EDC 25: Linn of Baldernock, Blairskaith

Grid reference: [NS 59074 75749]

Site type: Artificial mine workings

Site ownership: Not known

Current use: Disused

Field surveyor: Sarah Arkley & Luis Albornoz-Parra

Current geological designations: None

Date visited: 9th March 2009

Site map

(Figure 25) Linn of Baldernock Location Map

Summary description

A large number of sedimentary and igneous features occur; with stoop and room workings in a thin limestone which exhibit a number of different cave 'formations' such as stalactites.

Comprehensive descriptions of the various geological features can be found in the field guide of the Glasgow and Girvan area produced by the Glasgow Geological Society. Main features are the non- marine Baldernock Limestone in the Lawmuir Formation, the overlying Milngavie Sill (alkali-microgabbro) intruding the Hurlet Coal and strata belonging to the Lower Limestone Formation

Access into the stoop and room workings are possible with care but should be discouraged from a health and safety perspective. Inside the cave – immature stalagmites, stalactites, flowstones and cave pearls can be seen, but it should be noted that many of these speleothem features are delicate and have taken a long time to form.

Interesting wildlife habitat created in a 'cave' environment.

EDC 25: Stratigraphy and rock types

Age: Lower Carboniferous Formation: Lawmuir Formation

Rock type: Sedimentary Rock Cycles of the Strathclyde Group Type

Age: Lower Carboniferous Formation: Baldernock Limestone, Lawmuir Formation

Rock type: Limestone

Age: Carboniferous-Early Permian Formation: Milngavie Sills

Rock type: Basalt and microgabbro

Assessment of site value

Access and safety

Aspect/Description

Road access and parking Parking is possible along a rough track off the tarmac road to the north of the waterfall. Limestone mine is best accessed from the road immediately west of the site, walk upstream to the waterfall.

Safety of access Wooded area around the stream section, small informal path to the waterfall. Entering any mines should be discouraged from a Health & Safety point of view.

Safety of exposure Banks of the valley are quite steep in places and can be wet, care should be taken

Permission to visit No permission sought, weekend picnic spot with open access

Current condition Good

Current conflicting activities Karst features (stalagmites, stalactites, cave pearls, etc.) within the mine form very slowly and are very delicate, care should be take in promoting these features of the mine.

Restricting conditions None

Nature of exposure Natural stream section with stoop and room workings behind the waterfall

Culture, heritage & economic

Historic, archaeological & literary associations None known. Rating: 0.

Aesthetic landscape Wooded stream section. Rating: 3.

History of earth sciences None known. Rating: 0.

Economic geology Mined for limestone. Rating: 5.

EDC 25: Geoscientific merit

EDC 25: Linn of Baldernock, Blairskaith. Geoscientific merit.

Total Geoscientific merit score 50

Current site value

Community As a suggested site in the 'Glasgow Geological Society. Excursion Guide', interested geologists will already be aware of and visit this site. Rating: 6.

Education Excellent example of stoop and room workings in the Baldernock. Limestone and associated karst features within the mine. Rating: 8.

Fragility and potential use of the site

Fragility Geohazard, Over collecting

Potential use Higher/Further Education, School, On-site Interpretation, Geotrail, Multidisciplinary

Geodiversity value

An excellent site, displaying a variety of geodiversity features, including a good geological section through an igneous intrusion, a variety of sedimentary rocks, an excellent (and accessible) example of stoop and rooms workings, and on top of that some superb speleothem 'formations' within the old workings which must be some of the best in Scotland.

Photographs

(Photo 145) Outcrops in the Branziet Burn show that microgabbro sills have intruded between the sedimentary rocks belonging to the Lower Limestone Formation forming a series of waterfalls, or 'linns'. The waterfall section displays a sub-horizontal sill at the top (approx 3m thick), beneath which are cavities from abandoned workings where the Baldernock Limestone has been mined. Underneath the limestone lie layers of sandstone, limestone and black shales. Looking NNE.

(Photo 146) Close-up of brown tufa deposits on the lower lip of the waterfall. Calcium carbonate deposits form as lime-rich waters plunge over a cliff. The water is aerated and carbon dioxide is released, resulting in the water becoming supersaturated with calcite which consequently precipitates as calcium carbonate onto the rocks below.

(Photo 147) View from inside the old 'stoop and room' workings located behind the waterfall. Limestone was an important resource in Central Scotland and even thin seams were often mined. The Baldernock Limestone is about 1-1.5m thick. The 'stoops' (pillars) supporting the roof can still be seen, while the limestone was extracted from the 'rooms'. The mine extends a short way beneath the sill and is well preserved, but wet and muddy underfoot. Entering the mine should not be encouraged.

(Photo 148) View inside the limestone mine, showing a variety of cave formations or speleothems. These are formed as acidic water dissolves small amounts of limestone rocks, as it flows through cracks or joints into a cave. As the water comes into contact with the air, the carbon dioxide escapes and the water can no longer hold as much dissolved calcium. The excess calcium is precipitated on the cave walls, floor and ceiling. Speleothems form very slowly, taking around 50 years for 1cm of material. Examples of speleothems in the mine include stalactites, stalagmites, draperies, rimstone dams and cave pearls. Most of these features are at an early stage in their development and appropriate conservation must be applied to protect them.

(Photo 149) Stalagmites are probably the best known cave formations. They are upward-growing mounds deposited as calcite is forced out of the water by agitation as a droplet hits the floor. Their shape is determined largely by drip rate, ceiling height, cave atmosphere conditions, and the carbonate chemistry of the drip water. Many stalagmites can be dated due to the presence of naturally occurring radioactive isotopes which has allowed dating of associated paleontological and archaeological finds, as well as holding a record of past climates.

(Photo 150) 'Draperies' can be seen on some overhanging surfaces in the mine where surface tension has allowed calcite-rich solutions to cling to a wall or sloping ceiling as they stream slowly downward. The supersaturated solutions deposit a thin trail of calcite, which, hanging slightly lower than the surrounding surface, becomes a preferential route for continued flow, and so develops into slender, delicate sheets.

(Photo 151) Delicate 'soda straws' can be found hanging from much of the mine roof. They have formed as water seeps down from the surface and drops to the floor, leaving a tiny deposit of dissolved calcite on the ceiling. This deposit is in the shape of a ring which, as more water droplets come through, forms a small, hollow tube which hangs from the ceiling. In time, this will develop into a much larger stalactite.

(Photo 152) A rare and beautiful example of a cave pearl nest. 'Cave pearls' are concretions found in shallow cave pools, which form when water dripping into the pool loses carbon dioxide and precipitates calcite. Unusually, these pearls are not cemented onto the pool floor, which may be due to vibrations in the pool caused by the dripping water. Excess precipitate has formed a cup or nest around the pearls.

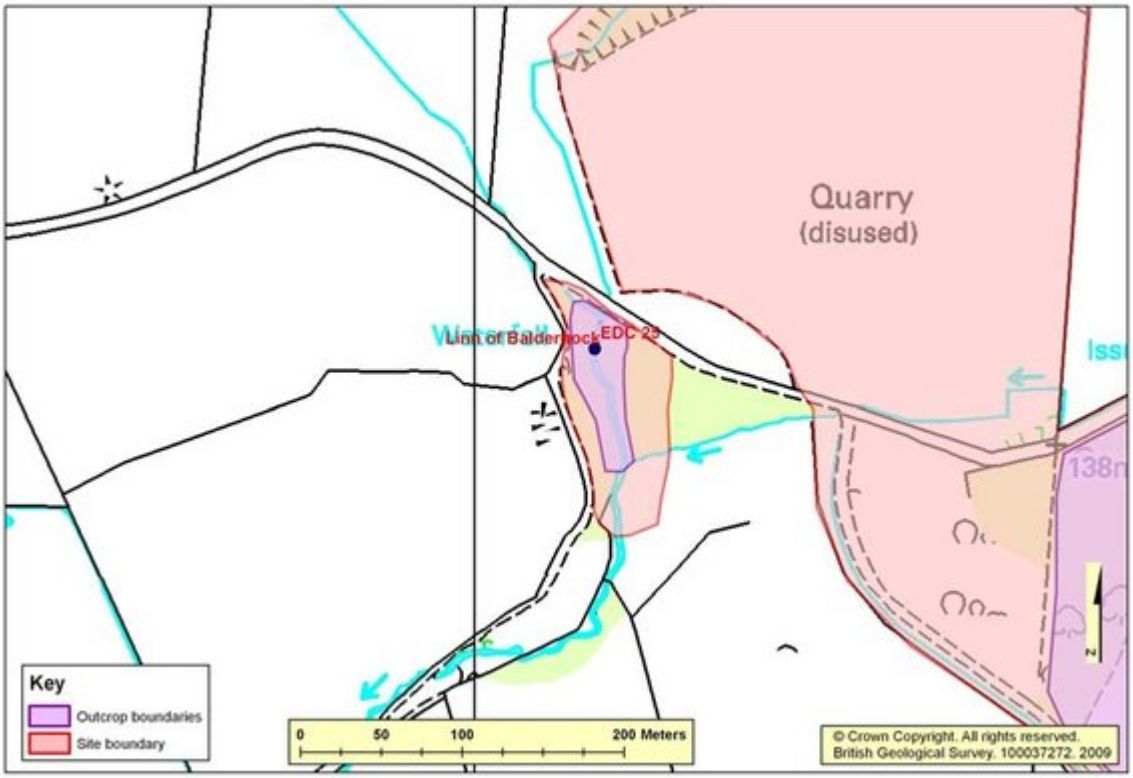
(Photo 153) The shape, size and colouring of cave pearls differs from one cave to another. However, they all have a similar concentric internal structure, which is formed as calcite continuously precipitates around a nucleus. The 'pearls' collected in the mine appear to have a piece of dark-coloured gravel at their core which is surround by white calcite. These examples are between 0.5cm and 2cm in diameter. The roundness typical of cave pearls is due to the uniform growth of the pearl.

(Photo 154) Superb examples of rimstone dams (or gours). These are mineral barriers, usually of calcite which pond streams or shallow pools in caves.

(Photo 155) Rimstone dams usually form where there is a slope underground with a flow of water, which creates a series of steps or terraces over the surface, or can form many tiny micro-gours on horizontal surfaces.

(Photo 156) Crystallization of a gour begins to occur at the air/water/rock interface. The turbulence caused by flow over the edge of the ridges may contribute to the outgassing or loss of carbon dioxide from water, resulting in precipitation of mineral on this edge.

Bibliography



(Figure 25) Linn of Baldernock location map.

GeoScientific Merit	Rarity	Quality	Literature/ Collections	1st
Litho Stratigraphy	5	5	2	☑
Sedimentology	4	4	2	☐
Igneous/Mineral/ Metamorphic Geology	5	5	2	☐
Structural Geology	0	0	0	☐
Palaeontology	4	4	2	☐
Geomorphology	2	2	2	☐

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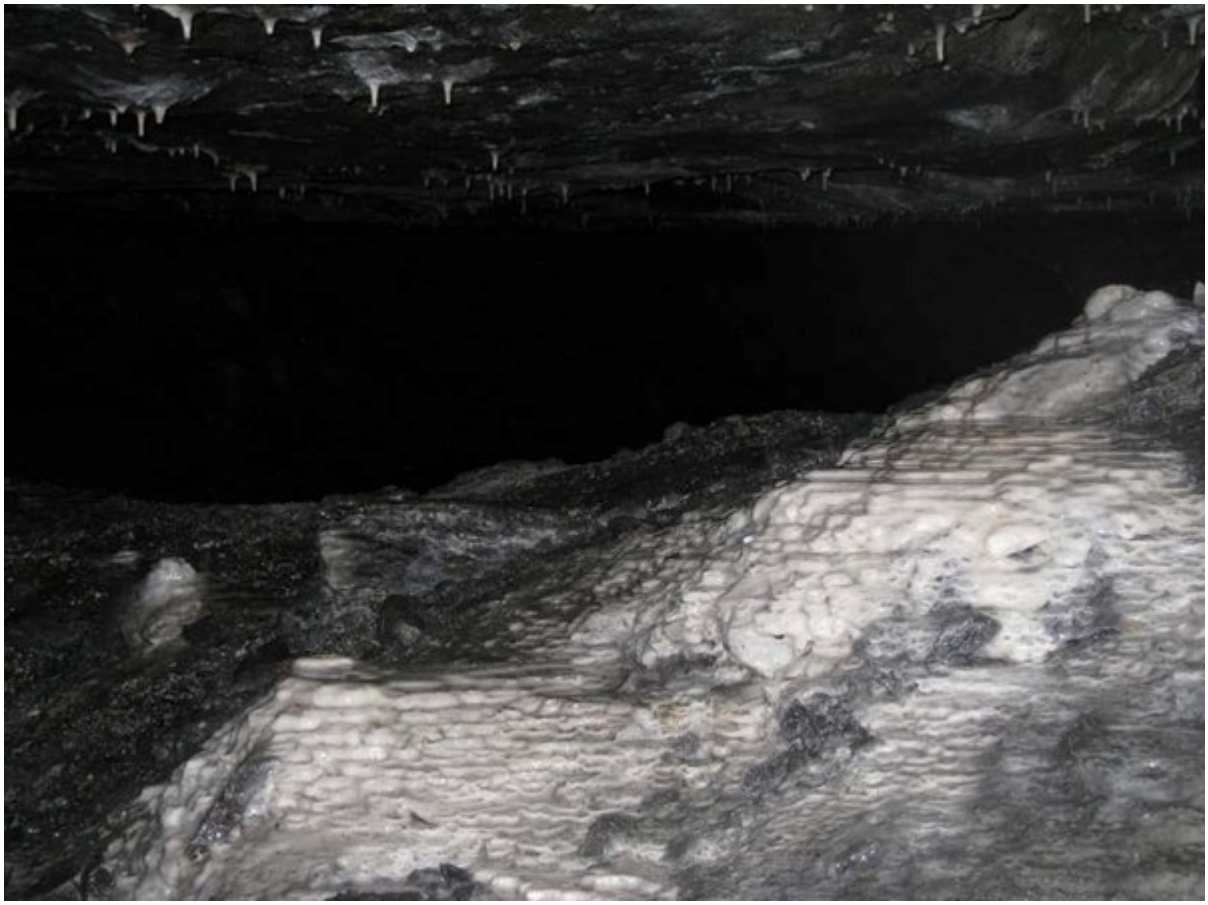

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