



South Wales RIGS Group Site Record

RIGS Description

SECTION A

General	South Wales
Site Name: Paviland Moraine	File Number: AH_71
RIGS Number: 782	Surveyed by: Various
Grid Reference: SS 44775 86430 to 49190 85940	Date of Visit: October 2011
RIGS Category: Scientific, Educational	Date Registered:
Earth Science Category: Geomorphological	
Site Nature: Coastal plain inland from cliffs	Documentation prepared by: AJH
Unitary Authority: Swansea Unitary Authority	Documentation last revised: 19 March 2012
OS 1:50,000 Sheet 159 Swansea & Gower	Photographic Record: See images attached to this report
OS 1:25,000 Explorer Sheet 164	
BGS 1:50,000 Sheet 246 (Worms Head) and Sheet 247 (Swansea)	
<p>RIGS Statement of Interest:</p> <p>The Paviland Moraine forms a critical component of the scientific understanding of the Pleistocene glacial history of South Wales. Although degraded, this ridge of glacial deposits which is best viewed from Paviland Manor in the west to Oxwich in the east is considered by some authors to represent a pre Late Devensian glacial limit.</p> <p>Mid-Pleistocene tills (the Llandewi Formation of Bowen 1999) have been recorded on the Gower (BGS 2003, 2011) and terminate in the south in the ridge of the Paviland moraine, which is composed of deeply weathered sand and gravel and red clay (till). Erratics include both Welsh sandstone boulders (Millstone Grit Group, Namurian) and clasts of Irish Sea provenance (George, 1933). First recognised in 1985, the Paviland Moraine represents the margins of an ice sheet which moved from north to south, and some erratics have been identified as being sourced from Mynydd-y-garreg in SE Dyfed. Bowen (1989b) correlated the Paviland "stage" with that of the Anglian (OIS 12), although more recently, Hiemstra <i>et al</i> (2008) have cast serious doubt on the age and sedimentary relationships on the Paviland moraine based on their work at Rotherslade to the east,</p> <p>Two boreholes, at Hills Farm, Port Eynon and Hangman's Cross, Oxwich both provide detailed reference sections through the Paviland Moraine deposits.</p>	

Geological setting/context:

The Pleistocene glacial evolution of the Gower peninsula has long been the subject of debate, and is allied to understanding the relationships between the landform assemblages and the sediments preserved in cave sequences along the southern coast.

The glacial deposits of the Gower were first described in detail by George (1933) and subsequently described by Bowen (1969b, 1974, 1981a, b, 1984, 1999), Campbell and Bowen (1989). The Paviland Moraine was first recognised and a pre-Devensian age was suggested based largely on amino acid chronostratigraphy from the raised beaches and other deposits on the coastal cliff sections (Bowen et al 1985). This was contradictory to Bowen's earlier work e.g. (Bowen 1981a, 1981b) which suggested the feature may be late Devensian in age.

An Anglian date for the feature is largely accepted in the literature (e.g. Ehlers *et al* 2011) despite other researchers (e.g. Hiemstra *et al* 2008) re-interpreting the sedimentary sequences preserved in the cliffs to the south of the moraine feature, such as those at Slade, and beginning to cast doubt on a pre-Devensian origin, suggesting instead that the moraine form may be part of a complex interaction between different ice streams advancing into the Gower at slightly different times.

This short resume highlights the scientific issues associated with this RIGS and important research needs to be undertaken to correlate the ridge form and its sediments with deposits found in the slades and tributary valleys found south of the ridge towards the coast.

References:

- Bowen, D.Q. (1969b). A new interpretation of the Pleistocene succession in the Bristol Channel area. *Proceedings of the Ussher Society*. **2**, 86.
- Bowen, D.Q. (1974). The Quaternary of Wales. In: T.R. Owen (ed). *The Upper Palaeozoic and post-Palaeozoic rocks of Wales*. University of Wales Press, Cardiff. 373-426.
- Bowen, D.Q. (1981a) The "South Wales end-moraine": fifty years after. In J. Neale & J. Flenley (eds). *The Quaternary of Britain*. Pergamon Press, Oxford.
- Bowen, D.Q. (1981b). sheet 1.3. In: H. Carter & H.M. Griffiths (eds). *National Atlas of Wales*. University of Wales Press, Cardiff.
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Bowen, D.Q. (1999). Wales. In: D.Q. Bowen (ed). *A Revised Correlation of the Quaternary Deposits in the British Isles*. Geological Society Special Report 23. London, Geological Society.

Bowen, D.Q., Sykes, G.A., Reeves, A., Miller, G.H., Andrews, J.T., Brew, J.S. and Hare, P.E. (1985). Amino-acid geochronology of raised beaches in South West Britain. *Quaternary Science Reviews*. **4**: 279–318.

British Geological Survey (2003). *Worms Head. England and Wales Sheet 246. Bedrock and Superficial Deposits. 1:50,000*. British Geological Survey, Keyworth.

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Cambell, S. and Bowen, D.Q. (1989). *Quaternary of Wales: Geological Conservation Review*. Nature Conservancy Council.

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Hiemstra, J. F., Rijdsdijk, K. F., Shakesby, R. A. and McCarroll, D. (2009). Reinterpreting Rotherslade, Gower Peninsula: implications for Last Glacial ice limits and Quaternary stratigraphy of the British Isles. *J. Quaternary Sci.* **24**. 399–410.

PRACTICAL CONSIDERATIONS:

Please score Accessibility and Safety Red Amber or Green

Accessibility:

Comment: The site is accessible along public rights of way and minor roads, and can also be viewed looking south from the B4247 road Many areas will require permission

Safety:

Comment: Much of the RIGS is on farmland..

Conservation status:

The site lies within the Gower Peninsula AONB and is adjacent to the Gower Coast, Horton and Oxwich Bay SSSI's, otherwise there is no known designation on this RIGS

OWNERSHIP/PLANNING CONTROL:

Owner/tenant: Various

Planning Authority: Swansea Unitary Authority

Planning status/constraints/opportunities:

There are no known planning constraints or opportunities

CONDITION, USE & MANAGEMENT:

Present use: Arable and Farmland

Site condition: The moraine feature is a subdued broad ridge and is generally recognisable although some of the more subtle geomorphological features have almost certainly been lost through agricultural practices.

Potential threats: Although within the Gower AONB, continued developments around villages, including caravan sites or changes in agricultural activity may impact upon this RIGS.

Site Management: A detailed geomorphological map of the moraine is urgently required.

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 and the scientific questions which have been raised by various researchers. It is of particular interest to Quaternary scientists and geomorphologists at the international as well as national level.

Potential use (educational): An accessible site although being extensive it may not be suitable for educational use unless only part of the moraine were examined.

Other comments:

Photographic Record



The crest of the Paviland Moraine looking south towards Port Eynon Bay, showing the rise of the land away from the cliff.



View SW from the moraine ridge near Paviland Manor, where the feature is at its most distinct.