

MISSISSIPPI GEOLOGICAL SOCIETY

eBULLETIN

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BIOPOLYMERS FOR EMBANKMENT DESIGN STABILITY
Benjamin Breland - US Army Corps of Engineers

SCHOLARSHIP AWARD WINNERS

PART 2: THE 2024 SOLAR ECLIPSE
Dr. David Dockery III, RPG

MONTHLY QUIZ
Steve Walkinshaw



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2023-2024 MGS MEETING SCHEDULE

When	What/Who	Where
September 13	Chad Winter - FC&E Engineering	River Hills - 11:30am
October 11	Tim Palmer	River Hills - 11:30am
November 8	Rawdon Seager	River Hills - 11:30am
December 13	Paul Parrish - MDEQ	River Hills - 11:30am
January	Cancelled	River Hills - 11:30am
February 14	David Snodgrass, MSOGB	River Hills – 11:30am
March 13	François-Xavier Dubost	River Hills – 11:30am
April 10	Scholarship Award Winners	River Hills - 11:30am
May 8	Benjamin Breland	River Hills - 11:30am

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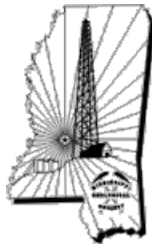
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PRESIDENT'S LETTER



Dear MGS Members,

For our last spring meeting, Benjamin Breland from the U.S. Army Corps of Engineers at the Engineer Research and Development Center in Vicksburg, MS, will be delivering a talk titled "BIOPOLYMERS FOR EMBANKMENT DESIGN STABILITY." The meeting is scheduled for Wednesday, May 8, 2024, at the River Hills Club, starting at 11:30 AM. The cost to attend is \$25.00 (students free). Check or exact change is appreciated.

I also wanted to extend my gratitude to everyone who contributed to the success of our recent spring fling event at Fertile Ground Brewery. It was a delightful gathering, and we appreciate the support from our sponsors:

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Your support is invaluable in enabling us to organize these events for our members.

Additionally, I would like to draw your attention to a significant proposal submitted by the Executive Committee of the AAPG to the House of Delegates. The proposal aims to replace AAPG's current Constitution and Bylaws with a revised set that implements a new governance structure. This proposal will be deliberated upon at the upcoming House of Delegates meeting on Friday, May 31, 2024, at 7:30 AM (CDT, UTC-5). There are two primary governance changes:

1. The Executive Committee, House of Delegates, and Advisory Council are consolidated into one 16-member Board of Directors that includes member-elected representatives from the Sections, Regions, Divisions, TIGs, and SIGs; and
2. Every voting member, rather than only HoD delegates, will be able to participate in governance decision-making for AAPG, which frees delegates to focus on retaining and attracting new members.

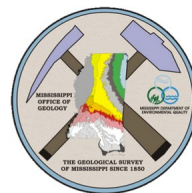
If you have any comments or feedback regarding these proposed changes, please feel free to reach out to me or Tim Palmer.

As we near the end of our 2023-2024 year, I want to express my gratitude for your active participation and support. It has been a wonderful year, and I look forward to reconvening our meetings in the fall.

Thank you once again for your continued dedication to the Mississippi Geological Society.

Jonathan R. Leard, RPG
MDEQ-Office of Geology
Surface Geology Division
Phone: (601)-961-5352

Website: <https://www.mdeq.ms.gov/geology/work-areas/surface-geology/>





“BIOPOLYMERS FOR EMBANKMENT DESIGN STABILITY”

Benjamin Breland

U.S. Army Corps of Engineers at the Engineer Research and Development Center

Abstract:

Biopolymers can help mitigate aging earthen embankments by providing stability and reducing surface and internal erosion failure modes in an environmentally friendly manner. The objectives are to investigate and quantify the potential improvements biopolymers provide when used as a soil additive in embankment design and remediation. A multi-discipline team was established to explore the benefits of this alternative to traditional soil additives. The efficacy of biopolymers was investigated through geotechnical testing, greenhouse studies, chemical analysis, and the evaluation of field demonstration sites. Results thus far show that the biopolymer can be effectively applied in the field and provides improvements to erosion resistance and seepage. Application rates investigated in greenhouse studies showed that the impact to common turfgrass resulted in significant improvements to root density and drought tolerance. Field demonstrations showed improved water retention and decreased suction magnitudes during drought periods. These results support the U.S. Army Corps of Engineers research and development strategy by improving existing infrastructure to adapt to climate change. Additionally, use of biopolymers to remediate levees will ensure environmental sustainability and resilience. Results of this investigation will be presented and discussed in the context of the efficacy of using biopolymers as a soil additive. Needed future research and development topics will be summarized based on the results from the current investigation.

Biography:

Benjamin Breland has worked as a geologist for the U.S. Army Corps of Engineers at the Engineer Research and Development Center (ERDC) in Vicksburg, MS for the last eight years. Benjamin Breland received a Master's degree from Mississippi State University in 2014 after receiving a Bachelor's degree from the University of Southern Mississippi in 2011.



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MGS SCHOLARSHIP AWARDS

The Lawrence F. Boland Memorial Scholarship Fund Trust, Inc. is pleased to announce the 2024 winners of the Lawrence F. Boland Memorial Scholarships and the Dustin Johnson Memorial Scholarship.

The 2024 winners of the Lawrence F. Boland Memorial Scholarships are:

William Creighton Ponthie, Millsaps College
Morgan Trotter, Mississippi State University
Helena Jimenez-Elder, University of Southern Mississippi
Elsie Buskes, University of Mississippi

The 2024 winner of the Dustin Johnson Memorial Scholarship is:

Logan Eubanks, Mississippi State University

These winners were selected from among outstanding students nominated by their departments.

The Boland Scholarship is offered to one junior or senior geology student at each Mississippi college and university offering geology degrees. Candidates are nominated by their departments. Selection is based on academic excellence, geological curiosity, character, ability to communicate, and to a lesser extent financial need. The Boland Scholarship has been presented since 1983.

The Dustin Johnson Award is usually offered to one junior or senior geology student from among Mississippi colleges and universities offering geology degrees. Candidates are nominated by their departments. The recipient is a student who has demonstrated character and determination, overcoming challenges while successfully pursuing a geological degree. Financial need is an important criterion.

Each recipient received a Certificate and a \$1,000 check at the April 10th joint meeting of the Mississippi Geological Society and the Mississippi Chapter of the Society of Petroleum Engineers held at the River Hills Club.





MGS SCHOLARSHIP AWARDS



Morgan Trotter

Lawrence F. Boland Memorial Scholarship

Logan Eubanks

Dustin Johnson Memorial Scholarship



Elsie Buskes

Lawrence F. Boland Memorial Scholarship



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Helena Jimenez-Elder

Lawrence F. Boland Memorial Scholarship



William Creighton Ponthie

Lawrence F. Boland Memorial Scholarship



MONTHLY POST

Dr. David Dockery III RPG

Part 2: The 2024 Solar Eclipse

David T. Dockery III, RPG

Carolyn and I attend a Christian Family Conference at the ministry's campus at Big Sandy, Texas, in April of each year, and this year the conference was in the zone of totality for the 2024 Solar Eclipse. In preparation for the eclipse, I bought a new camera lens, sun filter, and tripod. I was not alone in this endeavor as the conference had a photography class among its many venues for young students. This year the class was ready with their big camera lenses to photograph the eclipse on the campus track field (Figure 1). Others of the conference were in bleachers along the track field to watch the event. It's hard to position yourself to take a picture of something directly overhead, so without a chair, I sat on the bleachers. An astronomer,



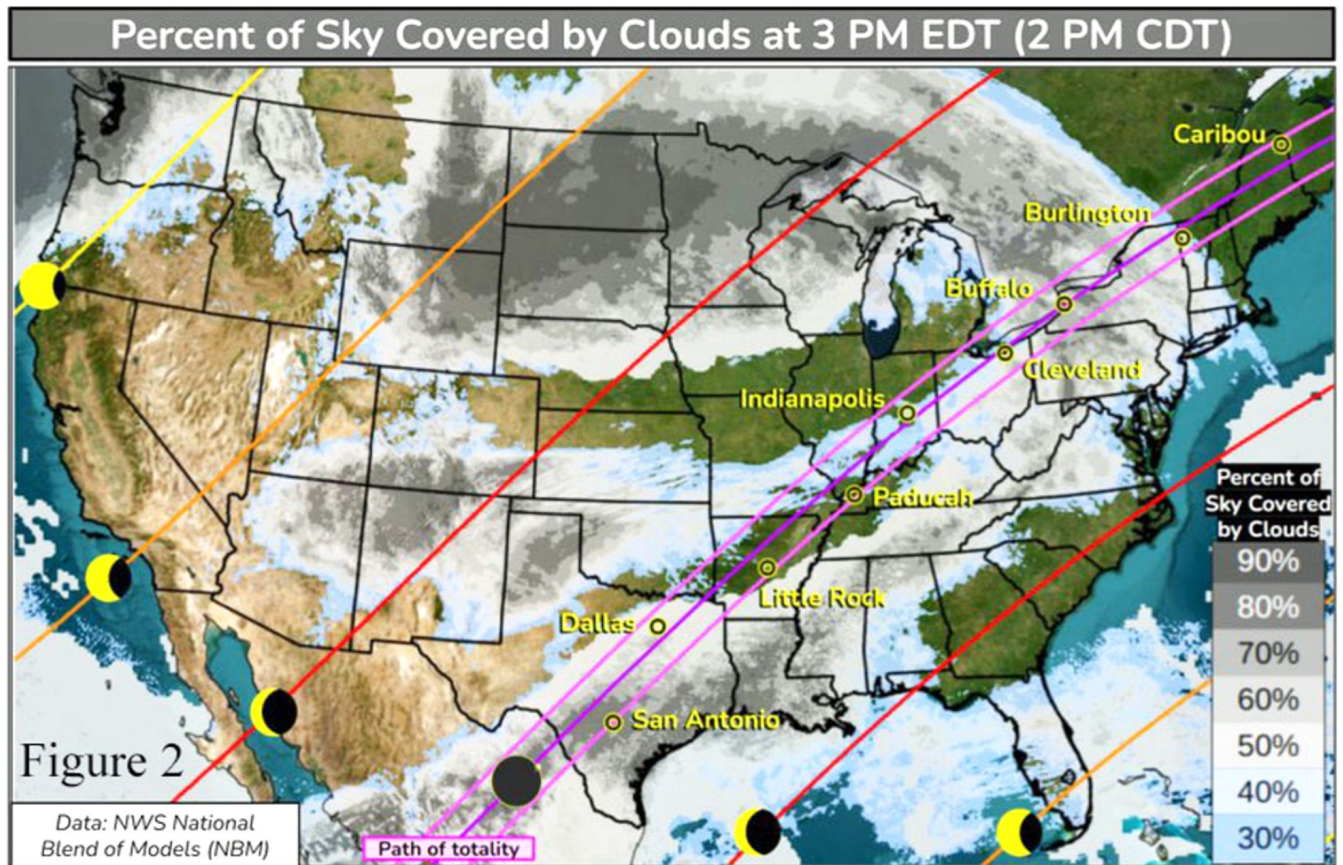
Figure 1



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Dr. David Dockery III RPG

One problem in photographing the eclipse was the clouds. We had to take pictures in the gaps between clouds. The forecast put Big Sandy cloud coverage at 50% (Figure 2).





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Dr. David Dockery III RPG

A dark lens cover over the camera lens was necessary to photograph the sun before totality and had to be removed to take a picture during totality. The sun's corona is only a millionth as bright as the sun's surface and can be viewed with the naked eye. Figure 3 shows my camera with 150-600 mm zoom lens and black sun-filter lens cover on left and, at right, the ambient light just before (top) and after (bottom) totality. These pictures are looking eastward, and the somewhat bright sky in the lower picture is beyond the shadow of totality.





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Dr. David Dockery III RPG

The astronomer present announced the beginning of totality and told us it would last for two minutes and six seconds. That didn't seem to be enough time for the cloud deck over us to pass by, so, as totality approached, I took pictures with my phone camera until I heard a collective gasp from the crowd. I looked at the sky to see an amazing unworldly sight, a black moon-sized disk surrounded by a hazy halo of light, coming from behind the clouds. *The Texas Tribune* post on April 8, 2024, reported from Celeste, Texas (88 miles northwest of Big Sandy): “**Clouds break just in time for many in Texas to view eclipse....** The clouds disappeared, opening the sky. Then a curtain of darkness settled in as the moon completely covered the sun, creating a shimmering halo. And a crowd of about 50 eager onlookers at The Nature Conservancy's Clymer Meadow Preserve erupted with cheers once the eclipse reached its peak of totality on Monday.”

Figure 4 is a progression of photographs of the eclipse with the first view of totality appearing from behind the clouds at right on the top row. The bottom row has two views of totality followed by the progression toward the sun in full view.

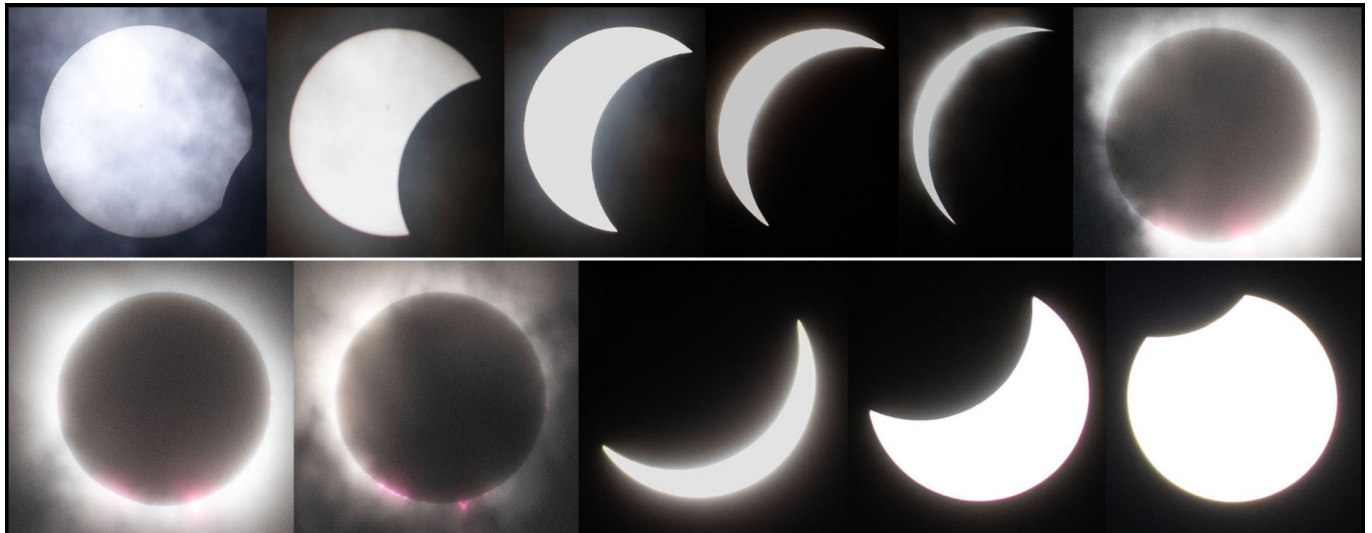


Figure 4. Solar eclipse pictures taken at Big Sandy, Texas, April 8, 2024. The third view of totality shows red structures called prominences in the solar corona.



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Dr. David Dockery III RPG

Figure 5, taken in Nikon raw camera format, shows the eclipse first as seen by us, second as revealed in Photoshop by a lower exposure to see the red prominences, plasma structures in the corona, and third as enlarged to better show the prominences.

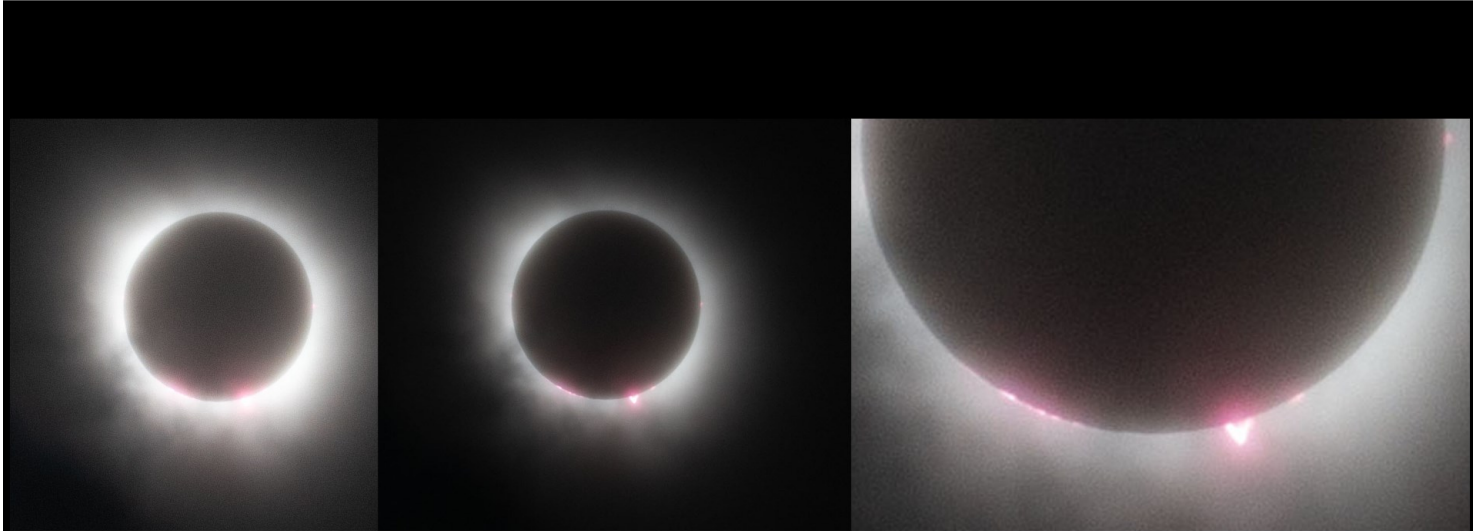


Figure 5. This is a single picture of totality taken in Nikon raw camera format, first showing the sun as seen with our eyes, second with lower exposure to reveal prominences, and third with prominences enlarged.



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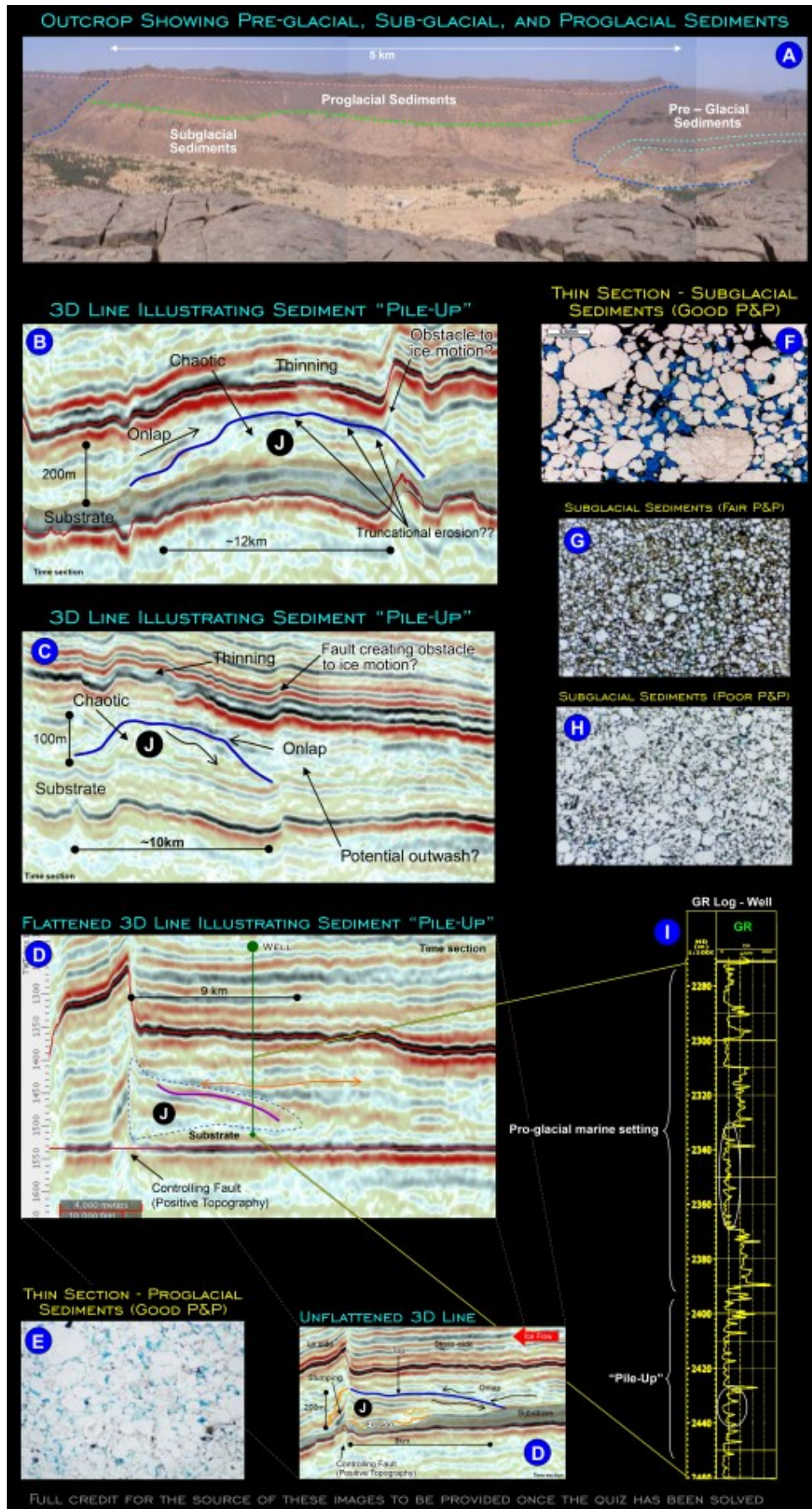
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MONTHLY POST

Steve Walkinshaw





MONTHLY POST

Steve Walkinshaw

Oil patch quiz time. Studies of seismic data and outcrops of glacial sediments have indicated a "pile-up" of sediments often forms where still-stands during ice sheet retreat across polar shelves allow sediments to build up at the grounding zone. These buildups (labeled "J"), often associated with low areas or proximity to basement faults, can form prolific oil and gas reservoirs.

Such reservoirs are prime subsurface targets in a certain area. The data shown is from a Paleozoic basin in a country that, during Paleozoic time, straddled the South Pole. This time coincided with the greatest mass extinction of marine life.

The internal architecture of such large buildups typically exhibits basal downlap and chaotic facies.

Questions...

Part 1: What are these buildups called (3 words)?

Part 2: What period of time in the Paleozoic era am I referring to? (x-y)

Part 3: In what 2 countries do such deposits produce?

Part 4: What was the direction (current-day orientation) of the ice retreat in those 2 countries?

Part 5: What's the principal difference between these deposits and most Holocene analogs?

Part 6: What does the orientation of such deposits indicate?

Bonus:

Part 7: What sets the cited mass extinction event apart from the other 4 greatest mass extinction events?



GEOLOGY POST

ARTICLES, PAPERS or NEWS?

ATTENTION!!!!!! Industry, Professors and Students:

I am looking for more content from the industry and our schools.

Submissions can include anything from professional papers, thesis abstracts, job opportunities to pictures. Anything!!!!

If you have any information or news you would like to share with the Society **PLEASE** email them to the MGS Editor at:

mcaton13@yahoo.com

Thanks & Regards,

Matt Caton
Editor

GEO LINK POST

USGS TAPESTRY OF TIME AND TERRAIN <http://tapestry.usgs.gov> The CCGS is donating to all of the 5th and 6th grade schools in the Coastal Bend. Check it out—it is a spectacular map. You might want a framed one for your own office. The one in my office has glass and a metal frame, and it cost \$400 and it does not look as good as the ones we are giving to the schools. Call Owen 510-6224 if you want one for your office for \$150. Duncan, Mike, Chris, Dave, Bob Randy, Seb., Kevin, Ken, Craig, Patrick, Robert.

FREE TEXAS TOPO'S <http://www.tnris.state.tx.us/digital.htm> these are TIFF files from your state government that can be downloaded and printed. You can add them to SMT by converting them first in Globalmapper. Other digital data as well.

FREE NATIONAL TOPO'S [http://store.usgs.gov/b2c_usgs/b2c/start/\(xcm=r3standardpitrex_prd\)/.do](http://store.usgs.gov/b2c_usgs/b2c/start/(xcm=r3standardpitrex_prd)/.do) go to this webpage and look on the extreme right side to the box titled TOPO MAPS DOWNLOAD TOPO MAPS FREE.

<http://www.geographynetwork.com/> Go here and try their top 5 map services. My favorite is 'USGS Elevation Date.' Zoom in on your favorite places and see great shaded relief images. One of my favorites is the Great Sand Dunes National Park in south central Colorado. Nice Dunes.

<http://antwrp.gsfc.nasa.gov/apod/astropix.html> Astronomy picture of the day — awesome. I click this page everyday.

<http://www.spacimaging.com/gallery/ioweek/iow.htm> Amazing satellite images. Check out the gallery.

<http://www.ngdc.noaa.gov/seg/topo/globegal.shtml> More great maps to share with kids and students.

www.geo.org Don't forget we have our own web page.

<http://micro.magneet.fsu.edu/primer/java/scienceoptiscu/owersofl0/>

<http://asterweb.jpl.nasa.gov/galery/default.htm> Great satellite images of volcanoes

<http://terra.nasa.gov/gallery/> More here

www.ermapper.com They have a great free downloadable viewer for TIFF and other graphic files called ER Viewer.

www.drillinginfo.com This is an incredible (subscription) well and completion data service for independents. Can be demo'ed for free.

<http://terraserver.com/> Go here to download free aerial photo images that can be plotted under your digital land and well data. Images down to 1 meter resolution, searchable by Lat Long coordinate. Useful for resolving well location questions.

<http://www.fs.fed.us/gpnmf/volcanocams/msh/> This is a live cam of Mt. St. Helens refreshed every 5 minutes. At the bottom are old videos of past eruptions in this cycle. It is worth a watch especially now.



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1979-1980	Philip R. Reeves	2020-2023	David Snodgrass



MONTHLY POST

Steve Walkinshaw

Answers:

Part 1: What are these buildups called (3 words)? grounding-zone wedges

Part 2: What period of time in the Paleozoic era am I referring to? (x-y) Late Cambrian - Ordovician

Part 3: In what 2 countries do such deposits produce? Algeria and Libya

Part 4: What was the direction (current-day orientation) of the ice retreat in those 2 countries? north to south

Part 5: What's the principal difference between these deposits and most Holocene analogs? the Paleozoic ice sheets of North Africa were intracratonic; most modern analogs are not

Part 6: What does the orientation of such deposits indicate? the direction of ice retreat

Part 7: What sets the cited mass extinction event apart from the other 4 greatest mass extinction events? in the 2nd paragraph, I refer to the greatest mass extinction of marine life, which occurred during the Ordovician–Silurian extinction event; the Ordovician–Silurian extinction event is the only one of the 5 greatest mass extinction events that coincides with a well-known, significant period of glaciation.