

FOREWORD

This is the Proceedings Volume for the International Symposium "Origin and Evolution of Continents" which was held on 13-14 October 1997 at the National Olympic Memorial Youth Center, Tokyo, Japan, and sponsored by the National Institute of Polar Research as a part of the Center of Excellence (COE) program. During the two-day symposium, 18 papers were presented orally and 25 papers as posters to a total of some 160 participants.

This symposium was aimed at obtaining better and more realistic models for the origin, formation, and present structure of the continental crust through a combination of geological and geophysical approaches. The topics considered included:

- * Origin of crustal materials
- * Geodynamic modeling of present continental crust
- * Rheological behavior of crustal materials
- * Heat sources and heat flow modeling
- * Fluid processes
- * Ultra-high pressure (UHP) and ultra-high temperature (UHT) metamorphism

The papers in the Proceedings Volume are representative of those presented at the Symposium, and include review papers by Kent CONDIE and Brian WINDLEY. CONDIE proposes episodic growth of continental crust caused by several super-events in the mantle during the Archean and Proterozoic. WINDLEY summarizes Archean and Early Proterozoic orogens and proposes that they were comparable to those formed today with respect to their relationships with subduction processes and magmatism. Examples of ultra-high pressure metamorphism (UHP) in the Western Alps and Su-Lu region of China are summarized by HIRAJIMA, who also discusses the debate between 'in situ' vs. 'external' origin of UHP rocks. HARLEY presents a method for estimation of the ultra-high temperature (UHT) conditions of metamorphism by means of elemental mapping of aluminous orthopyroxene from the Napier Complex, Antarctica. GREW demonstrates a mineralogical approach to the origin of UHT metamorphism through an investigation of boron and beryllium minerals in pegmatites from the Napier Complex, Antarctica. An example of UHT rocks from the Lewisian Complex of Harris in NW Scotland is presented by BABA, who discusses the P - T conditions and P - T path deduced from textures. SHIMURA *et al.* describe in detail migmatitic rocks from Antarctica, and propose that they have formed as a result of partial melting of pre-existing pelitic materials during high-grade metamorphism. MINTS and KONILOV recognize two types of crustal sections, namely thinned crust and thickened crust, based on generalized lateral and vertical P - T gradients. ANMA *et al.* present an example of compositional zoning in a granite pluton in SW Japan and discuss its origin in relation to diapir models. USUKI and WATANABE address the thermal structure and metamorphic evolution of the Hidaka terrain, Japan, using mineralogical data as well as recent SHRIMP dating. KITAMURA and ISHIKAWA describe experiments used to measure rock velocities of natural samples in order to model the crustal section of the Tanzawa plutonic complex, Japan. On the basis of gravity modeling and a multichannel seismic profile, JIN and KIM discuss the formation of Shackleton Fracture Zone and

the South Shetland Trench in relation to Cenozoic subduction. Using satellite gravity data, **LAWVER *et al.*** present a tight fit for Early Mesozoic Gondwana, including East Antarctica, India and fragments of eastern Africa.

This international symposium and the resulting proceedings volume are contributions to the new Japanese Antarctic program "Structure and Evolution of East Antarctic Lithosphere: SEAL". The aim of this program is to bring Japanese and overseas scientists together to investigate the thermal and tectonic evolution of the East Antarctic lithosphere through the long period of time which extends from the earliest Archean to the present, an aim that the present volume certainly fulfils.

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