

GEOLOGICAL SOCIETY SPECIAL PUBLICATION NO. 218

Ophiolites in Earth History

EDITED BY

Y. DILEK

Miami University, USA

and

P. T. ROBINSON

Dalhousie University, Canada

2003

Published by
The Geological Society
London

Contents

Preface	ix
Introduction	
DILEK, Y. & ROBINSON, P. T. Ophiolites in Earth history: introduction	1
DILEK, Y. Ophiolite pulses, mantle plumes and orogeny	9
Tethyan ophiolites in the Alpine-Himalayan orogenic system	
FLOWER, M. F. J. & DILEK, Y. Arc–trench rollback and forearc accretion: 1. A collision-induced mantle flow model for Tethyan ophiolites	21
DILEK, Y. & FLOWER, M. F. J. Arc–trench rollback and forearc accretion: 2. A model template for ophiolites in Albania, Cyprus, and Oman	43
MÜNTENER, O. & PICCARDO, G. B. Melt migration in ophiolitic peridotites: the message from Alpine–Apennine peridotites and implications for embryonic ocean basins	69
BAZYLEV, B. A., KARAMATA, S. & ZAKARIADZE, G. S. Petrology and evolution of the Brezovica ultramafic massif, Serbia	91
SACCANI, E., PADOA, E. & PHOTIADES, A. Triassic mid-ocean ridge basalts from the Argolis Peninsula (Greece): new constraints for the early oceanization phases of the Neo-Tethyan Pindos basin	109
SARKARINEJAD, K. Structural and microstructural analysis of a palaeo-transform fault zone in the Neyriz ophiolite, Iran	129
AITCHISON, J. C., DAVIS, A. M., ABRAJEVITCH, A. V., ALI, J. R., BADENGZHU, LIU, J., LUO, H., MCDERMID, I. R. C. & ZIABREV, S. V. Stratigraphic and sedimentological constraints on the age and tectonic evolution of the Neotethyan ophiolites along the Yarlung Tsangpo suture Zone, Tibet	147
HÉBERT, R., HUOT, F., WANG, C. & LIU, Z. Yarlung Zangbo ophiolites (Southern Tibet) revisited: geodynamic implications from the mineral record	165
MALPAS, J., ZHOU, M.-F., ROBINSON, P. T. & REYNOLDS, P. H. Geochemical and geochronological constraints on the origin and emplacement of the Yarlung Zangbo ophiolites, Southern Tibet	191
Magmatic, metamorphic and tectonic processes in ophiolite genesis	
HARPER, G. D. Tectonic implications of boninite, arc tholeiite, and MORB magma types in the Josephine Ophiolite, California–Oregon	207
SCHROETTER, J. M., PAGÉ, P., BÉDARD, J. H., TREMBLAY, A. & BÉCU, V. Forearc extension and sea-floor spreading in the Thetford Mines Ophiolite Complex	231
RAYMOND, L. A., SWANSON, S. E., LOVE, A. B. & ALLAN, J. F. Cr-spinel compositions, metadunite petrology, and the petrotectonic history of Blue Ridge ophiolites, Southern Appalachian Orogen, USA	253
HIRANO, N., OGAWA, Y., SAITO, K., YOSHIDA, T., SATO, H. & TANIGUCHI, H. Multi-stage evolution of the Tertiary Mineoka ophiolite, Japan: new geochemical and age constraints	279
TAKAHASHI, A., OGAWA, Y., OHTA, Y. & HIRANO, N. The nature of faulting and deformation in the Mineoka ophiolite, NW Pacific Rim	299

STAKES, D. S. & TAYLOR, H. P. Jr Oxygen isotope and chemical studies on the origin of large plagiogranite bodies in northern Oman, and their relationship to the overlying massive sulphide deposits	315
Hydrothermal and biogenic alteration of oceanic crust as recorded in ophiolites	
GREGORY, R. T. Ophiolites and global geochemical cycles: implications for the isotopic evolution of seawater	353
GIGUÈRE, E., HÉBERT, R., BEAUDOIN, G., BÉDARD, J. H. & BERCLAZ, A. Hydrothermal circulation and metamorphism in crustal gabbroic rocks of the Bay of Islands ophiolite complex, Newfoundland, Canada: evidence from mineral and oxygen isotope geochemistry	369
MUEHLENBACHS, K., FURNES, H., FONNELAND, H. C. & HELLEVANG, B. Ophiolites as faithful records of the oxygen isotope ratio of ancient seawater: the Solund–Stavfjord Ophiolite Complex as a Late Ordovician example	401
FURNES, H. & MUEHLENBACHS, K. Bioalteration recorded in ophiolitic pillow lavas	415
Ophiolite emplacement: mechanisms and processes	
WAKABAYASHI, J. & DILEK, Y. What constitutes ‘emplacement’ of an ophiolite?: Mechanisms and relationship to subduction initiation and formation of metamorphic soles	427
GRAY, D. R. & GREGORY R. T. Ophiolite obduction and the Samail Ophiolite: the behaviour of the underlying margin	449
SEARLE, M. P., WARREN, C. J., WATERS, D. J. & PARRISH, R. R. Subduction zone polarity in the Oman Mountains: implications for ophiolite emplacement	467
Regional occurrence of ophiolites and geodynamics	
HARRIS, R. Geodynamic patterns of ophiolites and marginal basins in the Indonesian and New Guinea regions	481
MILSOM, J. Forearc ophiolites: a view from the western Pacific	507
SPAGGIARI, C. V., GRAY, D. R. & FOSTER, D. A. Tethyan- and Cordilleran-type ophiolites of eastern Australia: implications for the evolution of the Tasmanides	517
ZHANG, Q., WANG, Y., ZHOU, G. Q., QIAN, Q. & ROBINSON P. T. Ophiolites in China: their distribution, ages and tectonic settings	541
SPADEA, P., ZANETTI, A. & VANNUCCI, R. Mineral chemistry of ultramafic massifs in the Southern Uralides orogenic belt (Russia) and the petrogenesis of the Lower Palaeozoic ophiolites of the Uralian Ocean	567
ISHIWATARI, A., SOKOLOV, S. D. & VYSOTSKIY S. V. Petrological diversity and origin of ophiolites in Japan and Far East Russia with emphasis on depleted harzburgite	597
SOKOLOV, S. D., LUCHITSKAYA, M. V., SILANTYEV, S. A., MOROZOV, O. L., GANELIN, A. V., BAZYLEV, B. A., OSIPENKO, A. B., PALANDZHIAN, S. A. & KRAVCHENKO-BEREZHNOY, I. R. Ophiolites in accretionary complexes along the Early Cretaceous margin of NE Asia: age, composition, and geodynamic diversity	619
STERN, C. R. & DE WIT, M. J. Rocas Verdes ophiolites, southernmost South America: remnants of progressive stages of development of oceanic-type crust in a continental margin back-arc basin	665
DILEK, Y. & AHMED, Z. Proterozoic ophiolites of the Arabian Shield and their significance in Precambrian tectonics	685