# **MAYO - COUNTY GEOLOGICAL SITE REPORT**

NAME OF SITE Other names used for site IGH THEME TOWNLAND(S) NEAREST TOWN/VILLAGE SIX INCH MAP NUMBER ITM CO-ORDINATES 1:50,000 O.S. SHEET NO. 22 GIS Code MO0048 **Doolough (Gneiss)** 

IGH5 Precambrian Doolough Bangor 25 472330E 823800N (centre of feature) GSI BEDROCK 1:100,000 SHEET NO. 6

# **Outline Site Description**

A low rocky shoreline on the headland occupying the northwest end of Doolough beach, situated on the northeast side of Blacksod Bay. Best rock exposures in the intertidal zone.

# Geological System/Age and Primary Rock Type

Mesoproterozoic bedrock comprising the Doolough Gneiss (Annagh Gneiss Complex), from which radiometric (U-Pb) dating yielded an age of c. 1,177 Ma. Dating of zircon minerals in the Doolough Granite yielded an age of c. 1,015 Ma. Doolough granite was intruded between the Doolough gneiss and the adjacent Mullet gneiss.

# Main Geological or Geomorphological Interest

The Doolough gneisses are restricted to the small areas around Doolough, and to the west at Baranagh on the Mullet peninsula. This site however is the best exposed locality of the Doolough gneisses and the only exposure of the Doolough granite. The protoliths (original rock type before being metamorphosed) of the Doolough gneisses were granodiorites and trondhjemites (c. 1,177 Ma) with lesser amounts of amphibolite. The Doolough granite (peralkaline) was intruded c. 1015 Ma at the contact (suggested to be a stitched tectonic contact) between the Doolough gneisses and the Mullet gneisses. The Mullet gneisses are exposed in coastal sections to the north of this locality. An undeformed pegmatite that cuts the folded, foliated and interbanded (decimeter scale) Doolough gneiss was dated c. 993 Ma. The interbanding, foliation and folding preceded the intrusion of the pegmatite dykes. The Doolough Gneiss is one of three subdivisions of the Annagh Gneiss Complex that occur on the Mullet peninsula and adjacent mainland to the east at Doolough. The Annagh Gneiss Complex rocks are exposed in the core of a NW-SE trending belt (SE plunging fold anticline) across the Mullet peninsula and at Doolough. The Annagh Gneiss Complex was deformed, metamorphosed and migmatized during the Grenville Orogeny (mountain-building event associated with the assembly of the supercontinent Rodinia around 1,000 Ma). These rocks chronologically and structurally underlie the Dalradian rocks of northwest Mayo. It has been proposed that the Annagh Gneiss Complex represents the depositional basement to Dalradian metasediments.

# Site Importance – County Geological Site; recommended for Geological NHA

The site is of international importance as it provides evidence as to the geochronology of Grenvillian deformation events in the Annagh Gneiss Complex, which can be correlated with events in NW Scotland. The Doolough Gneiss is the only known outcrop of crust formed in the Mesoproterozoic (1,600 – 1,000 Ma) in Ireland or Britain. The site requires designation as a geological NHA.

# Management/promotion issues

Access is relatively easy along the rocky shoreline. However, as with coastal sections, consideration must always be given to changing tides and waves. Parking is available at the north end of Doolough beach. The site is not deemed to be subject to any significant threat of development or damage, except if access is restricted, or the exposures are damaged by the removal of rock samples by hammer or boring.



Rocky coastline at Doolough, looking southeast towards Doolough beach.



Gneiss exposures at Doolough, without the loose boulder cover along much of this shoreline.



Banding in the Doolough gneiss.



Gneiss outcrops at Doolough.



Banded gneiss layers at Doolough.



Doolough Granite exposures covered by granite and gneiss boulders, looking west towards the Mullet peninsula.



Hennessy et al. 2014 (revised 2019). Geological Survey Ireland.