Geoscience Canada
Journal of the Geological Association of Canada
Journal de l'Association Géologique du Canada

Québec 2019: GAC–MAC–IAH Joint Annual Meeting Field Trips

Sebastien Castonguay

Volume 45, Number 3-4, 2018

URI: https://id.erudit.org/iderudit/1058020ar
DOI: https://doi.org/10.12789/geocanj.2018.45.141

See table of contents

Publisher(s)

The Geological Association of Canada

ISSN

0315-0941 (print)
1911-4850 (digital)

Explore this journal

Cite this document

Castonguay, S. (2018). Québec 2019: GAC–MAC–IAH Joint Annual Meeting Field Trips. *Geoscience Canada*, *45*(3-4), 163–165. https://doi.org/10.12789/geocanj.2018.45.141

GAC-MAC: FIELD GUIDE SUMMARY

Québec 2019: GAC–MAC–IAH Joint Annual Meeting Field Trips

Sébastien Castonguay
Geological Survey of Canada
490 rue de la Couronne, Quebec City, Quebec, G1K 9A9, Canada
E-mail: Sebastien.Castonguay@Canada.ca

WHERE GEOSCIENCES CONVERGE

The Geological Association of Canada (GAC), the Mineralogical Association of Canada (MAC) and the Canadian National Chapter of the International Association of Hydrogeologists (IAH-CNC) invite geoscientists to their joint annual meeting in historic Quebec City, a UNESCO World-Heritage site. Participants will have the opportunity to visit and discover the warmth and charms of Quebec City and explore its many attractive natural sites, where converge three geological provinces: the Appalachians, the St. Lawrence Platform, and the Grenville. The conference's theme "Where Geosciences Converge" aspires to promote collaboration and stimulating discussion among geoscientists during symposia, special sessions, short courses and field trips, under the umbrella of four multidisciplinary themes:

- Geosystems and Hydrogeosystems
- Resources, Energy and Environment
- Geosciences and Society
- Big Data for Geosciences

For full details on the technical program, travel and accommodation information visit: *gacmac-quebec2019.ca*.

Nine field trips are offered, both before and after the meeting, from day-trips to multi-day far-reaching tours that cover a range of topics. The pre-meeting, one-day "*Upper Ordovician succession in the Quebec City area: transition from carbonate to clastic forelands*" field trip, organized by Denis Lavoie (GSC-Quebec), will address the changes of tectonic setting and paleo-oceanographic conditions at the margin of Laurentia during the Late Ordovician, when the rapidly foundering of the warm- to ultimately cool-water like carbonate ramp was succeeded by organic matter rich black shales and overlying flysch (Fig. 1). The field trip will examine the rapid facies, faunal and geochemical evolution of these sequences and the transition from the carbonate ramp to a deep, fine-grained clastic succession.

The one-day field trip entitled "*Champlain Sea deltas and the St-Narcisse Moraine in the Portneuf and Mauricie regions of southern Quebec: 3-D stratigraphic modeling and regional aquifer systems*", led by Michel Parent (GSC-Quebec) and colleagues, will be of particular interest to quaternary- and hydro-geologists, and set the table for multiple groundwater-related special sessions. West of Quebec, the Portneuf and Mauricie regions host some of the largest, most productive and widely used granular aquifers in southern Quebec. Over the last 20 years, these aquifer systems have been extensively investigated in a series of studies ranging from 3-D stratigraphic models to groundwater flow modelling. The field trip will introduce participants to the regional groundwater systems of this part of the Laurentian foothills

Figure 1. Panoramic view of the transition between the Precambrian gneisses, Ordovician carbonate and clastic foreland units, Montmorency Falls. Photo by S. Castonguay.

Geoscience Canada, v. 45, https://doi.org/10.12789/geocanj.2018.45.141 pages 163–165

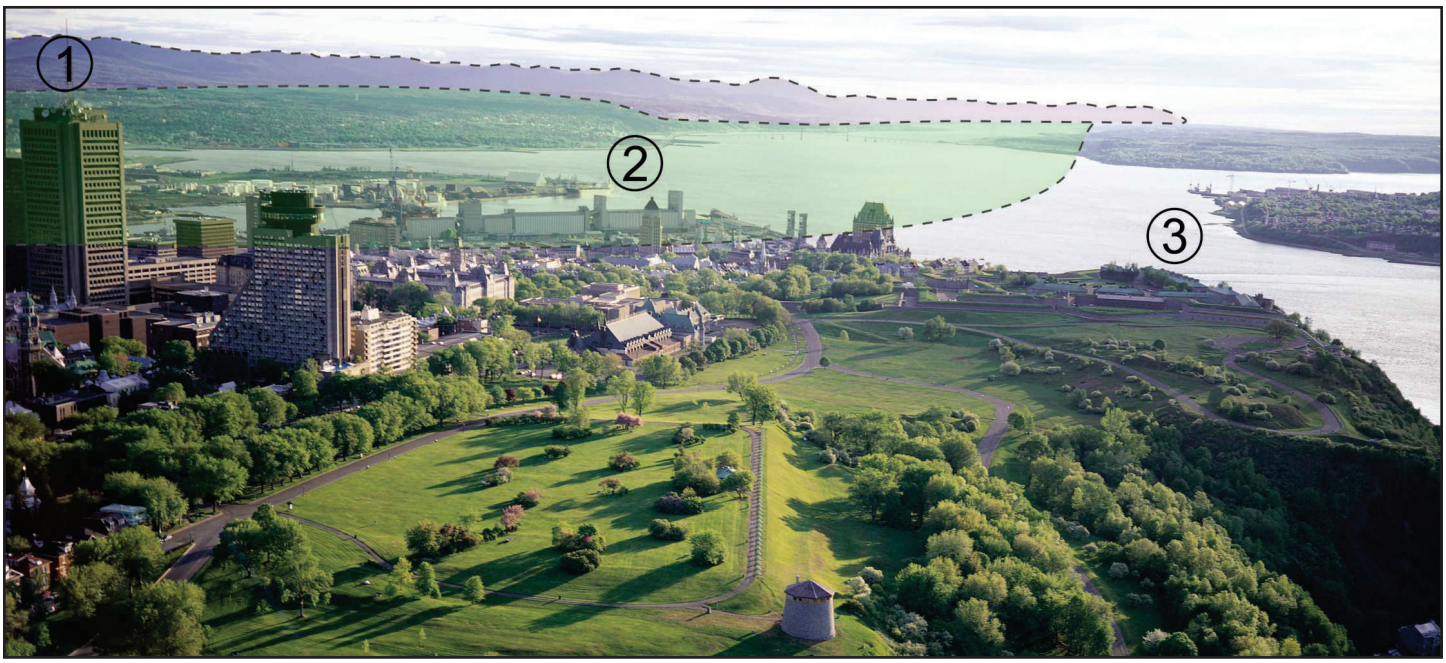


Figure 2. Panoramic view of the reliefs associated with the three geological provinces in the Quebec City area. 1- Canadian Shield/Grenville province; 2- St. Lawrence Lowlands/Platform; 3- Appalachians. Photo modified from *Quebec City Tourism*.

and present the stratigraphy and architecture of the Late Quaternary sediments hosting these aquifer systems, most notably the large paleo-deltas deposited by meltwater-fed rivers along the northern margin of the Champlain Sea and the glacio-fluvial/marine sediment bodies associated with the Saint-Narcisse Moraine and emplaced below the Champlain Sea limit in the St. Lawrence Valley.

Located 125 km east of Quebec City, the Charlevoix impact structure will be visited during the one-day "*The Charlevoix impact structure and seismic zone*" field trip, co-led by Léopold Nadeau (GSC-Quebec, retired) and Gordon Osinski (University of Western Ontario) and will represent a field introduction to the special sessions on "*Impact cratering in the solar system"* and "*Terrestrial analogues for comparative planetary geology and astrobiology"*. This locality is among the largest at ~54 km in diameter, and the most accessible meteorite impact structure in eastern North America. The Charlevoix impact structure occurs at the heart of the Charlevoix Seismic Zone, the locus of the highest seismic hazard in continental eastern Canada. Since the arrival of the first Europeans in the early 1600s, the Charlevoix Seismic Zone has been subject to five earthquakes of magnitude 6 or larger. The Charlevoix impact structure gives the region its singular landscape, with its central uplift, Mont-des-Éboulements, which stands at 780 m above sea level, surrounded by the ~40 km-wide peripheral ring trough. The overall morphology of the structure matches that of complex impact craters. Shatter cones, injection breccias and shock-related planar deformation microstructures in quartz and feldspar crystals are widespread and provide compelling evidence for the extent of shock metamorphism.

Quebec City is located at the junction of three geological provinces, bestowing upon it a unique geological panorama, which includes a historical district that dates back to the first days of the colony. The field trip "*Québec, fortified City: Geological and Historical Heritage*" that Parks Canada colleagues and I lead is a relaxed short-day walking tour through the streets of Old Quebec that combines history and geology with a multidisciplinary perspective. Quebec is the only city in North America to have retained major parts of its original defence system. The 4.6-km-long fortifications are characterized by flanking and defence in depth, which represent more than just the vestiges of the military art of war, but also bear witness to the era of fortified cities between the 17th and 19th centuries. From Upper Town, standing on the "Promontory Nappe," which represents the frontal thrust sheet of the Appalachians in the area, one can see to the north, across Logan's Line, the lowlands of St. Lawrence Platform, and the billion year old but still mountainous roots of the Grenville Orogen, part of the Canadian Shield (Fig. 2).

Pierre Verpaelst (Canadian National Committee for Geoparks) and André Desrochers (University of Ottawa) invite participants to two post-meeting field trips that are companion to the special session on "*Geoheritage: from local to international*" and the short course on geoheritage. The first, three-day field trip will visit the "*Geoheritage of the Gaspe Peninsula: examples of the Percé UNESCO Global Geopark and the Miguasha World Heritage Site*" and explore the main elements of these two sites (Fig. 3). The second three-day field trip entitled "*Geoheritage in development: the Charlevoix Astrobleme and Saguenay Fjord Aspiring Geoparks*" will introduce participants to these future geoparks and expose the challenges faced by their promoters.

After the meeting and the special session on "*Ophiolites as markers of oceanic and orogenic settings*", a two-day field trip co-led by Jean Bédard (GSC-Quebec) and Alain Tremblay (University of Quebec at Montreal -UQAM) will head to Thetford Mines to contemplate "*The Thetford Mines ophiolite and its orogenic con-*

Figure 3. Rocher Percé, Quebec, part of the Percé UNESCO Global Geopark. Photo by S. Castonguay.

text". Participants will visit the critical localities of the stratigraphy and the structural characteristics of the ophiolite complex, with a particular emphasis on pre- to syn-obduction structures and associated lithological variations in the crustal section of the ophiolite, and its overlying sedimentary cover. The trip will visit major lithological facies constituting the ophiolite complex: mantle, plutonic crust, boninitic lavas and dykes, chromitites, and hydrothermal systems. The excursion will examine pre-obduction synmagmatic structures that are attributed to fore-arc seafloor spreading, syn-obduction structures and facies (dynamothermal aureole and sole, intra-mantle granitoids, piggy-back basin sediment), as well as post-obduction overprinting structures related to both the Salinic and Acadian orogenies.

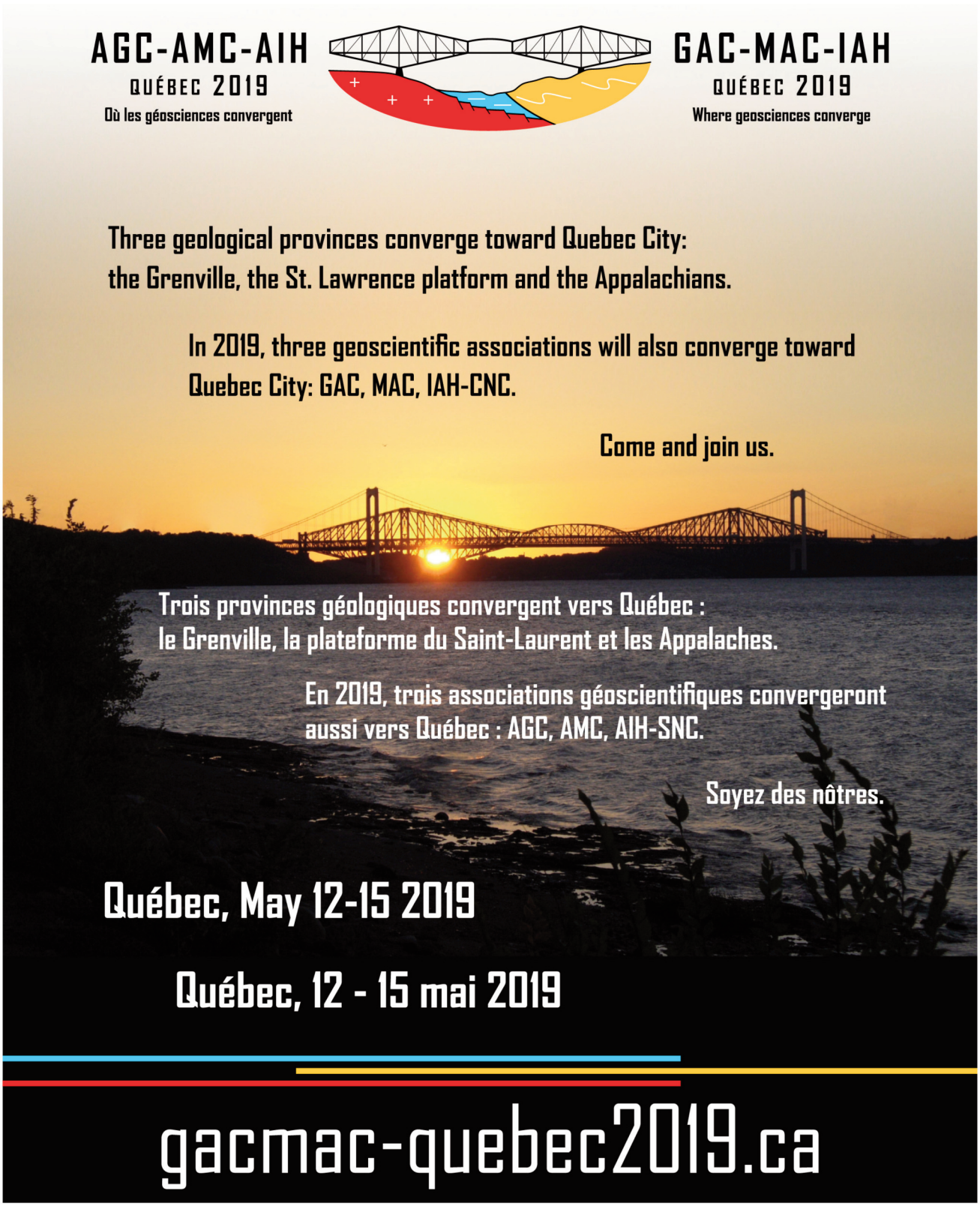
Irregularities in the geometry of continental margins, such as promontories and re-entrants, act as major controls on sediment distribution throughout a Wilson cycle. Stratigraphic variations, both parallel and perpendicular to the margin, allow the identification of second- and third-order morphologic irregularities. This is the case for sedimentary assemblages comprising the thrust sheets adjacent to the Montmorency Promontory that Pierre A. Cousineau (University of Quebec at Chicoutimi -UQAC) and Hugues Longuépée (Champion Iron Ltd.) propose to visit during the one-day field trip entitled "*Impact of an irregular margin on the sedimentary evolution of a narrow shelf-slope environment (Quebec City area)*". The Cambro–Ordovician successions of the Appalachians in the Quebec City area attest of the transition from deep-sea turbidites to shelf-edge deposits formed during the rift-to-drift phase to the eustatic and tectonic instabilities of an Atlantic-type passive margin before the onset of the Taconic Orogeny. Sediment near Quebec City was deposited at the edge of a promontory with a narrow steep-sided, horst-and-graben shelf. In regional paleogeographical reconstructions, the platform widens to the southwest, and has a ramp geometry where a large fluvial system developed. To the northeast, major canyons cut through the shelf and fed directly deep-sea fans.

John M. Hanchar (Memorial University), Marian Lupulescu (New York State Museum), and Jeff Chiarenzelli (St. Lawrence University) invite participants to the Adirondack Mountains, in New York State, to explore the regional Grenville geology and to visit several spectacular exposures of magnetite-apatite (MtAp) deposits and their hydrothermally altered Lyon Mountain Granite host rocks during the three-day "*Magnetite-apatite (MtAp) deposits and related rocks in the Adirondack Mountains, New York State*" field trip, based out of Ticonderoga, NY. After an introduction to Adirondack Grenville geology, several classic outcrops (e.g. Woolen Mills, the historic Gore Mountain garnet deposit), historic MtAp mines and deposits and host rocks will be visited, including, amongst others, the Barton Hill Mine (Mineville), Rutgers Mine (Fig. 4), Skiff Mountain Mine, and Dannemora.

Figure 4. Magnetite-apatite-clinopyroxene segregation in Na–K- altered Lyon Mountain Granite host rock, Rutgers Mine; displaying possible evidence for magma mixing. Photo by J.M. Hanchar.

I hope this menu of field trips will appeal to the broad geoscientific community and that you will visit Quebec City for GAC-MAC-IAH 2019. See you next spring! Further information can be found at *gacmac-quebec2019.ca*.

https://doi.org/10.12789/geocanj.2018.45.141



GEOLOGICAL ASSOCIATION OF CANADA
ASSOCIATION GÉOLOGIQUE DU CANADA

MINERALOGICAL ASSOCIATION OF CANADA
ASSOCIATION MINÉRALOGIQUE DU CANADA

CNC - SNC
International Association of Hydrogeologists
Association internationale des hydrogéologues