



Late Palaeozoic-Mesozoic magmatism in the Kastamonu belt, Central Pontides-NW Turkey and regional geological implications

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The geodynamic evolution of the eastern Mediterranean is characterized by the opening and closure of the Palaeo-Tethys since the Palaeozoic. Such geodynamic processes are well documented in the Pontides basement. The Pontides tectonic belt of Turkey is located to the north of the İzmir-Ankara-Erzincan suture and is believed to be of Eurasian origin. The Central Pontides is a tectonic mosaic of two juxtaposed Pontides terranes (the Istanbul and the Sakarya Zones) and oceanic assemblages, amalgamated since the Late Palaeozoic-Early Mesozoic time. The basement is made up of gneisses and amphibolites, intruded by numerous granitoids collectively called the Middle Jurassic Kastamonu granitoid belt. Single zircons ages from Deliktaş, Sivrikaya and Devrekani granitoids combined with isotope data reveal a hitherto unrecognized Permian-Carboniferous magmatism in the north, coexisting with Middle Mesozoic plutonism in the south of the belt.

Sivrikaya granitoid is host to granodiorites, tonalites and two-mica granites. Sivrikaya rocks have Sr_i ratios of 0.705-0.708, eNd_T values of -1.0 to -3.8, $\delta^{18}O_{WR}$ values of 10.0-11.6 ‰, and Mg# values of 61-28, suggesting dehydration melting of heterogeneous protolith dominated by amphibolite and metagreywacke-type sources with mantle contribution. The Deliktaş granite consists of muscovite-rich monzogranite. Samples have high Sr_i ratios (0.710-0.712), eNd_T values of -2.0 to -4.7 and constant $\delta^{18}O_{WR}$ values (~ 11.6 ‰) indicating a predominantly pelitic source. The Devrekani granitoid samples, metaluminous I-type diorites and quartz diorites, yield high

ϵNd_T values (-0.8 to -2.2), low Sr/Rb ratios (0.705-0.706), $\delta^{18}\text{O}_{WR}$ values of 8.2-9.0 ‰, positive Eu- and Sr-anomalies and very high Mg# (74-62), strongly supporting the contention that mantle and/or lower crustal sources were involved in their genesis. Evidence for the lack of significant input of old continental material is further provided by the absence of inherited Precambrian zircons in all analyzed Devrekani samples.

Although we got ages of ~ 303 Ma for the Sivrikaya and ~ 290 Ma for Deliktaş, evidence for Middle Jurassic (~ 165 Ma) plutonism is provided by Devrekani granitoid in the south of the Kastamonu belt. This Late Palaeozoic magmatism can be correlated with those of the Cyclades of the Aegean region, the Pelagonian zone in Greece, and the eastern and western Pontides. Zircon xenocryst ages as old as 2.3 Ga from the plutons in north, provide evidence for Proterozoic components, consistent with Laurasian and Gondwanan origin of the Central Pontides basement. Many zircon analyses show metamorphic events at 340-320-220-190 Ma.

The data imply a 'long-lived' Palaeozoic bimodal magmatism related to the northward subduction of the Palaeotethys and 'short-lived' unimodal Middle Mesozoic plutonism in the south of the belt linked to a south-dipping subduction of the Palaeotethyan marginal basin (the Küre basin). That is, the Early Mesozoic closure of the Palaeotethys triggered the detachment of subducted Palaeotethys oceanic lithosphere and the rapid uprise of hot mantle material that induced partial melting of lower crust, and the subsequent emplacement of the Devrekani granitoid.