CITATION **GIRVAN TO BALLANTRAE COAST SECTION SITE OF SPECIAL SCIENTIFIC INTEREST**

South Ayrshire

Site code: 690

NATIONAL GRID REFERENCE: NX 095874, NX 151935

OS 1:50,000 SHEET NO: Landranger Series 76
1:25,000 SHEET NO: Explorer Series 317

AREA: 87.41 hectares

NOTIFIED NATURAL FEATURES

Geological: Igneous petrology: Ordovician Igneous
Geological: Stratigraphy: Arenig-Llanvirn
Geological: Stratigraphy: Caradoc-Ashgill
Geological: Stratigraphy: Llandovery

DESCRIPTION

The Girvan to Ballantrae Coast Section Site of Special Scientific Interest (SSSI) consists of two separate parts, extending from 0.5 km south of Girvan to approximately 3 km north of Ballantrae at its southern extent. The site is nationally important for igneous and sedimentary rocks (of Arenig-Llanvirn, and Caradoc-Ashgill ages) that date from the Ordovician geological period (488 to 443 million years ago) and for sedimentary rocks (of Llandovery age) that date from the Silurian geological period (443 to 428 million years ago). The stratigraphical, structural and sedimentological significance of these features is of international interest.

The Ballantrae Complex, of Ordovician age, consists of three belts of pillow lavas and associated sediments, separated from each other by ultramafic intrusive rocks. The Complex shows many of the features of an obducted ophiolite although geochemical studies indicate that the various igneous rocks were generated in a variety of tectonic settings and have since been tectonically juxtaposed. The following localities are of particular importance in understanding the geology of the Complex.

At Bennane Lea the contact between the lavas and associated rocks of the central lava belt and the ultramafic rocks of the southern serpentinite belt is exposed. The succession to the north of the contact is a major volcano-sedimentary sequence belonging to the Balcreuchan Group and includes black radioloarian cherts, conglomerates and greywackes interbedded with the volcanic rocks.

The coastal section between Balcreuchan Port and Port Vad exposes a thick but repeated and structurally imbricated succession of lavas belonging to the Balcreuchan Group of the central lava belt. At Balcreuchan Port aphyric pillow-lavas

and breccias are excellently exposed in faulted contact with serpentinites. The lavas are of an island-arc type and contrast with lavas further south along the section which are more diverse in terms of rock-type and are more akin to oceanic island 'hot-spot' basalts.

The foreshore and cliff exposures at Games Loup demonstrate the contact between the northern serpentinite belt and the basic lavas of the central lava belt. The harzburgites to the north have been serpentinised and contain pyroxenite segregations. South of the contact the basic lavas of the Balcreuchan Group are sheared and brecciated but there is no evidence of a dynamothermal aureole of the type developed under the serpentinite unit at Knocklaugh. The lavas carry a primitive island arc geochemical signature. The Pinbain Block is the most northerly of the lava belts in the Ballantrae Complex and is well exposed along the coast at Slockenray. In the southern part of this block conglomerates are interbedded with cherts and black shales. The shales show soft-sediment deformation structures and it is thought that the conglomerate bodies, which contain boulders up to several metres in length are olistostromes. The variety of the clasts, representing almost all the known rock-types found in the Complex, shows that the ophioloite was being actively eroded at the time the conglomerates were accumulating. Further north the section exposes spilitic lavas and volcanogenic sediments. The latter show upwards coarsening sequences which record the build up of a hyalotuff delta formed in front of advancing lava flows in shallow water conditions.

Additional interest is displayed by further exposures south of Balcreuchan Port which are of great importance. The faunas recovered from within the Ballantrae Complex here permit an assignment of at least some of the sediments within the complex to the Arenig Series. Several localities contain a variety of graptolite taxa, including the first definite *Tetragraptus approximatus* from Britain. This taxon is characteristic of the lowest "Arenig" faunas in other parts of the world, and its occurrence here with other forms affords a correlation of these rocks with the "Lower Arenig" upper Lancefieldian (La3) – Bendigonian or Chewtonian stages of Australasia. The site is thus of significance in international correlation of Arenig strata.

From Horse Rock south to Kennedy's Pass is a classically important section through the Caradoc and Ashgill succession of the Girvan area. The sedimentary sequence lies unconformably on the Ballantrae volcanic rocks at Kennedy's Pass. The shales, mudstones, and greywackes are fossiliferous, with locally rich faunas of trilobites, brachiopods, and graptolites. This site represents the best section through the structurally complex Ardwell Flags and the lower two subdivisions of the Whitehouse Group in the Girvan area. This site is of key stratigraphical, structural, and sedimentological significance in Ordovician studies.

Woodland Point, to the south of Woodland Bay, includes the type section of the Woodland Formation, twenty one metres thick, which has a rich shelly and graptolite fauna, the former including *Stricklandia* and *Clorinda* brachiopod communities. These strata, of late Rhuddanian *Cyphus* zone age, and their fossil contents are of considerable importance for studies of early Silurian environments and palaeogeography.

NOTIFICATION HISTORY

First notified under the 1949 Act: 1972
Re-notified under the 1981 Act: 31 March 1989 with a 266.92 ha decrease in area (as land was not of geological interest)
Notification reviewed under the 2004 Act: 28 April 2010.

REMARKS

Measured area of site corrected from 89.2 hectares.