

Appendix 4: Faculty

Dr. Carolyn Eyles

Carolyn H. Eyles, Ph.D., P.Geo.,
Glacial Sedimentology Research Group
Professor, School of Geography & Earth Sciences
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The Glacial Sedimentology group is focused on applying sedimentological approaches to the study and interpretation of the deposits found within glaciated basins. The approach used is field-based, and in many cases involves quantitative geo-spatial analysis of field data. Recent studies have included glaciated basins ranging in age from Paleoproterozoic (Huronian) to modern (Canadian Rockies) and have formed the basis for numerous undergraduate and graduate thesis projects. Many students graduating from the Glacial Sedimentology research group have pursued further research in sedimentology and are now working in academic, government and industry positions. Several students are currently working on a project that involves detailed sedimentological analysis of Quaternary sediments in the Halton Region of southern Ontario. This sedimentological information is being used by hydrogeologists working for the Region who are seeking potable water sources for expanding urban centres.

Books

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Contributions to Books

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N. Eyles, **C.H. Eyles** and A.D. Miall. (1983) Lithofacies types and vertical profile models; an alternative approach to the description and environmental interpretation of glacial diamict sequences. *Sedimentology*, v. 30, p. 393-410

Recent conference presentations (*student)

*J. Slomka, *K.E. MacCormack and C.H. Eyles, 2009. Sedimentological analysis and 3-dimensional modeling of a shallow Quaternary aquifer in the Georgetown region, Ontario. 44th Central Canadian Symposium on Water Quality Research, Burlington, Ontario.

*J. Slomka, *K. E. MacCormack, C.H. Eyles and T. Lotimer, 2009. Sedimentological analysis of Quaternary glaciofluvial deposits in the Georgetown region, Ontario. 2009 Joint Assembly, Toronto.

*S. Puckering and C.H. Eyles, 2009. Looking under the ice: deciphering subglacial processes from the spatial arrangement of erosional landforms. 2009 Joint Assembly, Toronto.

*A.M. Trendell and C.H. Eyles, 2007. Sedimentological analysis of late Quaternary sediments exposed along the north shore of Lake Ontario, Canada. Geological Society of America Annual Meeting, Denver, Abstracts with Programs, v. 39, No. 6

*L. E. Hunt and C.H. Eyles, 2007. Sedimentological analysis of subglacial and proglacial deposits at Saskatchewan Glacier, Banff National Park, Alberta. Geological Society of America Annual Meeting, Denver, Abstracts with Programs, v. 39, No. 6

*M. Stoesser and C.H. Eyles, 2007. Into the ancient deeps: A sedimentological investigation of laminated argillites at Whitefish Falls, Ontario. Geological Society of America Annual Meeting, Denver, Abstracts with Programs, v. 39, No. 6

*S. Fletcher and C.H. Eyles, 2006. Sedimentological analysis of the Upper Gowganda Formation at Whitefish Falls: a Paleoproterozoic late-stage rift-basin infill? Geological Society of America Annual Meeting, Philadelphia, Abstracts with Programs, v. 38

*A.M. Trendell and C.H. Eyles, 2006. A record of changing ice marginal conditions preserved within late Quaternary sediments of the Bowmanville Bluffs, Ontario, Canada. Geological Society of America Annual Meeting, Philadelphia, Abstracts with Programs, v. 38

Dr. Joe Boyce

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Joe Boyce is an Associate Professor in the School of Geography and Earth Sciences and director of the Environmental and Archaeological Geophysics Laboratory. His research group investigates past changes in Holocene (last 10,000 yrs) paleoenvironments using sediment archives from lake basins and coastal environments. This work employs coring, measurements of sediment physical/geochemical properties (grain-size, geochemistry, microfauna, magnetic properties) and geophysical methods to document and interpret past changes in environmental conditions and human impacts on natural ecosystems. Recent work has documented human impacts due to deforestation and land clearance following pre-Columbian and European settlement in southern Ontario (Col By Lake, Rice Lake; Sonnenburg M.Sc. and Ph.D. work) and changing Holocene coastal environments at archaeological sites in the Mediterranean (western Turkey, Italy, Greece) and in the Middle East (Oman, Israel). Other recent work has investigated magnetic property methods for mapping contaminated sediment layers (Hamilton Harbour) and for documenting historical pollution in lake basins. Studies in Frenchman's Bay (Pickering, Ontario) have yielded high-resolution grain-size and magnetic records of the onset of European colonization and changes in basin hydrologic conditions associated with subsequent land-use changes. More recent work in Hamilton Harbour is developing new, innovative methods for remotely mapping contaminants using magnetic survey methods and measurement of sediment magnetic properties.

Recent Publications

Publications in Refereed Journals:

Boyce, J.I., Reinhardt, E.G., and Goodman, B.N. (2009) Magnetic detection of ship ballast mounds and anchorages at Caesarea Maritima, Israel. Journal of Archaeological Science, 36, 1516-1526. DOI:10.1016/j.jas.2009.03.007

Goodman, B.N., Reinhardt, E.G., Dey, H., Boyce, J.I., Sahoglu, V., Erkanal, H., Artzy, M. (2009) Multi-proxy geoarchaeological study redefines understanding of the paleocoastlines and ancient harbours of Liman Tepe (Iskele, Turkey). Terra Nova, 21: 97-104. DOI: 10.1111/j.1365-3121.2008.00861.x

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Papers in Refereed Conference Proceedings:

Boyce, J.I. (2009) Environmental magnetic methods for detecting and mapping contaminated sediments in lakes. Eos Trans. AGU, 90(22), Jt. Assem. Suppl., Abstract GP32A-01.

Sonnenburg, E.P., Boyce, J., and Reinhardt, E.G. (2009) Submerged archaeological sites and water-level fluctuations in Rice Lake, Ontario, Canada. Jt. Assem. Suppl., Abstract GA32A-07.

Krezoski, G.M., Boyce, J.I., Reinhardt, E.G., Gabriel, J., Erkanal, H. and Sahoglu, V. (2009) Paleogeographic reconstruction of submerged prehistoric shorelines and coastal environments at Liman Tepe, western Turkey. Developing International Geoarchaeology Conference 2009, May 24-29, McMaster University, Hamilton, Ontario.

Sonnenburg, E., Boyce, J., and Reinhardt, E. 2009. Holocene Water-Level Fluctuations and the Implications for Paleoindian Archaeology in Southern Ontario. Developing International Geoarchaeology Conference, Hamilton, ON.

Sonnenburg, E.P. and Boyce, J.I. (2009) Reconstruction of submerged landscapes in southern Ontario lakes using coring and geophysics. Society for Historical Archaeology, Annual Meeting, Toronto, Abstracts Volume.

Sonnenburg, E., Boyce, J. I. and Reinhardt, E.G. (2009) Paleogeographic reconstruction of a submerged landscape and its archaeological potential, Rice Lake, Ontario, Canada. Society for Historical Archaeology Annual Meeting, Toronto, Ontario.

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Sonnenburg, E.P., Boyce, J., and Reinhardt, E.G. (2008) Investigating submerged archaeological site potential of shallow lakes in the Great Lakes region, Canada. 6th World Archaeological Congress, Dublin, Ireland, Abstracts Vol.

Boyce, J.I., Krezoski, G.M., Erkanal, H., Sahoglu, V., Goodman, B.N. and Artzy, M. (2007) Shallow water mapping of a submerged Archaic-aged harbour at Liman Tepe, Turkey using data-fused side-scan sonar and magnetic images. Geological Society of America, Abstracts with Programs, Vol. 39, No. 6, p. 548.

Krezoski, G.M., Boyce, J.I., Reinhardt, E.G., Goodman, B. N., Erkanal, H. and Sahoglu, V. (2007) Coastal sediment record of the construction of Alexander the Great's Causeway, Clazomenae, Turkey. Geological Society of America Abstracts with Programs, Vol. 39, No. 6, p. 573.

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Sonnenburg, E.P., Boyce, J.I. and Reinhardt, E.G. (2006) Paleoenvironmental record of colonial land-use changes in the Lower Rideau Canal (Colonel By Lake), Ontario, Canada. Geological Society of America Annual Meeting, October 22-25, 2006, Philadelphia, Pennsylvania, Abstracts with Programs, Vol. 38, #55-11, p. 150.

Donato, S., Reinhardt, E.G., Rothaus, R. and Boyce, J.I. (2006) Identifying tsunami deposits using shell taphonomy. Geological Society of America Annual Meeting, October 22-25, 2006, Philadelphia, Pennsylvania, Abstracts with Programs, Vol. 38, #66-6, p. 177.

Reinhardt, E.G., Boyce, J.I. and Yakovenko, A. (2006) The Bova Marina Archaeological Project – underwater survey of the San Pasquale River Valley, Calabria, Italy. Geological Society of America Annual Meeting, October 22-25, 2006, Philadelphia, Pennsylvania, Abstracts with Programs, Vol. 38, No. 7, p. 149.

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harbor at Caesarea Maritima, Israel. Geological Society of America Annual Meeting, October 22-25, 2006, Philadelphia, Pennsylvania, Abstracts with Programs, Vol. 38, #66-7, p. 177

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Research interests focus on: Micropaleontology (thecamoebians and foraminifera); Quaternary Coastal Geology and Sea Level Change; Catastrophic Event Stratigraphy; Marine Geoarchaeology; Isotope Geochemistry

Recent Publications

Journal Articles

Submitted

Reinhardt, E.G., Nairn, R., Lopez, G., submitted, Sedimentation patterns in the Rio Cruces after the May 1960 Chilean earthquake and tsunami, *Marine Geology*, (MARGO 4021)

In press

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Dr. Alan Dickin

Alan Dickin, Ph.D
Professor, School of Geography & Earth Sciences

Research objective is to reconstruct the geological evolution of the Grenville Province of the Canadian Shield. The Grenville has been the most poorly understood province of the Shield, but Nd isotope mapping (Dickin, 2000) has now identified the major crustal terranes that make up the province. My current research involves detailed mapping of individual terrane boundaries in order to understand their geological history, and thereby reconstruct the accretionary growth of the Shield.

Publications

Books

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Web Site: www.onafarawayday.com

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Dr. Sang-Tee Kim

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Research Interests

- Stable Isotope Geochemistry
- Marine Geochemistry
- Aqueous Geochemistry
- Cosmochemistry
- Chemical Oceanography
- Paleoclimatology
- Experimental Geochemistry
- Biomineralization
- Low Temperature Geochemistry

Publications

Journal Articles

Wu, N., Farquhar, J., Strauss, H., **Kim, S.-T.**, and Canfield, D. E. (2010) Evaluating the S-isotope fractionation associated with Phanerozoic pyrite burial. *Geochim. Cosmochim. Acta.* (in press)

Kim, S.-T., Kang, J. O., Yun, S.-T., O'Neil, J. R. and Mucci, A. (2009) Experimental studies of oxygen isotope fractionation between rhodochrosite (MnCO₃) and water at low temperatures. *Geochim. Cosmochim. Acta.* **71**, 4400-4408.

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Abstracts and Conference Presentations

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Kim, S.-T., Farquhar, J., Gutzmer, J. and Kesler S. E. (2009) Sulfur isotope systematics of the Paleoproterozoic Bushy Park and Pering MVT deposits. 19th Annual V.M. Goldschmidt Conference, Davos, Switzerland. *Geochim. Cosmochim. Acta.* **73**, (13): A654-A654 Suppl.

Wu, N., Farquhar, J., Strauss, H., **Kim, S.-T.** and Canfield, D. E. (2009) Evaluating the S-isotope fractionation associated with Phanerozoic pyrite burial. 19th Annual V.M. Goldschmidt Conference, Davos, Switzerland. *Geochim. Cosmochim. Acta.* **73**, (13): A1454-A1454 Suppl.

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Dr. William Morris

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Research Interests

- Hyperspectral and Lidar remote sensing applied to mineral and oil exploration
- High resolution photogrammetry, topographic mapping and interpretation
- Borehole navigation, vector magnetics, magnetostratigraphy
- Airborne and ground magnetics and gravity surveys
- 3D geological and geophysical model building

Publications

Contributions to Book

Deschamps, S., and Morris W.A., 2001 Project Unit 00-303 Physical Rock Properties Study in the Matheson and Kirkland Lake Areas. Ontario Geological Survey Open File Report 6070. Summary of Field Work and other Activities 2001

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Research Interests

- Kinematics of deformation in active and fossil orogens: Central Andes (Argentina), Penokean Orogen (Canada)
- Relationship between deformation and melt transport: Pluton and dike emplacement, collapse caldera formation.
- Impact Geology: Central uplift formation in large terrestrial impact structures, generation of impact-induced melt systems (Sudbury, Canada, and Vredefort, South Africa).
- Exploration geology: Structural controls on the concentration of Cu-Ni and PGE mineralization.
- Methods: Field-based structural analysis, analogue modeling, image analysis, anisotropy of magnetic susceptibility, microstructural analysis.

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My research interests involve luminescence emission and magnetic resonance properties of minerals and biominerals, which are applied to problems in geochronology of the young earth, especially young coastal systems. I mainly use electron spin resonance dating and luminescence dating as tools in this work, but I am also involved in developing better dating methodologies to solve current problems in these areas. My newest area of interest is the use of luminescence properties of minerals to study sand transport in coastal systems, which spans the fields of coastal engineering, landscape evolution, storm recurrence frequency and shipwreck preservation issues in underwater archaeological sites.

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Research Interests

- Analytical technique development
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- Investigation and monitoring of contaminant biodegradation/bioremediation
- Biosignatures of microbial communities
- Microbial carbon sources and cycling in extreme environments
- Research in the fields of isotope geochemistry, organic geochemistry, aquatic geochemistry, microbial geochemistry, astrobiology, geoaerology

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Research Interests

- Water flow and contaminant transport
- Soil contamination and remediation
- Vadose zone hydrology
- Hydrogeology

Recent Publications

Mumford, K.G., **J.E. Smith**, and S.E. Dickson. 2009. New observations of gas-phase expansion above a dense non-aqueous phase liquid pool. *Vadose Zone J.* In Press.

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Research Interests

Dr. Waddington's research in ecohydrology studies the ecological and hydrological processes that underlie the structure and function of wetlands and watershed ecosystems and the distribution, movement, and quality of water.

Selected Publications

Strack M., Waddington J.M., Lucchese, M.C., and Cagampan, J.P. 2009. Moisture controls on CO₂ exchange in a Sphagnum-dominated peatland: Results from an extreme drought field experiment. *Ecohydrology*, (in press).

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Waddington, J.M. and Roulet, N.T., 2000. Carbon balance of a boreal patterned peatland. *Global Change Biology* 6: 87-98.

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Dr. Lesley Warren

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Research Interests

- Aqueous trace metal geochemistry in contaminated systems such as acid rock drainage, urban areas of the Great Lakes, vadose zone subsurface environments associated with bomb test sites in the US
- Microbial -geochemical linkages involved in key aqueous geochemical processes such as mineral precipitation and dissolution, degradation, sequestration or mobilization of contaminants, fossilization, and weathering
- Development and application of molecular based tools for characterization of microbial activity in the environment

Publications

Peer Reviewed Books

Maurice, P.A. and **Warren, L.A.** (Eds.) 2006 *Methods for Study of Microbe-Mineral Interactions*, CMS Workshop Lectures Vol. 14. 165 pp.

Peer Reviewed Contributions to Books

Warren, L.A. 2009. Acid Rock Drainage In: Reitner, J. and Thiel, V. (Eds) *Encyclopedia of Geobiology*, in the Springer Encyclopedia of Earth Sciences Series (**in press**)

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