

Garleton Hills Volcanic Formation

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Garleton Hills Volcanic Formation ([GHV](#)), Carboniferous, Midland Valley of Scotland

The Garleton Hills Volcanic Formation is part of the [Strathclyde Group](#) in the Lothians.

Name

From the Garleton Hills, East Lothian. The formation name was established by Chisholm et al. (1989).

Lithology

The Garleton Hills Volcanic Formation consists of lavas, tuffs and subordinate volcanoclastic sedimentary rocks. The lavas are transitional to mildly alkaline and show a limited range of composition. The basic rocks are hypersthene-normative. They are macroporphyritic in the range olivine-pyroxene-phyric basalt and basanite-olivine-clinopyroxene-plagioclase-phyric basalt-plagioclase-phyric hawaiite-mugearite-trachyte.

Genetic interpretation

The formation was produced by a single episode of volcanic activity. The depositional environment was terrestrial, probably on a coastal plain.

Stratotype

The type area is the Garleton Hills (NT 54 85), where there are many natural exposures. A reference section of thinner development occurs from 287.27 to 554.19 m depth in the Spilmersford Borehole, south-west of Haddington (BGS Registration Number NT46NE/73) (NT 4570 6902).

Lower and upper boundaries

The base of the formation is taken at the lithological change from underlying clastic sedimentary rocks of the Ballagan Formation (Inverclyde Group) to lavas, tuffs or volcanoclastic sedimentary rocks. This is gradational, and drawn where volcanic rocks predominate over sedimentary as in the Spilmersford Borehole (see above).

The top of the formation, at the base of the overlying Gullane Formation (Figure 6, Column 4E), is also gradational (as in the Spilmersford Borehole).

Thickness

The maximum thickness of the formation may be about 380.m (McAdam and Tulloch, 1985, fig. 18).

Distribution and regional correlation

Lothians. The rocks crop out in a belt from North Berwick to Dirleton on the coast to the Dunbar-Gifford Fault east of Haddington with their main outcrop in the Garleton Hills. A further outcrop occurs east of Gifford between the Dunbar-Gifford Fault and the Lamermuir Fault. The formation has been proved under younger rocks as far south-west as Spilmersford. Volcanic rocks encountered in a confidential borehole at D'Arcy in the Midlothian Coalfield are now referred to the Garleton Hills Volcanic Formation rather than an eastward extension of the Arthur's Seat Volcanic Formation (M A E Browne, verbal communication, 01.March 2007).

Age

Chadian to Arundian.

Formal subdivisions

References

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