



Geological tourism & protection of geological heritage: The UK experience



Clive Mitchell
Industrial Minerals Geologist
British Geological Survey

A microscopic image of a mineral specimen, showing various colored and textured regions. A scale bar in the top right corner indicates 1000 micrometers.

1000 μm

Outline of presentation

- What is geological tourism?
- Geological heritage and its conservation
- The UK experience
- UK environmental designations
- UNESCO Global Geoparks
- What about the UAE?

British Geological Survey (BGS)

The BGS is a world-leading geological survey that focuses on public-good science and research to understand earth and environmental processes.

www.bgs.ac.uk

UK Research
and Innovation



**British
Geological Survey**
Expert Impartial Innovative

Clive Mitchell

Industrial Minerals Geologist

- Geologist and Industrial Minerals Specialist at BGS since 1989
- Chartered Geologist (CGeol) with Geological Society of London
- Past work in Afghanistan, Africa, Middle East and Thailand
- Resource assessment in United Arab Emirates including high-purity limestone, dimension stone & construction aggregate



1992 Zambia



2018 UAE

What is geological tourism?

- Geological tourism is part of ‘Geotourism’
“Geotourism is tourism that sustains or enhances the identity of a territory, taking into consideration its geology, environment, culture, aesthetics, heritage and the well-being of its residents. Geological tourism focuses on geology or geomorphology.”

Arouca Declaration, 2011

Geoconservation

The background of the slide is a photograph of a desert landscape. In the foreground, there is a rocky, gravelly ground with some sparse, dry vegetation. In the middle ground, there are several rocky hills and mountains with a reddish-brown hue. The sky is a pale blue with some light clouds. The overall scene is arid and rugged.

- Geoconservation involves recognising, protecting & managing sites/ landscapes important for their rocks, fossils, minerals, or other geology or geomorphology
- Geodiversity is a key concept - variety of rocks, minerals, fossils, landforms, sediments & soils, with the natural processes which form & alter them.

The UK experience

- Environmental designations protect sensitive landscapes from development
- National Parks, Areas of Outstanding Natural Beauty (AONB) & Sites of Special Scientific Interest (SSSI)
- Regionally Important Geological Sites (RIGS), Limestone Pavement Areas & Special Landscape Areas
- UNESCO Global Geoparks

UNESCO Global Geoparks

- *Single, unified geographical areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development.*
- 140 UNESCO Global Geoparks in 38 countries with 69 in Europe (7 in UK) and 45 in Asia (37 in China). Only one Geopark in the Middle East (Qeshm Island in Iran) & none in GCC.

Distribution of GGN Members



As of April 2018, 140 Geoparks in 38 Member States are currently members of Global Geoparks Network.



LEGEND

- Continental Boundary
- Perennial Rivers
- Lakes
- Geopark Location

SCALE 1 : 180 000 000
 1800 0 1800 3600 5400 km

Kents Cavern, English Riviera UNESCO Global Geopark, UK



Fforest Fawr UNESCO Global Geopark, Wales, UK



Geological interpretation board, Fforest Fawr UNESCO Global Geopark, Wales, UK

PARC CENEDLAETHOL BANNAU BRYCHEINIOG

Comisiwn Coedwigaeth Cymru
Forestry Commission Wales

Bwa Maen



Le crynodd y ddaear a phlygodd y creigiâu! • Where the ground shook and the rocks buckled!

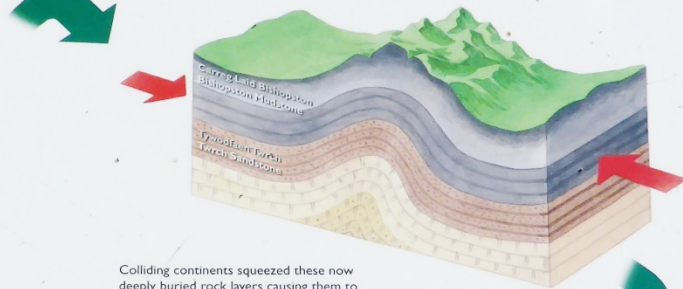
Enw'r clogwyn o'ch blaen yw Bwa Maen. Mae wedi'i ffurfio o galchfaen a gafodd ei gywasgu a'i dorri amser maith yn ôl, ac yn ei dreulio i adael y bwres trawiadol sydd i'w weld heddiw.

1 Dyddodir calchfaen mewn môr trofannol bas (360-325 miliwn o flynyddoedd yn ôl)
Limestone is laid down in a shallow tropical sea (360-325 million years ago)

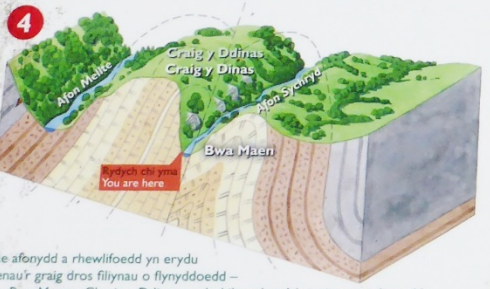


Mae deltau afonydd yn gollwng tywod a llaid ar draws yr ardal (325-315 miliwn o flynyddoedd yn ôl)
River deltas dump sand and mud across the area (325-315 million years ago)

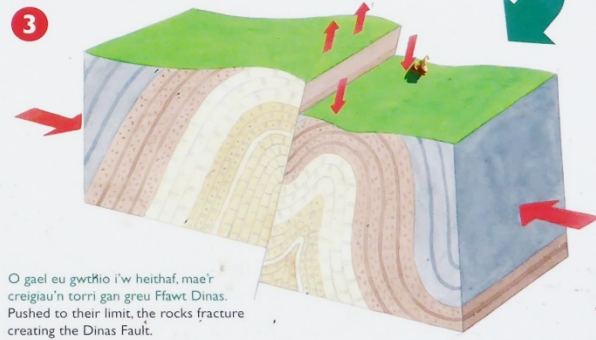
2 Gwasgwyd yr haenau creigiog hyn, sydd bellach wedi'u claddu'n ddwfn, gan gyfandiroedd yn gwrthdaro gan beri iddynt blygu (300-200 miliwn o flynyddoedd yn ôl)



Colliding continents squeeze these now deeply buried rock layers causing them to buckle (300-200 million years ago)



Mae afonydd a rhewlifoedd yn erydu haenau'r craig dros filiynau o flynyddoedd – mae Bwa Maen a Craig y Ddinas yn dod i'r amlwg fel siapiau yn y dirwedd.
Rivers and glaciers erode the rock layers over millions of years – Bwa Maen and Dinas Rock emerge as shapes in the landscape.



O gael eu gwrthio i'w heithaf, mae'r creigiâu'n torri gan greu Ffawt Dinas. Pushed to their limit, the rocks fracture creating the Dinas Fault.



Bwa Maen yw'r amlygiad craig gorau ar hyd Cylchfa Ffawtio-plygu Cwm Nedd – parth cul yn cynnwys ffawtiau, plygion a thoriadau, sy'n ymestyn o Henffordd i Fae Abertawe.

Nid peth anghyfreid yn y daear ynyfeydd ar hyd y gwendid hwn yng nghramen y Ddaear. Un o'r daeargrynfeydd mwyaf a gafwyd yn y DU oedd yn un diwethaf a drawodd Abertawe ym 1906.

Bwa Maen is the best rock exposure along the Neath Disturbance - a narrow zone of faults, folds and fractures extending from Hereford to Swansea Bay.

This line of weakness in the Earth's crust is no stranger to earthquakes. The last quake, which hit Swansea in 1906, was one of the UK's largest.

Nodwedd ddaearogol sy'n cael ei thrysori'n genedlaethol yw Bwa Maen, sydd, ar ôl gwaredu'r coed a'r eiddew'n ddiweddar, yn cael ei datgelu am y tro cyntaf ers degawdau.



Bwa Maen is a nationally treasured geological feature which, after the recent removal of trees and ivy, is revealed for the first time in decades.

www.forestry.gov.uk/cymru
www.forest.gov.uk/wales

www.bannaubrycheiniog.org
www.breconbeacons.org

www.geoparcyforestfawr.org.uk
www.fforestfawrgeopark.org.uk



BRECON BEACONS NATIONAL PARK

Fossil Tree

This tree grew in a tropical forest in the Carboniferous Period, about 320 million years ago. It is a species known as *Sigillaria*, an ancestor of modern clubmosses. When the tree died, sand from a river filled its rotting trunk and roots, and then hardened into sandstone which now forms a perfect cast.

The tree was found in 1915 in a quarry near Edmundbyers Cross. It was brought to Stanhope in pieces which were reassembled in the churchyard in the early 1960s.

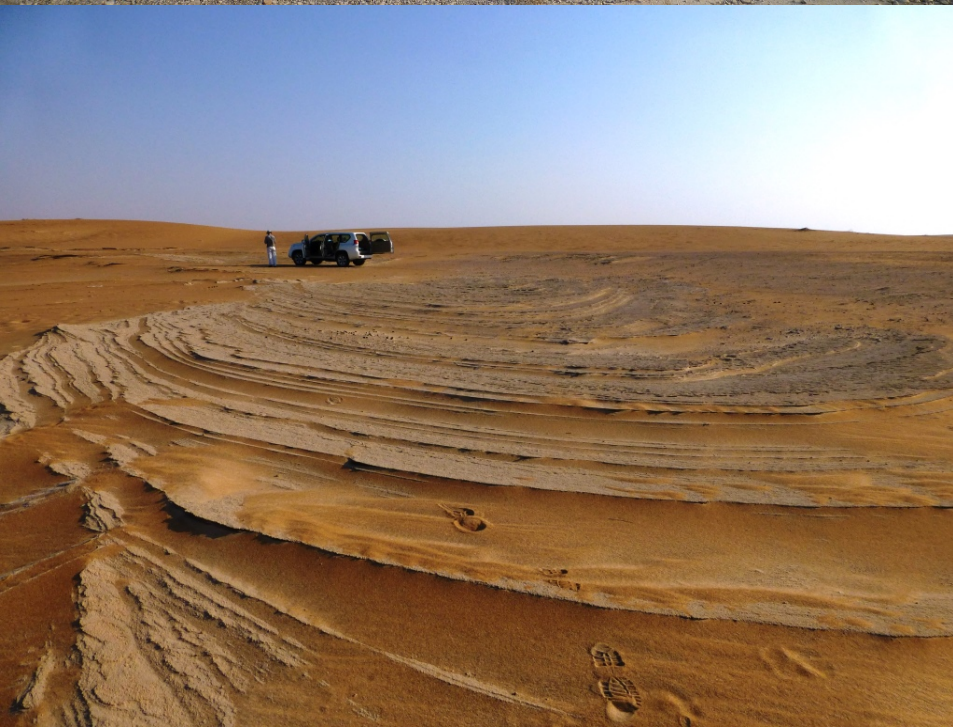


Fluorite, North Pennines UNESCO Global Geopark, UK



Case for a Geopark in the UAE?

- Tourism is growing in UAE, geological tourism would be a new aspect
- UAE has internationally significant geology e.g. UAE-Oman Ophiolite, Hajar mountains, Wadis (e.g. Wadi Bih)
- UNESCO designations proposed in UAE include: coastal sabkha, cultural sites Al Ain, Sir Bu Nair Island & Khor Dubai





BGS Geopark experience 1

- UK has 7 UNESCO Global Geoparks
- BGS is a member of the UNESCO Global Geopark Council (one of 12 voting members selected by the Director General of UNESCO to manage and govern the UNESCO Global Geoparks around the world)

BGS Geopark experience 2



- BGS carries out independent studies for prospective UNESCO Global Geopark sites to identify geological sites and advise on the application, establishment, development, education, conservation and sustainable development.
- BGS has worked with Geoparks in:
Brazil, Canada, China, Germany, Greece, Hong Kong, Iran, Ireland, Italy, Japan, Korea, Norway, Portugal, Russia, Spain & the UK.

Conclusions

- Geotourism goes hand in hand with protection of geological heritage
- The UK experience is formal recognition of geological sites and integration with the development planning system
- There is potential for the UAE to further develop geotourism and create a UNESCO Global Geopark

Thank you for your attention!



Clive Mitchell
Industrial Minerals Geologist

British Geological Survey
Keyworth, Nottingham, NG12 5GG,
United Kingdom (UK)

Email: cjmi@bgs.ac.uk

Tel. +44 115 936 3257

Twitter: @CliveBGS

www.bgs.ac.uk

