The evolution and differentiation of the continental crust pose fundamental questions that are being addressed by new research concerning melting, melt extraction and transport through the crust, and the effect of melt on crustal rheology, in addition to new advances involving geophysics and geochemistry. Many new insights into crustal processes have been triggered by combined field observations and laboratory experiments, supported by developments in numerical modeling.

The first three chapters deal with the structure of the continents, controls on heat production and the composition, differentiation and evolution of continental crust. The role of arc magmatism in the Phanerozoic and crustal generation in the Archean are addressed next. To understand the modification and differentiation of continental crust we first consider two regional examples, one of the lower crust and one of the middle crust. There follows a series of process-oriented chapters involving melting, melt extraction and migration and crustal rheology. The final two chapters review the emplacement and growth of plutons and outline a modeling approach to the physical controls on crustal differentiation.

Written by experts active in the field, this book provides a valuable summary of recent advances for graduate students and research workers.

M I C H A E L  B R O W N has held faculty positions at Oxford Brookes and Kingston universities in the UK, and at the University of Maryland in the USA, where he is currently Professor of Geology and Director of the Laboratory for Crustal Petrology. He is the founding editor of the Journal of Metamorphic Geology and is editor of books on High-temperature Metamorphism and Crustal Anatexis (Unwin Hyman, 1990) and The Origin of Granites and Related Rocks (Geological Society of America Special Paper).
Michael Brown and his colleagues and students investigate the pressure–temperature–time–deformation evolution of metamorphic belts, and the generation, segregation, transfer, and emplacement of granite within the Earth’s crust. His work involves integration between field and laboratory studies, and theoretical analysis and modeling. Michael Brown was awarded the Coke Medal for 2005 by the Geological Society.

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EVOLUTION AND DIFFERENTIATION OF THE CONTINENTAL CRUST

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