

Geology of the Aberfoyle district: Late-carboniferous quartz-dolerite dykes (Central Scotland Late Carboniferous Tholeiitic Dyke Swarm)

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This topic provides a summary of the geology of the Aberfoyle district - covered by the British Geological Survey. 1:50k geological map sheet 38E (Scotland).

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The most significant minor intrusions in the Aberfoyle district are several, large, east-north-easterly trending quartz-dolerite dykes. These belong to the major phase of tholeiitic magmatism that occurred in the late Carboniferous (Westphalian to Stephanian), producing quartz dolerite dyke swarm and related sill complexes across northern Britain, southern Sweden and the Oslo Rift in Norway. (Read et al., 2002^[1]). Within in the Midland Valley terrain, they have a dominantly east-west trend, thought by Read (1988)^[2] to indicate a north south tensional or transtensional phase during the late Carboniferous.

Many of the dykes are commonly over 10 m thick, and can be traced for tens of kilometres. Several of the dykes in the Aberfoyle area have exploited faults and so appear offset. One example crops out in the Achray Forest, north of Aberfoyle, where it is intruded along, and steps across, several of the NE-SW trending faults within the Dukes Pass-Loch Tay fault system.

The dykes are medium grained with chilled and locally xenolithic, margins. Petrographically, they are rather uniform, comprising basic plagioclase laths, augite, opaques and a glassy or micropegmatitic mesostasis, with or without pseudomorphed olivine, hypersthene or pigeonite. Chemically the quartz dolerites are tholeiitic, with a restricted compositional range (Read et al., 2002^[1]).

References

- ^[1] Read, W A, Browne, M A E, Stephenson, D, and Upton, B G J. 2002. Carboniferous. 251-299 in *Geology of Scotland* (Fourth edition). Trewin, N H (editor). (London: The Geological Society.)
- ^[2] Read, W A. 1988. Controls on Silesian sedimentation in the Midland Valley of Scotland. 222-241 in *Sedimentation in a synorogenic basin complex; the Upper Carboniferous of Northwest Europe*. Besly, B M, and Kelling, G (editors). (London: Blackie and Son.)

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