



The Rock Record – October, 2012

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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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All advertising inquiries should be directed to **Charla Philippon**

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Wednesday, October 24, 2012

Adrift at Sea in the Early Cretaceous – the Fort McMurray Armoured Dinosaur

Donald Henderson, Royal Tyrrell Museum

Legion, Regina

Lunch: 11:45 a.m.

Meeting: 12:00 – 1:00 p.m.

Members: \$10.00 and Non-members: \$15.00 for lunch

For those not having lunch the talk is free

Please contact Lynn Kelley lynn.kelley@gov.sk.ca

by Monday, 22nd if you are planning to have lunch

In March of 2011 a giant excavating machine in the Athabasca tars sands of northern Alberta exposed the rear half of what turned out to be a nearly complete ankylosaur with only the tail missing. The specimen is hosted in the Wabiskaw member of the Clearwater Formation and is dated as late Aptian (113Ma). The specimen was excavated over a three week period in April with the assistance of heavy equipment and staff from the Suncor Millenium Mine. The find is significant for many reasons. It is the oldest known, complete dinosaur from Alberta. It is the first ankylosaur from the Early Cretaceous of Alberta in contrast to the more typical latest Cretaceous forms from the province. It is the first dinosaur from the marine Clearwater Formation (better known for its ichthyosaurs and plesiosaurs), and represents a terrestrial animal that became entombed in a seafloor approximately 200km from the nearest known palaeo-shoreline. It experienced no post-mortem disruption, with all the bones, including phalanges, in three-dimensional articulation. All the dermal armour appears to be undisturbed and present. There are large areas with impressions of scales of alternating diamond and hexagon shapes in close association with the osteoderms on the dorsal surface. There is a large cluster of unusual, pisolith-like bodies (up to 2cm in diameter) in the gut region, and these may represent stomach contents. Unfortunately, the bone is much softer than the concretion containing the specimen, and careful and responsible preparation will take several years

Bio:Donald Henderson is the Curator of Dinosaurs at the Royal Tyrrell Museum of Palaeontology in Drumheller, AB. He dabbles in a range of fossil organisms including dinosaurs, marine reptiles, and pterosaurs, as well as studies of living forms such as crocodilians, elephants and giraffes. His main research interests are biomechanics and palaeo-ecology, but has recently begun to do descriptive palaeontology as well. He has a BSc in Geology and Physics from the University of Toronto, and a PhD in Vertebrate Palaeontology and Biomechanics from the University of Bristol in England.

Thursday November 1, 11:45 at the Legion

Please RSVP to Lynn by Monday October 29 if you plan on having lunch

STRUCTURAL, METAMORPHIC, AND U-PB GEOCHRONOLOGICAL EVOLUTION OF THE SOUTHERN PROVINCE, SUDBURY, CANADA

Tsilavo Raharimahefa

Department of Geology, University of Regina, SK, S4S 0A2

The 1850 Ma Sudbury impact structure straddles the Paleoproterozoic Southern Province to the south and the Archean Superior Province to the north. It has been affected by several orogenic events that have displaced and folded Huronian footwall rocks and Ni-Cu massive sulphide deposits at the base of the Sudbury Igneous Complex. To increase exploration success and to understand the tectonic evolution of the South Range of the impact structure, we investigated the tectonic history of the Southern Province, which is directly related to deformation events affecting the South Range.

The Southern Province has been subjected to at least four deformational events (D_1 - D_4). D_1 structures are characterized by a strong S_1 fabric that predates the formation of Sudbury impact breccia in the ca. 2420 Creighton granite. Two pre-impact granitic dikes cutting the D_1 fabrics of the Creighton pluton yielded LA-ICP-MS U-Pb zircon crystallization ages of 2343 ± 17 Ma and 2344 ± 47 Ma providing the best-estimated minimum age for the Blezardian Orogeny, which is the oldest deformation event in the Southern Province in the Sudbury region.

Sudbury breccia along the syn-sedimentary ENE-trending Murray Fault is overprinted by a strong foliation (S_2) and down-dip lineation (L_2), which formed during post-impact reverse dip-slip reactivation of the fault (D_2). S_2 is cut by olivine diabase dikes of the Sudbury dike swarm, indicating a pre-1230 Ma age for this deformation however; the minimum age for D_2 is defined by a 1704 ± 13 Ma granite dike cutting the S_2 fabrics in the Long Lake Fault zone. Within the post-impact Eden Lake Complex, the maximum age of D_2 is however delimited by its 1744 ± 29 Ma crystallization age, which is within error of the previously published U-Pb monazite age of 1743 ± 3 Ma from the Eden Lake Complex and the U-Pb titanite age of $1749 \pm 12/8$ Ma from a biotite-granodiorite near Little Raft Lake. D_2 is associated with a regional metamorphism at 2.8 kb to 4 kb and 540 °C to 565 °C.

The Southern Province was further deformed by two subsequent deformation phases D_3 and D_4 producing mylonitic foliations in the ca. 1.47 Ga Chief Lake Complex along the Grenville Front. S_3 and S_4 are characterized by strong down-dip mineral lineations with rotated feldspar wings consistent with NW-directed thrusting. U-Pb zircon dating of the deformed megacrystic granite of the Chief Lake Complex yielded crystallization age of 1467 ± 18 Ma, which defines the maximum age of S_3/S_4 . D_4 produced the most prominent fabrics along the Grenville Front, and in the Creighton pluton the NW-SE compression during D_4 was accommodated by the formation of conjugate dextral east-striking transcurrent shear zones and by sinistral north-striking transcurrent shear zones that locally follow the north-striking Sudbury breccia dikes.

Thursday November 15, 11:45 at the Legion

Please RSVP to Lynn by Tuesday November 13 if you plan on having lunch

Mapping Saskatchewan's Groundwater Resources **Kei Lo, Saskatchewan Water Security Agency**

The Saskatchewan Research Council (SRC) initiated a groundwater mapping program in the 1960's. The goal of the program was to delineate the spatial extent and distribution of potential groundwater resources in the agricultural sector of Saskatchewan based on NTS map sheets at the 1:250,000 scale. It established the foundation for hydrostratigraphic mapping and development of geological cross sections in Saskatchewan, leading to the first (1st) generation groundwater maps. The maps illustrated the distribution of potential bedrock aquifers and were accompanied with four (4) geologic cross sections.

The maps were updated from 1986 to 1999, using a digital platform (AutoCad). This generation was known as the 'second generation maps.' The 2nd generation maps updated the 1st generation maps and delineated the potential groundwater resources within the Quaternary deposits. It also further defined the bedrock geology in the Province. The maps illustrated the spatial extent and distribution of bedrock and glacial aquifers and are considered hydrostratigraphic maps because they did not include information on the water quality, potential yield or vulnerability of the aquifers. The 2nd generation mapping program completed 20 NTS map sheets covering the majority of the agricultural sector in Saskatchewan. However, the Saskatoon map sheet (73B) was not completed in the 2nd generation mapping.

In 2004, the Saskatchewan Watershed Authority initiated the 3rd generation mapping for south-western Saskatchewan. These maps provided information on the groundwater resources to the public and illustrated the spatial extent and distribution and depth to potential groundwater resources. It included detailed geologic cross sections and illustrated the bedrock and Quaternary stratigraphy. The Cypress Hills (72F), Prelate (72K), Wood Mountain (72G), and Swift Current (72J) map sheets were completed as the initial stages of the mapping program. Maps were produced on the ESRI ArcGIS platform.

In 2010, the Saskatchewan Watershed Authority recognized the need for better groundwater knowledge and access to reliable data. A new mapping program was initiated, engaging in the private sector to develop the protocols, standards, and methodologies to be used across the province. The current mapping program represents a first concerted, widespread effort at mapping groundwater potential, quality, and vulnerability. The maps update the accuracy and detail of the groundwater resources to include data obtained since the 2nd generation mapping and integrates the surficial aquifer maps into the geologic framework. The hydrogeological data and maps were produced in the ArcGIS platform and made available to the public.

The Saskatoon (73B) map sheet was considered the 'pilot' to develop the standards, protocols, and methodologies to map the groundwater resources in Saskatchewan. The Saskatoon (73B) map sheet included aquifer vulnerability maps, groundwater quality, and three dimensional visualization of each geologic formation. The Saskatoon (73B) map sheet was completed in 2011 and the Regina map sheet (72I) is expected to be completed by December, 2012.

Announcements and Events

2013 Williston Basin Petroleum Conference (WBPC) Workshops.

The society is once again responsible for organizing the two workshops associated with the WBPC. This opportunity is a great source of revenue for the society. This allows the society to bring in speakers, and hold other events such as field trips, curling bonspiels, and golf tournaments. At this time, the executive is looking for volunteers to join an organizing committee to put together the workshop booklets and plan the logistics of the events (i.e. plan catering and audio visual). We are looking for 4-6 people to be on the committee. Gavin Jensen will be on the committee as the liaison between the WBPC and the workshop committee. Please respond to gavin.jensen@gov.sk.ca if you have any questions or if you are interested in being on the committee. Committee members will receive free entry to the core workshop and the WBPC conference at value \$450.

SGS Golf Tournament and BBQ

The Society would like to thank Tom Love for organizing this year's golf event. He took over the "reins" from Bob Troyer and did an excellent job! Also we would like to thank Dave and Alice MacDougall for opening their home and hosting the BBQ, they provided a great venue for the BBQ!

Luncheon Talk Speakers

If anyone has any ideas for luncheon speakers please contact Lynn Kelley (lynn.kelley@gov.sk.ca) or Kim Kreis (k.kreis@sasktel.net)

SGS Merchandise

The SGS has a variety of reasonably-priced merchandise, mainly clothing, that is posted on the website: www.sgshome.ca for viewing. This includes seasonal items such as very nice golf shirts, t-shirts, and hats.
