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DEEP-TIME GeoSystems News

In this issue ...

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Steering Committe

Greetings

Welcome to the spring 2006 edition of the GeoSystems newsletter. The purpose of this newsletter is to disseminate happenings within the community of those interested in Earth's pre-Quaternary climate system. We continue to build the community; if you have not already done so, please register --and encourage students and colleagues to register-- on the website (www.geosystems.org). Doing so will enable registrants to receive periodic updates on sessions, workshops, calls for papers, research vignettes and other activities associated with deep-time climate research. Several such announcements are included in this issue.

In addition to the community activity continuing in deep-time climate research, we are making progress on larger-scale efforts to highlight the capabilities and relevance of research on Earth's deep-time climate system. Key among these efforts is discussions that are underway to initiate a National Research Council study on "The Importance of Deep-Time Geologic Records for Understanding Climate Change Impacts." The aim of this study will be to further our understanding of past climates, their signatures, and key environmental forcing parameters and their impact on ecosystems, through (1) assessing the present state of knowledge of earth's deep-time paleoclimate record, with particular emphasis on the transition periods of major paleoclimate change, (2) describing opportunities for high-priority research, with particular emphasis on collaborative multidisciplinary activities, and (3) outlining the research and data infrastructure that will be required to accomplish the priority research objectives. This study will present an exciting opportunity to raise awareness of these issues with the larger science community and key policy makers.

Please continue your own efforts to push the envelope of our collective knowledge of Earth's deeper-time climate system, and to help build the GeoSystems community.

Peace,
Lynn Soreghan
Chair, GeoSystems Steering Committee

March, 2006

Greetings

Funding News for the Paleoclimate Community

For FY2007, the Sedimentary Geology and Paleobiology (SGP) Program at NSF is anticipating an increase in funding for paleoclimate studies spanning all of Earth history. At NSF, FY2007 begins on October 1, 2006. Therefore this potential FY2007 funding increase could affect proposals submitted as early as the July 16, 2006 SGP deadline. As always, researchers should contact the relevant Program Officers with any questions.

Opening for Program Officer in Earth Sciences

Please be aware that an advertisement for a Program Officer position in Earth Sciences has just been posted on the NSF web site. The position is to run the Education and Human Resources Program but the new Program Officer will also contribute to one of the programs in the Surface Process Section of EAR. Those programs include Sedimentary Geology and Paleobiology, Geobiology and Low-Temperature Geochemistry, Geomorphology and Land Use Dynamics and Hydrologic Sciences. If you know of anyone who is interested and qualified, or if you are interested, please consult the NSF web page for additional details.

Building a Data System for GeoSystems and Deep-time Paleoclimate Research

Walter S. Snyder, Vladimir I. Davydov and Isabel P. Montañez

Introduction

We want to introduce the GeoSystems community to PaleoStrat (www.paleostrat.org) and the GeoSystems Data Portal. PaleoStrat is providing the engine to build a data system for GeoSystems and deep-time paleoclimate research. PaleoStrat, part of the larger, national geoinformatics effort, is being developed as an open, comprehensive, and dynamic working environment that hosts an integrated suite of sedimentary, paleontologic, paleobiologic, stratigraphic, geochemical, geochronologic, and related data that provides user support for the input, searching, output and synthesis of these data.

Why is a data system important for GeoSystems?

Data sharing is a fundamental way to help build a presence and product for the GeoSystems community. For the GeoSystems vision to be successful, we have to find ways to bind together the various researchers and research projects. We must be able to demonstrate to the funding agencies that our science is significant and that we, as a community, know where we are headed. This community building must happen to increase the funding opportunities for individual projects as well as to justify funding larger, targeted efforts. This newsletter is one tool that brings the community together; sessions and workshops at AAAS, GSA, AGU, AAPG/SEPM and EGU continue to help build awareness of the science. The GeoSystems booth at professional meetings is important both as a staging point for activities at these meetings and as a community information center. A "GeoSystems Data Portal" is another very effective community development activity because it promotes a community-wide effort to build and populate the system with data; it allows the community to come together to build a common platform for research. Not only can we capture the data generated by future deep-time paleoclimate research, but also important legacy data upon which our present hypotheses are based. A GeoSystems Data Portal also meets rising expectations from NSF and other funding agencies that all data generated by federal funding will be openly available; indeed, it is an opportunity for us to become leaders in the development and deployment of such a system.

Comprehensive and integrated data platform

Investigation of the deep-time record of climate events requires integration of many types of data- sedimentological, paleobiological, geochronological, and geochemical - archived in sediments on land and sea. In terms of the science, as summarized previously, we need a community effort that: 1) allows for the enhanced development and resolution of paleoclimate proxy data; 2) provides better geochronologic resolution, because abrupt changes are more common than previously imagined; 3) acquires interdisciplinary, high-resolution data from key stratigraphic successions; 4) allows climate modelers to develop and refine models applicable to deep-time slices and make available the necessary data to test these models; and 5) promotes interdisciplinary communication and collaboration. Whereas you can envision the array of data generated by these efforts housed in a number of disparate databases, it is here argued that a coherent, unified and integrated data system is more efficient and better serves the purpose of binding together the various subdisciplines that constitute GeoSystems. That, of course, is PaleoStrat's vision, and why we are providing the GeoSystems database engine.

Supporting user science

What will the GeoSystems Data Portal provide the user in terms of their science research, in terms of the quality of their science? The answer to this question can be summarized in the following list.

- Reproducibility and the complete geologic context
- Data integrity and authenticity
- User-driven data quality and reference data sets
- Legacy data capture
- Mechanisms for data input, searching and data assessment
- Secure personal and project work space ("controlled data sharing")
- Long-term data stewardship
- Support of publication data sets
- Meeting agency and project data requirements
- Time to think

Here, we will touch only on the first issue; please go to the PaleoStrat web site for discussion of the others.

Data, Reproducibility and the Complete Geologic Context:

Science runs on data - the more data that supports a given interpretation, the more robust that interpretation is; the opposite is also true. The amount of data and metadata that can be presented in a published article is limited whereas that which can be stored and accessed in a data system is virtually unlimited. Data systems such as the GeoSystems Data Portal will provide a mechanism to link together the published synthesis and discussion with vastly more data than can appear on the "printed" page. It also facilitates the reproducibility of the results presented in the paper. The cornerstone of all science is that reproducibility. However, without access to all data and metadata that were utilized in a published work, key portions of those data often must be unnecessarily recompiled by subsequent researchers, wasting time and precious research funding. Linkage between publications and databases will become even more important as all major journals move to digital, online publication, and with that, a more efficient and effective communication of science and science results. Permanent "Digital Object Identifiers" (DOI) referenced in the publication, will be tagged with the designated data hosted in GeoSystems Data Portal thus providing a mechanism to reference and retrieve the data associated with each published article. Data input into the GeoSystems database by the researcher become a permanent and expansive record of the research and because the system allows for the capture of the full context of the research, meets the needs of reproducibility.

In this way, a data system such as GeoSystems/PaleoStrat fosters more robust publications by both archiving data and by providing a means to present a more complete data/metadata set than can be possible in the publication itself. It is also important to note that all data within PaleoStrat (and therefore GeoSystems) will also be replicated at the GEON site (San Diego Supercomputing Center), thus insuring the permanent archiving of all data.

What will this system look like?

What we are now doing is building a skin for GeoSystems that runs on top of the PaleoStrat engine. The user may start at the GeoSystems web site, and click on the "GeoSystems Data Portal" to begin a session (Fig. 1).

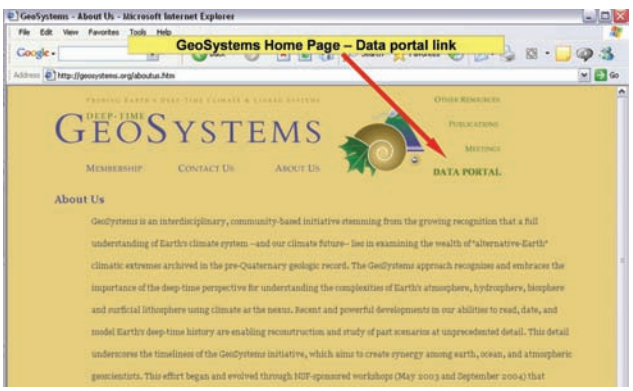
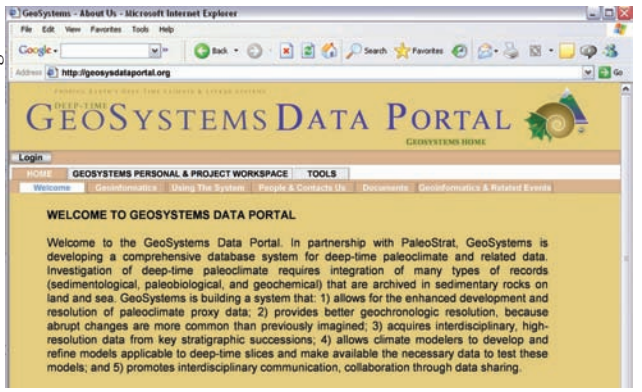


Figure 1

Figure 2 provides a mock-up of what the data portal might look like. From there you access all the functionality and public data housed in PaleoStrat - without leaving the "GeoSystems environment." Please see "Using the System" at www.paleostrat.org for more details.

Figure 2



Partnerships

No other such comprehensive, integrated data system exists, and the challenges for design, implementation, maintenance, and migration are immense. Therefore, we are working particularly closely with other geoinformatics efforts to share ideas and technologies, and where possible utilize partner's services. In direct collaboration with SedDB (www.seddb.org); SESAR (www.geosamples.org), GEON (www.geongrid.org), EarthChem (www.earthchem.org), and also Paleobiology Database (www.pbdb.org), CHRONOS (www.chronos.org), *i*GeoInfo (www.igeoinfo.org), and others, we are working to insure that PaleoStrat and therefore the GeoSystems Data Portal, is part of a larger system. Finally, we realize that deep-time paleoclimate research involves both terrestrial and marine-based data. Whereas PaleoStrat is being developed explicitly for the terrestrial Earth science community, we have built partnerships with our marine counterparts, specifically SedDB and EarthChem, to insure that data from the marine systems are available to everyone regardless if they are working in the GeoSystems/PaleoStrat or SedDB environments.

What can you do?

The GeoSystems Data Portal is a community platform, and as such, we need your feedback, suggestions, and criticisms to build a better system for you - the user. You need to tell us what other data types are needed. How do data need to be formatted to run in your favorite modeling program? What other tools for assessment and analysis do you need? Which of these tools do you want to use online versus downloading to your workstation? How can we make the system even easier to use? For now, please go to PaleoStrat.org for more information.

The development of a complex data system for GeoSystems is not easy, it takes time and resources. We will ask for your patience - we fully expect glitches and got'yas to happen periodically. Rest assured that the development team is and will continue to work overtime to correct these problems and to expand and upgrade the system to meet user expectations. Finally, even before the GeoSystems Portal is up, you can start to put your data into PaleoStrat, and it will automatically be part of the GeoSystems database.

Call for Papers for a Geological Society of America Volume on *"The Late Paleozoic Gondwanan Ice Age: Timing, Extent, Duration and Stratigraphic Records"*

Editors: Christopher R. Fielding and Tracy D. Frank (University of Nebraska-Lincoln), John L. Isbell (University of Wisconsin-Milwaukee)

Following negotiations with GSA officers, we are pleased to announce that approval in principle has been granted to proceed towards a special volume on the geology of the late Paleozoic Gondwanan Ice Age. Accordingly, we invite those with research interests in this field to consider offering a paper or papers to this volume.

The late Paleozoic represents the only transition from icehouse to long-standing greenhouse conditions on a vegetated earth. As such, understanding the climate dynamics, carbon cycle perturbations, and ecosystem reorganizations that characterized this period has relevance for predicting the effects of current climate warming that may result from growing levels of carbon dioxide (CO_2) in the atmosphere. Recent studies paint the late Paleozoic Gondwanan Ice Age (LPGIA) as an interval of dynamic climate change, with episodes of cooling and increased ice volume alternating with intervals of marked warmth. Moreover, emerging evidence suggests that, as has been recently suggested for the Cenozoic, atmospheric CO_2 played a strong role in controlling global climate.

Despite the vulnerability of human society to climate change associated with increasing atmospheric CO_2 levels, the links between greenhouse gases, climate, and polar ice volume are not well constrained. Will rising greenhouse gas concentrations in the atmosphere induce Earth to enter a prolonged greenhouse climate state similar to the system that dominated Late Permian through mid Eocene time? Will the transition to a greenhouse state be characterized by gradual unidirectional change, an abrupt transition, or rapid variations between climate extremes until a critical threshold is reached? How accurately do computer simulations of global climate predict the effects of increasing greenhouse gas concentrations? Despite a very different land-sea configuration, the LPGIA and its demise represent the only relevant vegetated-earth analogue for a future transition from current icehouse conditions to a greenhouse state. As such, it is clear that studies of this interval are key to improving our understanding of climatic variability and biotic changes associated with a turnover to a permanent ice-free world.

A group of nearly fifty researchers met for a two-day, NSF-sponsored research workshop following the Geological Society of America Annual Meeting in Salt Lake City, Utah (October 20/21, 2005). Among the proposals to arise from the very fruitful discussions and technical presentations held at that time was the desire to produce a synthesis volume that brings together the rapidly growing and multi-disciplinary body of knowledge on this crucial period of Earth history.

Volume Content

We seek to produce a comprehensive and lasting statement of the art, reflecting the major advances brought about by the wealth of recent research in this area. Rather than publish a book containing a series of disjunct research papers on aspects of the LPGIA, we seek papers on specific topics (see below), and will ask that submissions follow certain guidelines as to length, format, internal structure, nature of illustrations, etc., in order to assure a consistency of style and a format that can be readily accessed by potential readers. The style we envisage is somewhat like that employed in the seminal compilation of Hambrey & Harland, 1981 ("Earth's Pre-Pleistocene Glacial Record", Cambridge University Press), but of course taking advantage of modern presentation formats and styles. We believe this is the first time that such an endeavor has been undertaken for this crucial period of Earth history, and hope that you share our excitement for the possibilities that such a project raises.

Call for Papers

We seek papers on the following topics:

1. Near-Field Records – Lithostratigraphic, paleobiological and geochemical archives of glaciation and associated environmental change preserved on the ancient continent of Gondwana.

NW and northern South America
Southern South America
Central and North Africa
Southern Africa
East Africa
Arabian Peninsula
India
Antarctica
Western Australia
Southern Australia
Eastern Australia

2. Far-Field Records – lithostratigraphic, paleobiological and geochemical archives of glaciation and associated environmental change preserved on the paleo-continents of the northern hemisphere.

Western USA
Central USA
Eastern USA
Maritime Provinces of Canada
British Isles
Northwest Europe
Central and eastern Europe
The former USSR

We aim to achieve a comprehensive and even coverage of the topic. Accordingly, if multiple proposals to cover the same material are received, we will suggest that those individuals or groups join together to produce a consensus paper. Conversely, we reserve the right to solicit papers from individuals or groups of our choice if it is evident that certain topics will not otherwise be documented. Detailed Instructions to Authors will be issued once the provisional list of contributions has been determined. Papers will be subjected to full peer review in a manner similar to that employed by GSA and other scientific journals.

We seek at this time expressions of interest for the topics named above, with a list of authors and provisional title for each putative submission. Please reply by email to Chris Fielding (cfielding2@unl.edu) by March 31st, 2006.

Provisional timeline (to be confirmed when Instructions to Authors are issued):

Responses to call for papers: March 31st, 2006.
Notification of acceptance of title and contributors: April 30th, 2006
Deadline for submission of manuscripts: September 30th, 2006
Return of manuscripts to authors following peer review: December 31st, 2006
Deadline for submission of revised manuscripts: April 30th, 2007
Submission of final documents to GSA: June 30th, 2007

Call for papers Special Issue of Palaeogeography, Palaeoclimatology, Palaeocology: *GeoSystems: Investigations of the Late Paleozoic Tropical Earth System*

Guest Editors: G.S. (Lynn) Soreghan (University of Oklahoma) and Isabel P. Montañez (University of California, Davis)

The editors of *Palaeogeography, Palaeoclimatology, Palaeoecology* have approved our proposal to publish a special issue dedicated to climatic and linked aspects of the Late Paleozoic Tropical Earth System. We invite all interested researchers who have new and relevant research results on this topic to submit manuscripts for this special issue. Our purpose in proposing this special issue is two-fold:

(1) As our global climate shifts increasingly toward a state last known from deep time, trans-disciplinary studies covering the vast spectrum of Earth's climate behavior are critical for increasing our understanding of the climate system and the ecological responses of climate change. Expansion of climate studies to include such deep-time states is a focus of the GeoSystems effort, which began as a community-based effort organized through the US National Science Foundation, but has also garnered the interest of our European colleagues and thus has an increasingly international flavor.

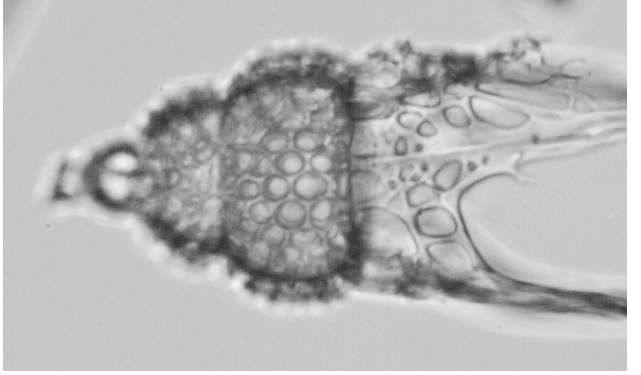
(2) The Late Paleozoic icehouse and the climatic states associated with the waxing and waning of ice sheets and their ultimate demise have been the recent focus of much interest and research including several NSF-sponsored workshops and special symposia at national U.S. meetings. Recent studies document the wealth of excellent continental and shallow-marine archives throughout low latitudes; indeed, the late Paleozoic record encompasses what is possibly the most complete and widespread terrestrial tropical record of *any* time period. These emerging records suggest that this unique vegetated-Earth analogue of a shift from an icehouse to a permanent greenhouse was associated with dynamic changes in atmospheric greenhouse gases, substantial tropical climate variability, and significant impact on paleotropical flora and fauna. As such, it is our nearest, long-lived record analogous to our impending ride from our current icehouse world into an increasingly greenhouse future.

We are excited about the multidisciplinary and global aspects of this topic. To date, we have received 15 tentative titles for potential contributions. Owing to the desire to highlight late-breaking research on this topic in the timeliest manner possible, *the deadline for manuscript submission is June 15, 2006*.

Sincerely,

G.S. (Lynn) Soreghan, Geology & Geophysics, University of Oklahoma, Norman, OK 73019, USA
lsoreg@ou.edu

Isabel P. Montañez, Dept of Geology, University of California, Davis, One Shields Dr, Davis, CA 95616
montanez@geology.ucdavis.edu



Raiding the Palaeozoic/Mesozoic sedimentary archive: Investigating environmental change with multiple proxies

European Geosciences Union
General Assembly, Vienna, Austria
April 2-7, 2006
Session SSP 10

Convenors: Ian Jarvis i.jarvis@kingston.ac.uk , Hugh Jenkyns hughj@earth.ox.ac. , Isabel Montañez montanez@geology.ucdavis.edu & Adrian Immenhauser adrian.immenhauser@falw.vu.nl

The symposium is being co-sponsored by IAS and EGU, and in association with the symposium we hope to produce an IAS Special Publication based on the papers presented at the meeting. The general meeting (EGU 2006) home site is at http://meetings.copernicus.org/egu2006/

Abstract Deadline: 13 January 2006

Aim: To bring together palaeontologists, sedimentologists, stratigraphers, organic and inorganic geochemists and palaeoceanographers to demonstrate how multiple palaeoenvironmental proxies can be applied to Palaeozoic and Mesozoic sedimentary successions to better understand and model major shifts and perturbations in the Earth System, including oceanic anoxic events, extinction events, and climate change.

Background: Over the last two decades, the combination of carbon and oxygen stable isotope records with palaeontological and sedimentological proxies has proven to be a powerful tool in advancing our understanding of palaeoclimate and other palaeoenvironmental change through the Palaeozoic – Mesozoic. Strontium isotopes have provided a new stratigraphic tool and have improved our knowledge of variations in the continental weathering flux. Nonetheless, most records of Palaeozoic – Mesozoic environmental change remain largely qualitative. However, considerable scope now exists for improved quantification and modelling by employing a multi-proxy approach that incorporates newly developed methods, such as:

Elemental chemistry: productivity proxies using P, Ba, and Cd/Ca ratios; improved palaeotemperature, palaeoclimate and sea-level change records employing Sr, Mn, Mg/Ca and Sr/Ca ratios.

Novel isotope systems: B, Ca, Ge, Li, Mg, Os and Si isotopes to assess variables including palaeoclimate, palaeo-pH, and hydrothermal versus continental weathering fluxes. Nd isotopes to trace ancient water masses.

Organic geochemical proxies: Applications of the TEX86 palaeotemperature proxy. Carbon and N isotope studies of biomarkers to devolve terrestrial and marine records of carbon cycle perturbations. Biomarker distributions in deep ocean sediments as indicators of photic zone anoxia.

We do not have any funds to support speakers, but IAS are offering travel grants to post-graduate student members (http://www.iasnet.org/), so if you have any students working in this area please encourage them to apply.

Deep Time Perspectives on Climate Change: Marrying the Signal from Computer Models & Biological Proxies

European Geoscience Union
General Assembly, Vienna, Austria
April 2-7, 2006
Session CL016

Conveners: Mark Williams mark.williams@port.ac.uk, Alan Haywood ahay@bas.ac.uk & Maryline Vautravers mava@bas.ac.uk

Synopsis: Scenarios for future climate change indicate that within the next 100-400 years, global annual average surface temperatures will increase by more than 6C (Intergovernmental Panel on Climate Change, 2001). This magnitude of warming has not been experienced for millions of years. There is a clear need to understand deep time (pre-Quaternary) climates if we are to predict the effects of future global warming on the Earth System and on the Earth's biota, which includes us.

The basic themes to run through the session are: (a) how does the fossil record reflect climatic events and; (b) what can past climate and biotic events teach us about future changes in the Earth System. Within the session, we will showcase the main microfossil and geochemical proxies used in the reconstruction of deep-time climates, and their use in advanced computer-based General Circulation Models. We particularly sought submissions which demonstrated a link between data and modelling in one or more of the following areas:

1) Ancient climates – Snowball Earth to Permian deserts

2) Mesozoic climates – Greenhouse worlds

3) Early Cenozoic climates – Slipping into an Icehouse World

4) Late Cenozoic climates – Icehouse Worlds: growth of the polar ice sheets

The session is being sponsored by the Scientific Committee on Antarctic Research Programme ACE (Antarctic Climate Evolution).

This session is also an opportunity to showcase contributions to a new joint Micropalaeontological Society/Geological Society of London book of the same name as this session.

Earth Systems Modelling and Frontier Exploration Conference

Snowbird, Utah

July 11-13, 2006

Venue: The venue for this conference is the Snowbird Ski and Summer Resort, which is situated just to the north of Salt Lake City, in the western Uinta Mountains. This is a geologically spectacular part of the United States.

Further information about the Snowbird venue can be found at: www.snowbird.com/meetings/

Purpose: Bringing together the leading experts in the fields of Earth Systems Modelling and Frontier Exploration, in order to assess their current status, facilitate inter-disciplinary and Industry-Academia collaboration, and help identify and define the direction of future developments in the application of modelling to exploration, especially risk reduction in frontier areas. Earth Systems models are more than the past-future climate models, they integrate more than just the atmospheric dynamical state, including surface hydrology, vegetation, ice, and the oceans.

Technical Sessions-Themes

1. *Earth System Modelling* – This includes models of climate, oceanography, tides, waves, vegetation and chemistry. This session provides a background to what these models are and can do (for those who are not familiar with their use), and their pros and cons. It will also include presentations on model uncertainty (some variables are more robust than others) and how models can/are being tested, and how rigorous this is.

2. *Modelling Source Facies* – Source rocks are fundamental to any petroleum system, and have been the main emphasis of previous exploration-related palaeoclimate modelling, especially the prediction of productivity (ocean upwelling). In this theme, we want to encourage submissions on all aspects of source rock depositional systems and efforts to model this, including not only the production of organic matter, but its transport and preservation.

(continued next page)

3. *Modelling Reservoir Facies* – An understanding of clastic reservoir depositional facies requires an understanding of sediment supply and transport; this in turn necessitates an analysis of terrestrial processes (weathering, erosion, vegetation, palaeodrainage, etc.). Carbonate reservoir facies are more complex still and we would particularly like to see submissions on this topic.

4. *Modelling Seal Facies* - Seal facies have been largely ignored in exploration facies modelling. Many of the principles used to model source and reservoir facies apply here, especially as pertaining to the deposition of fine-grained clastics.

5. *Integrated Modelling* – Putting the systems together. There have been some attempts at integrating all of the processes responsible for source, reservoir and seal facies, and in this final session, such studies would be of interest.

These sessions deal separately with source, reservoir and seal depositional systems, but with the acknowledgement that in terms of modelling there is considerable overlap between the processes responsible for each (e.g. rivers provide not only an organic and a clastic influx, of interest to source and reservoir modellers, but also a nutrient flux that can affect local productivity seaward of the river mouth). For each theme we encourage authors to concentrate on how their work furthers our understanding of the depositional systems, and what aspects can be robustly modelled. In many cases this may actually become clearer during the meeting.

Abstract Submission (Open November 15, 2005 - March 15, 2006)
Please e-mail a 1 to 4 page abstract including up to 2 optional figures to Paul Markwick at: pjm@getech.leeds.ac.uk
Authors will be notified of abstract acceptance or rejection by March 30, 2006.

*Information***:** For general information about the conference contact the conveners:
Theresa Scott tscott@sepm.org or Shushma Sangyam sushma.sangyam@geolsoc.org.uk

Who Should Attend: Any geoscientists (professionals or students) wanting to share and learn more about the development and application of earth system modeling.

Forum: 3-day conference; case-history approach; oral and poster sessions; invited papers.

Publications: Program with abstracts at the meeting and a planned post-conference SEPM - GSL Special Publication

Accommodations: Reservations will be made through the Snowbird Conference Center.

Registration opens February 1, 2006!!

Devonian-Early Carboniferous climate change: Glacial deposits and proxy records

Geological Society of America Annual Meeting
Philadelphia, Pennsylvania
October 22-25, 2006

Conveners: Peter Isaacson isaacson@uidaho.edu & Tom Algeo Thomas.Algeo@uc.edu

Synopsis: The Devonian to Early Carboniferous interval represents the initial change between the global greenhouse climate of the early to mid-Paleozoic and the major continental glaciations of the late Paleozoic. An episode of continental glaciation during the latest Devonian is now well documented from glacial deposits in South America, Africa,

and eastern Laurentia as well as from sequence stratigraphic and geochemical proxy records elsewhere. The causes, duration, and significance of this glaciation remain uncertain, however. Among the factors that may have influenced global climate change during the Middle to Late Devonian are concurrent changes in terrestrial floral assemblages, weathering rates and patterns, emergence of the Acadian and Variscan orogens, volcanic and submarine hydrothermal activity, and atmospheric pCO_2 and pO_2. Cause- and-effect relationships among these factors and their relative importance for Devonian-Early Carboniferous global events are areas of continuing research upon which this session is intended to focus. A particular challenge is to determine the relative timing and causal linkages between penecontemporaneous events in the marine and terrestrial realms. The significance of the end- Devonian glaciation for subsequent climate evolution also remains uncertain—was this an isolated event or the first step in a continuing process of global cooling that led to growth of large continental icesheets by the mid-Carboniferous? What role did climate change in general and the end-Devonian glaciation in particular play in contemporaneous biotic extinctions and turnovers? Our goal in proposing this session is to bring together researchers from a wide range of geologic subdisciplines who have worked on the Devonian or Early Carboniferous in order to promote interdisciplinary discussion and integration of diverse datasets relevant to these issues. To this end, we would like to bring together researchers from the following geologic communities: glacial geologists, paleoclimate modelers, sedimentary geochemists, sequence stratigraphers, paleobotanists, and marine paleontologists.

Invitation: We would like to invite you to submit an abstract for this session. If you know of other colleagues who might like to contribute, please inform us so that we can contact them. Please note that GSA's online abstract submission site will become operational around April 1st, and that the deadline for submitting abstracts is July 11th.

Publication: If this theme session generates sufficient interest, we would like to generate a publication (i.e., set of papers) from it. This would take the form of either a GSA Special Paper or a special issue of a major journal. If you think that you might like to contribute a manuscript to this project, please let us know early so that we can gauge interest and open negotiations with potential publishers.

Field trip: A one day, informal (i.e., not GSA-sponsored) field trip is planned to visit diamictite intervals of the latest Devonian Spechty Kopf Formation of Pennsylvania's Anthracite region. Cecil et al. (2002) recently have showed that a polymict diamictite with faceted, striated, and polished clasts is present in the lower Spechty Kopf Formation. This diamictite interval is interpreted to be glacial in origin. The Spechty Kopf unit is coeval with the more extensive Gondwana Devonian glacial event. We invite interested individuals to a one day field trip examining Appalachian field evidence for Late Devonian glaciation. Participants would meet in Wilkes Barre, PA on Friday evening, October 20, 2006, at a hotel to be announced. An overview will be given that evening by Vik Skema of the PA Geological Survey and David Brezinski of the Maryland Geological Survey. The field trip, on Saturday, October 21, will involve two to three exemplary outcrops. We intend to be in Philadelphia in time for the evening's icebreaker. Participants will be responsible for their own transportation, lodging and meals.

RSVP: We would like to make an initial assessment of interest in the project outlined above. Please respond and let us know if you might 1) submit an abstract or 2) join the fieldtrip at the Annual GSA Meeting in Philadelphia, or if you would be 3) interested in submitting a manuscript for a publication project after the meeting.

Paleoclimates: Is the Past the Key to the Future?

American Association of Petroleum Geologists
International Conference and Exhibition
Perth, Australia, 5-8 November 2006
Session 0-64/P-64

Conveners: Brian West brian.p.west@exxonmobil.com &
Paul Markwick pjm@getech.leeds.ac.uk

Abstract Deadline: 18 January 2006
More information about this meeting can be found at:
http://www.aapg.org/perth/index.cfm

Synopsis: The Earth's climate has changed radically through geologic time and this has been recognized since the early 19th century. But, only in the last two decades have computer-based climate models become sophisticated enough to robustly represent these changes. Because depositional systems are intrinsically dictated by contemporary climate and oceanography, these models have now become a powerful tool in frontier exploration, especially for predicting the past distribution and character of source, reservoir and seal facies. These are the same models that are used for assessing the nature and impact of future climate change. Therefore, understanding the veracity of model results is crucial for both explorationists and policy makers alike. Indeed, with current predictions of future concentrations of atmospheric CO_2 on the order of 2x pre-industrial values by 2100, the pre-Pleistocene record may be our only guide to the future response of the climate system to such changes. Consequently, an important role of paleoclimate studies is to quantitatively test model results for widely varying climate states using geologic data from both the public domain and, where possible, the wealth of high quality data diligently collected by the oil industry over the past century.

The goal of this session is therefore to bring together climate modelers, paleoclimatologists and explorationists in order to understand the past history of climate, the strengths and weakness of both paleoclimate models and data, and what implications this has for applications in oil and gas exploration as well as climate change research. We especially wish to encourage submissions from researchers involved in 'ground-truthing' model results through quantitative and qualitative data-model comparison.

Geosystems: Ancient Greenhouse Emissions and Hothouse Climates

AAAS Annual Meeting, Saint Louis, MO
February 17, 2006

Conveners: Isabel Montañez, montanez@geology.ucdavis.edu & Gerald Dickens jerry@rice.edu

At a special theme session and associated media briefing of the national meeting of the AAAS, there was scientific consensus that greenhouse gases now being released into the atmosphere from the burning of fossil fuels are contributing to global warming, and may reach levels by the end of the 21st century higher than seen since 30 million years ago. Several speakers highlighted, the potential unforseen impact of such future levels of atmospheric CO_2 given that existing computer models on the eventual impact of such warming remain imprecise. Scientists have been gaining new insights on our potential global future by studying several periods of extreme global warming in geologic time. Speakers discussed several of those paleoclimate episodes (mid-Cretaceous, PETM and mid-Pliocene) and the lessons they may hold. While the Earth is resilient and can adapt to rapid warming, human societies---particularly those in coastal areas imperiled by rising seas from melting icecaps---may be much less adaptable. The studies of long-scale history suggest that after certain thresholds are passed, global warming can quickly become a runaway event that markedly increases sea and atmospheric temperatures in as little as a few hundred years. Recovery, on the other hand, can take 100,000 years or more. Scott Wing, a paleobiologist at the Smithsonian Institution's Museum of Natural History, discussed the fossil evidence for rapid changes in flora during a warming event 55 million years ago, one that could be representative of what could happen as a result of human-induced global warming. Ellen Thomas of Yale University discussed the evidence from deep sea fossils that suggest there was a severe extinction of species during that same event, called the Paleocene-Eocene Thermal Maximum. Timothy Bralower of Pennsylvania State University discussed the repeated die-off of ocean organisms during anoxic events throughout the Cretaceous through PETM periods, and Brad Sageman of Northwestern University presented some of the first evidence for marine-terrestrial linkages during a significant oceanic anoxic event in the mid-Cretaceous. Modelers Karen Bice of Woods Hole Oceanographic Institute and Mark Chandler of Columbia University highlighted the limitations of ocean-atmosphere models for understanding the impact of greenhouse-gas forced climates, and discussed the lessons that can be learned from previous warm periods in the Cretaceous and mid-Pliocene, which were time periods as warm globally as the coming century is expected to be, regarding thresholds and feedbacks.

CHRONOS Internship Opportunities

Summer 2006

The *CHRONOS* program seeks applications from U.S. graduate and advanced undergraduate students interested in Earth history, paleobiology, stratigraphy and paleoceanography for one-month paid internships in Summer 2006 at Iowa State University. *CHRONOS* is a team of geoscientists and information technology specialists creating a cyberinfrastructure that delivers open access to a global federation of Earth history databases, tools, and services to geosciences researchers, and a source of Earth history data and visualization tools for educators and students. Interns will have the opportunity to utilize *CHRONOS* data sets and services in their own research or work with *CHRONOS* scientists and programmers on programs that are already in progress.

For more information see: *www.chronos.org*

For further information about internships, contact Cinzia Cervato (cinzia@iastate.edu). Interested applicants should submit a brief cover letter (including the outline of a proposed project that specifically involves the use of data or tools accessible through *CHRONOS*), resume, and the name and e-mail address of their research advisor to: Timothy J. Bralower (Department of Geosciences, Pennsylvania State University, University Park, PA 16802; bralower@geosc.psu.edu). Application deadline: March 15, 20

New Sedimentary & Fossil Database

Allister Rees (University of Arizona) has developed the interoperability of five global-scale fossil and sedimentary rock databases, as part of the Geosciences Network (GEON) project. These databases should prove useful to paleontologists, paleogeographers and paleoclimatologists interested in pre-Quaternary research. His web site (http://www.geo.arizona.edu/~rees/index.html) contains the database portal as well as examples of his Permian and Mesozoic research. Any comments, questions, or suggestions for collaboration can be sent to rees@geo.arizona.edu.