Enter search terms:
Search
in this series
Advanced Search

Notify me via email or RSS

Browse
Collections
Disciplines
Authors

Author Corner
Author FAQ

Dissertations

Analysis of the Gouldsboro Pluton and the Fehr Granite: Understanding the Scales of Magmatic Processes and Partial Melt Generation from the Deep to Shallow Crust

Download

SHARE

George Christopher Koteas, *University of Massachusetts - Amherst*

Follow

Date of Award
9-2010

Document Type
Open Access Dissertation

Degree Name
Doctor of Philosophy (PhD)

Degree Program
Geosciences

First Advisor
Sheila J. Seaman

Second Advisor
Michael L. Williams

Third Advisor
J. Michael Rhodes

Keywords
anatexis, bimodalism, deep crust, granite, microprobe, migmatites

Subject Categories
Geology | Other Earth Sciences

Abstract
The heterogeneity of the continental crust has a first order control on the dynamics of plate tectonic processes and the compositions of the Earth in both time and space. Heterogeneity can be characterized at a variety of scales and in a multitude of tectonic environments, but it is the links between seemingly disparate tectonic settings and crustal levels that are critical in understanding construction of the continents. The focus of this dissertation work is to apply microtextural, microgeochemical, whole rock geochemical and traditional petrographic techniques to study features in both deep and shallow crustal igneous rocks. The goal of these efforts is to better understand the roles that magmatic processes, mafic-felsic magma interaction, and partial melting have on the evolution of continental crust. Two principal field areas were selected, the Gouldsboro

pluton in coastal Maine and the Fehr granite in northern Saskatchewan, Canada, because they each represent end-members of the processes involved with the generation, modification, transport, and emplacement of magmas that build continental crust. Evidence for bimodal magmatism preserved in the Silurian age Gouldsboro pluton has led to a refined model for the construction of shallow crustal magma chambers. Research efforts focused on the Neoarchean Fehr granite and Paleoproterozoic Chipman dike swarm have contributed to the current understanding of the links between high temperature metamorphism (migmitization) and the production of new felsic magmas as well as the rheological and chemical influences of mafic-felsic magma interaction in the deep crust. The results of these combined field and laboratory efforts have demonstrated the important role of mafic-felsic magma interaction on the strength and composition of both deep and shallow continental crust and have contributed to the current understanding of the complex links between deep crustal heterogeneity and bimodal magmatism at shallow crustal levels.

Recommended Citation
Koteas, George Christopher, "Analysis of the Gouldsboro Pluton and the Fehr Granite: Understanding the Scales of Magmatic Processes and Partial Melt Generation from the Deep to Shallow Crust" (2010). *Dissertations.* Paper 284.
http://scholarworks.umass.edu/open_access_dissertations/284

This page is sponsored by the University Libraries.
© 2009 University of Massachusetts Amherst • Site Policies