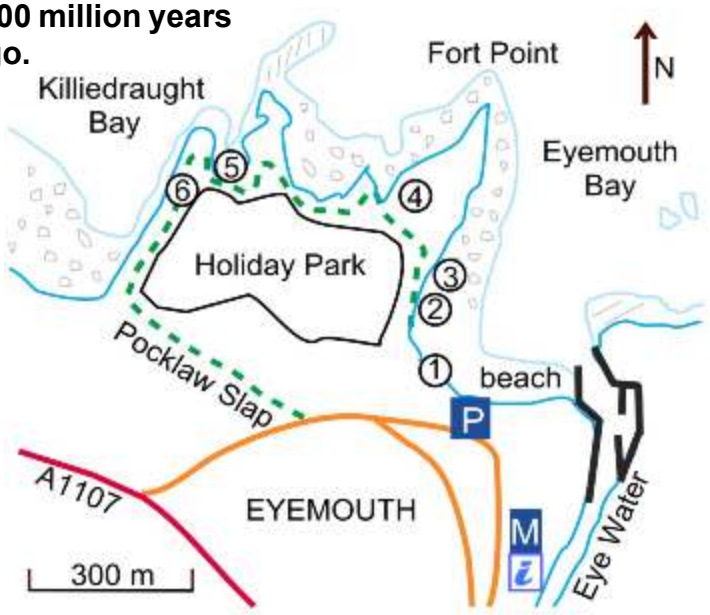
EYEMOUTH'S VOLCANIC ROCKS

This walk to the west of Eyemouth takes you around the spectacular scenery of the headland which was part of a volcano 400 million years ago and then covered by an ice sheet 20,000 years ago.



The walk starts on Eyemouth beach and takes you around the Eyemouth Fort headland on the coastal footpath. The circuit is about a mile but there are plenty of rocks to see on Eyemouth beach without walking around the headland. The walk is best done at low tide when you will see all the rocks and features. Parking in Eyemouth is available at several free car parks. There are buses from Berwick-upon-Tweed to Eyemouth (235/253). The numbers on the map are places where you can stop and look at features of geological interest. Binoculars might be useful.

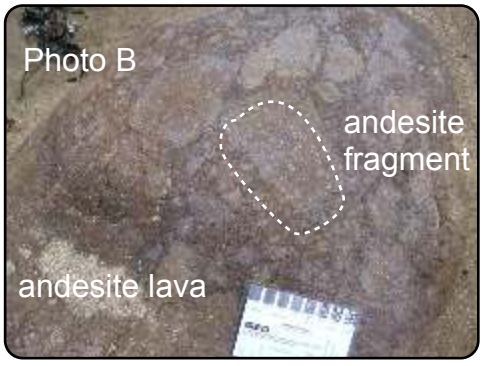
Start your walk at the ramp down to the beach near to Eyemouth Leisure Centre and Swimming Pool at the west end of the promenade (The Bantry) (NT 943 645).

The rocks on the west side of Eyemouth Bay are very different from those on the east side (see Eyemouth East leaflet). That is because a major **fault** runs down the Eye Water valley separating the younger **greywackes** to the east from the older **sedimentary** and **volcanic** rocks to the west.

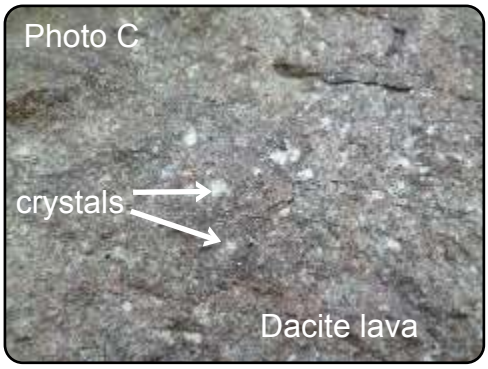
The cliff in front of you (Photo A) has three rock types of different colours. Nearest to you are orangey-red beds, which have layers of different sized pebbles in them. The sands and pebbles were deposited by **meltwater** from an ice sheet at least 12,000 years ago and they are the youngest rocks on the cliff. The Eyemouth Fort headland is made of **sedimentary** rocks called **Old Red Sandstones**, which have roughly horizontal layers, and are about 360 million years old (Devonian).

The mauve/violet rocks are **dacites,** which are **volcanic lavas** and were erupted about 400 million years ago near the beginning of the **Devonian period** and are therefore the oldest rocks you will see on this walk.

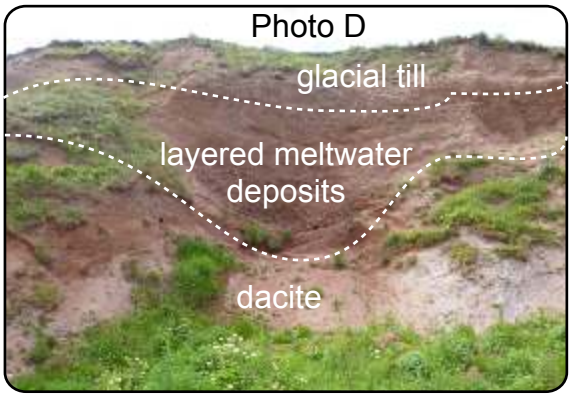
① *At the foot of the ramp look at the smoothed, rounded rocks which are exposed on the beach to your right* (Photo B). They may be covered by sand! These reddish-grey rocks are made of fragments of **andesite lava**, which were carried along in a **lava flow**. When the lava cooled and crystallised, the resulting rock included the andesite fragments. Later in the walk you will see the **volcanic pipe/neck** through which the lavas were erupted.



② *Walk along the beach and look at the mauve/violet rocks.* They are **dacite lavas**, similar to andesite, except that the minerals contain more **silica.** Some of the lavas are layered and contain tiny **crystals** which grew in molten **magma** below the surface before the eruption of the volcano. (Photo C).



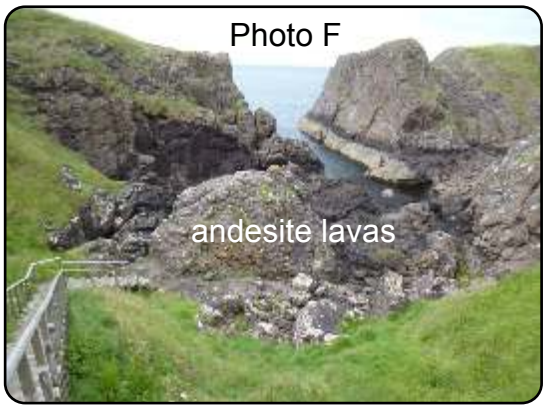
MELTWATER DEPOSITS AND GLACIAL TILL



③ *Walk further along the beach until you find the orangey-red beds which lie above the dacite lavas.* Photo D shows that the sands and pebbles lie in a small valley eroded into the lavas by a river which pre-dates the last advance of an **ice sheet**. The deposits at the base of the valley are layered, so they were probably carried by meltwater, whereas the randomly arranged pebbles and boulders embedded in clays above the meltwater deposits are **glacial tills**, which were deposited when a **ice sheet** covering this district, melted about 12,000 years ago.

Retrace your path to the steps and climb to the top of the cliff. There are several routes around the Eyemouth Fort headland. ④ At the first bay you can see the Old Red Sandstone with its horizontal beds (Photo E). If the tide is low you will be able to see that the sandstones sit on top of **volcanic** rocks, which are purple in colour and have uneven **joints**, by comparison with the horizontal **bedding planes** of the sandstones.

The volcanic rocks are tougher than the Old Red Sandstone and are less likely to be eroded away by waves, thus forming the headland. It is likely that this headland was quarried, as a section of the Old Red Sandstone above the volcanic rocks has been removed. Blocks of sandstone would have been taken away by boats to be used for buildings.

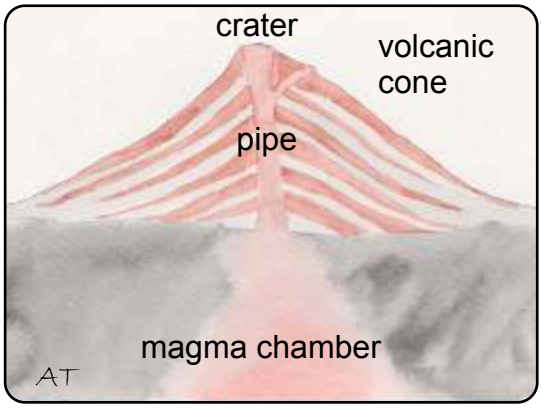


As you follow the coastal path round several inlets, you can see that the Old Red Sandstone cliffs are replaced by an unevenly jointed volcanic rock.

These cliffs are made of andesite and dacite, which formed thick lava flows which solidified quickly so that each sticky pulse of lava collapsed over the previous flow, giving 'cushion-like' structures (Photo F). ⑤ *There is a set of wooden steps going down into an inlet, so that you can have a close look at the volcanic rocks.*

KILLIEDRAUGHT BAY - A VOLCANIC PIPE

Follow the path until you can see Killiedraught Bay, the site of the volcanic pipe. ⑥ The diagram shows how magma reached the **crater** through a **pipe** from the **magma chamber.** Since the Eyemouth volcano erupted 400 million years ago, the **volcanic cone** has been eroded away, leaving the rocks of the pipe visible (Photo G).



The rocks of the pipe are called **volcanic agglomerates** and are made of a chaotic mixture of local rocks and lavas, as a result of a violent eruption which would have covered the area with volcanic ash.

To return to Eyemouth, turn left at the end of the coastal footpath and follow Pocklaw Slap (footpath, then road) down to the main road, then turn left to reach the sea front.

USEFUL REFERENCE BOOKS

Scottish Borders Geology - An excursion guide 1993 A.D.McAdam, E.N.K.Clarkson & P.Stone

Northumbrian Rocks and Landscapes - A Field Guide 1995 (ed. C. Scrutton) Yorkshire Geological Society

USEFUL MAPS

OS 1:50,000 Landranger 67 Duns, Dunbar & Eyemouth

OS 1:25,000 Explorer 346 Berwick-upon-Tweed

British Geological Survey 1:50,000 Scotland Sheet 34 Eyemouth (Solid)