



The Rock Record – May 2017

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Please contribute to the SGS
Newsletter

The SGS Newsletter is produced by the SGS executive. Letters, announcements, notices, comments, photos, news and information about SGS members, etc. are always welcome. Call an executive member or write to us at:

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Saskatchewan Geological Society Lecture

Wednesday, May 24, 2017

LIFE BEFORE IMPACT: PALEOBIODIVERSITY DYNAMICS IMMEDIATELY PRIOR TO THE END-CRETACEOUS MASS EXTINCTION IN CENTRAL CANADA

Dr. Emily L. Bamforth

¹Assistant Curator of Palaeontology, Royal Saskatchewan Museum. *T. Rex* Discovery Centre

P.O. Box 460, Eastend, SK. S0N 0T0. emily.bamforth@gov.sk.ca

Artful Dodger, 1631 – 11th Avenue, Regina

Lunch: 11:45 am

Meeting Talk: 12:15 to ~1:00 pm

For lunch, the cost is:

S.G.S Members: \$15.00

Student Members: \$5.00

Non-members: \$20.00

For those members not having lunch, the talk is free.

Please contact Mike Thomas at mike.thomas@sasktel.net or 306-457-7002

by 12:00 pm, Monday, May 22 if you plan on having lunch.

ABSTRACT

LIFE BEFORE IMPACT: PALEOBIODIVERSITY DYNAMICS IMMEDIATELY PRIOR TO THE END-CRETACEOUS MASS EXTINCTION IN CENTRAL CANADA

Emily L. Bamforth¹

¹Assistant Curator of Palaeontology, Royal Saskatchewan Museum. T. Rex Discovery Centre, P.O. Box 460, Eastend, SK. S0N 0T0. emily.bamforth@gov.sk.ca

Paleomacroecology, the study of large-scale ecological patterns in the fossil record, is an important interface between neobiology and paleontology. Research in this field seeks to resolve biodiversity patterns in the fossil record, and applies modern biodiversity theory to understand the processes that created these patterns on geologic timescales. Studies of this nature become critical when assessing the ecological response to large-scale biological disturbances such as mass extinctions. The fine-scale, multidisciplinary studies we are currently undertaking in southern Saskatchewan's latest Maastrichtian (66Ma) Frenchman Formation explore these paleobiodiversity trends. The formation preserves a complete and continuous record of terrestrial vertebrate ecosystems in the half-million years prior to the end-Cretaceous mass extinction event.

Data collected from 31 lithostratigraphic sections in study area of Grasslands National Park's (GNP) East Block were used to designate seven lithostratigraphic units, each of which represents a discrete period of geologic time. Paleoclimate estimates were derived from x-ray fluorescence analysis of paleosol samples collected from two of the stratigraphic sections. No significant temporal trends in mean annual temperature or precipitation were recovered, although other sedimentological indicators (e.g. bauxite deposits) imply that small-scale or seasonal climate fluctuations did occur. A second set of paleoclimate estimates was derived from plant macrofossil (leaf) physiognomy found in two Frenchman Formation paleofloral sites, one from GNP and the other from Chamberly Coulee, 200km to the northwest. When the Climate Leaf Analysis Multivariate Program (CLAMP) was applied to the two fossil leaf assemblages, the resulting climate estimates were not significantly different from those derived from the paleosol analyses. Based on the presence of inertinite (fossil charcoal) in one of the paleofloral sites, the marked disparity in floral diversity between the two sites was suggested to be reflective of secondary ecological succession following a disturbance by fire.

Fossil material collected from 38 vertebrate microsites in GNP, comprising of some 7800 specimens, was used to quantify biodiversity trends across time. Fossils were collected, along with the lithostratigraphic information necessary to place them in a chronological context, and were sorted, identified and catalogued. Temporal variations in alpha (within-site) and beta (among-site) diversities were explored. This study found that, 1) overall alpha diversity was relatively stable prior to the mass extinction, although two sudden, temporally distinct declines were detected, 2) temporal diversity trends varied among different vertebrate groups (fish, turtles and dinosaurs), 3) faunal turnovers in certain groups were indicative of changing environmental conditions not directly linked to climate, and 4) local factors were just as important in creating paleobiodiversity patterns as regional or global drivers. These results have important implications for our understanding of the timing and cause of the Cretaceous mass extinction on local scales, and demonstrate the benefits of assessing paleodiversity patterns on multiple ecological levels.



Emily Bamforth - Biography

Dr. Emily Bamforth is a vertebrate paleontologist with the Royal Saskatchewan Museum. She works primarily out of the RSM's T. rex Discovery centre in Eastend, SK, where she currently lives. The Royal Saskatchewan Museum's (RSM) vertebrate palaeontology is the only vertebrate palaeontology research program in the province. Although the T. rex Discovery Centre is open only seasonally to the public, the work in the vert palaeontology lab there goes on year-round. Dr. Bamforth's research in Eastend focuses mainly on palaeoecology, which involves studying plant and animals fossils, as well as geology, to understand ancient ecosystems.

Dr. Bamforth received a BSc in evolutionary biology from the University of Alberta in 2005, with an undergraduate thesis that involved 38 million-year-old fossil snake hibernacula from Wyoming. She went on to do a MSc in Precambrian Invertebrate Paleontology at Queens University with Dr. Guy Narbonne, exploring Ediacaran taphonomy and paleoecology at Mistaken Point in Newfoundland. In 2008, she began her PhD at McGill University under the supervision of Dr. Hans Larsson, exploring pre-extinction biodiversity trends immediately prior to the K-Pg extinction in Saskatchewan. She received her doctorate in 2014, the same year she began working for the Royal Saskatchewan Museum. Dr. Bamforth has published several papers and numerous conference abstracts of Ediacaran and Cretaceous paleontology. She was a recipient of an NSERC CGS-D Scholarship, as well as a two-time winner of the Geological Association of Canada - Paleontology Division's Thomas E. Bolton Best Student Paper award. She enjoys teaching and field research.



President's Message – To be or not to be in a field trip...

Once a geologist, always a geologist... Just got back from the first field trip of the year, and the memories of my first geological field trip came back strong. I remember carrying my precious geological hammer with me everywhere, stop at every outcrop – short of jumping out of the trains – and trying to figure out the type of rock in front of me, its history, the fossils present. My five week long field trips were amazing opportunities to ask questions, to connect to my classmates, to be challenged and to admit that I was not the holder of all knowledge. Every year, I repeat the experience multiplied through the eyes of my students. I see them bloom, connecting the magic words from the books to the reality of the field. This year, one of my favourite moments was when a student working on the field turned around and asked me: “Monica, can I come next year as a TA for the field trip?”

I love being in field trips. I also love hearing stories about geologists doing field trips. And it is not only the geological but also the cultural and social experience that enriches us. Those experiences are opening the doors to a world that's relatively out of our reach but within “an arm's length” if we have the courage to take the leap. And this year there are few extra field trips happening. Two students from UofR are heading out to Madagascar for a two-week long field trip under Dr. Tsilavo Raharimahefa's supervision. A group of our members is heading out to Cypruss Hills – Writing-on-Stone area for the “unofficial” field trip of the Society (details to follow below). The official field trip of the Society is following the itinerary of the SIFT, adding in the Burgess shale. Without counting all the students heading up north to work with the Geological Survey or for their projects.

For all these field trip opportunities I am grateful to all the people that make them possible! And because I am at giving thanks, let's recognize some of the members that are doing a lot for outreach activities:

Michelle Hanson and Ken Ashton, Geological Survey, Regina Regional Science Fair (RRSF), School Lecture, Canada Wide Science Fair (CWSF)

Maria Velez, UofR, RRSF, CWSF

Geoffrey Reith, UofR, School Lecture, CWSF

Colin Card, Sean Bosman, and Ryan Morelli, Geological Survey, School Lecture

Ralf Maxeiner, Geological Survey, Williston Basin Petroleum Conference, Geological Calendar

Dan Kohlrus and Erik Nickel, Geological Survey, Williston Basin Petroleum Conference

Mike Thomas and Kim Kreis, Luncheon speakers' program

Kate Machlahlan, APEGGS, School Lecture, Public Lecture

I will be running out of space mentioning all the other people behind the scene, but even if your name is not mentioned, I would like you to know that myself, and this wonderful Society is greatly appreciating all your efforts and everything you do. And this thanks include all the students that kindly donated precious time out of their busy schedule to help out with all of the above activities.

Ladies and Gentlemen, all of you wonderful people that work together for this Society, I would like to Thank you! for everything you do. And to encourage you to get involved in planning and seeing through all the great activities of this small, but very active Society! If you have any ideas that will improve our Society and you'd like to see becoming reality, please talk to us.

That being said, if you'd like to keep informed with everything that we do, follow and like us on Facebook, check periodically our website www.sgshome.ca. We will also try to keep you informed by sending you periodic emails.

Monica Cliveti



OTHER NEWS AND EVENTS

“Unofficial Spring Field Trip” – 2 weeks away! You can still join!

Saskatchewan Geological Society SPRING “CAMPING” FIELD TRIP

to

Eastend T-Rex Museum, Cypress Hills West Block, Writing-on-Stone Provincial Park

June 2nd to 4th (or 5th), 2017



Day 1 (Friday, June 2), meet at Southland Mall, Swiss Chalet parking lot, 0800 hrs, leave Regina for Eastend T Rex museum, visit with Curators Tim Tokaryk and Emily Bamforth for awhile, then head to West Block Cypress Hills “**unserviced** group camping site”, move in, and take over.....hopefully no later than late afternoon (total distance~390 km to Eastend via Shaunavon, plus ~100 km to West Block camping).

Day 2 (Saturday, June 3), check out Conglomerate Cliffs, "Mystery Rocks" (see attached photo), potential sites in Sask “West Block”, plus west into Alberta side where the rocks are better exposed.

Day 3 (Sunday, June 4), continue with visits to the various localities Alberta / Sask., as above.....or not. Return to campground, break camp by early afternoon, and make our way home ..

OR for an optional 4th day, head west to Writing-on-Stone campground (~200 km), set up camp, check out the Cretaceous Milk River hoodoo exposures and stare at the very closeby Sweetgrass Hills / 50-54 Ma, early Tertiary igneous uplift just across the line in Montana.



Day 4 (Monday, June 5), goof around at Writing-on-Stone, possibly check out the petroglyphs from which the park gets its name (from the 1971 SGS field trip guide, *"Despite the fact that the drawings have been protected by establishment of a provincial park, many of the rock faces containing the drawings have been so badly mutilated that it is difficult to distinguish ancient artistry from contemporary idiocy".*) And when we have had enough, we head back to Regina, likely a 6 hour trip from Writing-on-Stone.

NOTES

- This trip is an "unofficial" one, and not financially supported by the Society.
- Participants supply their own transportation / food / beverage / camping needs (*campers, tents, bivy sacks, whatever*) / and camping fees. The organizers will supply itinerary / road log with directions to campgrounds, possibly some knowledgeable guides, and that's about it.
- **Carpooling is encouraged.** If enough folks wish it, we can likely rent a multi-passenger van for the trip for those not hauling a camper. Contact organizers if this idea would work for you.
- The "West Block" does not require any pre-booking for camp-sites. If planning on taking in the Writing-on-Stone part, we have a "group site" pre-booked for the Sunday, June 5. If staying on longer than that, folks will possibly have to book a site (*Reserve.albertaparks.ca or phone [1-877-537-2757](tel:1-877-537-2757)*).
- The trip is meant as a **family & friends type venture**.....kids, pets, etc. are welcome. If the weather co-operates, the early summer scenery in these areas is beyond compare. If the weather looks to be uncooperative, we may have to cancel, or re-tool somehow; in wet weather, roads can become impassable in this fairly remote part of the parks (and campfires hard to light).

We will send out an update announcement in mid-May to assess potential numbers, car-pooling options, and weather.

Please contact any of the organizers below if you are interested in such a thing, or questions, or suggestions, etc. We hope you'll join us.

Mike mike.thomas@sasktel.net 306-457-7002

Kim k.kreiss@sasktel.net 306-539-9835

Brian brianbrunskill@sasktel.net 306-757-4470

John lakegeol@sasktel.net 306-741-1529

Membership Renewals PLEASE

SGS membership is on a calendar year basis. It is now time to renew your membership for 2017. The most convenient way to renew your membership is to do it online <https://sgshome.ca/membership/membership-application>.



Saskatchewan Geological Society Annual Field Trip **Rocky Mountains, Alberta- British Columbia, August 18 to 22, 2017**

On this trip, we will retrace the Canadian Society of Petroleum Geologists *Student Industry Field Trip* (SIFT) with 2 transects of the Canadian Rockies along Highways 1 & 3, viewing rocks ranging in age from Middle Proterozoic Belt / Purcell to Upper Cretaceous Belly River. Dr. Clint Tippet will be our tour guide. Clint is a Structural Geologist, recently retired from Shell Canada, President elect of C.S.P.G., and one of the originators of the S.I.F.T. field trip.

- **Day 1 (Friday August 18)**, meet in Regina, drive west to Banff and meet up with S.G.S. members who are joining us from Alberta. Two nights accommodation in Banff are “dormitory-style”.
- **Day 2**, transect front ranges / main ranges from Canmore to Lake Louise / Field. Return to Banff.
- **Day 3**, drive Banff to Stanley Glacier “fossil hike” trailhead in Kootenay Park, Hwy 93. Hike is led by Parks Canada personnel, 10 km round trip (details in attached pdf). There is room for maximum 12 participants on this hike. For those not participating in the hike, various roadside stops on Hwy 93 from the S.I.F.T. guidebook will be visited. Continue south to Invermere & overnight.
- **Day 4**, Invermere to Cranbrook along Rocky Mountain Trench, then transect Rockies west to east this time along Hwy 3, to Pincher Creek, Alberta. Overnight in Pincher. (Ouch!)
- **Day 5 (Tuesday, August 22)**, return to Regina or Calgary.

COST: \$500 for members and \$250 for student members (includes transportation, accommodation, field lunch & beverage, Park fees, and guide book).

PAYMENT DEADLINE: Accommodation in National Parks is tight in summer. We have reserved & paid deposit on accommodation for 24 participants. **Non-refundable full payment plus signed liability waiver (attached) due by July 14th. We will be cancelling any overbooked accommodation after this date.**

PAYMENT PLUS WAIVER: <https://sgshome.ca/events/registration/all-registration>

Or cheques can be made out to Saskatchewan Geological Society and mailed, with signed liability waiver, to Mr. Gavin Jensen, Subsurface Geological Lab, 201 Dewdney Avenue East, Regina, Sask. S4N 4G3.

A final reminder notice will be sent out in early July, 2017. For further info, contact Mr. John Lake at lakegeol@sasktel.net. Hope to see you on the trip.

-John Lake, Gavin Jensen, & Mike Thomas, SGS Field Trip Coordinators.



Upcoming Activities in a nutshell

Here is what's in the works for the months to come, submitted by Mike Thomas and Kim Kreis.

SASK. GEOL. SOC. PROGRAM, WINTER / SPRING / SUMMER, 2017

1. **Emily Bamforth**, May 24. "Saskatchewan's vertebrate paleontological endowment, with special reference to SW Sask and the late Cretaceous / early Tertiary Periods", location to be announced.
2. **Spring "camping" field trip** to Eastend T Rex Museum, Cypress Hills "West Block", and Writing-on-Stone Provincial Park. June 2-5.
3. Field Trip to Rocky Mountains, transects along Hwy 1 & 3 plus Kootenay Park, "Burgess Shale-type" fossil hike. August 18-22.
4. Golf Tournament, September 8, from 12 on...

Suggestions for other potential speakers or activities are always welcome. Please contact either Mike Thomas or Kim Kreis with your ideas.

31th Annual Golf tournament - Friday, September 8th, 2017

Registration is now open for our 31th Annual Golf Tournament. Tee-off times for the Texas Scramble begin somewhere between 12 and 1pm, depending on the number of teams at the Sherwood Forest Golf Course.

The BBQ will commence around 5:00 pm at the MacDougall residence at 3730 McTavish Street. Food will be served around 6:00.

As usual, there will be refreshments and socializing throughout the evening. Any awards and prizes for your efforts on the links will be presented at the BBQ. (If you would like to donate prizes for the BBQ, please contact Colin Card with the contact information below. Thank you!)

We have tee-off bookings for **60** participants; non-members are welcome but priority will be given to SGS members.

Preferred registration method can be found on our website at <https://sgshome.ca/events/registration/all-registration>. Participants can also mail in the attached registration form with a cheque made **payable to the Saskatchewan Geological Society**.



2017 CIM MEMO and Field Conference

Dear Colleagues,

The Saskatoon Geological Section of the Canadian Institute of Mining, Metallurgy, and Petroleum along with the CIM Saskatoon Branch, are proud to announce their partnership for the upcoming joint CIM MEMO and Field Conference to be held in Saskatoon, Saskatchewan from September 24th to 26th 2017.

Approximately 400 delegates including the invited speakers, professional geoscientists, service companies, professors, students, and the general public will be attending. The Geological Section is gathering abstracts and experts in the fields of mineral exploration, geophysics, geochemistry, and resource estimation as part of the two-day Mineral Exploration and Geoscience technical program stream running alongside the MEMO conference. This stream will provide an opportunity for delegates to broaden their knowledge with new advances in mineral resources, share ideas and innovations with peers, and will provide greater context and opportunities to discuss the realities, challenges and opportunities we share in the face of today's evolving exploration landscape and market. In addition to the conference, several field tours are planned to up and coming and established exploration projects and mines within the province. Combined with the trade show, workshops and several social and networking opportunities running in conjunction with the full MEMO Conference make for a full-circle experience and up-to-date education opportunity for anyone involved in mining and mineral exploration.

Visit the [MEMO Conference website](#) for regular updates. For further information regarding the 2017 Field Conference, contact the Saskatoon Geological Section at cim.saskatoon.geo@gmail.com or Shayne Rozdilsky at Shayne.rozdilsky@usask.ca.

Sincerely,

Shayne Rozdilsky
Program Chair

News from the D.M. Kent Club

The new executive is going to be really busy this year as they have lots of activities planned. Stay tuned for details.



OUR 2017 CORPORATE MEMBERS:



Dave Thomas

