

Halifax 2005

CONTAMINATED GRANITE SYMPOSIUM

Most granite magmas evolve as open systems, so the questions are: by what processes has externally derived material contaminated the magma, and by how much has the original granite magma changed its composition?



Field trip participants to Peggys Cove

The question on processes can be answered because sufficient mineralogical, textural, and chemical evidence exists, but the quantification question is difficult if not impossible to answer because the simple mixing equation (original magma + contaminant = final granite) involves two unknowns. In this symposium, convened by Barrie Clarke, Scott Paterson, and Ron Vernon, the approaches used to address these questions were:

Mineral chemical and/or textural – Barrie Clarke used a systematic approach to try to understand the two pre-assimilation processes (redox and thermal decomposition) and the three assimilation reactions (melting, dissolution, and ion exchange) for xenocrysts. Sarah Carruzzo continued the search for readily identifiable xenocrysts in the South Mountain Batholith (SMB) and concluded that ilmenite retained enough of its original composition and texture to be assigned xenocrystic status. Hugh Samson (in absentia) presented convincing textural and mineral assemblage evidence for the recognition of foreign sulfides in the SMB. Finally, Trevor MacHattie demonstrated with U-Pb dating from the Wathaman Batholith that zircon is the most readily identifiable xenocryst.

Petrological and/or whole-rock chemical – Ron Vernon scoured S-type granites in the Lachlan Fold Belt looking for restite, without much success, and concluded that the enclaves in these granites are either accidental country rock xenoliths or microgranitoids. Dolores Pereira described granitic rocks close to their source, before restite removal, in the anatectic complex at Peña Negra, central Spain. Both Sheila Seaman and Ben Hooks presented petrological and neodymium isotopic evidence suggesting that two different plutons from the Coastal Maine Magmatic Province were contaminated by mafic magmas. Fabien Solgadi discussed a

The Mineralogical Association of Canada held its annual meeting in Halifax, Nova Scotia, last May. We highlight some of the special sessions and symposia sponsored by MAC.

similar type of mafic–felsic magma interaction for synorogenic Hercynian granites of the French Massif Central. Cliff Stanley used whole-rock geochemical data to separate the effects of assimilation from the effects of fractional crystallization in the SMB.

Field-based physical – Scott Paterson presented clear evidence from Sierran plutons of physical contamination by extensive fragmentation of wall rocks. Bernard Bonin drew an analogy between magma stopping and roof collapse into mined-out underground voids. Dan Barker invited us to think about “exogenous” growth of plutons whereby new pulses of magma occur along the contact between the country rock and the crystallized pluton, thereby enhancing the opportunity for contamination during each magma pulse.

Experimental – Saskia Erdmann, using naturally occurring samples from the South Mountain Batholith and its monotonous host rocks to replicate the processes in the batholith, discovered that xenolith partial melting was an important process not only in providing an easily assimilable melt fraction, but also in creating new peritectic phases and releasing refractory phases into the magma.

Abstracts are available at <http://www.gac.ca/ANNMEET/2005Abstracts.html> The co-convenors are currently editing a set of papers for publication in *The Canadian Mineralogist*.

Barrie Clarke
Dalhousie University

THERMOCHRONOLOGY

Thermochronology has come to the fore as a powerful tool for deriving temperature–time histories of geological terranes. In particular, recent developments of relatively low-temperature thermochronometers, such as (U-Th)/He dating and refinements of fission-track dating and numerical modeling, have extended the range of processes that can be studied to the realm of basin diagenesis and landscape evolution. Furthermore, continuing refinements in the analysis and interpretation of higher-temperature thermochronometers from such isotopic systems as $^{40}\text{Ar}/^{39}\text{Ar}$, U/Pb, and Re/Os have led to the widespread application of thermochronology in a variety of geological studies. This special session highlighted new advances and applications of thermochronology over the entire spectrum of high- to low-temperature regimes.

Convened by James Lee (Queen’s University), Marcos Zentilli (Dalhousie University), Mike Villeneuve (Geological Survey of Canada), and Ray Donelick (Apatite to Zircon Inc.), the session encompassed two full days of talks

and included poster session. Topics illustrated a wide range of applications, including neotectonics, metallogeny, petroleum studies, tectonics, and crustal evolution. Two general themes that emerged from the talks highlighted (1) new applications related to advances in instrumentation (e.g. increased analytical precision, sensitivity, and spatial resolution) and (2) new applications due to the development of new techniques. The sessions were well attended by both professionals and students and followed the highly successful GAC short course on thermochronology, held just before the beginning of the meeting.

James Lee
Queen’s University

CARATS MEET CRATONS

“From Cratons to Carats: A symposium to Honor the Career of Herwart Helmstaedt” was organized by four of Herb’s former graduate students, Sally Pehrsson (Geological Survey of Canada), John Percival (Geological Survey of Canada), Dan Schulze (University of Toronto), and David Scott (Geological Survey of Canada), and sponsored by the Mineralogical Association of Canada. The two-day symposium featured presentations on the structure and tectonics of Archean cratons and the geotectonic controls on diamond exploration, reflecting the focus of Herb’s research career.

On the first day, the “Cratons” session was kicked off with a keynote lecture by Dr. Maarten de Wit entitled “‘Helmstaedtian’ Cratons and Greenstone Belts,” in which Herb’s contributions to the understanding of the formation of Archean Cratons were summarized. This was followed by lectures on the nature of tectonic processes as revealed through the study of the early Earth’s crust and lithospheric mantle. Early the next morning, Dr. John Gurney’s introduction to the second half of the symposium, the “Carats” session—“A view on the Contribution of Herb Helmstaedt to Craton Evolution over Four Decades (1973–2005)”—was very well attended. Throughout the second day, the presentations explored the links among subduction, development of the lithospheric mantle, and diamond formation, and featured case studies from around the world.

This symposium brought together an international group of researchers from North America, South Africa, Europe, and Australia. It provided me with an opportunity to interact with some of the most-renowned researchers in this field and was an excellent way to conclude my MSc. My attendance at this conference was assisted, in part, by a travel grant from the Mineralogical Association of Canada.

Anetta Banas
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