

# Canadian Sedimentology Research Group — Second Regional Meeting

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# Conference Reports



## Canadian Sedimentology Research Group — Second Regional Meeting

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In May 1987, the Canadian Sedimentology Research Group (CSRG) held its first regional meeting at the University of Western Ontario. At the end of this somewhat "experimental" gathering the general consensus was that we should "do it again" and Bob Dalrymple offered to host the next meeting at Queen's University in 1988.

About fifty sedimentologists gathered in Kingston from 13-15 May 1988 to attend the second CSRG regional meeting. Although most of the participants were from southern Ontario, others had travelled from further afield including Laurentian University, McGill University, the Ontario Geological Survey (OGS), the Ontario Ministry of Natural Resources (OMNR), INRS Rimouski and Bedford Institute of Oceanography (BIO). Accommodation on campus was cheap and very pleasant; meals were also served on campus and were of excellent quality and value.

Like the London meeting, the first day was taken up with three one-day field trips each designed to appeal to differing sedimentological tastes.

Bob Dalrymple (Queen's U) and Rainer Wolf (OGS) led a trip to visit outcrops of the Potsdam Group, a heterogeneous siliciclastic

assemblage of Cambrian to Early Ordovician age which lies at the base of the Sauk Sequence. The first outcrop exposed mineralogically immature conglomerates and pebbly arkoses interpreted as braided river deposits. The precise age of these units (Covey Hill Formation) is unknown, but they are assumed to underlie the quartzitic Nepean Formation. The next stop featured the entire thickness of the Nepean Formation (15-25 m). The sandstones here bore evidence of tidal processes (herringbone cross-bedding, reactivation surfaces, etc.) and the high density, low diversity trace fossil assemblage suggested deposition in a "stressed" environment. These features, together with other criteria such as some controversial evaporite dissolution traces, suggested a sub- to supratidal origin. The final 2 stops were the most spectacular. At Stop 3, the group examined aeolian cross sets up to 10 m thick! These beds were assumed to lie in the lower part of the Nepean Formation. The presence of well-developed *Protichnites* traces, and less abundant wave ripples and falling water marks in the toesets and bottomsets implied that the dune complex was periodically inundated by the sea. Large vertical "pillars", several metres high and over a metre in diameter, cut through the sandstones. They may have been produced by groundwaters issuing from a buried paleokarst. The aeolian units were capped by a succession of massive or laminated-to-burrowed graded beds interpreted as storm deposits. The general lack of mudstones in these units (and in the tidal flat sequence at Stop 2) was problematic. It was suggested that all mud-sized particles in this region had been winnowed and removed by aeolian activity prior to the marine transgression. The final stop again featured the aeolian units. This time, large angular clasts (several dm in diameter) were to be seen sitting in the foresets. The leaders suggested that they had broken off a nearby fault scarp and rolled to their final resting places in the dune field. In summary, the participants of this trip were treated to four interesting, and at times very perplexing, localities.

A second group, led by Guy Narbonne, Leigh Smith and Clinton Cowan (Queen's U)

spent the day examining Ordovician shallow marine carbonates of the Black River and Trenton Groups. The first stop revealed tidal-flat deposits, complete with desiccation cracks, cryptalgal laminae and evaporite pseudomorphs, resting directly on Grenville basement. Overlying "subtidal" peloidal mudstones contained irregular surfaces disturbingly like paleokarst, sparking considerable debate over short-term sea level changes. Another section revealed carbonates containing gneiss cobbles lapping up against the flanks of a Grenville "island", giving a vivid impression of the local paleobathymetry. Three later stops displayed a splendid variety of carbonate flat and subtidal facies including oolites, *Tetradium* bafflestone facies, floatstones, rudstones and limestone shale couplets (which generated an hour-long discussion on the question of "storms" versus global sea-level cycles). Enthusiasm ran so high that in addition to the five "official" stops, the leaders were coerced into making two extra stops, the last of which revealed most spectacular examples of domal stromatolites.

John Shaw (Queen's U) led a third group to a number of sites featuring erosional features on bedrock, ice-contact and proximal outwash deposits. The tour began with a run to the west along Highway 401, passing examples of large-scale flutes in the median strip on the way to the Wilton Creek site described recently by John Shaw (CJES, 1988). Light rain provided ideal conditions for viewing flutes, rat-tails and striations on an upper limestone terrace and a spectacular suite of scallops, spindle-form flutes and pot-holes lower in the valley. John advanced convincing arguments for the formation of these features by sub-glacial meltwater erosion. The tour then proceeded east, stopping at examples of similar flute development at another limestone site and on exposures of intrusive and metasedimentary rocks on the Frontenac Arch. Part of the afternoon was spent in teeming rain on the slopes of various pits in a large esker system. Highlights of this exciting (though dismal) phase of the tour included examples of a poorly sorted gravel facies, interpreted as a sub-glacial tunnel deposit, and various sequences associated with subaqueous outwash fan deposition at

the ice margin. The day ended on a sunny, but boisterous, note when participants joined forces with Bob Dalrymple's group to examine an intriguing outcrop of the Potsdam sandstone bearing more glacial and glaciofluvial erosion marks. A lengthy discussion followed John's interpretation of these features, (although the other party were without the benefit of the earlier examples seen that day) which focussed on criteria for the recognition of flutes and on the possible scale of the sub-glacial meltwater discharge involved in their genesis.

This full day of excellent field excursions was followed by dinner, and an evening "ice-breaker" (as if we needed it!) at the graduate student club.

The more "formal" part of the meeting began on Saturday morning with a welcome from John Dixon, Chairman of the Geology Department at Queen's. The remainder of Saturday and Sunday was devoted to the presentation of twenty talks, plus informal viewing of poster displays. Talks were not organized into thematic groups, as they had been in London, but were arranged in random order to give equal prominence to all disciplines. Similarly, invited keynote speakers were integrated with the rest of the talks. There was a healthy mix of subject matter; eleven papers dealt with clastic sedimentology, and nine with chemical sediments and diagenesis. Bob Dalrymple gallantly opened the meeting (conveners prerogative?) with a fascinating exposition of some of his work on mudflat sedimentation in the Bay of Fundy, followed by Bruce Hart (U Western Ontario (UWO)) who described some unusual gravelly shoreface sediments from the Cardium Formation in Alberta. Janet Springer (OGS; co-authored with Giovanni DiPrisco) explained how they had been able to recognize widespread karstification of the Precambrian-Paleozoic unconformity in Ontario. Following coffee and Tim Horton's best, Bob Trevail (OMNR) discussed the distribution of volcanic ash, and its value in correlating the Ordovician of SW Ontario, and the morning session concluded with a talk from the first keynote speaker, David Piper (BIO). David gave an excellent presentation on Quaternary glacially influenced slope sediments from offshore eastern Canada, and illustrated his story with seismic lines and spectacular remote camera photographs of some of the features produced by the 1929 Grand Banks earthquake.

Saturday afternoon began with a presentation by Leigh Smith (Queen's U) on sea level changes and their control on burrow dolomitization in Ordovician sediments in Manitoba, followed by Darryl Long (Laurentian U) who gave a well-illustrated talk on Ordovician storm-dominated carbonates from Anticosti Island. The second keynote speaker, John Shaw (Queen's U), then presented the audience with a thought-pro-

voking talk on current problems in glacial sedimentology, which included his novel views on the origin of some drumlins by catastrophic sub-glacial meltwater discharge. The second afternoon session opened with Terry Carter (OMNR) who compared the Proterozoic Balmat evaporite sequence of New York with the Silurian strata in SW Ontario. Janok Bhattacharya (McMaster U) gave a very polished and well-illustrated talk on sequence stratigraphy in the Cretaceous Dunvegan Formation in Alberta. Fred Longstaffe (UWO) presented the third keynote talk on the application of stable isotope studies to unravelling the diagenetic history of sedimentary basins — despite the (unplanned) absence of half his slides!

On Saturday evening, we gathered in the Games Room of Victoria Hall for a buffet supper, with cash bar. The atmosphere was relaxed and informal and discussions continued into the late hours.

Sunday morning sessions began with a talk by Greg Browne (UWO) on fluvial strata of the Pennsylvanian Boss Point Formation in New Brunswick and Nova Scotia. Carolyn Eyles (McMaster U) followed with a talk on glacially influenced Late Cenozoic slope and fan deposits in the White River region of Alaska. Hairvo Quing (McGill U) showed some of the results of his research on dolomitization of the Middle Ordovician Presqu'île barrier at Pine Point, NWT; Hairvo brought the house down by showing a slide of several *hectares* of core-boxes, while modestly suggesting that his interpretations were based on an "adequate" data base! After coffee, Roger Walker (McMaster U) talked on scales of event stratigraphy using examples from his work on Cretaceous sediments in the Western Interior Seaway. Judith Patterson (U Toronto, Erindale) presented her PhD work on the sedimentology of deformed terrains in the Virginia Piedmont, making at least some of us realize how lucky we were to work on undeformed sedimentary rocks! Eric Mountjoy (McGill U) concluded the Sunday morning session with an excellent keynote address on problems of burial dolomitization in the Western Canada Sedimentary Basin.

A short business meeting followed lunch, where it was decided to hold the next regional meeting in Ottawa. Paul Fejer (Queen's U) opened the final session with a talk on allocyclicity, parasequence stacking patterns and relative ("eustatic"?) sea level changes in Upper Devonian carbonates in British Columbia. Guy Plint (UWO) followed with a discussion of extensional and overthrust tectonics and related sedimentation in the Pennsylvanian of southern New Brunswick, and Rick Cheel (Brock U) rounded off the afternoon with a thought-provoking discussion on the depositional history of the conglomeratic Cypress Hills Formation in southern Alberta and Saskatchewan.

Nine poster displays were on show around the coffee room. Derek Armstrong (OGS) presented the most recent results of his mapping of Paleozoic strata on the Bruce Peninsula; Geoff Burbidge (Ottawa U) showed us pictures of "the world's oldest glacial striae", and Janis Dale (Queen's U) described the benthic macrofauna of some Canadian Arctic fjords. Marc Dubord (Queen's U) discussed the relationship between carbonate platform margin sedimentation and eustatic changes in the Ogilvie Formation (Emsian-Eifelian) of the northern Yukon Territory; Don Forbes (BIO) presented his recent work on seabed characteristics and sediment mobility on the inner Scotian shelf; and Louis Michaud, Monique Sala and Bernard Long (INRS Rimouski) described the structure of a deltaic lobe in a sub-boreal environment (north shore of the St. Lawrence River). Rob Rainbird (UWO) described compound cross-bedding in a Proterozoic quartz arenite from the Shaler Group, Victoria Island, NWT; Natalie Ross and Bernard Long (INRS Rimouski) outlined the structural evolution of a breaker bar in a meso-tidal environment; and David Piper (BIO) presented preliminary observations on some modern fan-deltas from the Gulf of Corinth, Greece.

In all, the meeting was a great success; most talks were followed by good discussion from the floor, and there was plenty of opportunity for informal discussion during coffee breaks and in the evenings over a beer. The relatively small lecture hall used for the talks was well chosen and this contributed to the relaxed and informal atmosphere which we feel is the essential ingredient (along with good geology!) in the success of these regional meetings. We congratulate Bob Dalrymple and his team of helpers for an excellent meeting!

The third CSRG regional meeting is being organized by Geoff Burbidge at the University of Ottawa and is scheduled for 24-26 May 1989.

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