



Lewisian (LEW)

Block Description

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Introduction

The geology represented by this GCR Block are metamorphosed rocks of Precambrian age in Scotland that are older than the Dalradian/Torrionian (**see Dalradian (DAL), Torrionian (TOR)**). 'Precambrian' is a broadly used term for rocks that pre-date the Cambrian Period (540–510 Ma), i.e. were formed before the Phanerozoic Eon. It encompasses 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 Archaean Eon.

Origin

The crust of north-west Scotland, together with parts of Greenland and North America that make up the ancient continent of Laurentia, was built up mainly from igneous rocks that crystallized during Precambrian time around 2900 to 2700 million years ago (Ma).

At that time, the rocks that crop out at the surface now were deep in the Earth's crust. They were deformed and metamorphosed at very high temperatures, producing gneisses with a folded layering – the Lewisian Complex. There were, in fact, two periods of deformation and metamorphism, separated by a stable period when the crust fractured and allowed in basic magma that crystallized as a set of dykes (Scourian dykes). The early metamorphic event was of high grade (where the typical mafic mineral in the rock is pyroxene), whereas the later 'Laxfordian' metamorphism was of medium grade (typical mafic mineral is hornblende).

The Lewisian gneisses are overlain unconformably by the unmetamorphosed cover of Torrionian or younger strata, **see Torrionian (TOR)**, and can be thought of as the 'basement rocks' of the crust of Britain brought to the surface during tectonic events.

Several rock types are found in the Lewisian Complex. They can be broadly subdivided into felsic gneisses (rich in light-coloured minerals like feldspar and quartz), mafic gneisses (containing a large proportion of dark mafic minerals such as pyroxene, hornblende, or biotite mica), and ultramafic gneisses (containing exclusively mafic minerals). The felsic gneisses are the most abundant, and are the metamorphosed equivalents of granite or, more characteristically, tonalite (like granite but without potassium feldspar). Mafic and ultramafic gneisses are generally found together, and can be understood as metamorphosed varieties of gabbro and peridotite.