



Moine (MOINE)

Block Description

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Introduction

The geology represented by this GCR Block are the highly metamorphosed rocks of Precambrian age in Scotland that are older than the Dalradian (**see DAL**). Moine rocks are considered to be the metamorphic equivalent of the Torridonian strata (**see TOR**).

'Precambrian' is a broadly used term for rocks that pre-date the Cambrian Period, i.e. were formed before the Phanerozoic Eon. It encompasses such a vast span of time, extending back to at least 4000 Ma, and has been subdivided into two Eons, the Archaean, and the younger Proterozoic Eon. The Precambrian rocks selected for this block belong to the latter, specifically to its youngest part, which has been given the chronological term 'Neoproterozoic'.

The 'Moine Thrust Belt' forms the outer edge of the Caledonian mountain belt in northern Scotland (see **Caledonian Structures of the Southern Uplands (CAL-STR-SU)**), separating the deformed and metamorphosed orogenic interior of Moine and Dalradian rocks from the undeformed foreland of the Lewisian crust (**see LEW**) with its sedimentary cover of Torridonian and Cambro-Ordovician successions. As such, the thrust belt defines the north-west limit of the Ortho-Caledonides.

The Moine Thrust may be defined as the tectonic contact which carries the Moine metasediments together with the Lewisian basement upon which they were deposited. These units were carried onto Cambro-Ordovician and Torridonian sediments which overlie their own Lewisian basement. The thrust is characterised by extensive mylonite development in both its footwall and hangingwall. The mylonite zone is locally several hundred metres thick. In general, where that stratigraphic separation across the thrust is greatest, particularly when the footwall lies in carbonates of the Durness Group, the mylonite zone is carried by a discrete fault zone marked by cataclasites. Such behaviour, indicating a transition from ductile deformation with relatively high temperature crystalline plasticity to brittle faulting and fracture processes, is predicted to occur on fault zones that migrate up through the crust. The transition occurs on all sections across the thrust belt, locally within the deformation zone associated with the Moine Thrust as indicated above and elsewhere within underlying, later thrusts which stack up the Cambro-Ordovician sediments. Thus the Moine Thrust changes its character from place to place. Indeed, the western edge of the Moine outcrop is not everywhere defined by the Moine Thrust. Later thrusts and faults, some associated with much later basin formation characterise the map edge of Moine rocks in much of the Lochcarron area.