GAC-MAC: FIELD GUIDE SUMMARY

Ottawa 2025: GAC–MAC–IAH–CNC Joint Annual Meeting Field Trips

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Come Explore the Many Layers of Ottawa

The annual 2025 GAC-MAC-IAH-CNC conference will be held from May 11th to the 14th in the Nation's Capital at University of Ottawa. The venue is merely steps from the UNESCO World Heritage site of the Rideau Canal, Parliament Buildings, National Museums, historic Byward Market and numerous other attractions. As usual, there will be a plethora of sessions, short courses and field trips to choose from. Delegates can pick from pre-meeting and post-meeting field trips highlighting locations that stretch from western Québec to the Niagara Geopark and the famous Sudbury Impact Structure in northern Ontario. These range from one-day excursions to multi-day trips that delve deep into central Canada's geological heritage. We invite you to experience the remarkable geology of the conference region and the many sights of our Nation's Capital. We hope that there is something that appeals to everyone in the field trip listing for the 2025 GAC-MAC-IAH-CNC joint annual meeting! For full details on the technical program, travel, and accommodation information, please visit: *https://event.fourwaves.com/ottawa2025/pages*.

Pre-Conference Field Trips

Cambro-Ordovician Potsdam Group of the Ottawa Embayment: Stratigraphic archive of rift reactivation, climate change, and eustatic rise. This 2-day trip is organized by David Lowe (Memorial University of Newfoundland) and Bill Arnott (Ottawa University). The excursion will focus on the origin and evolution of the Ottawa Embayment as recorded by the fill of a reactivated rift, providing a stratigraphic archive of climate fluctuation, relative sea level change, and fault reactivation before and during the regional early Ordovician transgression of Laurentia. Note that participants will cross the US border into New York State on Day 2 and may need visas for such entry if not citizens of Canada or the USA.

School students explore outcrops of glacially sculpted, Precambrian gneiss, Erskine Johnstone/Georges Vanier Schoolyard, Kanata, Ontario. Photo credit B. McLarty Halfkenny.

View of faulted, tilted and glacially sculpted Paleozoic sedimentary rock along the Rideau River at Hogsback Falls, Prince of Wales Park, Ottawa, Ontario. Photo credit B. McLarty Halfkenny.

Collections Tour. Led by Michelle Coyne. A tour of either the Pink Road facility where the Canadian Museum of Nature's collections are located, or Hawthorne Street facility where the Geological Survey of Canada's collections are located. The

Podolsky North outcrop showing massive chalcopyrite veins in the footwall of the Sudbury Igneous Complex, Sudbury, Ontario. Credit D. Peters.

Stromatolite pavement exposed during extreme low water levels on the Ottawa River, west of Champlain Bridge, Gatineau, Québec, looking south toward the city of Ottawa, Westboro area. Photo credit B. McLarty Halfkenny.

afternoon will be at the Canadian Museum of Nature. The field trip cost will include an admission ticket for the museum that participants can visit at their leisure.

Discovering Earth Sciences K–12 educator professional training workshop and field trip. This excursion will be led by Beth McLarty Halfkenny (Carleton University). The GAC-MAC conference has a rich history of engaging with local teachers wherever the conference is held, leveraging the expertise of conference attendees to help educators gain the knowledge, resources and confidence to teach Earth Science topics within their provincial curriculum. The one-day professional training and sharing workshop will include an afternoon field trip to sites in the Ottawa region that showcase exceptional geological features and can be used to illustrate how teachers can build field experiences for their students. Participants will receive a teaching resource kit containing rocks, minerals, fossils, identification tools and guides, other books, posters and digital resources including prepared lesson plans. Participants will also have the opportunity to attend the conference's "Geoscience Education and Communication" technical session with a discounted one-day pass.

Geoheritage of Niagara Geopark – Wine and geology. This 2-day field trip will be led by Bill Pearson (Professional Geologists of Ontario Foundation). The excursion highlights the Niagara UNESCO Aspiring Global Geopark focusing on geology of the Niagara Escarpment and its influence on many other aspects of the region. The trip will include a visit to the world-famous Niagara Falls and one of the area's finest wineries.

Geoheritage of the National Capital – An accessible field trip. This is a one-day excursion led by Beth McLarty Halfkenny (Carleton University) and Anita Marshall (University of Florida) that is intended to fully include conference participants with accessibility needs, and to showcase and model the technologies, methods, and considerations for creating inclusive field excursions. This trip will visit several geosites with geoheritage value in the National Capital Region, chosen for their exceptional geological features and for varied physical barriers and other accessibility challenges that can be overcome with thoughtful planning.

Geological highlights of the Ottawa Region: Precambrian basement, Paleozoic cover, faults, landslides and uplift history. This 2-day field-trip will cover many of the geological highlights of the Ottawa area, and its setting in the Ottawa-Bonnechere Graben. The trip will be led by Wouter Bleeker (Natural Resources Canada). We will travel through time from Precambrian bedrock, through lower Paleozoic cover stratigraphy, into the glacial and post-glacial history, and into the current era of seismic activity and catastrophic landslides.

Geology of the Sudbury Impact Structure and a deeper understanding on the origin and formation of its associated Ni-Cu-PGE mineralization in contact and offset dyke environments. This multi-day excursion will be led by Dustin Peters, Sandra Baurier and Michael Lesher of Laurentian University. The field trip will start and end in Sudbury, Ontario, and participants are responsible for their own travel to and from Sudbury. The trip consists of a geological traverse across the Sudbury Impact Structure that will focus on both shocked and undeformed country rocks, and on mineralized and unmineralized sublayer norite and footwall breccia of the Sudbury Igneous Complex. It will highlight differences and similarities related to the timing and mode of emplacement of the offset dykes in the southwestern and southern parts of the Sudbury Structure (Copper Cliff, Worthington and Vermillion) and their surrounding footwall rocks. Participants will also observe the complex relationship between the different breccia units hosted in offset dyke environments and at the base of the impact melt sheet. Mineralized drill core sections will be examined and mining companies active in the region will contribute updates on their recent operations.

Groundwater methodologies and approaches from synoptic to pore scale. This one-day field trip will be led by Hazen Russell and Melissa Bunn (Geological Survey of Canada). It will include presentations on methodology (held at the University of

North margin of the Ottawa-Bonnechere Graben (Gatineau Park) with Middle to Upper Ordovician foreland-interior platform rocks underlying farmland to the left and Precambrian metamorphic rocks of the Grenville Province underlying the highlands to the right. Credit: G. Dix.

Ottawa) and field visits that demonstrate equipment deployments for downhole geophysics, passive seismic, reflection seismic, and hydrogeological-sedimentological investigations.

Life in Rocks: From ancient Earth to Mars and beyond. This is a half-day excursion led by Richard Léveillé (McGill University). Outcrops of Ordovician limestone along the Ottawa River offer some of the best and most easily accessible stromatolites in Canada. These layered and often domed-shaped structures are excellent examples of geobiological interactions and help record the co-evolution of the geosphere and biosphere on Earth. This trip will feature an easy access stroll to the stromatolite localities and other fossiliferous rocks in the area.

Post-Conference Field Trips

Chalk River Laboratories Tour. This one-day excursion will be led by Philip Kompass (Canadian Nuclear Laboratories) and Tessa Di lorio (City of Ottawa). It consists of a visit to the Chalk River Laboratories (CRL), Canada's large single scientific campus and the birthplace of nuclear technology in Canada. With a site which spans over 3000 hectares, and over 120 unique scientific facilities, a visit to CRL is a unique experience. For more than 60 years, Canadian scientists and technicians have been conducting hydrogeological research, with a particular focus on radionuclide migration in the environment. The site has an extensive groundwater monitoring network and ongoing groundwater remediation measures which will also be discussed. Note that advance registration for security clearances will be required for all participants.

Late tectonic rare-metal pegmatitic magmatism in the Bancroft area, southwest Grenville Province. The Bancroft region is known as the "Mineral Capital of Canada". This two-day trip will be led by David Lentz (University of New Brunswick, Fredericton). On the first day, the excursion will visit the Quadville pegmatites, known for beryl and rose quartz, the Craigmont corundum pegmatite and the MacDonald REE-Y-Nb-U pegmatite. On the second day, the excursion will feature the Saranac Zr-REE pegmatite, the Princess sodalite pegmatite, the Goulding-Keene pegmatite, and finally the type perthite locality south of Perth. Other localities including some near the Faraday pegmatite (Madawaska uranium deposit) will also be visited if possible. These iconic localities are very well known for their mineral collecting and former mines, although in recent decades they have become less accessible due to changing land ownership. Scientific discussions will focus on source(s), timing, degrees of fractionation, the role of exsolved volatiles, fractionation history, and structural controls on pegmatite emplacement.

Middle to Upper Ordovician foreland-interior carbonate platform: A record of initiation through foundering in the Ottawa area. This one-day excursion will be led by George Dix (Carleton University) and will examine key boundaries and stratigraphic transitions in the Middle through Upper Ordovician stratigraphic record of a foreland-interior platform succession that underlies eastern Ontario. The carbonate and siliciclastic sedimentary record extends from foreland initiation represented by the local expression of the Sauk-Tippecanoe I supersequence boundary to final stages of platform foundering adjacent to an anoxic deep-water shale basin. The trip examines stratigraphic and sedimentological evidence for local and regional structural controls on base-level change related to basement reactivation along the axis of the intracratonic Ottawa-Bonnechere Graben and far-field effects of plate boundary evolution.

Subglacial signature of paleo-ice streams in the Ottawa-Bonnechere Graben, eastern Ontario. This two-day field trip will be led by Riley Mulligan (Ontario Geological Survey) and Roger Paulen (Natural Resources Canada). It will introduce participants to key landforms and sections that shed light on a wide range of subglacial events and processes that operated within the Ottawa-Bonnechere Graben region of eastern Ontario. Participants will encounter a wide range of bedrock erosional features, originating from at least three distinct ice flow phases and a complex local pattern of abrasion, plucking, hydraulic jacking and bedrock raft entrainment. Evidence for processes is exposed in road cuts and quarry walls and thick sections of

https://doi.org/10.12789/geocanj.2024.51.219

till that display a complex ice flow history. The nature and paleo-glaciological significance of clast macrofabric data measured from sections exposing their internal sediments will also be discussed.

Thetford Mines Ophiolite. This 3-day field trip will be led by Jean Bédard (Natural Resources Canada) and Alain Tremblay (UQAM) and will provide a detailed encounter with the Thetford Mines Ophiolite. It will show representative crustal and mantle facies, including surrounding continental margin sedimentary rocks, a sliver of the obduction sole, layered dunite-chromitite in the lower crust, peridotite-pyroxenite layered rocks injected by PGE-enriched chromitites, late websterite megadykes emplaced into active syn-oceanic faults, gabbroic rocks affected by hydrothermal systems, boninitic pillow lavas and sheeted dykes, and the syn-orogenic flysch. It is anticipated that there will be a choice of field trip stops on the final day, depending on whether participants are returning to Québec or Ottawa (via Montréal).