

Fetlar2013

Geology

In terms of geology, Shetland can be regarded as a 'jigsaw' that was assembled around 400 million years ago. The assembly of this jigsaw was the result of a massive collision as plate tectonic forces drove three ancient continents and the ocean between them together to form a supercontinent. As a result the vast Caledonian Mountain Chain was thrust up in a process known as the Caledonian Orogeny. Later, forces pulled the supercontinent apart once again so that by 60 million years ago the Atlantic Ocean was forming. Shetland, as part of a new European tectonic plate, split from North America and drifted to its current location at 60 north.

The island of Fetlar, broadly speaking, is made up of 3 different groups of rocks. The chemical makeup of each group influences the types of vegetation and wildlife that can be found living in each area. Weathering and erosion caused by the sea continue to shape the landscape; at Funzie the cliff edges are blocky and square in appearance, whilst at Houbie the land slopes down gently to meet the water.

Dalradian rocks

About 730 million years ago a large ocean known as Iapetus began to form and spread between ancient 'North America' and 'Europe'. Layers of sand and mud were deposited at the edges of the Iapetus Ocean as the continents eroded to build up thick sandstones and mudstones. As the Iapetus closed these sedimentary rocks were compressed and heated to form metamorphic rocks including silica-rich quartz gneisses, mica-rich phyllite, and, where the mud had contained calcium-carbonate, crystalline limestone.

A group of these rocks, from ancient 'North America', is known as the Dalradian Supergroup and makes up the west of Fetlar and Unst. The rocks are acidic and weather to produce soils with low natural fertility that become leached and waterlogged resulting in the formation of blanket bog.

An Ancient Ocean Floor

As the Iapetus Ocean closed a slice through the Earth's crust beneath the ocean was trapped between the colliding continents and thrust up onto 'North America'. This stranded ocean crust is known as an ophiolite and is seen today as the

serpentine rocks that are found in the central sector of Fetlar.

The rocks of the ocean crust began as deep mantle material that was mafic (high in magnesium and iron). As the ocean floor spread, the mantle material rose and solidified to form new crust made largely of the minerals olivine and pyroxene. When the ocean crust was forced up onto the continent hot fluids circulated through the rocks, altering the olivine and pyroxene to serpentine.

Serpentine rocks are low in some plant nutrients and high in toxic metals. Many areas of serpentine rock support an unusual form of heathland, rich in wild flowers such as thyme, dog violet, mountain everlasting, alpine meadow-rue and early purple orchid.

The Funzie Conglomerate

The Caledonian Mountains eroded quickly. Over thousands of years great thicknesses of water-rounded cobbles and finer sediment built up at the base of the mountains and were cemented together to form conglomerate. The Funzie conglomerate in the east of Fetlar is of particular interest. After it had built up a slice of the ancient ocean crust was thrust over it. The immense heat and strain stretched the round cobbles into cigar shapes. The finer sediments were metamorphosed into phyllite. The ocean crust has since eroded away exposing the deformed conglomerate beneath.

Geowall

The Geowall at Funzie was created and installed in 2008 by Geopark Shetland. A visual representation of the geology of Fetlar, the Geowall shows the complex nature of the rock formation of the island, including the unique Funzie conglomerate.

Geopark Shetland

For more information see the Shetland Ophiolite self-guide trail pack and the Geopark Shetland app for Android and Iphone.

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