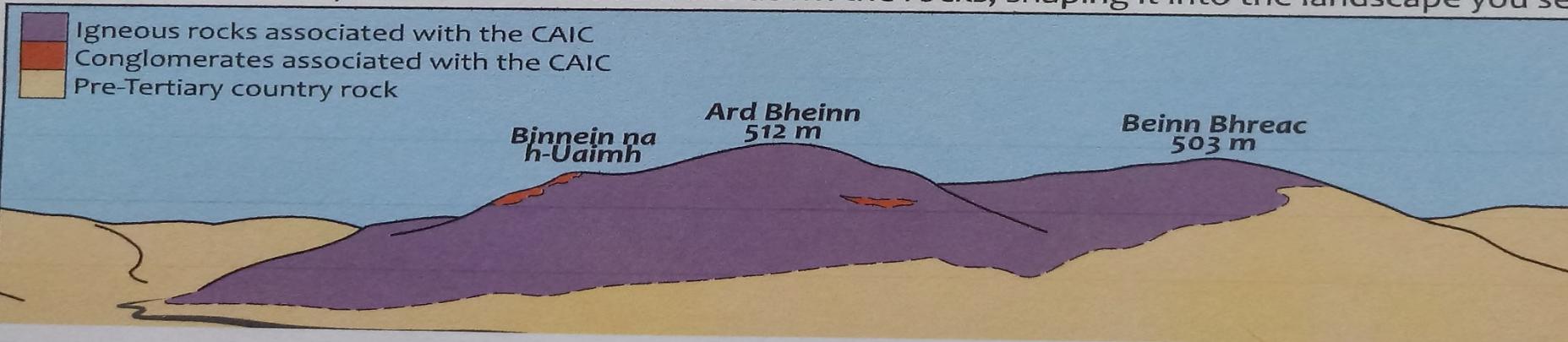


2. Collapse of the steep caldera walls allowed large blocks of country rock to fall inside and be preserved as 'conglomerates'. Amongst these are fragments of Jurassic aged sediments and Cretaceous chalk, which remarkably still contain fossils. Rocks of this age are not found anywhere else on Arran.

4. A final period of explosive eruptions deposit huge amounts of ash inside the caldera. The summit of Ard Bheinn is made up of these volcanic deposits!

A geological view of Ard Bheinn looking East

Over time erosion from ice, wind and rain have worn down the rocks, shaping it into the landscape you see today.



Thanks to Robert Gooday and his co-workers for access to their up to date research and figures on the Central Arran Igneous Complex (Gooday et al)

Chilled Out! Glaciation and Arran



The U shaped Valley of Glen Sannox



The Pyramidal
Peak that is
Cir Mhor
taken looking
North up Glen
Rosa



Historical Sites 1787



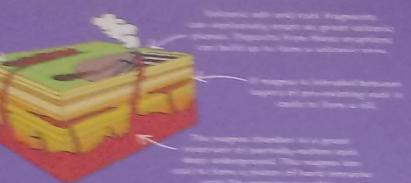
Fire on Arran

Palaeogene Igneous Province

long ago, the continents of North America and Europe started moving magma to rise towards the surface. At the same time, in the earth appeared below the crust, causing a huge amount of magmatic activity.



Palaeogene Igneous Province made up of?



British Palaeogene Igneous Province

The British Palaeogene Igneous Province is a collection of the areas where volcanic activity took place in the area, measured in a scientific way.



Fire on Arran An island shaped by magma

From the spectacular mountains in the north, to the sheer coastal cliffs in the south, Arran's landscape is dominated by igneous rocks formed 60 million years ago. These rocks are often harder than the surrounding sedimentary units, so are less easily eroded by the forces of ice, wind, and water.



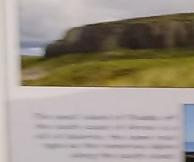
The Granite Mountains

The north of the Island is dominated by the rugged mountains of Beinn Tarsuinn, Crin Hill, and Goat Fell. These mountains are made of granite, a coarse-grained intrusive rock which forms when magma cools slowly deep underground.



Sills

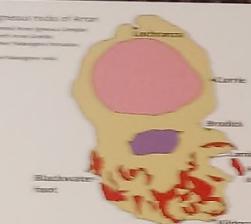
Much of the geology in the south of the island comprises igneous intrusions known as sills, which formed as magma intruded between layers of pre-existing rock. They are poorly exposed in the island's rugged interior, but can form high, sheer cliffs around the coast.



This small section of cliff at the head of the Firth of Clyde is made of a type of granite called 'Ailsa Craig'.



This small section of cliff at the head of the Firth of Clyde is made of a type of granite called 'Ailsa Craig'.



Ailsa Craig

Ailsa Craig is a distinctive, conical island located south of Arran. It is made of a rare kind of microgranite – fine-grained type of granite. This unique rock type is an ideal material for the manufacture of curling stones.



This is the last remaining island of the British Isles to have been settled by humans.



Over 400 tonnes of Ailsa Craig granite were used to build the 2014 Sochi Winter Olympics.



All curling stones are made from Ailsa Craig granite, which is why it is called 'Ailsa Craig'.

Fire on Arran Iceland - Arran's volcanic descendant

Around 60 million years ago, Arran was a site of intense magmatic activity. The tectonic plates of Eurasia and North America were being pulled slowly apart, creating cracks in the crust which allowed magma to reach the surface. As the North Atlantic Ocean opened up, this volcanic system moved away from Arran, but is still active in Iceland.

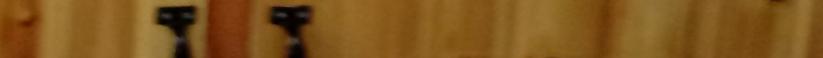
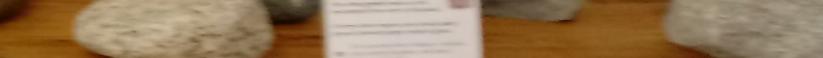


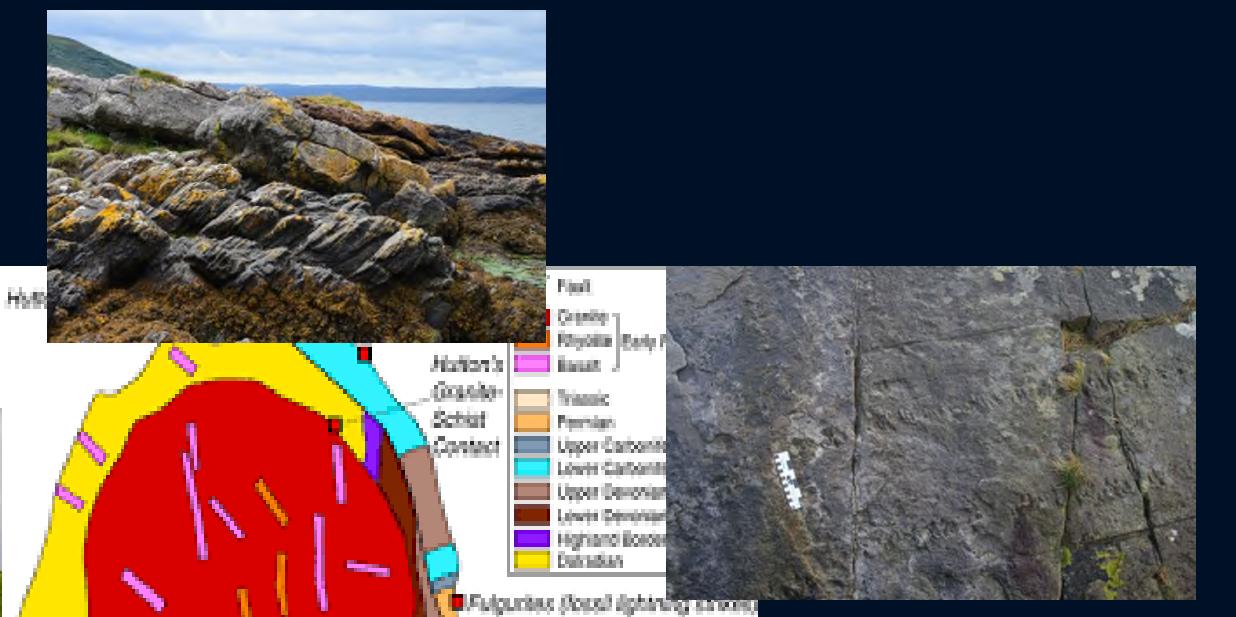
In Iceland, lava commonly erupts from fissures (cracks) in the surface. These fissures are permeated as dykes – vertical sheets of igneous rock, many of which are over 100m thick.



Ard Bheinn - Arran's Explosive Volcano

The hills around Ard Bheinn in the centre of the island are the site of a giant volcanic system that was active in the Palaeogene, around 60 million years ago. Instead of erupting lava, this volcano spewed great plumes of volcanic ash that would have reached high into the atmosphere. So much material was erupted that the underlying magma chamber collapsed, forming a giant depression in the landscape known as a 'caldera'.





One Island, Many Amazing Stories

