

YORKSHIRE GEOLOGICAL SOCIETY

President: Professor Pete Rawson

Circular 512



A Registered Charity
No. 220014

ANCIENT OCEANS AND ATMOSPHERES



**14.00 to 16.30 SATURDAY 15TH NOVEMBER 2003
DEPARTMENT OF GEOGRAPHY, SHEFFIELD UNIVERSITY,
SHEFFIELD, SOUTH YORKSHIRE**

NON MEMBERS WELCOME

ANCIENT OCEANS AND ATMOSPHERES

- 14.00-14.05 Chairman's Introduction and Society announcements
- 14.05-14.55 Global warming fifty million years before mankind:
Was carbon dioxide the culprit?
Professor D.J. Beerling, Animal and Plant Sciences, University of Sheffield
- 14.55-15.25 Tea and coffee.
- 15.25-16.15 Silurian seas - the state of the speculation
Richard J. Aldridge, University of Leicester
- 16.15-16.30 Closing remarks

GLOBAL WARMING FIFTY MILLION YEARS BEFORE MANKIND: WAS CARBON DIOXIDE THE CULPRIT?

D. J. Beerling, Animal and Plant Sciences, University of Sheffield

The early Eocene was the warmest interval of the past 70 million years of Earth history. But the proxy data for the greenhouse gas CO₂, show widely varying estimates, with most indicating near present-day levels. So, what was driving the extreme global warmth of the Eocene if not CO₂. This presentation will consider new work being conducted jointly at the Universities of Sheffield and Bristol using an 'Earth systems' approach. We now realize that other greenhouse gases present in the atmosphere in trace amounts, but for which we have no geologic record, were important. In particular, greater emissions of the potent greenhouse gas methane from Eocene wetlands doubled the concentration in the ancient atmosphere. Moreover, other trace gas emissions emitted by terrestrial ecosystems altered the chemistry of the atmosphere. This led to increases in the greenhouse gases tropospheric ozone and stratospheric water vapour. Climate feedback experiments show these to be important previously unrealized forcing mechanisms responsible to a large extent for early Eocene warmth.

SILURIAN SEAS - THE STATE OF THE SPECULATION

Richard J. Aldridge, University of Leicester

The ocean/atmosphere system is notoriously complex, and our understanding of its present dynamics is far from complete. So, how can it be possible to address the nature of this system as it was more than 400 million years ago, when the modern ocean basins had not been born, continents had yet to be clothed in green plants, and atmospheric composition was probably significantly different from today's? The answer is that, although we can never hope to achieve a full picture, the geological record fortunately preserves items of evidence that allow us to construct at least broad hypotheses and to go on and test them. The clues come from the nature of the sediments deposited in the oceans and on their margins, from the geochemical fingerprints retained by these rocks, and from the remains of the life forms that thrived in these ancient seas.

The global record of Silurian rocks shows some remarkably consistent patterns. There were times when limestone deposition and coral reefs were widespread on continental shelves, punctuated by other periods when shale deposition dominated and graptolites flourished in the same areas. These cycles have traditionally been attributed to changes in sea level, but it is unlikely that transgressions and regressions alone can account for the patterns we observe, nor for the changes in the biota that accompany the lithological turnovers. In 1990, the Swedish geologist Lennart Jeppsson devised a more complex model that involved an alternation of oceanic states, termed by him P and S states.

The model primarily relates to the generation of oceanic deep waters. Periods when the deep water is interpreted to have been salinity dense are described as secundo (S) episodes; if the main deep water source was cold dense water, then a primo (P) episode resulted. Brief intervals between episodes when vertical circulation was turned on and off by external disturbances, e.g. Milankovitch cycles, are called events. Primo episodes were characterized by less carbonate precipitation in marginal seas and increased diversity and abundance of planktonic communities; secundo episodes featured the expansion of carbonate deposition in shallow waters, with rich and diverse benthic faunas. According to the model, the system was regulated by the balance of carbon dioxide between the oceanic and atmospheric reservoirs.

Although really a rather simple model, this hypothesis seems to account well for many of the patterns observed in the Silurian record. However, subsequent work has led to some modifications of the initial theory, and some tests have failed to identify predictions made by the model. For example, a detailed study made by David Gelsthorpe of microplankton changes through one of the most severe P-S transitions, the Ireviken Event at the Llandovery/Wenlock series boundary, has failed to reveal the anticipated drop in diversity and abundance. Amendments to the model, invoking planktonic production of dimethyl sulphide and iron fertilization may be sufficient to explain this discrepancy, but the debate remains open.

ANNUAL DINNER

The annual dinner will be held on Saturday 6th December 2003 6.00pm for 6.30pm after the AGM. As usual, it will be at King's Manor, York University. The cost of a ticket will be £18.60 and should be booked with Mavis May, Bethany Cottage, 3 Gordon Park, Beck Bank, Cottingham, East Yorkshire HU26 4LF. Telephone: 01482 876768. *Final booking date is 29th November 2003.*

Please tell me at the time of booking if you wish to have a vegetarian meal or have dietary needs. Dress is smart informal and guests are welcome at this event.

Hoping to see you all there.

Mavis May

DINNER MENU

Ballantine of Salmon and Herbs
with a Dill and Tomato Dressing

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Roast Guinea Fowl
with Confit Leg and Bitter Orange Sauce
Selection of Fresh Vegetables

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Hazelnut Dacoise with Rum Cream

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Coffee and Continental Chocolates

Welcome to New Members

Mr Byron Blessed, Whitby
Mr J G Husdon, Scarborough
Dr R M Owens, National Museum of Wales
Miss Catherine A Skinner, Sheffield
Mr Stuart Swann, Scarborough
Mr David B Kemp, Open University
Mr David Bower, Bradford
Mr Leo McCreton, Middlesbrough
Mr D A Redhouse, University of Cambridge
Mr C J Small, Derby
Dr T R Hawkins, Cheshunt, Herts

MEETING OF THE EAST MIDLANDS REGIONAL GROUP OF THE GEOLOGICAL SOCIETY

The Christmas meeting lecture of the East Midlands Regional Group of the Geological Society will be given by Professor David Lerner from the University of Sheffield and will be entitled 'The impact of cities on their underlying groundwater'. The meeting will be held on Thursday 11th December 2003 (18.30 for 19.00 pm) in Meeting Room 1, British Geological Survey, Keyworth, NG12 5GG. Free refreshments will be available, please e-mail robert.evans@ntu.ac.uk if you are going to attend, so catering can be allowed for.

Please note these details have changed since the last Circular.

Further details can be found at www.geolsoc.org.uk/template.cfm?name=EMRG92359286751.

GEODIVERSITY ACTION PLANS FOR THE NORTH PENNINE AONB

The British Geological Survey Goediversity has been commissioned to carry out Action Plans for the North Pennine AONB and requires your input, comments and advice. The Society will be responding to these plans, but if you would like to respond personally, please do so to Brian Young at Liddisdale, Millfield Road, Riding Mill, Northumberland NE44 6DL. Telephone/Fax: 01434 682755. E-mail: by@bgs.ac.uk by the 30th November 2003.

BRITISH SEDIMENTOLOGICAL RESEARCH GROUP

The British Sedimentological Research Group is holding yts AGM at the University of Leeds from Saturday 20th December to Monday 22nd December. Saturday includes fieldtrips, workshops and evening icebreaker, Sunday includes the conference meal at the National Mining Museum. Full details can be found at <http://earth.leeds.ac.uk/bsrg2003>.

CALL FOR PAPERS : NEW POSTGRADUATE RESEARCH

The Society's general meeting on 21st February next year, to be held at the University of Durham, is to be a forum for Earth Science postgraduate students to present the findings of their research. Talks on any subject are welcome and they do not have to represent the "finished article", the Society is keen to hear of the latest developments in research being undertaken in the region. If you would like to give a talk then please contact the Programme Secretary.

MEETINGS OF CORRESPONDING SOCIETIES

Contact society representatives for the latest information.

CRAVEN & PENDLE GEOLOGICAL SOCIETY

Yvonne James. Tel: 01282 813772 or www.cpgs.org.uk

Geology of La Palma, Canary Islands, Spain Friday 14th November

Speaker: Hed Hickling, B.A., M.Sc.

Members Slides & Christmas Jacob's Join Friday 12th December

CUMBERLAND GEOLOGICAL SOCIETY

Nigel Courtman. Tel: 01229 861478 or www.cumberland-geol-soc.org.uk

Early Mining in the Lake District Wednesday November 12th 2003

Speaker: David Bridges

The Lecture Theatre, Westlakes Research Institute, Moor Row, Whitehaven.

The Iceland Excursion Wednesday December 3rd 2003

Nigel Courtman and members of the Society: Excursion to Iceland, July 2003.

The Friends Meeting House, Keswick.

EAST MIDLANDS GEOLOGICAL SOCIETY

John Wolf e-mail sec@cmgs.org.uk or www.emgs.org.uk

HUDDERSFIELD GEOLOGY GROUP

Julie Earnshaw (Secretary). Telephone: 01484 311662 or e-mail: earniehome@ntlworld.com

Swimming with Ammonites Monday 10th November

Ammonite collecting on the Yorkshire Coast

Speaker: John Pratt

Mystery Fieldtrip Sunday 16th November

With Phil Robinson

AGM and meal at the Croppers Arms, Marsh Monday 8th december

HULL GEOLOGICAL SOCIETY

Mike Horne. Tel: 01482 346784 (after 7.30 pm) or e-mail: m.horne@hull.ac.uk
or www.go.to/hullgeolsoc

Post-glacial evolution of the Humber Estuary Thursday 20th November

Speaker: Dr John Rees of the British Geological Survey.

Pillars of Wisdom, Fire and Stone: Thursday 11th December

a Tourists Guide to Italian Volcanos

Speaker: Nigel Whittington

LANCASHIRE GROUP OF THE GEOLOGISTS' ASSOCIATION

Norman Catlow. Tel: 01772 727577 or e-mail: norman@catlow4736.freeserve.co.uk

LEEDS GEOLOGICAL ASSOCIATION

Anthea Brigstocke (General Secretary). Telephone: 01904 626013.

E-mail: abrigstocke@hotmail.com or www.leedsgeolassoc.freeserve.co.uk

**Several Fingers on the Pulse of the Volcano; a Case
History of Montserrat** November 20th

Speaker: Dr Jurgen Neuberg, School of Earth Sciences, University of Leeds

**AGM and Conversazione
short talks and displays by members** December 11th

Speaker: Roger Stevens, Lecture Theatre Block

LEICESTER LITERARY & PHILOSOPHICAL SOCIETY

Chairman: Andrew Swift. Tel: 0116 252 3646. as48Ele.ac.uk

Meetings held in Lecture Theatre 10 (LTM) in the Geology Department, Leicester University at 7.30pm (except where stated).

Tectonic Ice Ages and Human Evolution Wednesday 22nd October
Dr. Mark Maslin, Department of Geography, University College, London

**Geology by canoe, Rodrick Murchison's mapping
of the Ural Mountains.** Wednesday 5th November

Speaker: Professor Michael Collie, Barkstone, Nottingham.

Title TBA theme Volcanoes Wednesday 19th November
Speaker: Dr Jenni Barclay, School of Environmental Sciences, University of East Anglia.

**Sliding into the deep freeze:
the Plio-Pleistocene geology of East Anglia** Wednesday 3rd December

Dr Jan Zalasiewicz, Department of Geology, University of Leicester

Chairman's meeting Wednesday 17th December
To be held at New Walk Museum, Leicester

MANCHESTER GEOLOGICAL ASSOCIATION

Jane Michael. Tel: 0161 366 0595, e-mail: jammyjane@aol.com or
www.mangeolassoc.org.uk

NORTH EASTERN GEOLOGICAL SOCIETY

Frank Trowbridge. Tel: 01642 582786, e-mail: frank.trowbridge@care4free.net
or www.northeast-geolsoc.50megs.com

Some mineralogical research in the North Pennines 21st November 2003
Speaker: Trevor Bridges (joint meeting with the Russell Society).

**Member's Night. Discussion on the Society's Finances
Aspects of the Geology of Central Australia** 12th December 2003
Speaker: Gordon Wilkinson.

WESTMORLAND GEOLOGICAL SOCIETY

Mrs P. M. Wilson. Tel: 01539 533198 or www.wgso.fsnet.co.uk

Recent activity on Etna as at November 2003 19th November 2003
Speaker: Professor Harry Pinkerton, Lancaster university.

Member's Evening and Jacob's Join 17th December 2003
Members share current projects, displays, exhibits or give short presentations.

YORKSHIRE REGIONAL GROUP OF THE GEOLOGICAL SOCIETY

Isla Smail. Tel: 0113 242 8498, e-mail: isla.smail@arup.com

Coastal Geomorphology of Yorkshire

Wednesday 12th November

Speaker: Mark Lee. At the Rupert Beckett Lecture Theatre, University of Leeds.

Light refreshments served beforehand, for more details contact Mike Osborne

Tel: 0113 242 8498 or e-mail: michael.osborne@arup.com

YRGGG AGM and Christmas Quiz

Thursday 11th December

At the Old Post Office Pub, Wakefield (Junction 38, M1: just off roundabout on A635 Barnsley Road). Bring a team or form one on the night. Light refreshments provided.

For more information contact Mike Osborne (see above).

SUBMISSION OF PAPERS

Manuscripts for publication in the Proceedings should be submitted to *'The Editors, Proceedings of the Yorkshire Geological Society, Geological Society Publishing House, Unit 7, Brassmill Lane Enterprise Centre, Brassmill Lane, BATH, BA1 3NJ.'* Typescripts should be prepared using the updated instructions for authors given on the inside back cover of the latest issue (Volume 54 Part 3, May 2003).

Publication of manuscripts may be expected in the next, or next but one part, following acceptance. As a result of the change in publishing arrangements the proceedings will be abstracted and/or indexed in, *GeoArchive, GeoRef, Geobase, Geological Abstracts and Mineralogical Abstracts, Research Alert and Science Citation Index Expanded (SCIE).*

COPY FOR CIRCULAR

Copy deadline for the lecture meetings Circular 513 is 17th November. The next indoor meeting will be held on the 6th December 2003 at University of York. AGM and Presidential Address, speaker: Professor Pete Rawson.

General Secretary

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