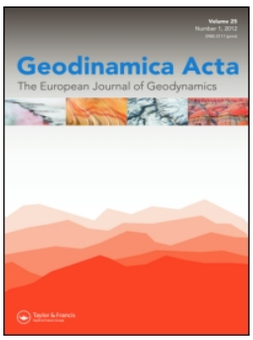

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PREFACE

Metamorphic terranes of the Aegean region

Erdin Bozkurt

The geodynamic evolution of mountain belts at convergent plate boundaries, particularly the understanding of mechanism(s) of crustal thickening and subsequent orogen collapse as demonstrated by rapid exhumation of metamorphic rocks, formed the subject of intense research over the last three decades. In this regard, Aegean region is a good example and forms a natural laboratory for studying processes of crustal thickening, extension and exhumation of metamorphic terrains. This special issue of ***Geodinamica Acta*** therefore presents examples of multidisciplinary modern research and includes selected original scientific contributions dedicated to the better understanding of evolution of metamorphic terranes in the Aegean region. The seven papers assembled into this special issue are representative of many recent researches and offer the reader with an insight into a wide range of aspects of the metamorphic terranes of the Aegean (Menderes, Strandja, Sandıklı and Uludağ massifs in Turkey, Rhodope Massif in Bulgaria and, Cycladic Massif in Greece). Modern research combines the results of detailed structural, petrographic, geochemical and geochronological analysis of constituent rocks of these metamorphic massifs. The crucial role of and interplay among metamorphism, migmatization, granitic magma generation and emplacement, and normal faulting in the history of the metamorphic terranes also forms the core of major discussion.

The first paper by **Okay and Satır** reports *P-T* and geochronologic (U-Pb on zircons and Rb-Sr on micas) evidence for an Eocene magmatic and low pressure-high temperature (LP/HT) metamorphic event, in a WNW-ESE belt on the northern margin of the Anatolide-Tauride Block, which locally overprints the Upper Cretaceous HP/LT metamorphic rocks. Two possible models were proposed as possible causes for this post-collisional Eocene plutonism and associated LP/HT metamorphism: (i) subduction of an oceanic lithosphere or (ii) slab breakoff during the closure of the Neotethyan Ocean. The authors conclude that Eocene plutons and LP/HT metamorphism probably developed in a magmatic arc situated over a NNE-dipping subduction zone located along the Vardar suture and that this subduction zone was also responsible for the Eocene HP/LT metamorphism in the Cycladic Massif. **Bonev, Marchev & Singer** present, in their study of two metamorphic domes – the Kesebir-Kardamos and the Biala reka-Kehros domes – in the Eastern Rhodope, new $^{40}Ar/^{39}Ar$ geochronological and structural data that shed light on the geological processes involved during exhumation of the two metamorphic domes in the footwall of detachment faults. The southward gradual increase of radiometric ages up structural section is interpreted to suggest an asymmetrical mode of extension, cooling and exhumation. Geochronologic data from the footwall metamorphic rocks together with altered rocks from the ore deposits in the immediate hanging-wall of detachments and silicic dykes indicate that extensional tectonics and related exhumation and doming, epithermal mineralizations and volcanic activity are closely spaced in time. The age of Palaeozoic magmatic activity in the Strandja Massif of northwestern Turkey formed the subject of paper by **Gürsel, Natal'in, Satır & Toraman**. They present new structural, geochemical and geochronological data from leucocratic orthognesisses. The results confirm the previously documented Permian magmatic episode but also provide firm data, for the first time, for a Carboniferous episode which is attributed to a magmatic arc that devolved atop of a mature continental basement. As the massif continues into Bulgaria, the results of this work have more regional implications. The Pressure-Temperature-time paths of metapelites from the structural dome of Naxos have been reconstructed on the basis of new geothermobarometric data and Rb-Sr dating, as well as previously published data by **Duchene, Aissa & Vanderhaeghe**. The interpretation of the *P-T-t* paths indicates a time span of 15–20 Ma for dome formation. Two possible models were proposed as possible causes of the HP/LT to MP/MT transition: (i) heating of deeper parts of the dome

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through magma injection or (ii) either homogeneous (75%) or localized thinning during dome formation.

A multiequilibrium thermobarometric approach was used by **Trotet, Goffe, Vidal & Jolivet** to estimate the *P-T* conditions of successive metamorphic stages in carpholite-bearing blueschists that occur at the base of the Phyllite-Quartzite nappe of Peloponnese. Thermobarometric calculations suggest that Mg-carpholite is a retrograde phase in the Peloponnese, a phenomenon which has never been observed elsewhere in HP/LT carpholite-bearing schists. The calculated *P-T* paths indicate that the Mg-carpholite blueschists were subducted to ~40 km depth and maintained in a cool thermal gradient of ~7 °C/km during exhumation. **Talip Güngör** provides structural data from Lower Cambrian rocks that forms the stratigraphically lowermost part of the relative autochthonous unit of the Taurides in the Sandıklı (Afyon) region. Lower Cambrian is represented by quartzites with metapelites intercalations, metapelites with mafic volcanic intercalations and rhyolites with volcanosedimentary intercalations and is conformably overlain by sequence of white quartzites, brown dolomites, trilobite-bearing limestones and mudstones of the Middle–Late Cambrian age. The Lower Cambrian rocks were deformed and underwent a low-grade metamorphism. The analyses of orientation of foliation and linear fabrics and sense of shearing show pronounced differences and these are attributed to the effect of regional-scale Alpine fold event(s) that rotated the earlier fabrics. The field relations, petrography and geochemical characteristics of granitoid rocks that expose in the footwall of a regional scale ductile southern Menderes shear zone (southwest Turkey) formed the subject of the paper by **Bozkurt, Winchester, Mittwede & Ottley.** The granitoid rocks include widespread possibly Ediacaran high-grade granitic orthogneisses and younger (Tertiary) sheets, sills and/or dikes of variably deformed calc-alkaline and peraluminous, syn- to post-collisional tourmaline-bearing leucogranites that are confined to the immediate footwall of the shear zone. The authors suggest that the leucogranite melt generation and emplacement occurred in pulses during which both compressional and extensional processes played key roles in melt generation, emplacement, deformation and exhumation of the massif. The paper also documents geochemical evidence of granite-hosted tourmalines from metaconglomerate and those from metasedimentary schists and concludes that since the tourmaline-bearing pebbles were unlikely to be derived from granitoid gneiss, the crucial piece of evidence for the presence of a major (Pan-African) unconformity in the southern Menderes Massif is unnecessary.

In summary, the papers in this issue would have more regional implications and provide new and valuable data towards the better understanding of processes involved in the formation of metamorphic terranes not only in the Aegean but elsewhere in the world.

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