



South Wales RIGS Group Site Record RIGS Description

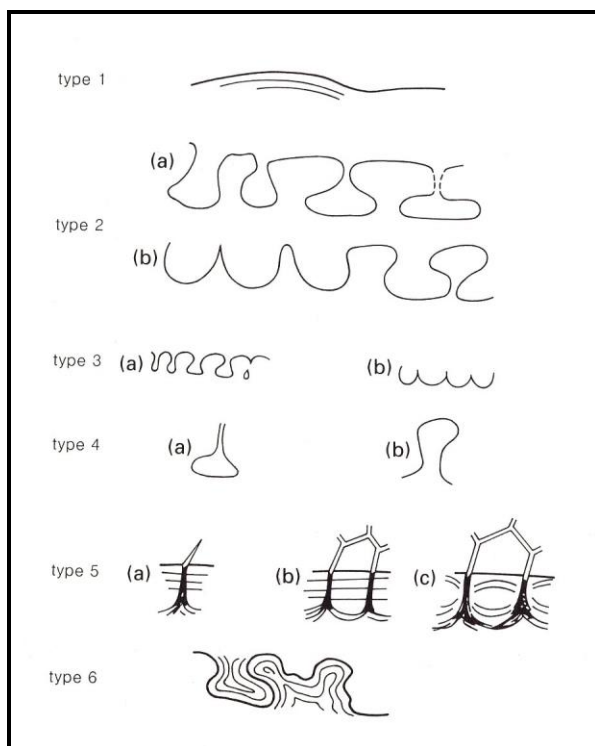
SECTION A

General	South Wales
Site Name: Carn Pen-y-Clogau	File Number: AH_70
RIGS Number: 781	Surveyed by: D. Hawley
Grid Reference: SN 272172 218638	Date of Visit: October 2011
RIGS Category: Scientific, educational, aesthetic	Date Registered:
Earth Science Category: Geomorphological	
Site Nature: Mountain plateau	Documentation prepared by: AJH
Unitary Authority: Carmarthenshire CC	Documentation last revised: 19 March 2012
OS 1:50,000 Sheet 160	Photographic Record: See images attached to this report
OS 1:25,000 Explorer Sheet OL12	
BGS 1:50,000 Sheet 230 Ammanford	
<p>RIGS Statement of Interest:</p> <p>On the hillslope to the east of Carn-y-Clogau are well developed sorted stone polygons exposed by eroding hill peat. These stone circles and polygons are the consequence of a long period of frost action in a periglacial environment during or immediately after the Late Devensian ice sheet was present in the area. Other periglacial features are preserved on the Black Mountain, including further stone polygons+ and longer linear stone stripes, but these designated RIGS are probably the best preserved due to their relatively recent re-exposure.</p> <p>The presence of periglacial patterned ground provide information on the thermal conditions of the environment at the time of their formation. of the original ice wedges. Low mean annual air temperatures (MAAT) and cold winter temperatures result in the development of permanently frozen ground – permafrost – to many metres depth, with only the near surface active-layer thawing in the summer to no more than 1-2 metres depth. The patterned ground forms as a result of involutions developing in the annually frozen soil above the permafrost table.</p> <p>It is possible that this location was a nunatak, an unglaciated mountain top rising above the Devensian ice surface, in which case these features may represent over 16 000 years of periglacial activity prior the Holocene .</p>	

Geological setting/context:

Involutions are influenced by the soil, silts being more frost susceptible, the thickness of the annual active-layer and the soil moisture content. The freezing fronts, advancing from the surface downwards and upwards from the permafrost table undulates through the soil depending on the soil grain size and presence of clasts, and differential water pressures build up within the soil as consequence, resulting in diapiric type structures, the re-orienting of soil grains and clasts and the gradual sorting of soil material, to result a the surface in a patterned grounds of stone polygons on horizontal surfaces, or stone stripes on slopes (Ballantyne and Harris 1993).

On level ground, temporary fluidisation of the soil may result in density-driven diapiric movements resulting in cryoturbation structures and involutions.



Morphological classification of cryoturbation structures in terms of symmetry, amplitude:wavelength ratio and pattern of occurrence (after Vandenberghe 1988):

type 1: individual folds of small amplitude but large wavelength; type 2: fairly regular, symmetrical and intensely convoluted forms with amplitudes of 0.6-2.0m; type 3: similar to type 2 but with smaller amplitudes; type 4: solitary "teardrop" or diapiric forms; type 5: upwards injected sediment in cracks; type 6: irregular deformation structures



Large-scale irregular involutions at Llanon, Dyfed, west Wales

Photograph courtesy Prof. C. Harris

References:

Ballantyne, C. K. and Harris, C. (1993). *The Periglaciation of Great Britain*. 330pp. Cambridge University Press.

Burn, C. (1990). Implications for palaeoenvironmental reconstruction of recent ice-wedge development at Mayo, Yukon Territory. *Permafrost and Periglacial Processes*, **1**, p.3-14.

Lachenbruch, A. H. (1962). Mechanics of thermal contraction cracks and ice-wedge polygons in permafrost. *Geological Society of America, Special Paper*, 70: 69 pp.

Vandenberghe, J. (1988). Cryoturbations. pp179-198. In: M.J. Clark (Ed). *Advances in Periglacial Geomorphology*. Wiley, Chichester.

SECTION B

PRACTICAL CONSIDERATIONS: Please score Accessibility and Safety Red Amber or Green			
Accessibility:			X
Comment: The site is accessible along the foreshore from either Sully or Swanbridge. It is not accessible at the highest tides.			
Safety:			X
Comment: The low cliffs may present some risk of rockfall. The foreshore rocks may present a slip and trip hazard.			
Conservation status: The site is under the jurisdiction of the Brecon Beacons National Park and lies within the Fforest Fawr Geopark. It lies within the Mynydd Du (Black Mountain) SSSI			

OWNERSHIP/PLANNING CONTROL: Owner/tenant: Brecon Beacons National Park Authority Planning Authority: Carmarthenshire County Council Planning status/constraints/opportunities: There are no known planning constraints or opportunities			
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CONDITION, USE & MANAGEMENT: Present use: Sheep grazing and hill walking Site condition: The site was formerly vegetated (rough pasture) and peat covered. Peat erosion has exposed the patterned ground even though the site is unaffected by development or farming activity. The site is not adjacent to any major hill-walking route, so that there is no likelihood of the site itself requiring protection from footpath erosion. Potential threats: The site lies within a few hundred metres of a recognised public right of way. It lies within the Brecon Beacons National Park and the Fforest Fawr Geopark. Other management issues, such as stabilising the peat may damage the stone structures. Site Management: The stone polygons will be very sensitive to damage by footpath erosion or attempts to restore the peat.			
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SITE DEVELOPMENT: Potential use (general): This site is of some interest to the general public, but it probably does not warrant any on-site interpretation initiative. Its importance lies in its possible origin – by a long period of periglacial activity at potentially low elevation, raising questions about the presence of ice cover during the Last (Devensian) Ice Age, and the efficacy of the return to cold conditions during the Loch Lomond Stadial			
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(Younger Dryas). It is of particular interest to Quaternary scientists and geomorphologists at the international as well as national level.

Potential use (educational): An accessible site that exhibits well the impacts of periglacial conditions either above the ice surface or after the ice has retreated from the area.

Other comments:

Photographic Record



Aerial view of stone polygons at Carn Pen-y-clogau

