
Tables

(Table 1.1)a Ordovician Igneous Rocks Block: networks and GCR site selection criteria

Volcanic Rocks and Ophiolites of Scotland Network, Chapter 2

Site name	GCR selection criteria
The Punds to Wick of Hagdale	Representative of lower part of Shetland Ophiolite, in particular the controversial intrusive relationship of dunite to mantle components. Internationally important in that it offers a rare section across the petrological Moho.
Skeo Taing to Clugan	Representative of lower part of Shetland Ophiolite, providing evidence for intrusive rather than layered cumulate relationships. Internationally important in that it offers a rare section across the geophysical Moho.
Qui Ness to Pund Stacks	Representative of upper part of Shetland Ophiolite, and illustrates relationships between dykes and underlying gabbro. Exceptional exposure of sheeted dyke complex, the clearest and most extensive in Britain.
Ham Ness	Representative of major structural relationships in Shetland Ophiolite with ultramafic rocks, gabbro and sheeted dykes brought into close proximity. Exceptional demonstration of emplacement of ultramafic nappe over sheeted dykes.
Tressa Ness to Colbinstoft	Exceptional section in Shetland Ophiolite through base of ophiolitic nappe, illustrating tectonics of emplacement and enigmatic metasomatic relationships.
Virva	Representative of basal structures in Shetland Ophiolite with exceptional evidence pertaining to unusual intrusive relationships. Internationally important in terms of the tectonic emplacement mechanism of ophiolite complexes.
Garron Point to Slug Head	Representative of part of Highland Border Complex, containing a variety of ophiolitic igneous lithologies.
Balmaha and Arrochymore Point	Representative of part of the Highland Border Complex, providing evidence of the relationship of serpentinite to overlying elastic rocks.
North Glen Sannox	Exceptional section through pillow lavas of the Highland Border Complex, containing evidence for the tectonic relationship with adjacent Dalradian rocks.
Byne Hill	Representative of an important component of the Ballantrae Ophiolite. Exceptional illustration of a zoned gabbro-leucotonalite body intruded into ophiolitic serpentinite.
Slockenray Coast	Representative of several components of the Ballantrae Ophiolite. Exceptional features of upper part include ophiolitic mélange, mixing of coeval lava flows of different compositions and a lava-front delta. Lower part is an exceptional gabbro pegmatite contained within serpentinite cut by pyroxenite veins.

Knocklaugh	Representative of basal zone of Ballantrae Ophiolite. Internationally important section allowing interpretation of the metamorphic dynamothermal aureole at the base of an ophiolite in terms of its obduction while still hot.
Millenderdale	Unique representative within the Ballantrae Ophiolite of multiple dyke intrusion into gabbro. Exceptional development of unusual metamorphic and textural relationships.
Knockormal	Exceptional occurrences of blueschist and garnet-clinopyroxenite within the Ballantrae Ophiolite. Internationally important historically as a possible zone of very high pressure metamorphism.
Games Loup	Representative of interveining between ultramafic components of the Ballantrae Ophiolite and juxtaposition of ultramafic rock and spilitic pillow lavas by faulting.
Balcreuchan Port to Port Vad	Representative of Balcreuchan Group, the upper part of the Ballantrae Ophiolite. Exceptional example of structural imbrication of varied lava sequence, and the only unambiguous British example of boninitic lavas.
Bennane Lea	Representative of highest exposed part of Ballantrae Ophiolite, faulted against ultramafic rock. Exceptional illustration of relationships between deep-water chert, volcanoclastic sandstone, mass-flow conglomerate and submarine lava.
Sgavoch Rock	Representative of the earliest accreted component of the Southern Uplands thrust belt. Exceptional display of pillow lavas and associated volcanic features; arguably the finest in Britain.

Intrusions of the NE Grampian Highlands of Scotland Network, Chapter 3

Site name	GCR selection criteria
Hill of Barra	Representative of olivine-rich cumulates from lower part of Lower Zone in Inch intrusion.
Bin Quarry	Representative of troctolitic and gabbroic cumulates from upper part of Lower Zone in Huntly intrusion. Exceptional for small-scale layered structures.
Pitcurry and Legatesden quarries	Representative of cumulates from Middle Zone of Inch intrusion associated granular gabbros and later pegmatite sheets
Hill of Johnston	Representative of late-stage differentiates (ferromonzodiorites and quartz-syenites) of the Inch intrusion. Exceptional mineralogical and geochemical features.
Hill of Craigdearg	Representative example from Boganclogh of the quartz-biotite norites found in many of the 'Younger Basic' intrusions. Exceptionally fresh and Mg-rich ultramafic rocks, unlike the Lower Zone cumulates.
Balmedie Quarry	Exceptional examples in the Beihelvie intrusion of layered gabbros, sheared and crushed by post-magmatic tectonic events.
Towie Wood	Exceptional exposures in the Haddo House–Arnage intrusion of xenolithic complex and associated norites developed near the roof of a 'Younger Basic' intrusion.
Craig Hall	Representative example from Kennethmont granite-diorite complex of variety of rocks found in granitic intrusions broadly coeval with 'Younger basic' intrusions.

Lake District Network, Chapter 4

Site name	GCR selection criteria
------------------	-------------------------------

Eycott Hill	Representative of Eycott Volcanic Group. Exceptional locality for 'Eycott-type' (orthopyroxene-plagioclase megaphyric) basaltic andesite.
Falcon Crags	Representative of pre-caldera volcanism in Borrowdale Volcanic Group. Internationally important example of dissected plateau-andesite province. Internationally important for understanding 'piecemeal' caldera collapse. Representative type areas in Borrowdale Volcanic Group of stratified Scafell Caldera succession.
Ray Crag and Crinkle Crags	Exceptional example of structures within an exhumed hydrovolcanic caldera and of welded ignimbrites.
Sour Milk Gill	Internationally important exposures of large-magnitude phreatoplinian ash-fall tuff, associated with development of 'piecemeal' caldera collapse.
Rosthwaite Fell	Exceptional illustration of variations in magmatic and hydromagmatic volcanism in internationally significant Scafell Caldera. Exceptional example of post-caldera lava, its vent and feeder. Exceptional examples of volcanotectonic faults.
Langdale Pikes	Internationally important example of caldera-lake sedimentary sequence and of subaqueous lag breccia associated with ignimbrite. Exceptional exposures illustrating distinction between rocks of pyroclastic fall, flow and surge origin, and for rocks formed through magmatic, phreatomagmatic and phreatic processes. Representative of volcanic megabreccia within the internationally significant Scafell Caldera.
Side Pike	Representative of post-Scafell Caldera volcanism and sedimentation in Borrowdale Volcanic Group.
Coniston	Exceptional example of features of magma intrusion into wet sediment.
Pets Quarry	Representative of late Ordovician, post-Borrowdale Volcanic Group, volcanism in the north of England.
Stockdale Beck, Longsleddale	Representative of Threlkeld microgranite.
Bramcrag Quarry	Representative of Ennerdale granite.
Bowness Knott	Representative of Eskdale granite.
Beckfoot Quarry	Representative of Eskdale granodiorite.
Waberthwaite Quarry	Representative of Carrock Fell Complex. Internationally important for historical contributions to understanding of crystallization mechanisms.
Carrock Fell	Representative of Haweswater basic intrusions.
Haweswater	

Central England Network, Chapter 5

Site name

Croft Hill
Buddon Hill
Griff Hollow

GCR selection criteria

Representative of South Leicestershire diorites.
Representative of Mountsorrel complex.
Representative of Midlands Minor Intrusive Suite.

Wales Network, Chapter 6

Site name

GCR selection criteria

Rhobell Fawr	Representative of Rhobell Volcanic Group (Tremadoc), the earliest manifestation of Caledonian igneous activity in Britain south of the Iapetus Suture.
Pen Caer	Representative of Fishguard Volcanic Group (Llanvirn). Exceptional locality for products of major submarine basic–silicic volcanic complex. Internationally important for occurrence of silicic lava tubes.
Aber Mawr to Porth Lleuog	Internationally important for presence of silicic welded submarine ash-flow and ash-fall unit (Llanvirn), the first to be recognized worldwide.
Castell Coch to Trwyn Castell	Representative of the youngest (Llanvirn) volcanic episode in north Pembrokeshire.
St David's Head	Exceptional composite intrusion showing evidence of multiple magma injection and in-situ fractional crystallization.
Cadair Idris	Representative of Aran Volcanic Group (Arenig–Caradoc), the most important volcanic episode in southern Snowdonia.
Pared y Cefn Hir	Representative of Aran Volcanic Group, with best exposed sequence of volcanic rocks of Arenig to Llanvirn age in North Wales.
Carneddau and Llanelwedd	Representative of Builth Volcanic Group (Llanvirn), the most important Ordovician volcanic episode in the Welsh Borderland.
Braich tu du	Representative of 1st Eruptive Cycle (Caradoc; Soudleyan) of Snowdon Centre.
Llyn Dulyn	Exceptional exposures of silicic ash-flow tuffs emplaced in subaerial environment, allowing palaeogeographical reconstruction of part of 1st Eruptive Cycle of Snowdon Centre. Complements Capel Curig.
Capel Curig	Exceptional exposures of Oleic ash-flow tuffs emplaced in submarine environment, allowing palaeogeographical reconstruction of part of 1st Eruptive Cycle of Snowdon Centre. Complements Llyn Dulyn. Internationally important historically, for first recognition of welding in submarine ash-flow tuffs.
Craig y Garn	Representative site illustrating initiation of 2nd Eruptive Cycle (Caradoc; Soudleyan–Longvillian) of Snowdon Centre. Exceptional preservation of one of the thickest and most complete intra-caldera sequence of ash-flow tuffs in British Caledonides.
Mod Hebog to Moel yr Ogof	Representative of ash-flow tuffs of subaerial outflow facies from caldera at Craig y Garn GCR site, belonging to 2nd Eruptive Cycle of Snowdon Centre. Exceptional preservation of fault and subsidence related brecciation, sliding and widespread disruption of previously deposited ash-flow tuffs.
Yr Arddu	Representative of earliest activity from Snowdon Centre; ash-flow tuffs erupted from submarine fissure.
Snowdon Massif	Representative of main phases of intrusive and extrusive activity linked to evolution of major submarine caldera, of 2nd Eruptive Cycle of Snowdon Centre. Exceptional demonstration of complex inter-relationships, through time, between alternating basic–acid magmatism, changing styles of volcanic activity and effect on sedimentation.

Cwm Idwal	Exceptional illustration of thinned sequence representing outflow facies of major submarine caldera, linked to 2nd Eruptive Cycle of Snowdon Centre. Complements Snowdon Massif.
Curig Hill	Representative of lowest unit of final phase of magmatism related to 2nd Eruptive Cycle of Snowdon Centre.
Sarnau	Representative of middle and upper units of final phase of magmatism related to 2nd Eruptive Cycle of Snowdon Centre.
Ffestiniog Granite Quarry	Representative of sub-volcanic granitic intrusion linked to 2nd Eruptive Cycle of Snowdon Centre.
Pandy	Representative of Ordovician (Caradoc) igneous activity in the northern Welsh Borderland.
Trwyn-y-Gorlech to Yr Eifl	Representative of Garnfor multiple intrusion, a sub-volcanic intrusion related to the Upper Lodge Volcanic Group (Caradoc).
Penrhyn Bodeillas	Representative of Penrhyn Bodeillas Granodiorite, a sub-volcanic intrusion linked to Upper Lodge Volcanic Group (Caradoc).
Moelypenmaen	Representative of the Llanbedrog Volcanic Group (Caradoc).
Llanbedrog	Representative of high-level silicic intrusion associated with Llanbedrog Volcanic Group (Caradoc).
Foel Gron	Representative of most evolved member of suite of peralkaline intrusions associated with Llanbedrog Volcanic Group (Caradoc).
Nanhoron Quarry	Representative of least evolved member of suite of peralkaline intrusions associated with Llanbedrog Volcanic Group (Caradoc), preserving rare contact with lower Ordovician sedimentary rocks.
Mynydd Penarfynydd	Exceptional coastal exposures through layered basic sill, ranging from picrites through gabbros to intermediate compositions.

(Table 1.1)b Silurian and Devonian Plutonic Rocks Block: networks and GCR site selection criteria.

Alkaline Intrusions of the NW Highlands of Scotland Network, Chapter 7

Site name	GCR selection criteria
Loch Borralan Intrusion	Representative of the intrusion. Exceptional as only British examples of several rock types, including nepheline-syenite, pseudoleucite-syenite and carbonatite. Radiometric age and structural relationships important for timing of movements in Moine Thrust Zone. Internationally important for some of the most extreme potassium-rich igneous rocks found anywhere on Earth. Historically of great importance in development of hypotheses for evolution of igneous rocks.
Loch Ailsh Intrusion	Representative of the intrusion. Radiometric age and structural relationships important for timing of movements in Moine Thrust Zone. Internationally important as type-locality of alkali-feldspar-syenite 'perthosite', and because of unusually sodium-rich character of syenites.

Loch Loyal Syenite Complex	Representative of the complex and the only extensive British intrusion composed of peralkaline quartz-syenite (nordmarkite).
Glen Oykel south	Representative of 'gorudite' (peralkaline rhyolite) suite of dykes which are emplaced only in Ben More Nappe. Important structural relationship of dyke cutting Loch Ailsh intrusion establishes that the latter was emplaced prior to movements on Ben More Thrust.
Creag na h-Innse Ruaidhe	Representative of 'gorudite' suite of dykes in one of the outliers (klippen) of the Ben More Nappe, an important structural relationship.
Beinn Garbh	Representative and exceptional exposures of sills of 'Canisp Porphyry' (a striking feldspar-phyric quartz-microsyenite), the largest development of Caledonian magmatism in the Foreland.
The Lairds Pool, Lochinver	Representative of 'Canisp Porphyry' as a dyke cutting Lewisian basement, which indicates the western extent of this suite in the Foreland.
Cnoc an Leathaid Bhuidhe	Representative of Canisp Porphyry as a sill, close to, but not above the Sole Thrust, confirming the restriction of the suite to the Foreland.
Cnoc an Droighinn	Representatives of 'Hornblende Porphyrite' suite of sills in a setting of great structural complexity, in which the sills are repeated by imbrication.
Luban Croma	Representative of sills of 'Hornblende Porphyrite' suite, and others, illustrating range and variation of pre-deformational minor intrusive rocks in Assynt.
Allt nan Uamh	Representative of unaltered hornblende-rich lamprophyre (vogesite), an otherwise rare rock type which occurs widely in the Moine Thrust Zone of Assynt and Ullapool.
Glen Oykel north	Exceptional locality at which an enigmatic diatreme of brecciated dolomitic limestone in a fine-carbonate matrix is associated with a vogesite sill. May represent only example of transport by gas in Caledonian alkaline suite.
Allt na Cailliche	Representative of suite of quartz-syenite (nordmarkite) sills which occur only close to the Moine Thrust; the only igneous suite in Assynt whose emplacement was localized by the thrusts themselves.
Camas Eilean Ghlais	Representative of nepheline-syenite ('ledmorite') dykes, emplaced in the Foreland yet clearly trending towards the Loch Borralan Intrusion, with implications for timing of thrust movements. Internationally important historically in demonstrating that alkaline magmatism did not involve reactions with limestone.
An Fharaid Mhór	Representative example of nepheline syenite ('ledmorite') dyke in the Foreland, trending towards the Loch Borralan intrusion.

Loch Airighe Bheg	Representative of pluton within Rogart complex, Argyll and N. Highlands Suite. Exceptional examples of appinitic xenoliths exhibiting hybridization with host quartz-monzodiorite.
Glen More	Representative of Ratagain pluton, transitional alkaline member of Argyll and N. Highlands Suite. Exceptional for wide range of compositions, range of mantle and crustal sources, and extreme enrichment in Sr and Ba.
Loch Sunart	Representative of Strontian pluton, Argyll and N. Highlands Suite. Exceptional evidence for basic magmatism coeval with granodiorite emplacement. Internationally important for relationship to Great Glen Fault and deformation during emplacement and crystallization.
Cnoc Mor to Rubh' Ardalanish	Representative of eastern part of Ross of Mull pluton, Argyll and N. Highlands Suite, which shows reverse concentric zoning. Exceptional features of passive emplacement with stoping and assimilation of country rock.
Knockvologan to Eilean a' Chalmain	Representative of central part of Ross of Mull pluton. Exceptional examples of mafic enclaves, hybrid granitic rocks and internationally important example of 'ghost' stratigraphy in metasedimentary xenoliths.
Ben Nevis and Allt a'Mhuilinn (Chapter 9)	Representative of Ben Nevis pluton, Argyll and N. Highlands Suite.
Bonawe to Cadderlie Burn	Internationally important historically, for development of cauldron subsidence theory.
Cruachan Reservoir	Representative of Etive pluton, Argyll and N. Highlands Suite and dyke swarm. Internationally important example of upper crustal, multiple pulse intrusion by a combination of block subsidence and diapirism within a shear-zone.
Red Craig	Representative of marginal fades and hornfelsed envelope of Etive pluton, dyke swarm and screen of Lorn Plateau volcanic rocks.
Forest Lodge	Representative of Glen Doll diorite, South of Scotland Suite. Exceptional examples of assimilation of metasedimentary xenoliths with high-grade hornfelsing, local melting and hybridization.
Funtullich	Internationally important historically, as the site in Glen Tilt where Hutton first demonstrated the magmatic origin of granite in 1785.
Craig More	Representative of Comrie pluton, South of Scotland Suite, a good example of a normally zoned, diorite to granite pluton. Exceptional internal contacts.
Garabal Hill to Lochan Strath Dubh-uisge	Representative of Comrie pluton and aureole. Exceptional section across aureole, which has historical international importance.
	Representative of Garabal Hill–Glen Fyne complex, South of Scotland Suite. Exceptional orderly sequence of intrusion from basic to acid. Internationally important historically, for studies of fractional crystallization.

Loch Dee	Representative of Loch Doon pluton, South of Scotland Suite, a fine example of a normally zoned pluton. Internationally important for studies of origin of compositional variation.
Clatteringshaws Dam Quarry	Representative of outer part of Fleet pluton, Galloway Suite, derived from melting of underthrust Lower Palaeozoic sedimentary rocks similar to those of Lake District.
Lea Larks	Representative of more evolved inner part of Fleet pluton, one of the most evolved late Caledonian granites. Internationally important for studies of extreme fractionation.
Lotus quarries to Drungans Burn	Representative of complete zonation of Criffel pluton. Internationally important for unusual transition from outer, mantle-derived rocks to inner granites derived from melting of sedimentary rocks.
Millour and Airdrie Hill	Representative of outer, mantle-derived part of Criffel pluton, Galloway Suite. Exceptional for mafic enclaves and foliation associated with emplacement. Internationally important for studies of diapirism.
Ardsheal Hill and peninsula	Representative and type area of Appinite Suite. Exceptional for range of ultramafic to acid compositions and for breccia-pipes. Internationally important for study of open system feeders to surface volcanism.
Kentallen	Representative example of appinitic intrusion. Exceptional Mg- and K-rich lithology, well-exposed contacts and complex age relationships.

Northern England Network, Chapter 4

Site name	GCR selection criteria
Grainsgill	Exceptional relationships of granite intrusion, greisen formation and mineralization in Skiddaw Granite.
Shap Fell Crag	Representative of Shap granite. Exceptional evidence for timing of Acadian deformation. Internationally important for study of K-feldspar megacrysts.

(Table 1.1)c Silurian and Devonian Volcanic Rocks Block: networks and GCR site selection criteria.

Scotland Network, Chapter 9

Site name	GCR selection criteria
South Kerrera	Representative of Lorn Plateau volcanic succession. Exceptional examples of subaerial lava features and interaction of magma with wet sediment.
Ben Nevis and Allt a'Mhuilinn	Representative of Ben Nevis volcanic succession. Exceptional intrusive tuffs. Internationally important as example of exhumed roots of caldera, and historically for development of cauldron subsidence theory.
Bidean nam Bian	Representative of entire succession of Glencoe volcanic rocks. Exceptional examples of ignimbrites, intra-caldera alluvial sediments and of sill complex intruded into unconsolidated sediments. Internationally important historically for development of cauldron subsidence theory and currently for evidence of graben-controlled volcanism.

Stob Dearg and Cam Ghleann	Representative of succession in eastern part of Glencoe caldera, including basal sedimentary rocks. Exceptional rhyolites, ignimbrites and intra-caldera sediments. Possible international importance for radiometric dating in conjunction with palaeontology close to Silurian/Devonian boundary.
Buachaille Etive Beag	Representative of Glencoe Ignimbrites. Exceptional exposures of pyroclastic flows separated by erosion surfaces and alluvial sediments.
Stob Mhic Mhartuin	Representative of Glencoe ring fracture and ring intrusion. Exceptional exposures of crush-rocks and intrusive tuff.
Loch Achtriochtan	Representative of Dalradian succession below Glencoe volcanic rocks. Exceptional topographic expression of ring fracture and ring intrusion.
Crawton Bay	Representative of Crawton Volcanic Formation.
Scurdie Ness to Usan Harbour	Representative of 'Ferryden lavas' and 'Usan lavas', comprising lower part of Montrose Volcanic Formation.
Black Rock to East Comb	Representative of 'Ethie lavas', comprising upper part of Montrose Volcanic Formation.
Balmerino to Wormit	Representative of eastern succession of Ochil Volcanic Formation. Possible international importance for radiometric dating in conjunction with palaeontology close to Silurian/Devonian boundary.
Sheriffmuir Road to Menstrie Burn	Representative of western succession of Ochil Volcanic Formation. Exceptional topographic expression of Ochil fault-scarp.
Craig Rossie	Representative of rare acid flow in upper part of Ochil Volcanic Formation.
Tillicoultry	Representative of diorite stocks, intruded into Ochil Volcanic Formation, surrounded by thermal aureole, and cut by radial dyke swarm. Exceptional examples of diffuse contacts, due to metasomatism and contamination, with 'ghost' features inherited from country rock.
Port Schuchan to Dunure Castle	Representative of Carrick Hills volcanic succession. Exceptional features resulting from interaction of magma with wet sediment are of international importance.
Culzean Harbour	Representative of inlier of Carrick Hills volcanic succession. Exceptional features resulting from interaction of magma with wet sediment are of international importance.
Turnberry Lighthouse to Port Murray	Representative of most southerly inlier of Carrick Hills volcanic succession. Exceptional features resulting from interaction of magma with wet sediment are of international importance.
Pettico Wick to St Abb's Harbour	Representative of volcanic rocks in the SE Southern Uplands. Exceptional vent agglomerates, block lavas, flow tops and interflow high-energy volcaniclastic sediments.
Shoulder O'Craig	Representative of vent and minor intrusions in SW Southern Uplands.
Eshaness Coast	Representative of late Eifelian, Eshaness volcanic succession, NW Shetland. Exceptional exposures of ignimbrite, hydromagmatic tuffs, pyroclastic breccias, flow tops and magma–wet sediment interaction, all in spectacular coastal geomorphology.

Ness of Clousta to the Brigs	Representative of Givetian, Clousta volcanic rocks, Walls, Shetland, including phreatomagmatic deposits.
Point of Ayre	Representative of Givetian, Deerness Volcanic Member, mainland Orkney.
Too of the Head	Representative of Givetian, Hoy Volcanic Formation, Isle of Hoy, Orkney, unusual for alkaline character. Potential international importance as radiometric time marker in Mid-Devonian.

Wales Network, Chapter 6

Site name	GCR selection criteria
Skomer Island	Representative of most complete section through Skomer Volcanic Group (Llandoverly), the most significant expression of late Caledonian volcanism in southern Britain.
Deer Park	Representative of Skomer Volcanic Group, providing critical biostratigraphical age constraints.

(Table 6.1) Stratigraphy of the Cadair Idris area, showing correlations with earlier nomenclature.

Pratt <i>et al.</i> (1995)	Cox (1925) and Cox and Wells (1927)	Thickness (in)
Craig Cau Formation	Upper Acid Group	> 400
Ty'r Gawen Mudstone Formation	Llyn Cau Mudstone	150
Penygadair Volcanic Formation	Upper Basic Group	200
Ty'r Gawen Mudstone Formation	Llyn y Gadair Mudstones and ash	200
Llyn y Gafr Volcanic Formation	Llyn y Gafr Volcanic Formation	360
Cregennen Formation		160
Offrwm Volcanic Formation	Lower Acid Group	80

(Table 6.2) Stratigraphy of the Pared y Cefn-hir area, showing correlations with earlier nomenclature.

Pratt <i>et al.</i> (1995)	Cox and Wells (1921)	Thickness (m)
Llyn y Gafr Volcanic Formation	Lower Basic Volcanic Series	> 100
Cregennen Formation	Moelyn, Crogenen and Bifidus slates	225
Cefn-hir Member	Cefn Hir Ashes	45
Bryn Brith Member	Bryn Brith Beds	55
Offrwm Volcanic Formation	Lower Acid Volcanic Series	90
Allt L'Aryd Formation	Basement Series	80

(Table 6.3) Stratigraphy and lithologies of volcanic rocks of the Builth Inlier.

Lithology	Stratigraphy (after Jones and Pugh, 1949)	Thickness (m)
Silicic ash-flow tuff	Rhyolitic ash and ashy mudstones of the Cwmamliw Series	35
Sandstones and conglomerates of volcanic provenance	Sandstones of the Newmead Series, including the boulder beds	65
Feldspar-phyric basalt and andesite lavas, passing laterally into hyaloclastite breccia	Spilites, keratophyres and bouldery spilitic ash of the Builth Volcanic Series	250
Feldspar crystal-rich basic lapilli-tuffs and tuffs	Pebbly feldspar ash of the Builth Volcanic Series	50
Silicic ash-flow tuff		0–35

Basic lapilli-tuffs, tuffs and mudstones, with subordinate dacite and hyaloclastite	Red agglomerate, ash and shales of the Builth Volcanic Series	> 200
Silicic ash-flow tuff	Rhyolitic ash of the Llandrindod Volcanic Series	50

(Table 7.2) Glossary of uncommon or varietal rock names employed for members of the alkaline suite in the NW Highlands.

Rock name	First use in NW Highland's literature	Modern equivalent(s)	Petrography and mineralogy	Comments
Assyntite	LB. Shand (1910) NW of Cnoc na Sroine	Socialite nepheline-syenite	Trachytic texture; alkali feldspar, interstitial nepheline, both enclosing sodalite, with biotite, magnetite and titanite Alkali feldspar-nepheline intergrowths (both in pseudoleucite and matrix), well-formed melanite and biotite. Pseudoleucite not always present Alkali and plagioclase feldspar phenocrysts in a groundmass of turbid feldspar and quartz	Obsolete name. An exotic rock hut poorly exposed
Borolanite	LB. I tome and Teall (1892) from SE end of intrusion	Melanite-hiotite (pseudoleucite-) nepheline-syenite	Diopsidic pyroxene and ilmenomagnetite enclosed by biotite and replacive melanite Alkali feldspar and aegirine phenocrysts in fine wary-feldspar matrix full of aegirine needles Phenocrysts of hornblende and plagioclase, sometimes biotite, in fine feldspathic groundmass Equigranular, medium grained with closely intergrown melanite, diopsidic augite, biotite.	The original name is still occasionally used informally
'Canisp Porphyry'	MI. Adopted by Sabine (1953) from early usage	Porphyritic quartz-microsyenite		Forms major sill complex
Cromaltite	LB. Shand (1910) from Bad na h-Achlaise. After Cromalt Hills	Melanite-biotite pyroxenite		Obsolete name. Similar pyroxenites without melanite at LA
Grorudite	MI. Sabine (1953)	Peralkaline rhyolite Comendite		Dykes. Equivalents are strictly volcanic
Hornblende porphyrite	MI. Sabine (1953) following Bonney (1883)	Hornblende microdiorite Spessartite		Many sills. C.alc-alkaline
Ledmorite	LB. Shand (1910), from Ledmore River	Melanite-augite nepheline-syenite Melanocratic nepheline-syenite	Alkali feldspar intergrowths with nepheline	Name occasionally used informally

Nordmarkite	LA. Phemister (1926), after Nordmarken, Norway	Quartz-syenite	Leucocratic syenites made of alkali feldspar and interstitial quartz with variable aegirine-augite and/or alkali amphibole	Main rock of BL. Also occurs as deformed sills
Perthosite	LA. Phemister (1926), main syenite unit	Alkali feldspar-syenite	Nearly monomineralic alkali feldspar rock. Name refers to microperthitic texture Similar to 'nordmarkites' and 'perthosites' but with more	Name still widely used
Pulaskite	LA. Phemister (1926) after Pulaski Co., Arkansas	Pyroxene syenite Melasyenite	aegirine-augite. Some variants have melanite at LA, with minor nepheline and melanite at LB	Type example is nepheline-bearing so use at LA is incorrect
Shonkinite	LA. Phemister (1926) after Shonkin Sag, Montana	Pyroxene (nepheline-) melasyenite	At LA diopside and biotite, sometimes hornblende occur in glomeroporphyritic clusters set in alkali feldspar. Nepheline-bearing at LB	Nepheline usual but not essential. Associated with leucorites at LB
Sövite	LB. Young <i>et al.</i> (1994)	Calcite carbonatite	Porphyritic sövite has large calcite rhombs set in finer calcite matrix. Phlogopite sövite has small phlogopite crystals together with apatite set in calcite matrix Hornblende phenocrysts set in fine-grained matrix of euhedral plagioclase, alkali feldspar, hornblende and minor quartz. Diopside occurs as glomeroporphyritic clots and rare phenocrysts Fine-grained, sometimes schistose rock, with altered	Small body with xenoliths from LB outside southern contact
Vogesite	MI. Sabine (1953) after Vosges mountains	Vogesite, Hornblende-rich lamprophyre	alkali feldspar, hornblende and minor quartz. Diopside occurs as glomeroporphyritic clots and rare phenocrysts Fine-grained, sometimes schistose rock, with altered	Many sills. Calc-alkaline
Vullinite	LW Shand (1910), from Allt a'Mhuillinn	None	plagioclase set in matrix of alkali feldspar, plagioclase, diopside, hornblende and biotite	Obsolete name. Shand considered it probably metamorphic

LB: Loch Borralan intrusion; LA: Loch Ailsh intrusion; BL: Ben Loyal intrusion; MI: Minor Intrusion.

Rock names in bold were named from type examples in Assynt. Historical details are from Holmes (1920) and Brögger (1921). Note that many of the old varietal rock names are used in the text, between quotation marks, for clarity when referring to earlier publications..

(Table 9.1) Nomenclature of the Outer and Inner granites of Ben Nevis by various workers. SiO₂ contents from Burt (1994).

Maufe (1910)	Anderson (1935)	Burt (1994)	SiO₂ (wt.%)
Outer Granite	Outer Quartz-diorite	Fine Quartz-diorite	58.0–62.2
Outer Granite		Sgurr Finnisgaig Quartz-diorite	63.1
Outer Granite	Inner Quartz-diorite	Coarse Quartz-diorite	53.0–61.7
Outer Granite	Porphyritic Quartz-diorite	Porphyritic Outer Granite	63.7–70.9
Inner Granite	Inner Granite	Inner Granite	67.9–71.9

(Table 9.2) Succession in the down faulted block of Ben Nevis (after Burt, 1994).

Formation	Description	Interpretation
Summit Formation	Autobrecciated andesite-dominated; pervasive brecciation throughout andesite sheet; veside-poor; sills present; monolithological volcanic breccia beds are subordinate; lateral variations evident.	Proximal flows of largely degassed andesite lava, plus block-and-ash flows; probably erupted and deposited subaqueously (at least in part).
Ledge Route Formation	Moderately well-sorted volcanic (andesite-dominated) breccias; all strongly clast-supported; have deformed underlying fine-grained beds; lateral variations evident.	Proximal ash-fall deposit reworked by mass flow processes; fine-grained beds indicate quiescence and lacustrine conditions.
Coire na Ciste Formation	Massive unsorted volcanic breccias and block-and-ash flows; exotic clasts of welded ignimbrite and rhyolite lava; vesicle-poor andesite clasts; baked mudstone clasts; andesite lavas and sills; some quartzite-dominated breccias; lateral variations evident.	Volcaniclastic lahars and debris flows, andesite lavas and sills, and pyroclastic flow deposits; all deposited in subaqueous environment (i.e. lacustrine); fine-grained and laminated mudstones indicate periods of quiescence.
Allt a'Mhuilinn Formation	Unconformably overlies Dalradian lithologies; largely mudstone and siltstone (laminated, with rhythmic small-scale fining-up beds), with intercalations of non-volcaniclastic conglomerates (quartzite-dominated); lateral variations evident; no igneous materials present.	Freshwater lacustrine environment; mudstones and siltstones are low-volume fine-grained turbidites developed from bank collapse; conglomerates are subaqueous debris flows and lahars.
Dalradian rocks (Leven Schist?)	Pelites and semipelites; older ductile folding plus later brittle fracturing.	Part of the original land surface (bottom of lake bed).

(Table 9.3) Stratigraphy of the volcanic and associated sedimentary rocks preserved in the Glencoe cauldron subsidence.

Group names of Clough <i>et al.</i> (1909)	Group names used in this account	Main units of Moore (1995)	Sub-units of Moore (1995)
---	---	---------------------------------------	--------------------------------------

Group Appin	Subgroup Ballachulish	Formation Appin Quartzite
		Ballachulish Slate
		Ballachulish Limestone
		Leven Schist
	Lochaber	Glencoe Quartzite

References

Table 6.1 Stratigraphy of the Cadair Idris area, showing correlations with earlier nomenclature.

Pratt <i>et al.</i> (1995)	Cox (1925) and Cox and Wells (1927)	Thickness (m)
Craig Cau Formation	Upper Acid Group	> 400
Ty'r Gawen Mudstone Formation	Llyn Cau Mudstone	150
Penygadair Volcanic Formation	Upper Basic Group	200
Ty'r Gawen Mudstone Formation	Llyn y Gadair Mudstones and ash	200
Llyn y Gafr Volcanic Formation	Llyn y Gafr Volcanic Formation	360
Cregennen Formation		160
Offrwm Volcanic Formation	Lower Acid Group	80

Table 6.2 Stratigraphy of the Pared y Cefn-hir area, showing correlations with earlier nomenclature.

Pratt <i>et al.</i> (1995)	Cox and Wells (1921)	Thickness (m)
Llyn y Gafr Volcanic Formation	Lower Basic Volcanic Series	> 100
Cregennen Formation	Moelyn, Crogenen and Bifidus slates	225
Cefn-hir Member	Cefn Hir Ashes	45
Bryn Brith Member	Bryn Brith Beds	55
Offrwm Volcanic Formation	Lower Acid Volcanic Series	90
Allt Lŵyd Formation	Basement Series	80

Table 6.3 Stratigraphy and lithologies of volcanic rocks of the Builth Inlier.

Lithology	Stratigraphy (after Jones and Pugh, 1949)	Thickness (m)
Silicic ash-flow tuff	Rhyolitic ash and ashy mudstones of the Cwmamliw Series	35
Sandstones and conglomerates of volcanic provenance	Sandstones of the Newmead Series, including the boulder beds	65
Feldspar-phyric basalt and andesite lavas, passing laterally into hyaloclastite breccia	Spilites, keratophyres and bouldery spilitic ash of the Builth Volcanic Series	250
Feldspar crystal-rich basic lapilli-tuffs and tuffs	Pebbly feldspar ash of the Builth Volcanic Series	50
Silicic ash-flow tuff		0–35
Basic lapilli-tuffs, tuffs and mudstones, with subordinate dacite and hyaloclastite	Red agglomerate, ash and shales of the Builth Volcanic Series	> 200
Silicic ash-flow tuff	Rhyolitic ash of the Llandrindod Volcanic Series	50

Rock name	First use in NW Highland literature	Modern equivalent(s)	Petrography and mineralogy	Comments
Asyenite	LB, Shand (1910) NW of Creac na Seise	Sodalite nepheline-syenite	Trachytic texture; alkali feldspar, interstitial nepheline, both enclosing sodalite, with biotite, magnetite and titanite	Obsolete name. An exotic rock but poorly exposed
Borosludite	LB, Home and Teall (1892) from SE end of intrusion	Melanite-biotite (pseudoleucite)-nepheline-syenite	Alkali feldspar-nepheline intergrowths (both in pseudoleucite and matrix), well-formed melanite and biotite. Pseudoleucite not always present	The original name is still occasionally used informally
'Camp Porphyry'	ML, Adgey by Sabie (1955) from early stage	Porphyritic quartz-microsyenite	Alkali and plagioclase feldspar phenocrysts in a groundmass of nubby feldspar and quartz	Forms major sill complex
Cronachite	LB, Shand (1910) from Had na h-Achdise, after Cronach Hills	Melanite-biotite pyroxenite	Diopside pyroxene and ilmenomagnetite enclosed by biotite and nepheline-melanite	Obsolete name. Similar pyroxenites without melanite at LA
Gronadite	ML, Sabie (1955)	Pseudolite rhynchite Concordite	Alkali feldspar and argentine phenocrysts in fine quartz-feldspar matrix full of argentine needles	Dikes. Equivalents are strictly volcanic
Hornblende porphyritic	ML, Sabie (1955) following Bostoy (1883)	Hornblende microdiorite Spessartite	Phenocrysts of hornblende and plagioclase, sometimes biotite, in fine feldspathic groundmass	Many sills. Calc-alkaline
Ledonite	LB, Shand (1910), from Lednary River	Melanite-augite nepheline-syenite Melanite-syenite nepheline-syenite	Equigranular, medium grained with closely intergrown melanite, diopside-augite, biotite. Alkali feldspar intergrowths with nepheline	Name occasionally used informally
Northmarkite	LA, Phemister (1926), after Northmarken, Norway	Quartz-syenite	Leucocratic syenites made of alkali feldspar and interstitial quartz with variable argentine-augite and/or alkali amphibole	Main rock of ML. Also occurs as deformed sills
Perthite	LA, Phemister (1926), main syenitic unit	Alkali feldspar-syenite	Nearly monomineralic alkali feldspar rock. Name refers to microperthitic texture	Name still widely used
Palaskite	LA, Phemister (1926) after Palaski Co., Arkansas	Pyroxene-syenite Melasyenite	Similar to 'northmarkite' and 'perthosites' but with more argentine-augite. Some variants have melanite at LA, with minor nepheline and melanite at LB	Type example is nepheline-bearing so use at LA is incorrect
Shonkinite	LA, Phemister (1926) after Shonkin Sag, Montana	Pyroxene (nepheline-) melasyenite	At LA diopside and biotite, sometimes hornblende occur in glomeroporphyritic clusters set in alkali feldspar. Nepheline-bearing at LB	Nepheline usual but not essential. Associated with ledonites at LB
Stonite	LB, Young <i>et al.</i> (1994)	Calcite carbonatite	Porphyritic stonite has large calcite rhombs set in finer calcite matrix. Phlogopite stonite has small phlogopite crystals together with apatite set in calcite matrix	Small body with no solidus from LB outside southern contact
Vogsite	ML, Sabie (1955) after Voges mountains	Vogsite Hornblende-rich lamprophyre	Hornblende phenocrysts set in fine-grained matrix of euhedral plagioclase, alkali feldspar, hornblende and minor quartz. Diopside occurs as glomeroporphyritic clots and rare phenocrysts	Many sills. Calc-alkaline
Vallinite	LB, Shand (1910), from Allt a'Mhuilinn	None	Fine-grained, sometimes schistose rock, with altered plagioclase set in matrix of alkali feldspar, plagioclase, diopside, hornblende and biotite	Obsolete name. Shand considered it probably metamorphic

LB: Loch Borrailie intrusion; LA: Loch Ailsh intrusion; BL: Ben Loyal intrusion; ML: Minor Intrusion.
Rock names in bold were named from type examples in Isyorn. Historical details are from Holmes (1920) and Bellenger (1921). Note that many of the old varietal rock names are used in the text, between quotation marks, for clarity when referring to earlier publications.

Table 9.1 Nomenclature of the Outer and Inner granites of Ben Nevis by various workers. SiO₂ contents from Burt (1994).

Maufe (1910)	Anderson (1935)	Burt (1994)	SiO ₂ (wt.%)
Outer Granite	Outer Quartz-diorite	Fine Quartz-diorite	58.0–62.2
Outer Granite		Sgurr Finnisg-aig Quartz-diorite	63.1
Outer Granite	Inner Quartz-diorite	Coarse Quartz-diorite	53.0–61.7
Outer Granite	Porphyritic Quartz-diorite	Porphyritic Outer Granite	63.7–70.9
Inner Granite	Inner Granite	Inner Granite	67.9–71.9

Table 9.2 Succession in the down faulted block of Ben Nevis (after Burt, 1994).

Formation	Description	Interpretation
Summit Formation	Autobrecciated andesite-dominated; pervasive brecciation throughout andesite sheet; vesicle-poor; sills present; monolithological volcanic breccia beds are subordinate; lateral variations evident.	Proximal flows of largely degassed andesite lava, plus block-and-ash flows; probably erupted and deposited subaqueously (at least in part).
Ledge Route Formation	Moderately well-sorted volcanic (andesite-dominated) breccias; all strongly clast-supported; have deformed underlying fine-grained beds; lateral variations evident.	Proximal ash-fall deposit reworked by mass flow processes; fine-grained beds indicate quiescence and lacustrine conditions.
Coire na Ciste Formation	Massive unsorted volcanic breccias and block-and-ash flows; exotic clasts of welded ignimbrite and rhyolite lava; vesicle-poor andesite clasts; baked mudstone clasts; andesite lavas and sills; some quartzite-dominated breccias; lateral variations evident.	Volcaniclastic lahars and debris flows, andesite lavas and sills, and pyroclastic flow deposits; all deposited in subaqueous environment (i.e. lacustrine); fine-grained and laminated mudstones indicate periods of quiescence.
Allt a'Mhuilinn Formation	Unconformably overlies Dalradian lithologies; largely mudstone and siltstone (laminated, with rhythmic small-scale fining-up beds), with intercalations of non-volcanic conglomerates (quartzite-dominated); lateral variations evident; no igneous materials present.	Freshwater lacustrine environment; mudstones and siltstones are low-volume fine-grained turbidites developed from bank collapse; conglomerates are subaqueous debris flows and lahars.
Dalradian rocks (Leven Schist?)	Pelites and semipelites; older ductile folding plus later brittle fracturing.	Part of the original land surface (bottom of lake bed).

Table 9.3 Stratigraphy of the volcanic and associated sedimentary rocks preserved in the Glencoe cauldron subsidence.

	Group names of Clough <i>et al.</i> (1909)	Group names used in this account	Main units of Moore (1995)	Sub-units of Moore (1995)
Group 7 c.100 m thick	Andesites and rhyolites	Andesites and rhyolites	–	–
Group 6 c.20 m thick	Shales and sandstones	Shales and sandstones	–	–
Group 5 c.80 m thick	Rhyolites	Rhyolites	–	–
Group 4 c.280 m thick	Andesites	Andesites	–	–
Group 3 c.80 m thick	Agglomerates	Collapse breccias and alluvium	Collapse breccias and alluvial deposits	Glas Coire Alluvium Church Door Buttress Breccias Upper Queen's Cairn Breccias
Group 2 c.600 m thick	Rhyolites	Rhyolites	Glen Coe Ignimbrites	Upper Glen Coe Ignimbrite Lower Queen's Cairn Breccias Queen's Cairn Fan Middle Glen Coe Ignimbrite Lower Glen Coe Ignimbrite
			Etive Rhyolites	Upper Etive Rhyolite Crowberry Ridge Tuff Middle Etive Rhyolite Raven's Gully Tuff Lower Etive Rhyolite Kingshouse Tuff
Group 1 c.500 m thick	Augite andesites and basalts	Basal Sill Complex	**Pre-caldera Basal Andesite Sill Complex	

**Analyses in Bailey (1960) show that some of the sheets are in fact basalts and basaltic andesites.

Table 9.5 Metasedimentary rocks found in the Glen Coe area.

Group	Subgroup	Formation
Appin	Ballachulish	Appin Quartzite Ballachulish Slate Ballachulish Limestone Leven Schist
Grampian	Lochaber	Glencoe Quartzite Eilde Flags
	–	