Monday, May 21, 2001
REACTIVE FLUID FLOW DURING METAMORPHISM:
FIELD STUDIES AND MODELING I
8:25 a.m.  Georgian Room

Chairs: G. T. Roselle
J. J. Ague

Yardley B. W. D. * [KEYNOTE]
Continuous and Episodic Fluid Flow in Regional Metamorphism [#3776]
Prograde metamorphism leads to fluid flow that is generally uniform and pervasive, but metasomatically
induced disequilibrium can lead to intense focused flows linked to marbles. Retrograde fluid flow is dominated
by episodic infiltration driven by seismicity.

Wing B. A. * Ferry J. M.
3-D Geometry of Fluid Flow During Barrovian Regional Metamorphism from an Inversion of Integrated
Petrologic and Stable Isotopic Data [#3601]
A formal inversion of tracer data (CO₂, O- and C-isotopes) from metacarbonate rocks in SE Vermont explicitly
resolves the complex (upward, downward, up-T, down-T) and fundamentally three-dimensional nature of
regional metamorphic fluid flow.

Ague J. J. *
Transport of Rare Earth Elements by Fluids During Barrovian-style Metamorphism [#3641]
Rare earth elements (REE) may be added to metacarbonate rocks by aqueous fluids in alteration zones around
quartz veins and at lithologic contacts during Barrovian-style metamorphism. P-complexes may play an
important role in transporting the REE.

Nabelek P. I. * Wilke M. Huff T. A. Sirbescu M.-L.
Production of Carbonic Fluids from Graphite During Metamorphism and Their Retention in the
Deep Crust [#3377]
The presented work deals with consumption of graphite during high-grade metamorphism of pelitic rocks and
with the consequent fate of carbonic fluid species in the crust.

Baxter E. F. *
Field Measurement of Slow Metamorphic Reaction Rates and the Implications for Local Equilibrium-based
Geochemical Methods [#3683]
A method for measuring natural reaction rates in the field is presented. Application of the method yields a
reaction rate many orders of magnitude slower than extrapolations based on lab data. Geochemical implications
will be discussed.

Ferry J. M. * [KEYNOTE] Wing B. A. Rumble D. III
Chemically Reactive Fluid Flow During Contact Metamorphism of Siliceous Carbonate Rocks [#3008]
Reactive fluid flow that drove prograde mineral reactions in 15 contact aureoles is reviewed. With few
exceptions, fluid was magmatic and primarily flowed vertically upward with time-integrated flux in the range
100–10,000 mole fluid/square cm rock.

Dipple G. M. *
The Origin of Permeability in Siliceous Dolomite During Contact Metamorphism [#3417]
Infiltration of exotic hydrous fluid into marble of the Horsethief Creek aureole (British Columbia) occurred
during transient periods of high permeability and sub-lithostatic fluid pressure accompanying compaction that
follows CO₂ release.
Bowman J. R. *  
Stable Isotope Imaging of Metamorphic Paleoauquifers: Constraints on Timescales of Fluid Flow and Permeability Structure in the Alta Stock Thermal Aureole, Utah [#3677]  
Detailed stable isotope analyses of Periclase zone marbles in the Alta aureole, Utah, define bedding concordant permeability heterogeneity within the marbles, and indicate that individual layers experience significant differences in fluid flux and duration of fluid flow.  

Cui X. *  Nabelek P. I.   Liu M.  
Fluid Flow and Oxygen Isotope Resetting in the Notch Peak Contact Metamorphic Aureole, Utah: Insights from Two-Dimensional Numerical Modeling [#3078]  
We studied numerically the coupled macro-scale fluid and heat flow with oxygen isotope resetting in the Notch Peak contact metamorphic aureole, Utah. The results provided useful information on the isotopic alteration and fluid flow in the aureole.