

PENRHYN BODEILAS

T.P. Young and W. Gibbons

OS Grid Reference: SH318422

Introduction

The Penrhyn Bodeilas GCR site (Figure 6.61) preserves one of the best-exposed and most accessible of several intermediate to acid Ordovician intrusions that crop out east of Nefyn in northern Llŷn. The intrusion is particularly interesting in being rich in co-magmatic enclaves, and is considered to represent a subvolcanic intrusion.

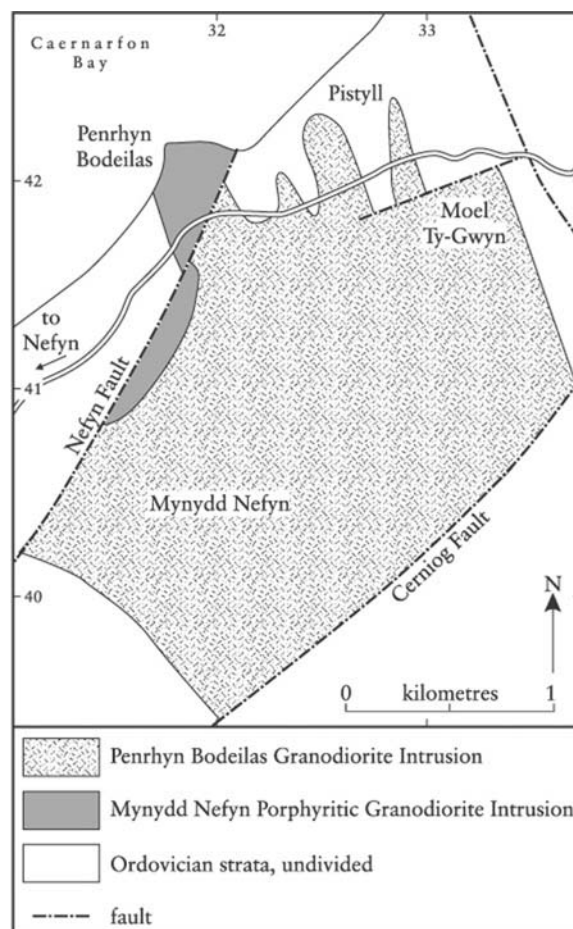


Figure 6.61: Map of the Penrhyn Bodeilas Intrusion, north Llŷn (adapted from Tremlett, 1962).

Description

The Penrhyn Bodeilas Granodiorite Intrusion is exceptionally well exposed in coastal outcrops around the headland of the same name. The intrusion is a coarse-grained, greyish coloured granodiorite. It contains crystals of plagioclase 3–4 mm in length and of intermediate composition (An_{32}). Similarly sized clots of mafic minerals (hornblende, some clinopyroxene, chlorite and magnetite) occur together within a fine-grained (1 mm) groundmass, mostly of plagioclase together with quartz-feldspar intergrowths. Enclaves include examples of both basic and intermediate composition ('dolerite' and 'andesite' of Tremlett, 1962) (Figure 6.62). A late-stage, more evolved magmatic component is represented by thin aplitic veins, most of which are steep and strike NNE–SSW. Some of these late-stage aplites show chilled margins against the main body of the intrusion (Tremlett, 1962).

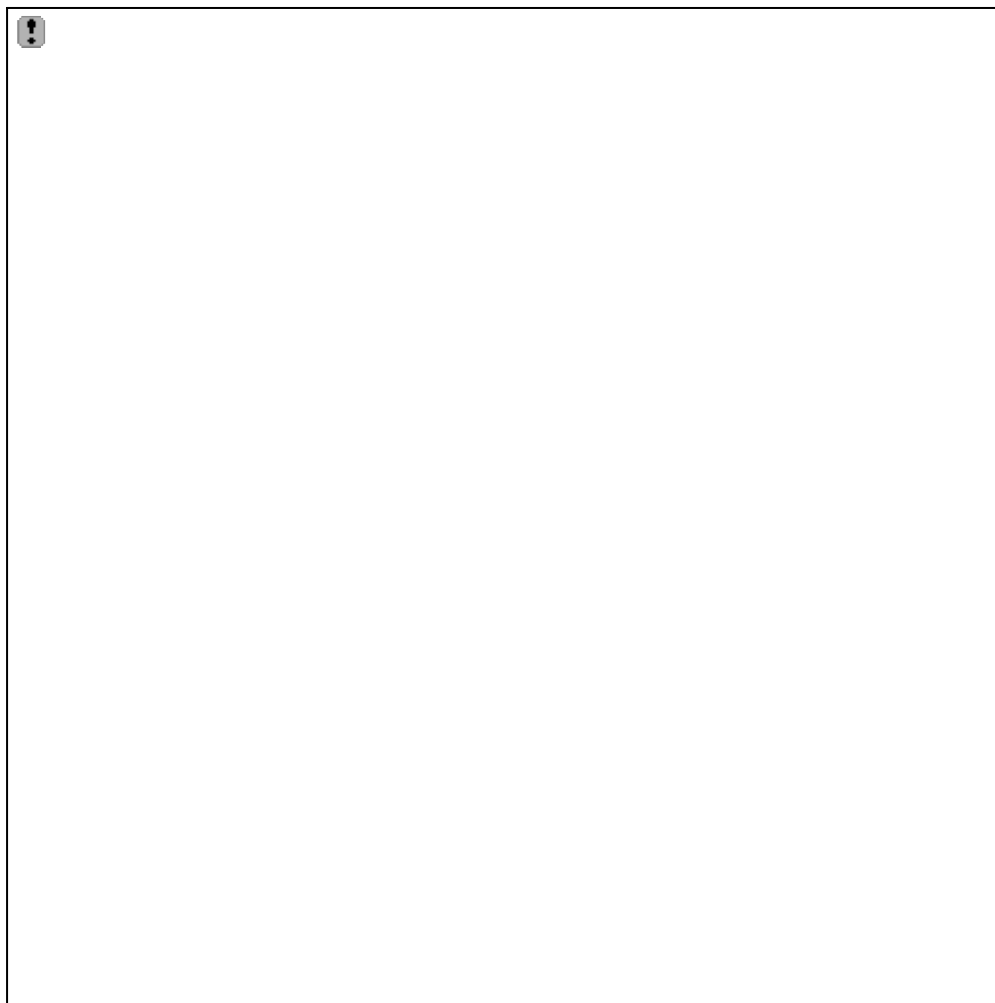


Figure 6.62: Co-magmatic mafic enclaves in the Penrhyn Bodeilas Intrusion, Penrhyn Bodeilas. (Photo: R.E. Bevins.)

Interpretation

The Penrhyn Bodeilas Granodiorite Intrusion is interpreted as one of a suite of Caradoc age subvolcanic intrusions. It remains unclear whether this intrusion was directly related to the magmatism associated with either of the two Caradoc age magmatic centres in Llín (Young *et al.*, in press). The geographical position of the intrusion is marginal to the area of distribution of the Llanbedrog Volcanic Group (Woolstonian), but it lies closer to the more northerly centre. Volcanic rocks from this northern centre include the Upper Lodge and Allt Fawr Rhyolitic Tuff formations both of which are interpreted as ?Soudleyan–Longvillian in age (Young *et al.*, in press). Analyses presented by Croudace (1982) plot in the trachyandesite field on the Zr/TiQ vs Nb/Y diagram (Winchester and Floyd, 1977).

Conclusions

The Penrhyn Bodeilas Granodiorite Intrusion is a well-exposed example of a high-level subvolcanic slightly alkaline intrusion belonging to one of the magmatic centres that developed on Llín in Caradoc times. It is of particular interest in containing a suite of abundant and compositionally variable co-magmatic enclaves, and a well-developed late aplitic facies preserved as a swarm of steeply inclined dykes.

Reference list

Croudace, I. W. (1982) The geochemistry and petrogenesis of the Lower Paleozoic granitoids of the Llyn Peninsula, North Wales. *Geochimica et Cosmochimica Acta*, **46**, 609–22.

-
- Tremlett, W. E. (1962) The geology of the Nefyn–Llanaelhaearn area of North Wales. *Liverpool and Manchester Geological Journal*, **3**, 157–76.
- Young, T. P., Gibbons, W., and McCarroll, D. (in press) The geology of the country around Pwllheli. *Memoir of the British Geological Survey*, Sheet 134 (England and Wales).