The Geology of Glentrasna, Connemara, Co. Galway

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BSc Geology: Final Year Project
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Abstract:

The Glentrasna area was chosen for this undergraduate research as it affords study of a great variety of intrusive units. An early suite of gabbros and quartz diorites, part of a Grampian age continental arc system, shows complex internal contacts with the Quartz Diorite intruding and disrupting the Gabbro. This suite was later intruded by the Caledonian Galway Granite which was emplaced northward in several stages. This mapping project focuses on the complex geological interactions that are associated with these intrusions.

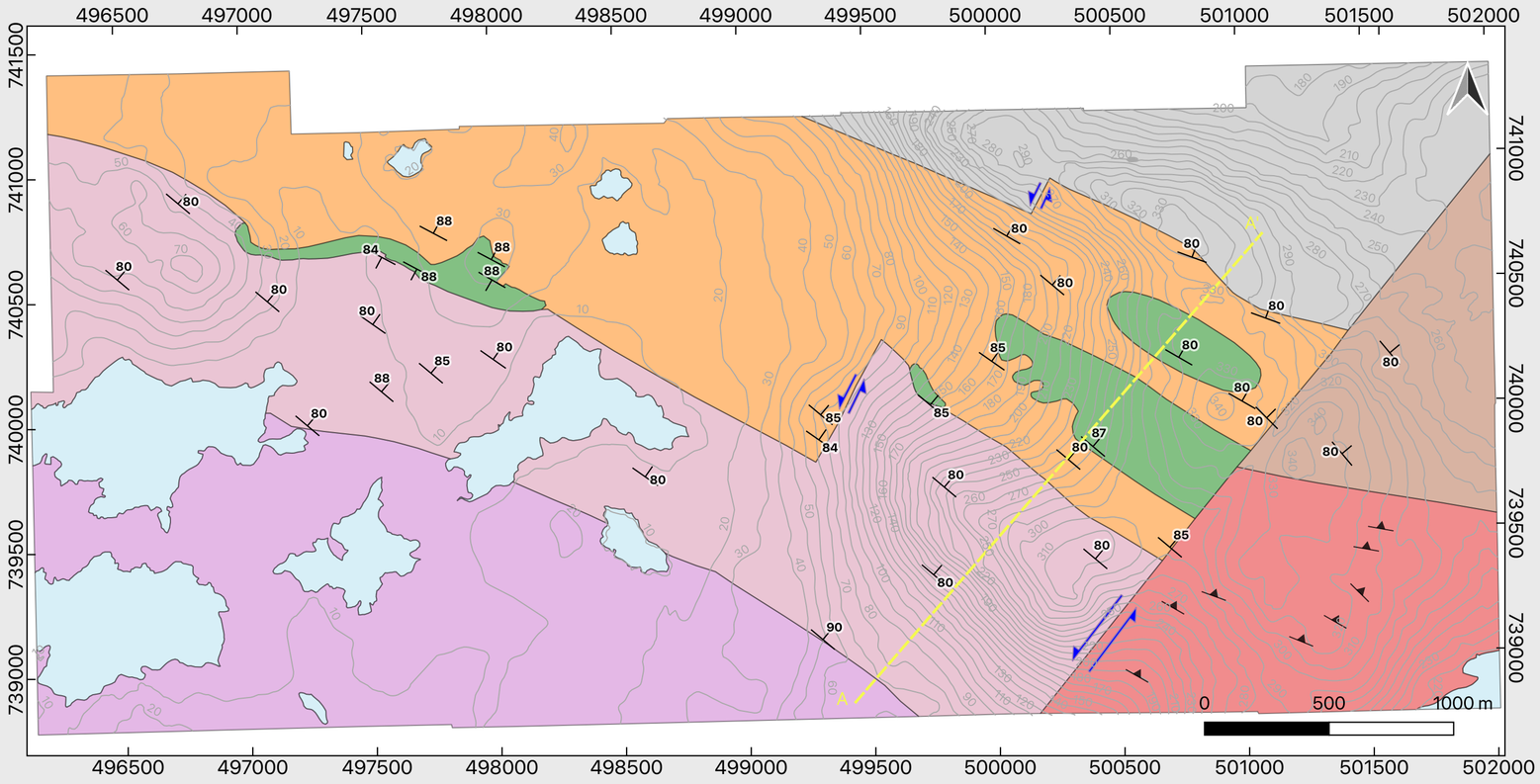
Field-based aspects of this project include the mapping of approximately 14 sq. km around Glentrasna, an analysis of magmatic fabrics including megacrystic alignments, solid state quartz ribboning and an extensive study of the zone around the prominent Shannawona Fault. Distinct granite units have been identified that reflect the punctuated phases of magmatism that occurred during batholith emplacement from the southwest.

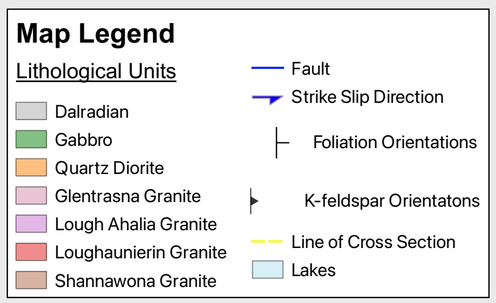
Conclusions:

The Dalradian is the oldest and most complex unit, dominated by migmatites, schists and hornfels, and was intruded by the Gabbro unit. This Gabbro is the oldest intrusive body and, despite being a very strong and resistant rock type, it was later broken apart into elongate pods and sheets by the Quartz Diorite, a unit defined by strong solid state magmatic quartz fabrics. The Galway Granite batholith, which was emplaced from the southwest, can be split up into several distinct units with transitionary boundaries, based on differences in textures and mineral assemblages from its punctuated phases of magmatism.

The main Shannawona fault, which runs SW-NE, was identified as being an oblique fault zone with near-vertical normal dip-slip combined with sinistrel strike-slip movement, leading to a fault zone that juxtaposes the deep level central block against the shallower western block of the Granite batholith. K-feldspar megacrysts define the Loughaunierin Granite on the eastern side of the fault zone. An analysis of these megacrysts showed that they become more uniformly aligned moving further north within the unit, until they transition to quartz ribbon fabrics within the porphyritic Shannawona Granite.

Figure 1: Location of the research and mapping area pinpointed in red.





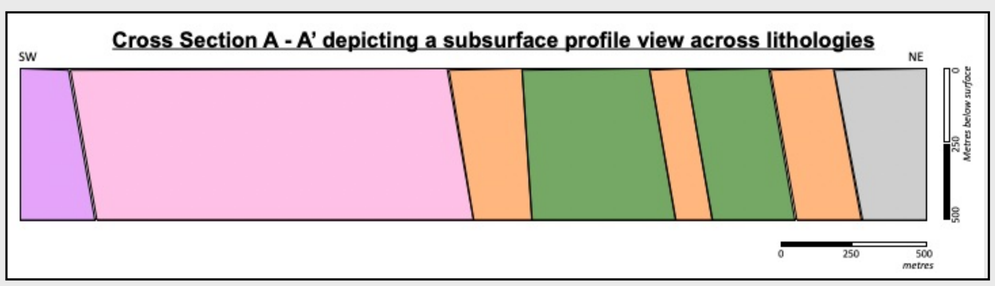


Figure 2: Field images depicting the interactions between the mafic, epidote-rich Gabbro and the lighter Quartz Diorite units, which make up the Gabbro-Diorite complex. At many localities, as seen in photos to left, the gabbro is broken apart into elongate pods from the pressure of the Quartz Diorite intruding into it. At other localities the two units are laid out in sheet sequences.

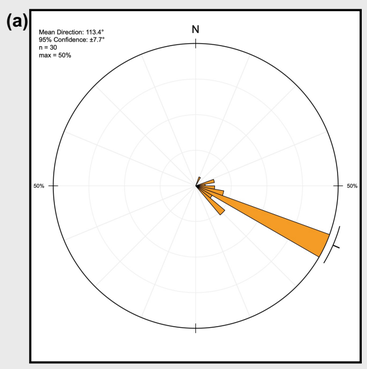


Figure 3: Analysis of the Shannawona Fault zone including; (a) rose diagram showing the alignments of K-feldspar megacrysts on the southeastern side of the fault; (b) an increase in pegmatites near the main fault, running outward from the main fault gully and; (c) a field image looking along the main fault gully out to the southwest.

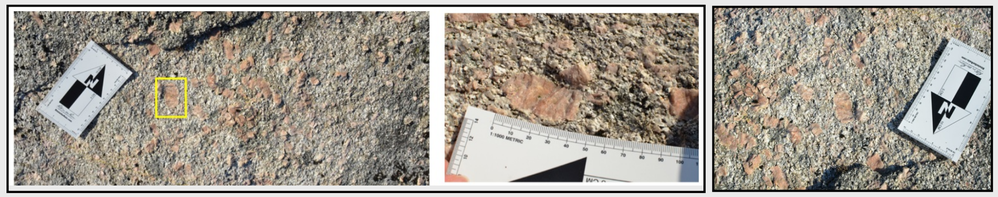


Figure 4: A field-based analysis of the size and orientations of K-feldspar megacrysts within the Loughaunierin Granite unit was undertaken on the southeastern side of the Shannawona fault zone.