

Carlingford Complex, Palaeogene intrusive centre, Northern Ireland

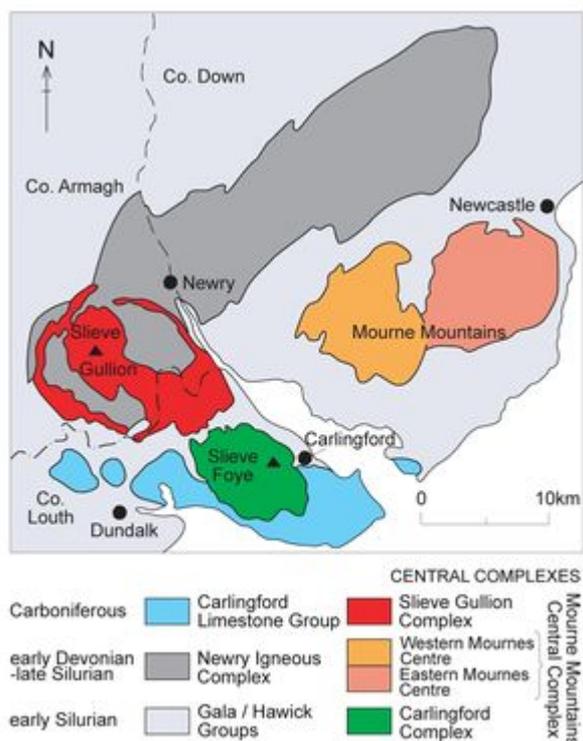
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Carlingford Complex



Distribution of Palaeogene intrusive centres in the north of Ireland (P947865)



Looking southeast along Carlingford Lough which is flanked by the southern edge of the Western Mourne Centre (left) and Slieve Foye and the Carlingford Complex on the south side of the lough. (P948031)

Although the Carlingford Complex is located entirely in Co. Louth ^[1] it is one of three closely associated Palaeogene intrusive igneous centres (P947865) and is therefore included here (P948031). The Carlingford Complex is the oldest intrusive complex dated (U-Pb zircon SHRIMP age) to $61.4 \pm 0.8\text{Ma}$ ^[2].

The earliest component of the Carlingford Complex consists of 275 m of tholeiitic basalt and hawaiite lavas that are exposed at the southern edge of the complex on south-facing slopes of Slievenaglogh [J 145 075] near Rampark ^[3]. The lavas were subsequently intruded by at least two separate phases of gabbro ^[4]. An early gabbro was confined to the southwest part of the complex and is now exposed in a series of north-south elongated plugs in the Trumpet Hill area [J 098 101] and in the disused quarry [J 104 104] near Ballymakellet Bridge. The later gabbro was intruded into the roof of the intrusive complex and is now preserved as isolated patches within the complex and as hills and knolls at its periphery. On Slieve Foye [J 169 120], the later gabbro consists of four layers with a total thickness of over 365 m that were formed by four separate magma pulses along the unconformity between the Silurian country rocks and the earlier basalt lava. Each magma pulse produced a layer between 60–150 m thick and each layer shows the effects of crystal fractionation. The resulting compositional layering in each layer is defined by a more mafic-rich base, enriched in olivine, and a less-mafic top that is more plagioclase-rich. The later gabbro contains xenoliths of Silurian country rock altered to pyroxene hornfels, and of Carboniferous limestone altered to a calcsilicate rock.

Following the emplacement of the gabbro, there was a return to predominantly silicic intrusive magmatism and the intrusion of at least two phases of granophyre ^[5]. The early granophyre is not exposed in the complex but is preserved as xenoliths in vent agglomerates on Slievenaglogh [J 135 090]. The agglomerates were associated with a brief episode of explosive volcanic activity prior to the intrusion of the later granophyre. The later (Carlingford) granophyre occupies the centre of the complex forming a ring dyke with a laccolithic top. The geochemical signature of certain silicic rocks in the Carlingford Complex suggests that the granitic magmas were largely generated by basaltic differentiation ^[6]. At the southern margin of the Carlingford Complex, Carboniferous limestone recrystallised by intrusion of the granophyre now contains forsteritic olivine, garnet and spinel and calcsilicate minerals including wollastonite and diopside. During the closing stages of igneous activity at Carlingford increasing pressure from beneath, and uplift of the caldera, resulted in the dilation of surface fractures and facilitated the repeated intrusion of basic magma in the form of cone sheets and a linear dyke swarm.

References

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