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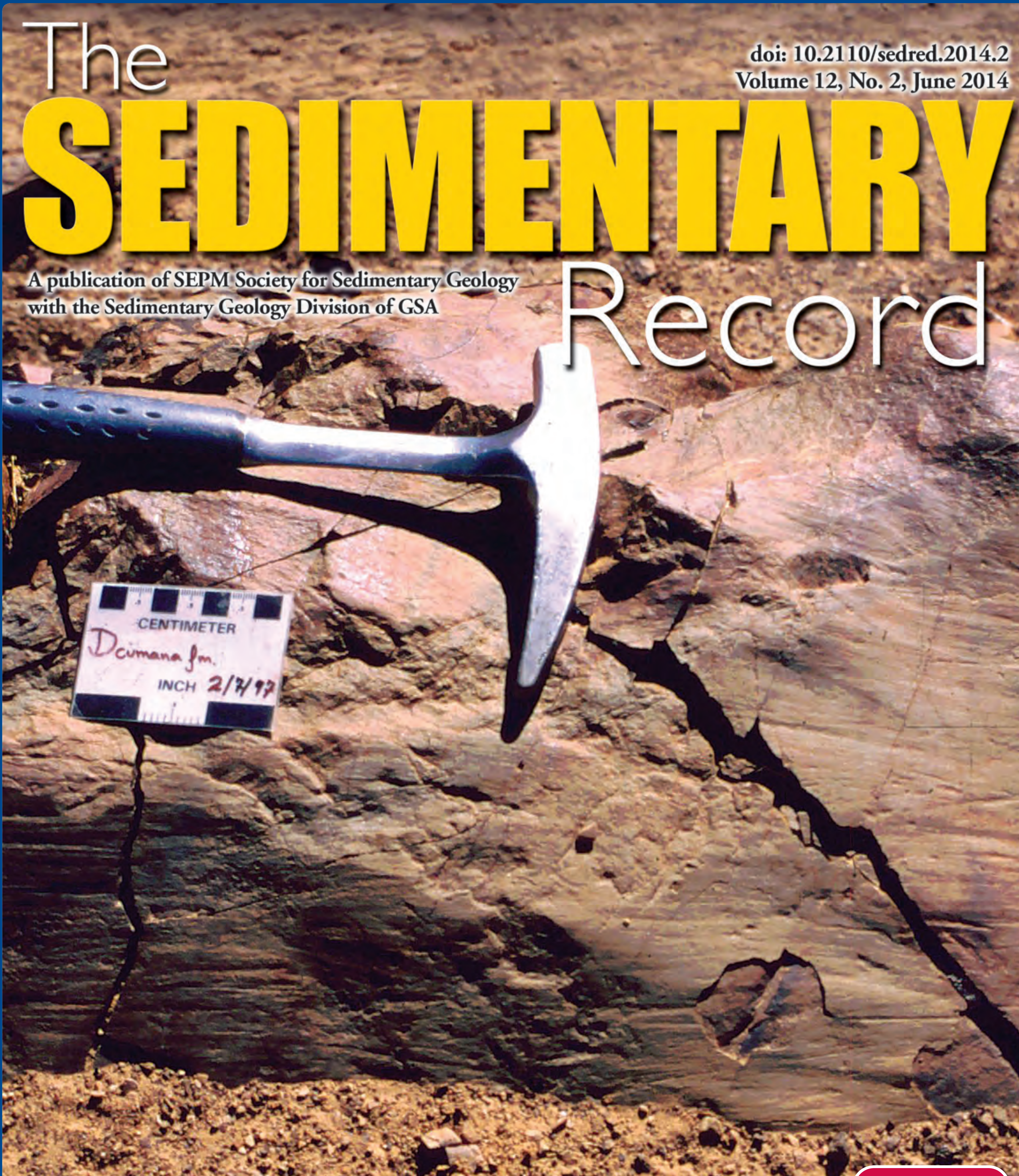

INSIDE: THE SEARCH FOR SEDIMENTARY EVIDENCE OF GLACIATION DURING THE FRASNIAN/FAMENNIAN (LATE DEVONIAN) BIODIVERSITY CRISIS

PLUS: PRESIDENT'S COMMENTS, THE GEOLOGICAL SOCIETY'S - WILLIAM SMITH MEETING 2014, RESEARCH CONFERENCES

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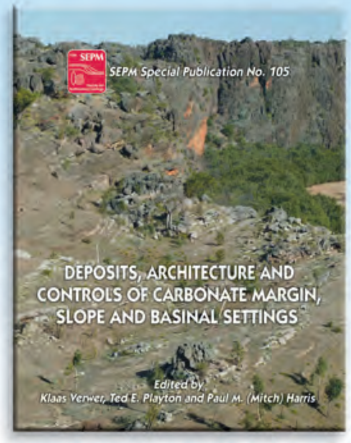

Special Publication #105

Deposits, Architecture, and Controls of Carbonate Margin, Slope, and Basinal Settings

Edited by: Klaas Verwer, Ted E. Playton, and Paul M. (Mitch) Harris

Carbonate margin, slope and basinal depositional environments, and their transitions, are highly dynamic and heterogeneous components of carbonate platform systems. Carbonate slopes are of particular interest because they form repositories for volumetrically significant amounts of sediment produced from nearly all carbonate environments, and form the links between shallow-water carbonate platform settings where prevailing in situ factories reside and their equivalent deeper-water settings dominated by resedimentation processes. Slope environments also provide an extensive stratigraphic record that, although is preserved differently than platform-top or basinal strata, can be utilized to unravel the growth evolution, sediment factories, and intrinsic to extrinsic parameters that control carbonate platform systems. In addition to many stimulating academic aspects of carbonate margin, slope, and basinal settings, they are increasingly recognized as significant conventional hydrocarbon reservoirs as well. The papers in this volume, which are drawn from the presentations made at the AAPG Annual Meeting in Long Beach, California (USA), in May 2012, as well as solicited submissions, provide insights into the spectrum of deposit types, stratal configurations, styles of growth, spatial architectures, controlling factors behind variations, and the hydrocarbon reservoir potential observed across the globe in these systems. The sixteen papers in this Special Publication include conceptual works, subsurface studies and outcrop studies, and are grouped into sections on conceptual works or syntheses, margin to basin development and controlling factors, architecture and controls on carbonate margins, and carbonate distal slope and basin floor development.

Articles for this volume are available for purchase at the SEPM Online First webpage! http://www.sepm.org/OnlineFirst.aspx

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Phanerozoic Paleoclimate: An Atlas of Lithologic Indicators of Climate

By: Arthur J. Boucot, Chen Xu, and Christopher R. Scotese, with contributions by Robert J. Morley

This publication combines the interpretations of two major sets of data. One is the geophysical data that is used to interpret the position of the tectonic plates through geologic time. The other is based on a long time search of the geological literature to find, record, and evaluate the lithologic descriptions of countless reports around the globe; paying careful attention to those lithologies that have climatic implications. The introduction to this volume includes a detailed discussion of the lithologies, mineralogies and biogeographies that are considered to be the most reliable in identifying the climatic conditions existing during their formation and how they are used or not used in this compilation. Global paleoclimatic zones based on the climatically interpreted data points are identified during twenty-eight time periods from Cambrian to Miocene using paleotectonic reconstructed maps. The paleoclimate of each time period is summarized and includes a discussion of the specific referenced data points that have been interpreted to be the most reliable available for that time period and location.

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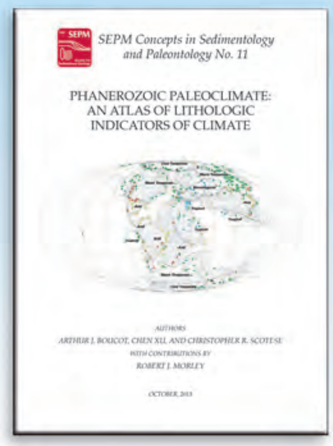

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Evaluating Water-Depth Variation and Mapping Depositional Facies on the Great Bahama Bank – a "Flat-Topped" Isolated Carbonate Platform

By: Paul M. (Mitch) Harris, Samuel J. Purkis, and James Ellis

Great Bahama Bank (GBB) has long served as a frequently visited and well-studied example of a flat-topped, isolated carbonate platform. As such, GBB stands behind much of our understanding of modern processes and products of carbonate sedimentation. The geological models derived from studies on GBB are commonly used to illustrate depositional facies variations and frequently serve as reservoir analogs.

We have used Landsat TM and ETM+ imagery and an extensive set of water depth measurements to first critically evaluate the magnitude and patterns of bathymetry across GBB. We then integrated the seafloor sample data of Reijmer et al (2009) along with a small number of additional samples with the Landsat imagery compiled into ArcGIS and analyzed with eCognition to develop a depositional facies map that is more robust than previous versions. The new maps, in our opinion, can serve as a template for better characterizing GBB at all scales, highlight future research areas where "ground-truthing" is needed to further investigate facies patterns, and facilitate better use of this isolated carbonate platform as an analog for both exploration- and reservoir-scale facies analysis. As examples of information that can be extracted from the maps, we analyze the platform margins of GBB with respect to their orientation, examine the relationship between water depth and facies type, interrogate facies position and breadth across the platform top, and relook at the occurrences of whitings relative the distribution of mud on the platform.

The geospatial data for GBB are compiled into a 3.9 GB GIS database which is included on the DVD of this digital publication. The GIS contains raw data, interpretive products, and visualization examples that were produced during development of the water depth and facies maps of GBB, including the Landsat TM imagery, DEM, images developed by combining layers in the GIS, and facies and whitings maps. In addition, the Projects folder of the GIS contains files that automatically display images, maps, and DEMs with an appropriate symbology in ArcGIS version 10.1 (.mxd), ArcGIS Explorer version (Build) 1750 and 2500 (.nmf), and GlobalMapper version 14-1 (.wks).

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Cover photo: Late Famennian large striated sandstone clast in Cumaná Formation diamictite, Hinchaka locality, Peninsula de Copacabana, Bolivia altiplano. *Photograph courtesy of Dr. Enrique Díaz-Martínez, Instituto Geológico y Minero de España, Madrid.*

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The Search for Sedimentary Evidence of Glaciation during the Frasnian/Famennian (Late Devonian) Biodiversity Crisis

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INTRODUCTION

The cause of the Late Devonian (Frasnian/Famennian) biodiversity crisis remains controversial. Over 36 years of amassed empirical biological data have been used to argue for a causal link between global cooling and the Frasnian/Famennian extinctions (for a review of the data see McGhee 2013, 2014). In particular, glaciation produced by global cooling has long been proposed to have been a trigger for the Frasnian/Famennian extinctions (Caputo and Crowell 1985, Caputo 1985, Streel et al. 2000a, 2000b, Isaacson et al. 2008). However, decades of searching have failed to uncover sedimentary evidence for glaciation in late Frasnian strata on the landmass of Gondwana (in South America and Africa). In this paper I will argue that this is to be expected, and that the continent of Gondwana is the wrong locality to search for such evidence.

SEDIMENTARY EVIDENCE OF LATE DEVONIAN GLACIATION

Late Famennian Evidence: Sedimentary evidence for massive glaciation on Gondwana in the late Famennian, at the end of the Late Devonian, is unequivocal. Biostratigraphically-dated glacial tillites (Fig. 1), glacial striated pavements and clasts (Fig. 2), and ice-rafted dropstones are widespread in western Gondwana (South America and Africa; Caputo et al. 2008, Isaacson et al. 2008) where continental ice sheets covered 16×10^6 km^2 of land at the very minimum, and were probably much larger. In Laurussia, late Famennian glacial tillites produced by lowland glaciers as close as 30°S to the equator are present in the Appalachian basin (Fig. 3), glacioeustatically-produced incised valleys that are 75 m to 90 m deep are present in both North America and Europe, and decimeter- to meter-sized ice-rafted dropstones are present in offshore marine sediments (Brezinski et al. 2010). The depth of the late Famennian incised valleys approaches the valley incision depths of 100 m seen in the Pleistocene glaciations, thus suggesting a late Famennian glacial severity approaching that of the Pleistocene.

Late Frasnian Enigmas: In contrast to the Famennian, the hypothesis that glaciers were present in the late Frasnian world remains highly controversial. However, sedimentary evidence for glaciation and glacioeustacy in the late Frasnian has increased steadily over time. Filer (2002) has demonstrated the existence of numerous sedimentary cycles in late Frasnian subsurface strata that are continuous over 700 km, revealed in the analysis of data from over 600 gamma-ray logs from hydrocarbon test wells in the Appalachian basin, and has argued that these cycles are evidence of glacioeustatic sea-level changes. McClung et al. (2013) have traced 12 of these Frasnian sedimentary cycles from the subsurface to surface outcrops and have argued that the ability to correlate these cycles in both outcrop and subsurface, and both parallel and perpendicular to depositional strike, consistent with the hypothesis that the sedimentary cycles are the product of glacioeustatic sea-level fluctuations. Moreover, McClung et al. (2013) have estimated that these 12 sedimentary cycles had a temporal periodicity around 375 kyr and have measured over 70 smaller-scale sedimentary cycles in outcrop with an estimated periodicity of around 65 kyr, cyclic frequencies that are similar in magnitude to the long-term orbital eccentricity and axial obliquity Milankovitch cycles seen in the Cenozoic glaciations (Zachos et al. 2001). Last, McClung et al. (2013) have also demonstrated the existence of incised-valley fills in outcrop which they argue to have been produced by a sea-level fall of some 35 m to 40 m, a late Frasnian glacioeustatic sea-level fall about half the magnitude of the sea-level fall that produced the incised valleys in the late Famennian.

As yet, evidence for late Frasnian glaciation is found only outside of Gondwana. On Gondwana all efforts to find late-Frasnian-age glacial striated pavements and tillites, similar to those found in the late Famennian, have failed. The western edge of the landmass of Gondwana was positioned over the South Pole in the Frasnian as well as in the Famennian (McGhee 2013, plates 10 and 11)—where then were the Frasnian glaciers? I argue that a closer examination of the pattern of glacial onset seen in the Cenozoic ice age may explain the enigma of the absence of sedimentary evidence of late Frasnian glaciation on the Gondwana landmass.

Figure 1: Late Famennian Cumaná outcrop with very large granite and other clasts of various lithologies, Quebrada Chamacani, Peninsula de Copacabana (Díaz-Martínez et al., 1999).

COMPARATIVE ANALYSIS OF LATE DEVONIAN AND CENOZOIC GLACIAL AND BIOTIC EVENTS

Only two icehouse intervals exist in the Phanerozoic in which glaciation persisted for tens of millions of years: the late Paleozoic and the Cenozoic (see the discussions in Fielding et al. 2008). The onset of the Cenozoic glaciations occurred in two steps: the first step glaciation took place in the early Oligocene, followed by a warming period, and the second step glaciation took place in the middle Miocene (Lewis et al. 2008). If the Late Devonian glaciations also took place in two steps, the late Frasnian and then the late Famennian, then the timing of the onset of proposed glaciation and of associated extinction pulses in the Devonian and the Cenozoic icehouse intervals is striking similar. In the onset of the Cenozoic ice age the time interval between the first step extinctions in the Oligocene (33–32 Ma) and second step extinctions in the Miocene (14–13 Ma) was 19 Myr and in the proposed onset of the Devonian ice age the time interval between the Frasnian (376–375 Ma) and Famennian (360–359 Ma) extinctions was 16 Myr (for detailed discussion see McGhee 2013). The sequential severity of the extinctions was also the same: in the onset of the Cenozoic ice age the first step Oligocene extinctions were much more severe than the second step Miocene (Prothero 1994, Prothero et al. 2003) and in the proposed onset of the Devonian ice age the first step Frasnian extinctions were much more severe than the second step Famennian (McGhee et al. 2013). Last, the Oligocene cooling event triggered continental glaciation that persisted for 8 Myr (Zachos et al. 2001) and the Frasnian cooling event triggered a cold interval, the Famennian Gap, that persisted for 7 Myr (McGhee 2013). If the Earth cooled at a similar rate in the Cenozoic and Devonian then the temporal spacing and magnitudes of extinction seen in these two time intervals may not be coincidental.

In addition, both the Miocene and Famennian glaciations were characterized by positive carbon-isotope anomalies (+0.8‰ $\delta^{13}C$ and +1.2‰ $\delta^{13}C$, respectively; Zachos et al. 2001, Kaiser et al. 2006), oxygen-isotope increases

Figure 2: Late Famennian large striated sandstone clast in Cumaná Formation diamictite, Hinchaka locality, Peninsula de Copacabana, Bolivia altiplano. *Photograph courtesy of Dr. Enrique Díaz-Martínez, Instituto Geológico y Minero de España, Madrid.*

(0.3–1.0‰ $\delta^{18}O$ and 0.8–1.2‰ $\delta^{18}O$; Flower and Kennett 1995, Kaiser et al. 2006), drops in sea-surface temperature (6–7°C drop in the Miocene and at least a 2–4°C drop in the Famennian, based on partial data; Shevenell et al. 2004, Kaiser et al. 2006), and sea-level falls (55–60 m and 60–90 m; Westerhold et al. 2005, Isaacson et al. 2008, Brezinski et al. 2010). The areal expanse of the Miocene ice sheet has been estimated to have been in the range of 14.0–16.8 × 10^6 km^2 (Westerhold et al. 2005, Wilson and Luyendyk 2009) and the Famennian ice sheet covered at least 16 × 10^6 km^2 (Isaacson et al., 2008). Likewise, both the Oligocene and proposed Frasnian glaciations were characterized by positive carbon-isotope anomalies (+0.8‰ $\delta^{13}C$ and +3.0‰ $\delta^{13}C$, respectively; Zachos et al. 2001, Joachimski and Buggisch 2002), oxygen-isotope increases (0.5–1.0‰ $\delta^{18}O$ and 1.0–1.5‰ $\delta^{18}O$; Pusz et al. 2011, Joachimski and Buggisch 2002), drops in sea-surface temperature (3–4°C drop in the Oligocene, based on partial data, and a 5–7°C drop in the Frasnian; Wade et al. 2012, Joachimski and Buggisch 2002), and sea-level falls (45–90 m and 35–45 m; Pusz et al. 2011, McClung et al. 2013). The areal coverage of land by the Oligocene ice sheet has been estimated to have been in the range of 7.0–11.9 × 10^6 km^2 (Zachos et al. 2001, Pusz et al. 2011) and I have estimated the areal expanse of the potential Frasnian ice sheet to have been in the range of 8–11 × 10^6 km^2 (McGhee 2014).

Sedimentary evidence for the existence of glaciers in the late Famennian is undisputed, it is the existence of glaciers in the proposed first step in the Late Devonian glaciations, the late Frasnian, that remains disputed. Interestingly, this evidential relation between the proposed two steps in the onset of Devonian glaciations is also very similar to that of the two steps in the onset of Cenozoic glaciations: sedimentary evidence for the existence of glaciers in the second step of the Cenozoic glaciations, the middle Miocene, is undisputed (Lewis et al. 2008). However, evidence for glaciation in the first step, the early Oligocene Oi-1 glaciation, is much more tenuous.

Figure 3: Late Famennian Spechty Kopf diamictite, Interstate 81, approximately 3 miles south of Wilkes-Barre, Pennsylvania. Photograph courtesy of Dr. Peter Isaacson, Department of Geological Sciences, University of Idaho.

The problem is that Oi-1 glacial sediments on land in Antarctica have been removed by the erosive action of the larger middle Miocene glaciers, with two possible exceptions (Strand et al. 2003, Ivany et al. 2006). The size of the first step Oi-1 glaciers has been estimated to have been in the range of 7.0–11.9 × 10^6 km^2 (Zachos et al. 2001, Pusz et al. 2011). In contrast, the size of the second step Miocene glaciers has been estimated to have been in the range of 14–16 × 10^6 km^2 (Westerhold et al. 2005, Wilson and Luyendyk 2009), totally covering the expanse of and erasing the trace of the initial Oligocene glaciers on the Antarctic landmass. Thus the best independent sedimentary evidence for the existence of the Oi-1 glaciation is glacially-derived, ice-rafted debris in marine sediments. Zachos et al. (1992) have documented the presence of layers of angular quartz sands and heavy minerals at the Oi-1 stratigraphic level on the Kerguelen Plateau in the southern Indian Ocean. These layers contain over 200 grains per gram of clastic grains that are larger than 250 μm, which are argued to be too large to have been transported offshore from Antarctica by wind and thus must have been transported by ice (Zachos et al. 1992). In addition, Ehrmann and Mackensen (1992) reported the presence of gravels and pebbles at the same stratigraphic horizon containing the ice-rafted sand deposits on the Kerguelen Plateau. The presence of gravel in offshore marine deposits is unequivocal evidence of ice rafting, and the presence of ice-rafted debris as far north as 61°S is argued to be evidence of either a high frequency of icebergs in the area, or of a few large debris-containing icebergs, both of which evidence large-scale continental Oi-1 glaciation rather than small-scale local glaciation in Antarctica (see discussion in Ehrmann and Mackensen 1992).

PREDICTIVE SEDIMENTOLOGY: A FIELDWORK CHALLENGE TO TEST THE LATE FRASNIAN GLACIATION HYPOTHESIS

I suggest that glacial sediments of late Frasnian age never will be discovered

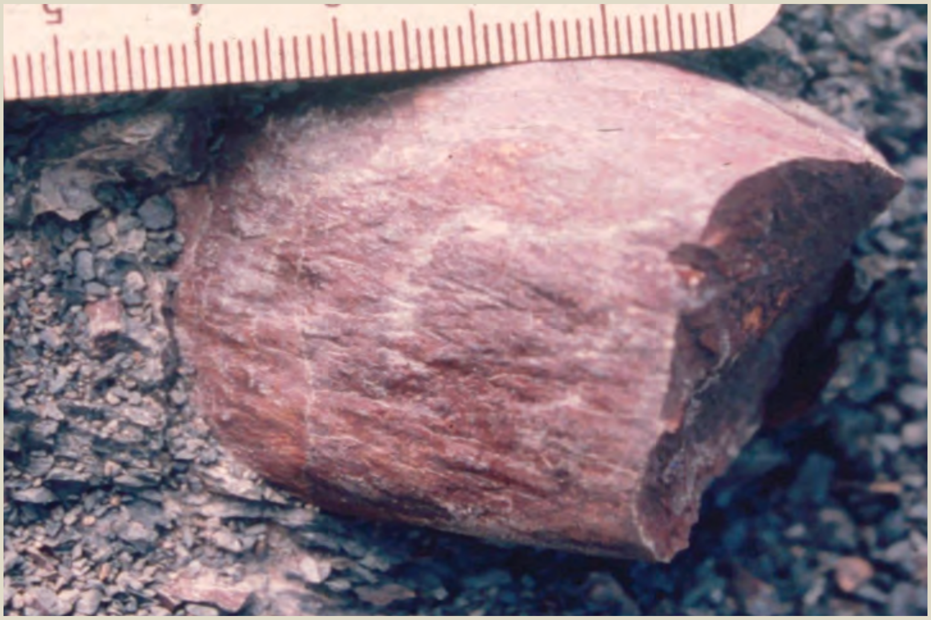

Figure 4: Late Famennian striated dropstone contained within marine shale from the Cumaná Formation, Hinchaka locality, Peninsula de Copacabana, Bolivia altiplano. *Photograph courtesy of Dr. Peter Isaacson, Department of Geological Sciences, University of Idaho.*

on the landmass of Gondwana because they were removed by the erosive action of the much larger glacier that formed in the late Famennian, analogous to the removal of Oi-1 glacial sediments on Antarctica by the much larger Miocene glacier. As discussed above, McClung et al. (2013) have demonstrated the existence of Frasnian incised-valley fills that suggest a late Frasnian glacioeustatic sea-level fall about 50% of the sea-level fall that produced the incised valleys in the late Famennian. The minimum areal expanse of the late Famennian glaciers has been measured to have been 16×10^6 km^2 in western Gondwana (Isaacson et al. 2008) and I have proposed that glaciers approximately 50% to 71% the area of the Famennian ice sheet, or $8–11 \times 10^6$ km^2, were present in western Gondwana in the late Frasnian (McGhee 2014). The scaling used to obtain that estimate is based upon the scaling of the size range of the first step Oi-1 glaciers to the size range of the second step Miocene glaciers in the onset of the Cenozoic icehouse interval, and the assumption that that scaling was similar in the size ranges of the first step late Frasnian glaciers to the second step Famennian glaciers in the proposed onset of the Devonian icehouse interval. As in the case of the Oi-1 glaciation in Antarctica, the much larger late Famennian glaciers would have totally covered the expanse of and erased the trace of the initial late Frasnian glaciers on Gondwana. Therefore I suggest that glacial sediments produced by the late Frasnian glaciers will only be found in marine sediments offshore from the Gondwana landmass. However, the possibility always exists that some sedimentary glacial deposits of the hypothesized late Frasnian glaciers remain intact on the continent of Gondwana. If so, I suggest that the search for this sedimentary evidence be focused within the central 50% to 71% of the areal expanse of the Famennian glaciation field.

To test the hypothesis that glaciers formed in the late Frasnian a world-wide search should be initiated for the presence of ice-rafted debris in late Frasnian marine strata deposited offshore from Gondwana. Rather than the meter- to decimeter-sized Famennian ice-rafted debris (Fig. 4), a search should be initiated for the presence of Frasnian ice-rafted debris of medium-sized (> 250 μm) and larger sand grains and gravels with pebbles, similar to the ice-rafted debris found in Oi-1 marine sediments (Zachos et al. 1992, Ehrmann and Mackensen 1992) That search should target Frasnian marine strata correlated to the Lower and/or Upper Kellwasser horizons where late Frasnian extinctions and sharp drops in sea-surface temperature occurred (for discussion see McGhee 2013, 2014). Absence of evidence is not evidence of absence, as even in the Oi-1 glaciation ice-rafted debris is not universally found in the sedimentary record: for example, ice-rafted sand and gravel is present on the Kerguelen Plateau in the Indian Ocean but absent on the Maud Rise in the Atlantic Ocean (Ehrmann and Mackensen, 1992). Yet the discovery of even one site with marine strata containing ice-rafted debris at the same horizon as one of the Lower or Upper Kellwasser horizons would confirm the existence of glaciation in the late Frasnian.

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REGISTRATION OPEN

http://www.geolsoc.org.uk/wsmith14

The Geological Society's - William Smith Meeting 2014

The Future of Sequence Stratigraphy: Evolution or Revolution?

Cosponsored by SEPM, Eni, Neftex and BG Group

September 22-23, 2014

Venue – The Geological Society, Burlington House, London

This meeting brings together a diverse range of sedimentary geologists to foster a critical examination of the current state of the sequence stratigraphic model, and to highlight robust new methods, concepts and protocols that could evolve or maybe even potentially revolutionize stratigraphic understanding and prediction.

Conference Sessions:

- Does sequence stratigraphy provide testable predictions?
- Are the assumptions in the sequence stratigraphic model still valid?
- Varying Earth surface systems through time and the consequences for sequence stratigraphic prediction
- The challenges in constructing eustatic curves
- Sediment routing and variable sediment supply: do these fundamentally change the model?
- The consequences of non-uniqueness for interpretation and prediction
- What next for sequence stratigraphy? Evolution or revolution?

Keynote Speakers:

- Ron Steel, University of Texas & University of Aberdeen: William Smith lecture
- Henry Posamentier, Chevron: Does sequence stratigraphy provide testable predictions?
- Andrew Miall, University of Toronto: Are the sequence stratigraphic model assumptions still valid?
- Mike Gurnis, Caltech: Is there a stable reference point for eustatic curve construction?
- Tetsuji Muto, University of Nagasaki: The consequences of non-uniqueness for sequence stratigraphy

Conveners:

- Professor Peter Burgess (Royal Holloway University London)
- Professor Philip Allen (Imperial College London)
- Professor Paul Wright (PWGC ltd)

PRESIDENT'S COMMENTS

It's the end of the world as we know it...... REM

Assigned to compose some "president's comments", researcher that I am, I turned to the 43 previous such columns that have appeared in the Sedimentary Record since September of 2003. Having read quite a few of these previously I wasn't shocked to discover that approximately half mention digital publishing in one context or another. Indeed, for more than a decade now accelerating development of digital publishing has occupied the minds of SEPM leadership and members alike. And no wonder: Dissemination of science through our flagship journals is at the heart of our mission and, historically, journal access was a central benefit of membership. Publishing remains the underpinning of SEPM's financial health, as the income from institutional journal subscriptions has, in effect, subsidized society activities across the board---member subscriptions, research conferences, field trips, and student support---for many years. The need to "go digital", for both journals and books, was a financial and technical imperative, and the advent of open access publishing was a societal imperative, as publically funded science justifiably needs to be publically available. The end of print was a wrenching change for many and the changes to SEPM's financial model just a bit harrowing to the Headquarters' staff and a decade's worth of SEPM Councils tasked with charting the Society's course through this new world. But here we are, still alive, financially sound, and active as a society. Our journals are fully digital with a growing submission rate and excellent citation performance (thank you Editors and Associate Editors!). The full archive of SEPM publications has been digitized. SEPM has an established open access policy. Although no author has yet taken advantage of this, we are ready against the day that a major shift to open access publishing occurs. Our special publications are issued digitally "ahead of print". SEPM has a growing website, and a presence on LinkedIn and on Twitter.

The listing of SEPM's forays into the digital world is a long one now---in fact, I think I'd like to declare that we are "there", and so, hoping you'll first indulge a bit of nostalgia, I promise this column will be the last you hear from me on the topic of the digital transition. I still recall the excitement of the first issue (v. 45, no. 1) of my new subscription to JSP arriving in my university mailbox in the spring of 1975. I was a senior and had followed the wise advice of Vanderbilt professor Leonard Alberstadt: "If you want to be a researcher you should join SEPM so you can start getting the journal." An extensive collection of journals lined the walls of his office,

Figure 1. For the amazement of digital natives: Kitty's sentimental and now-pointless collection of old journals. Upper two shelves hold issues from her personal subscription 1975-2006. Lower shelf holds issues from 1960-1974 obtained in a library surplus sale c. 1980 for 1$/issue which seemed an amazing stroke of good fortune at the time. Boxes on the chair hold reference cards (inset) which were used to record and organize information gleaned from reading journals in hard copy, mostly in an actual library. Kitty's graduate professors seemed to believe that the number of hours devoted each week to creating such cards was a measure of dedication to research. Bibliographies constructed from such cards were typed and re-typed on a manual typewriter through various manuscript drafts.

Figure 2. Proof that researchers trained in the mode of operation shown in Figure 1 (even one who can't seem to throw out 6 big boxes of yellowed reference cards) can make the leap to digital: GeoRef, GSW's JSR portal, some reference management software, a digital figure (left), and a digital manuscript. (Funny how the digital age has done nothing to clean up my desk!).

PRESIDENT'S COMMENTS

lending this advice considerable credibility. Figure 1 gives you a clear idea of how research was done in those days. Count me as one who thought it was a lot of fun, but let's also remember that it was fraught with risk---spills, for instance, and heaven forbid, fire! Figure 2 depicts the same type of research being done today. There are still risks, but the biggest one perhaps is that we are simply overwhelmed by the amount of information available. I'll happily side with Figure 2, as has SEPM.

There are many challenges ahead, of course, and our Society must never rest from looking toward the next changes we need to make---rich resources for future columns, no doubt! I would suggest that SEPM is really rather lucky here because as a society of sedimentary geoscientists we have a membership very comfortable with the notion of change and the enduring need to respond and adapt to change.

As mentioned in his December 2013 column, outgoing President Evan Franseen has worked with past President David Budd to organize an SEPM strategic planning meeting that will take place in Boulder, Colorado in May. Next time I will report on that event. I am pleased to have the opportunity to serve the society for the coming year and I look forward to working with everyone--the membership, the Council, and our headquarters staff---to advance the science of sedimentary geology through the activities of SEPM.

Kitty Milliken,
SEPM President

It's the end of the world as we know it. And I feel fine.
REM

SEPM Society for Sedimentary Geology
"Bringing the Sedimentary Geology Community Together"
www.sepm.org

SEPM RESEARCH CONFERENCES

Do you want to have a small get together for a group of colleagues to discuss your favorite research topic? Fifty to eighty researchers and students all deeply involved in the same area of research as you.

A highly interactive way – formal and informal discussions, talks, posters, dinners, field trips – to network and move the research forward. Well that describes an SEPM Research Conference!

Become a convener today and have your research topic energized in a way that only small group dynamic interaction can achieve. You pick the topic, you pick the location, you and your team set up the science program and SEPM handles the rest.

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- Society sponsorship support for academic and student participants
- Low overhead for lower registration costs
- Special Publication support and fast publication – using SEPM Online First and POD processes

What's your topic?

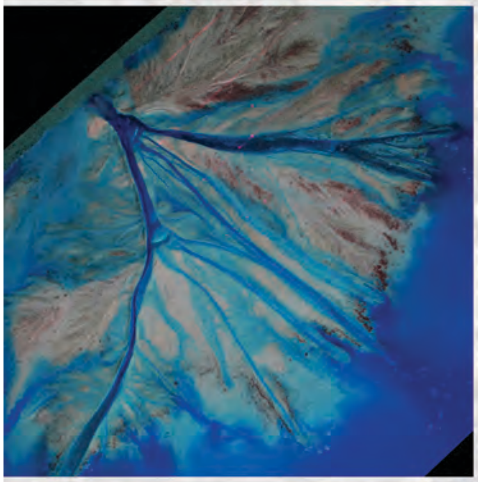
For more information on how to propose a conference check out
http://www.sepm.org/pages.aspx?pageid=29

Or contact SEPM Research Councilor Andrea Fildani (afild@statoil.com)
or Executive Director Howard Harper (hharper@sepm.org)

SEPM RESEARCH CONFERENCE

AUTOGENIC DYNAMICS OF SEDIMENTARY SYSTEMS

AUGUST, 3-6, 2014 IN GRAND JUNCTION, CO, USA

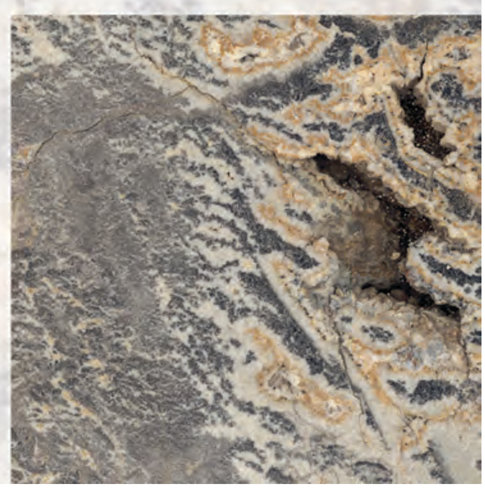


Physical, chemical, and biological systems are now known to exhibit internal "autogenic" dynamics that produce organized sedimentary patterns ranging from pore to basin scales. This interdisciplinary research conference will share & discuss numerical, experimental, and field approaches to identifying, quantifying, and modeling autogenic dynamics through time and in a wide range of sedimentary systems.

Program Highlights

- *Chris Paola - Autogenic dynamics - from experiments to field scales*
- *Peter Burgess - Self-organization & autocyclicity in carbonates*
- *Roy Plotnick - Lattice and percolation models in ecology, paleontology, and geology*
- *Christopher Esposito - Observing morphology becoming stratigraphy: the statistical imprint of coastal processes in deltaic stratigraphy*
- *Qi Li - Influence of sediment cohesion on autogenic surface dynamics and resulting stratigraphic architecture*
- *Johann von de Koppel - Spatial patterns in ecosystems*
- *David Pyles - Relating degree of compensational stacking in distributive submarine fans to the size of the receiving basin*
- *Tuesday, August 5th – Field Trip – Ryan Ewing & Liz Hajek*

Registration at www.sepm.org
Professionals: SEPM Members $310 / Non-Members $335
Students: SEPM Members $95 / Non-Members $120



SEPM and CSPG Announce The Inaugural Mountjoy Conference*

1926 SEPM Society for Sedimentary Geology

Canada's Energy Geoscientists cspg.org

Advances in Characterization and Modeling of Complex Carbonate Reservoirs

August, 23-29, 2015 • Banff, Alberta, Canada

Themes

- The Nature of Unconventional Carbonate Reservoirs
- Carbonate Reservoirs in Structurally Complex Regions
- The Nature of Intensely Fractured, Vuggy Carbonates
- Advances in Modeling Carbonate Systems, Reservoirs and Flow in Carbonates
- Advances in Diagenesis
- Dolostones – The nature of dolostones in the geologic record

Conveners

Dr. Alex J. MacNeil Osum Oil Sands (Calgary) amacneil@osumcorp.com

Dr. Jeff Lonnee – Shell International Exploration & Production Inc. (Houston) jeff.lonnee@shell.com

Dr. Rachel Wood – School of GeoSciences, University of Edinburgh (Edinburgh) rachel.wood@ed.ac.uk

Call for Abstracts will be announced soon with notices at SEPM and CSPG websites.

* A series of Mountjoy Conferences are being planned as an ongoing joint project between SEPM and CSPG made possible by a bequest from Eric Mountjoy's Estate. The initial schedule is set at holding a Mountjoy Conference every three years with the first in 2015, on a 'carbonates' topic as stipulated by the bequest.

Petroleum Systems in "Rift" Basins

34th Annual GCSSEPM Foundation Bob F. Perkins Research Conference

Houston, Texas • December 6-9, 2015

- Rifts & Overlying/Related Sag Basins
  - *Disproportionately*
    - *"Rich"*
      - ~30% of the "giant" fields are in rifts & overlying/related sag basins
    - *"Frustrating"*
      - Each rift basin or segment is a *UNIQUE* geological entity, yet all are variations on a common theme.

- Submit Abstracts by August 1, 2014

  @ http://www.gcssepm.org/conference/2015_conference.htm

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A CGG Company

An AAPG/SEPM Hedberg Research Conference

1926 SEPM Society for Sedimentary Geology

AAPG

Latitudinal Controls on Stratigraphic Models and Sedimentary Concepts

September 28 – October 1, 2014 • Banff, Alberta, Canada

Stratigraphic and sedimentary models are important tools in reducing exploration risk and have been successfully applied in both mature and frontier basin exploration settings. However, although these models are based on decades of research, they rely primarily on temperate and tropical latitude analogs. The question is whether this inherently biases the results of such models when they are applied to systems at higher latitudes, which may have ramifications for high latitude exploration.

Themes

1. Process controls and their latitudinal associations: climate, oceanography, topographic controls, weathering and sediment flux
2. Source: geochemistry, sedimentology, productivity and preservational differences with latitude; prevalence of different processes; modelling of latitudinal variations in source facies; glacial system associated source rocks
3. Reservoir: clastics vs. carbonates (viz., Tethyan vs. Boreal arguments); weathering and sediment flux variations; deepwater, non-marine, shallow marine systems; glacial systems
4. Seal: fine clastic deposition variations; weathering systems and the dominance of mechanical vs chemical processes
5. Chronostratigraphic framework: sequence stratigraphy and biostratigraphy; can we correlate between high, mid and low latitudes?
6. Applying latitudinal variations to models

Highlighted Speakers

- Carmen M Fraticelli - *Uncertainty in using stratigraphic models for exploration - how latitude introduces variability in sedimentary systems*
- Joellen L Russell - *Controls on the Latitudinal Distribution of Climate Processes: Results from Earth System Model Simulations*
- James P. M. Syvitski - *Latitudinal Controls on Siliciclastic Sediment Production and Transport*
- Joe Macquaker - *Latitudinal controls on mudstone deposition – predicting large scale controls on lithofacies variability and implications for predicting source and unconventional reservoir distributions*

Conveners

- Carmen M Fraticelli, Nobel Energy, Houston, Texas, USA
- Paul Markwick, GETECH Group plc, Leeds, UK
- Allard W. Martinius, Statoil, Stavanger, Norway
- John Suter, ConocoPhillips, Houston, Texas, USA

See more at: http://www.aapg.org/events/research/hedbergs/

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