



The Rock Record - November 2016

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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 Luncheon Talk

Wednesday, November 16th, 2016

"The northern Appalachians and British Caledonides: an Early Paleozoic accretionary orogen before the Late Paleozoic assembly of Pangea"

Cees van Staal
Geological Survey of Canada, Vancouver, BC

VENUE:

University of Regina, College West

Pizza Lunch: 11:45 a.m.

Talk: 12:00-1:00 p.m.

For lunch the cost is:

No Lunch (Talk only): \$5.00

Members: \$15.00

Student Members: \$10.00

Non-Members: \$20.00

Please RSVP to Jason Cosford at cosford@jdmollard.com
by noon on Monday, Nov. 14th, if you are going to have lunch.

DETAILS OF Nov. 16th TALK – Cees van Staal

Geological Survey of Canada, Vancouver, BC

ABSTRACT – “The northern Appalachians and British Caledonides: an Early Paleozoic accretionary orogen before the Late Paleozoic assembly of Pangea”

Prior to the formation of Pangea, the Northern Appalachians-British Caledonides accretionary orogen formed over ca. 150 my by piecemeal accretion of outboard terranes to a progressively growing composite Laurentian margin. The accreted material originated either in seaways and marginal basins in the peri-Gondwanan or peri-Laurentian realms and comprises micro-continental ribbons with arc supra-structure and, to a lesser extent, supra-subduction zone oceanic slivers. The preponderance of micro-continental ribbons in Iapetus necessitates detailed knowledge of the opening history in order to understand the closure. The final opening of Iapetus took place between 550 and 540 Ma following a ca. 70 my period of rifting and formation of extensive hyper-extended, non volcanic segments with adjacent seaways partially underlain by exhumed lithospheric mantle along the Laurentian margin. The conjugate margin to Laurentia likely was represented by Arequipa-Antofalla, which was left behind when Amazonia departed earlier during the Ediacaran. Subduction in Iapetus initiated at ca. 515 Ma at opposite margins, probably as a result of a major plate reorganization following the terminal amalgamation of Gondwana. Shortly thereafter Ganderia and Avalonia diachronously rifted-off Gondwana and drifted towards Laurentia, opening the Rheic Ocean in their wake. Meguma could have travelled with Avalonia or as a separate microcontinent. Closure of the main tract of the Iapetus Ocean took place during the Late Ordovician following arc-arc collision. Iapetus' main closure did not lead to widespread orogenesis; most collisional damage took place as a result of arrival of continental ribbons at the composite Laurentian margin following closure of narrow oceanic, Iapetus-related seaways or marginal basins. The resultant deformation is grouped into Cambro-Ordovician Taconic-Grampian, Silurian Salinic-Scandian and Devonian Acadian orogenies; however, these orogenies are all composite and involve several discrete or progressive accretionary events marked by arrival of multiple terranes. Few remnants of true Iapetan oceanic lithosphere or its sedimentary pelagic cover are preserved and hence, were subducted.

****Note: Talk is at University of Regina, College West 237.3
at 11:45 AM**

Pizza Lunch (normal Society lunch prices apply)



**ABSTRACT – “What Does an Athabasca Basin Uranium Deposit Footprint Look Like?
- Empirical characteristics and the relevance to exploration”**

The Athabasca Basin is truly a ‘one-of-kind’ world class uranium district in terms of global uranium endowment and the extremely high grade nature of its deposits. Exploration over the past 50 years has identified an estimated 2.6 B lb U₃O₈ contained in some 54 deposit systems around the basin. Mining operations between 1974 and 2015 has produced 839.3 M lb U₃O₈ from 23 deposits. The 2015 uranium production in the basin of 34.6 lb U₃O₈ have and came from three operations; the McArthur River, Cigar Lake and Eagle Point mines. This accounted for 22% of the world uranium production in 2015.

Uranium deposits in the Athabasca Basin belong to an empirical model class termed as Proterozoic unconformity uranium deposits by the International Atomic Energy Agency. The deposits are situated immediately below, above, or spanning an unconformable contact that separates relatively undeformed red-bed sedimentary rocks of Proterozoic age from underlying Archean to Paleoproterozoic crystalline metamorphic basement. A number of genetic models explaining how these deposits formed have been proposed over the last 40 years and many of the debates around various aspects of these process-focused models continue today.

Although genetic models are important in the understanding of metallogenic process, most of the tactical decisions that exploration companies and their geologists make in the search for the next big discovery are based on their understanding of the empirical geological models relevant to the commodity of interest. Over time, recurring empirical associations with mineralization or deposits are recognized and eventually become accepted facts of the ‘model’. More importantly, these accepted facts of the empirical model are often used as measuring gauges at various stage gate decision points of exploration programs.

A compilation of various parameters characterizing the mineralization footprints of 54 uranium deposits systems from the basin was undertaken in order to quantitatively define what an Athabasca Basin uranium deposit footprint looks like and the range of variations that exist. This talk will review some of the assumptions long held by exploration geologists and discriminate fact from myth with respect to the footprint of a typical Athabasca Basin unconformity uranium deposit. The talk will conclude by presenting a provisional footprint-based classification scheme for Athabasca Basin uranium deposits.

Bio -

David Thomas is Director of Geoscience at Cameco Corporation and has been working in the uranium industry for the past 20 years. Previous roles in Cameco included business development and generative work as Director of Exploration New Business and Chief Geologist with Cameco’s Exploration Technical Services group. Previous to Cameco, he was with the Saskatchewan Geological Survey for 14 years where he undertook mineral deposit studies in gold, base metal and uranium districts.



DETAILS OF Dec. 1st TALK – Jeremy Richards (University of Alberta)
SEG Thayer Lindsley Lecturer; Artful Dodger @ 11:45 am

ABSTRACT – “Tectonomagmatic controls on arc metallogeny”

The fundamental control of plate tectonic processes on ore formation was realized almost as soon as the plate tectonic model was established in the late 1960s-early 1970s. The formation of seafloor massive sulfide deposits at oceanic spreading centers, various types of sediment-hosted deposits in continental rifts, porphyry and epithermal deposits in volcanic arcs above subduction zones, and granite-related ore deposits in continental collision settings were quickly established. More recently, the formation of porphyry, epithermal, and some types of IOCG deposits has been recognized to occur by remobilization of lithosphere previously affected by prior episodes of subduction (or other types of mantle) metasomatism.

At root, these ore deposit types reflect the focused convection of heat and volatiles from the mantle towards the surface. Plate boundaries provide high-permeability pathways for this heat and mass flux, which is transmitted to the surface either directly as magmas or fluids (or both). At convergent margins, the flux begins with dehydration (and in some cases melting) of subducting oceanic lithosphere, which releases water, S, Cl, and other fluid-soluble components into the mantle wedge, triggering partial melting. Ascent of these partial melts into, and interaction with, the upper plate lithosphere generates hydrous intermediate-composition magmas, which rise into the upper crust where volatiles are exsolved due to decompression and crystallization. These hydrothermal fluids may go on to form porphyry and epithermal deposits if their flow is focused and sustained by a large magma supply.

Bio -

Jeremy first became interested in economic geology at an early age while on walks across the Yorkshire Pennines with his grandmother, where the dumps from numerous small historical lead mines yielded fine samples of galena and other minerals for his nascent rock collection. After studying geology at the University of Cambridge (1980–1983), he travelled to Canada to complete his MSc on Keweenawan Cu deposits at the University of Toronto with Ed Spooner (1986), and then to Australia for his PhD on the Porgera gold deposit with Ian Campbell at the Australian National University (1990). Following a post-doctoral fellowship at the University of Saskatchewan in Canada with Rob Kerrich, he returned to the UK to take up a lectureship at the University of Leicester. In 1997, he returned once again to Canada for a position at the University of Alberta, where he resides today. His current research interests focus on regional tectonomagmatic controls on ore-formation, and in particular subduction- and collision-related systems. This work has taken him to North and South America, the Middle East, Asia, and the southwest Pacific. A second research interest is in the role of mining in sustainable development, a field in which he has graduated one PhD and three Master’s students. Jeremy has been a member of SEG since 1983, and a Fellow since 1985; he served on SEG Council and several committees between 2003–2006, and has been an Associate Editor for Economic Geology from 1997–2001, and 2012 to the present. He co-edited two volumes in the Reviews in Economic Geology Series (volumes 10 and 14), and the Economic Geology 100th Anniversary Volume. He is currently chief editor of an SEG Special Publication, which will be based on talks given at the SEG meeting in Çeşme, Turkey, in September 2016.



President's Message

Believe it or not, 2016 is quickly drawing to a close. That can only mean one thing....the 2017 Saskatchewan Geology Calendar is now available! Our calendar committee (Ralf Maxeiner, Jason Cosford, Ken Ashton, Janis Dale, Monica Cliveti, Michelle Hanson, Kevin Ansdell and Tim Prokopiuk) has been working hard to bring you this edition – the second annual - and it's another beauty. The photos are spectacular (January is my personal favourite) and the committee has done a great job again this year in revealing the geological wonder of the province and, in doing so, promoting the geosciences in Saskatchewan.

Please show your support of this initiative and the hard work of the committee by picking up a copy. I was somewhat surprised last year with the first edition to find that several of my non-geoscientist friends and family members wanted a copy of their own after seeing mine. I think this speaks to the general interest of people in the geosciences and their desire to learn more about the natural features that they see around them on a regular basis. They make a great stocking stuffer and the great thing is that they're very reasonably priced and get even cheaper the more you buy! Information on the calendar and how to obtain your copy(ies) is provided in the "Other News and Events" section later in this newsletter. Also see the "Geology Calendar" portion of our website at <http://sgshome.ca/outreach/geology-calendar> for more information.

Apart from the calendar, the Society has a lot going this time of year. We have several upcoming high quality lunch speakers this month, including Cees van Staal (GSC Vancouver; Nov. 13th), Dave Thomas (Cameco; Nov. 23rd), and Jeremy Richards (SEG Thayer Lindsley Lecturer; Dec. 1st). Information on the talks, including time and location, is provided in the first section of this newsletter. We are extremely fortunate to have all of these speakers come to Regina, so please make it a priority to come out and support these events. As well, the 47th annual Saskatchewan Geological Open House is taking place from Nov. 28th-30th, 2017 at the Delta Bessborough Hotel in Saskatoon. This Open House is the preeminent mineral exploration and mining conference in Saskatchewan and the Society plays a large role in making this such a successful event year after year. One of our priorities with the conference is the annual Open House Public Lecture. This year we are pleased to have Dr. William Hay, Professor Emeritus at University of Colorado, coming to deliver the lecture. Dr. Hay is a well-known marine geologist, micropaleontologist, paleoceanographer, and paleoclimatologist, and will be presenting a talk entitled "Rethinking Cretaceous Climate". The lecture, co-sponsored by APEGs and the Saskatchewan Mining Association, will take place at 7:00pm on Tuesday, Nov. 29th, so please come out and enjoy it if you will be in Saskatoon that evening.

Ryan Morelli



OTHER NEWS AND EVENTS

2017 Saskatchewan Geology Wall Calendar

A month earlier than last year, the new Geology Calendar for the province is now available. Early reviews suggest that the calendar is a better product than last year, with more variety and better images. We only printed 1000 of them, so please don't wait to get your own copy. Those of you who bought last year's calendar will know that it is as much decorative as it is educational. It is also hoped that calendar sales can support other SGS outreach activities. The monthly photos are a good representative selection of geoscience images that include landscape shots, detailed outcrop and mineral shots, aerial and satellite images, and a fossil. The images are also geographically balanced, with photos from Uranium City, Reindeer Lake, Chaplin, the Frenchman and many more locations.

As last year, the calendar can be purchased in Regina at the U of R bookstore, the Museum of Natural History, the MacKenzie Art Gallery, Butcher Boy on Park Street, RCMP Heritage Centre, The Artful Dodger, as well as at SGS luncheon talks. This year it is also available in Saskatoon, at the U of S bookstore, the airport gift store, McNally Robinson bookstore and the Western Development museum.. You can also obtain it directly from one of the committee members. The cost is \$10 (1-4), \$8 (5-9), and \$6 (>10). Get your calendar today, it will make a great Christmas present and supports as well as promotes your Society.

Your Calendar Committee, Ralf Maxeiner, Jason Cosford, Ken Ashton, Janis Dale, Monica Cliveti, Michelle Hanson, Kevin Ansdell, Tim Prokopiuk

Sunday Monday Tuesday Wednesday Thursday Friday Saturday

2017 Saskatchewan Geology Calendar
Available in Regina and Saskatoon gift stores after Oct 15

It Was Alive!
Reflected light from a scanning

used in paleoenvironmental studies because they are sensitive to changes in water depth and water temperature. *Murchisonella* has a glassy, calcareous shell or exoskeleton and the globular chambers indicate that it was planktonic (lived floating in the water column). This specimen came from Cretaceous shale at a

2017 Saskatchewan Geology Calendar

PRINTWEST
SMA Saskatchewan Mining Association

SGS Geology Calendar
The Saskatchewan Geological Society (SGS) is pleased to present this annual calendar designed to showcase the province, geology and geoscience. Monthly photos feature various scenes from the 13 billion years of Earth's history that have shaped our province and surrounding the Precambrian shield to the north in the western prairies.

Suggested Retail Price: \$10

www.sgshome.ca



Saskatchewan Geological Open House

The 2016 Saskatchewan Geological Open House will take place from Nov. 28-30th at the Delta Bessborough Hotel in Saskatoon. Several events are planned for this year's conference, including:

- Short Course – “Exploration Geochemistry” (Monday, Nov. 28th, 8:30am - 5:00pm)
- Icebreaker (Monday, Nov. 28th, 6:00-10:00pm)
- Technical Poster Sessions
- Technical Program
- Free Public Lecture: *“Rethinking Cretaceous Climate”* by Dr. William Hay, Professor Emeritus at University of Colorado (Tuesday, Nov. 29th, 7:00pm; co-sponsored by APEGGS and the SK Mining Association)

Registration for the Open House is Free. Additional information on the conference can be found at: <https://openhouse.sgshome.ca/index>.

Upcoming Talks

Here is what's in the works for the months to come, submitted by Jason Cosford and Mike Thomas:

List of some upcoming speakers:

- **Dr. William Hay: “Rethinking Cretaceous Climate” (Open House Public Lecture, Nov. 28th @ 7pm)**
- Charlie Harper (Dec. 14th; Artful Dodger)
- Colin Card, SK Geological Survey (tbd)
- Peter Hill, SK Geological Survey (tbd)
- Jessica Flynn, SK Geological Survey (tbd)
- Chris Johnson, South Dakota School of Mines (tbd)

Suggestions for other potential speakers are always welcome. Please contact either Jason Cosford or Mike Thomas with your ideas.

Information Item: RFG (Resources for Future Generations) 2018

The rapid growth of developing economies and the fundamental needs of many disadvantaged people across the globe are resulting in an increased demand for many resources and changes in the delivery of existing ones. The need for focused environmental priorities and new technologies will add additional requirements and constraints.

The International Union of Geological Sciences (IUGS), the Canadian Federation of Earth Sciences (CFES), the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), the Geological Association of Canada (GAC) and the Mineralogical Association of Canada (MAC) are partnering to bring industry, academia and governments together to tackle this growing issue.

The Resources for Future Generations conference (RFG 2018) takes its theme from a new IUGS initiative of the same name designed to mobilize geoscientists, policy-makers and other stakeholders to explore resource and related sustainability issues.

The RFG 2018 conference will take place from June 16-21, 2018 in Vancouver. Please visit <http://rfg2018.org/en.aspx> to learn more about the conference, including information on technical sessions and a provisional conference timeline.



Information Item: Rocky Mountain Section AAPG – Call for Papers

The AAPG Rocky Mountain Section Annual Meeting is taking place from June 25th-28th, 2017. Please visit the meeting website at <http://rmsaapg2017.com/> for more information, including technical sessions and abstract submission information. A “Call for Papers” advertisement is also included at the end of this newsletter.

News from the D.M. Kent Club

The Kent Club has had a great start to year. On October 21st, we hosted our first annual Student Industry Geoscience Roundtable. It was a roaring success, with 42 students and 13 industry professionals in attendance. With companies such as Cameco, J.D. Mollards and the Saskatchewan Geological Survey in attendance, our members got to learn about their future as a geoscientist, and learn important networking skills as we get into conference season. Featured in the picture are Lynn Kelley (afternoon Keynote speaker), and John Kelley (President of the D.M. Kent Club). After a major positive response, we will definitely be running SIGR again!

Our upcoming events include a fundraiser steak night, as we try to get ourselves to WIUGC, PDAC, and RoundUp. November 15th at Bushwackers, and for just \$25 you get a 6oz steak, fries, garlic toast, a Caesar salad and a 12oz beer! With all profit going to fund our trips, it is a win-win. If you are interested in coming, please contact John Kelley for tickets at dmkentclub@gmail.com or 306-596-5231.



All in the Family – Lynn and John Kelley celebrate a successful day at the first annual Student-Industry Geoscience Roundtable at the university on October 21st (photo courtesy of Pam Schwann).



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Rocky Mountain Section Annual Meeting

CALL FOR PAPERS

RMS-AAPG

2017 JUNE 25-28
BILLINGS MONTANA



SUBMISSION DEADLINE FEBRUARY 28, 2017

<http://rmsaapg2017.com/>

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