

DERRY

AREA OF COUNTY: 2,067 square kilometres or 798 square miles

COUNTY TOWN: Londonderry

OTHER TOWNS: Coleraine, Dungiven, Limavady, Maghera, Magherafelt, Portstewart

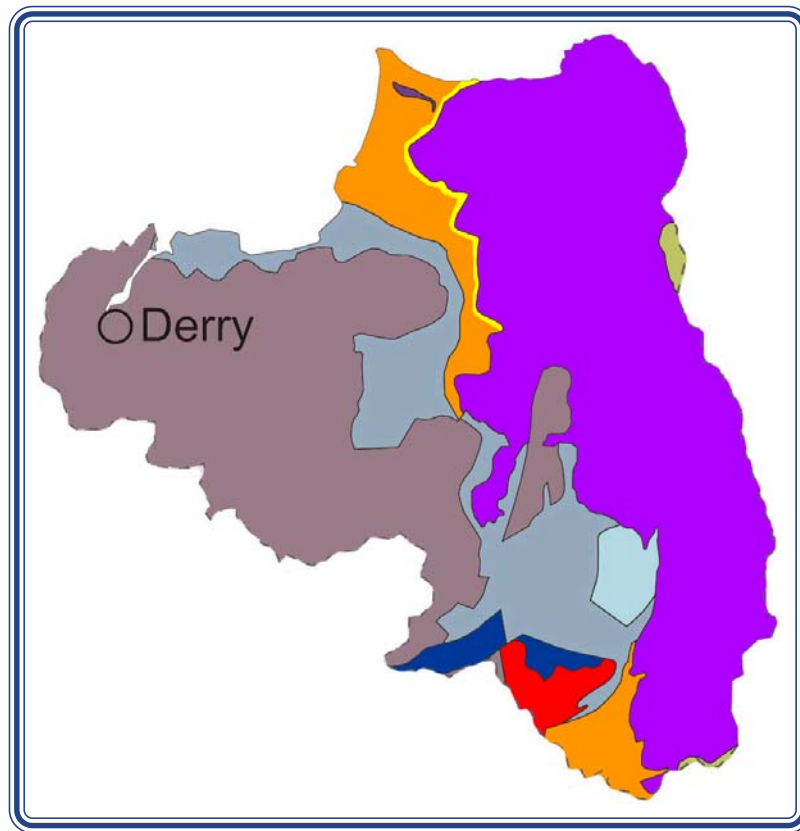
GEOLOGY HIGHLIGHTS: Binevenagh scarp and landslips, volcanic lavas, glacial lake deltas

AGE OF ROCKS: Precambrian, Ordovician, Carboniferous, Triassic to Palaeogene, Pleistocene



Binevenagh

Paleogene lava flows in the cliffs at Binevenagh, separated from a vast landslipped block by a deep gully



Geological Map of County Derry

Pale purple: Precambrian Dalradian rocks; **Dark blue:** Precambrian volcanic rocks; **Red:** Granite; **Blue grey:** Lower Carboniferous sandstones; **Light blue:** Lower Carboniferous limestone; **Orange:** Triassic and Jurassic sediments; **Yellow:** Cretaceous chalk; **Purple:** Tertiary (Paleogene) basalts; **Olive Green:** Tertiary (Paleogene) Lough Neagh Clay.

Geological history

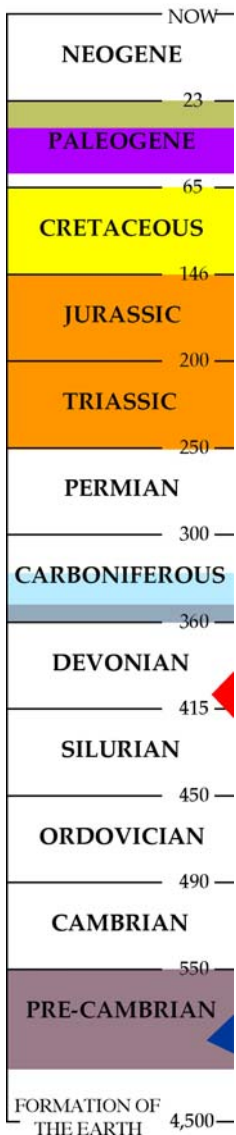
Around 600 million years [Ma] ago the rocks that now lie beneath the city of Derry, and beneath much of the western half of the county, were being deposited as sand, silt and limestone on the shallow floor of an ancient ocean. When this ocean finally closed, as the continental plates either side moved together, these sandstones, siltstones and limestones were transformed by heat and pressure into the metamorphic rocks quartzite, schist and impure marble. In the south-eastern corner of the county is a relatively small area of rocks of mid-Ordovician age, around 475-465 Ma. Most of these rocks are volcanic in origin. Some erupted onto the floor of a deep ocean while others never reached the surface and instead cooled deep beneath a volcanic island.

An irregular strip of, often red, sandstones and mudstones, runs across the middle of the county. These rocks, mostly deposited on a low river plain

Red Carboniferous sandstones at Barony Glen

are of Carboniferous age, around 340 million years old. This was a time when the area of Earth's crust that now forms Ireland lay very close to the Equator.

A spectacular scarp, crested by hard volcanic lavas around 60 million years old, rises on the eastern side of the county. The low ground below is formed of soft Triassic and early Jurassic rocks, over which vast blocks of the harder white limestone and dark basalt lavas have foundered to form the vast landslips below Binevenagh.



During Triassic times, between 250 and 200 million years ago, reddish sands and muds were deposited on a semi-desert plain. Sea level rose around the start of the Jurassic, drowning the desert plains. The grey mud and thin limestones deposited by this encroaching sea teemed with life, now found as fossils of marine creatures such as ammonites and clams.

Resting on top of these Jurassic clays, and forming the lower part of some of the cliffs on the coast, is the much younger Ulster White Limestone. This brilliant white rock, around 70 to 80 million years old and equivalent to the Chalk of England, was deposited in open sea far from land. Just like the Chalk, it was formed from the slow accumulation of the limey skeletons of countless billions of microscopic marine algae.

Atop the white limestone, and forming the steep scarps and cliffs of Binevenagh and the coast, are layer upon layer of dark basalt lava erupted from volcanoes during the early Palaeogene, around 60 million years ago. These dark lavas came from relatively gentle eruptions but the lowest layer, about a metre thick and more orange in colour, was formed by a far more violent eruption that seems to have swept across a large area of Northern Ireland. These basalt lavas are the youngest solid rocks in the county, but large areas of the

Geological timescale showing age of rocks in Derry.



Donalds Hill Quarry face of Ulster White Limestone, with brown weathered basalt lavas on the slope above. A harder, pale brown band at the junction of the two was deposited by a very violent volcanic eruption.

older rocks have been buried beneath vast spreads of sand and gravel deposited during the last ice age when ice and glacially-dammed lakes dominated the landscape.

Derry fossils

Fossils are usually found only in sedimentary rocks less than about 550 million years old. Hence, many of the rocks in Co Derry are either too old or of the wrong type to contain fossils. Of the sedimentary rocks in the county, the red sandstones and mudstones of the Carboniferous and Triassic were deposited in environments that were not good for preserving the remains of dead animals and plants. It is only in the Jurassic clays and limestones, and the Ulster White Limestone that fossils are found in this county. Ammonites and various types of clam, such as the oyster commonly known as the Devil's Toenail, are the most distinctive fossils of the Jurassic clays, but these soft clays are seldom seen, only in a few riverbanks. In the Ulster White Limestone the most common fossils are the bullet-like belemnites, an extinct relative of the squid. Of various other fossils, the dome-shaped sea urchins (including *Galerites* pictured right) are perhaps the most commonly found when eroded out of the coastal cliffs.



Suggested reading

- Mitchell, W.I. (ed.) (2004). *The Geology of Northern Ireland: Our Natural Foundation*. (2nd edition) Geological Survey of Northern Ireland, Belfast.

Map adapted with permission from Geological Survey of Ireland 1:1,000,000 map 2003
Image credits: Mike Simms 1, 3, 4 (top); Ulster Museum 4 (bottom).