



Magnetic fabrics and petrology of the Newry Igneous Complex, Northern Ireland reveals a new emplacement model

Paul Anderson (1), Carl Stevenson (1), Mark Cooper (2), Rob Ellam (3), Ian Meighan (2), Colm Hurley (4), John Reavy (4), James Inman (1), Dan Condon (5), and Quentin Crowley (6)

(1) University of Birmingham, United Kingdom (pea005@bham.ac.uk; c.t.stevenson@bham.ac.uk), (2) Geological Survey of Northern Ireland, United Kingdom (Mark.Cooper@detini.gov.uk), (3) Scottish Universities Environmental Research Centre, Scotland, United Kingdom (r.ellam@suerc.gla.ac.uk), (4) University College Cork, Ireland (j.reavy@ucc.ie), (5) NERC Isotope Geosciences Laboratory, British Geological Survey, United Kingdom (dcondon@bgs.ac.uk), (6) Trinity College Dublin, Ireland (crowleyq@tcd.ie)

The Newry Igneous Complex (NIC) is a largely granodioritic intrusion, comprising three plutons together with an intermediate-ultramafic body at its NE end. The recent Tellus survey of Northern Ireland has highlighted several geophysical anomalies within this area, including two previously unrecognised concentric aeromagnetic structures. U-Pb zircon ages and a geochemical study suggest that these features represent magmas intruded at different times, and that each pluton was emplaced through a series of inward-younging, concentric pulses.

A combination of anisotropy of magnetic susceptibility (AMS) and field relations were used to investigate the emplacement of these pulses. AMS reveals strong, dominantly oblate, concentric fabrics. These suggest forceful emplacement. Field relationships indicate that the complex was intruded as steep, sheet-like pulses. Host rocks show deflection of fabrics around the NIC supporting the forceful emplacement model. However the amount of strain recorded in the host rocks does not fully explain the space required for intrusion. The presence of a deeply penetrating tectonic structure offers a way to transport magma and create space through a releasing bend. The releasing bend would have created some of the space for intrusion to take place initially and likely guided the ascent of magma. However, the strong fabrics present within the NIC suggest that most of the space for the intrusion was created in a forceful way. Therefore, the NIC was emplaced as a ballooning type pluton after ascent through a tectonically created conduit along a deeply penetrating fault.