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Eocene continental arc magmatism along the southern Eurasian margin: New U-Pb LA-ICPMS, Sm-Nd and whole-rock geochemical data from Marmara Island, NW Turkey

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Different metamorphic units of unknown age are exposed in the Marmara Island in the form of N-dipping thrust sheets. A granodioritic intrusion was emplaced into one of these sheets as a ca. 4 km wide and 20 km long, WSW-ESE trending, sill-like intrusion. The granodiorite intrusion was sheared and mylonitised following its emplacement, along with its host rocks. Both N-dipping foliation and WSW-ENE trending stretching lineation developed in the intrusion are also found in the adjacent units, suggesting that the most prominent mesoscopic fabric in the Marmara Island was formed subsequent to the granodiorite intrusion.

Different ages were proposed for the granodiorite intrusion in the Marmara Island based on its stratigraphic relation with the adjacent units and its deformation state; these include Precambrian, Late Palaeozoic and Neogene ages. We have dated the inrusion by Laser Ablation ICP-MS analysis of U and Pb isotopes on zircon separates. Our analysis of 22? zircon grains yielded a well-constrained magmatic age of early Lutesian (47,6 $\pm$ 0,2 Ma) for the granodioritic magmatism. We also performed geochemical analysis of 17 samples of the intrusion by XRF for major- and trace-elements. Immobile element geochemistry of the granodiorite revealed that it is a calc-alkaline, metaluminous granodiorite that carries a subduction component, marked by a Nb depletion relative to LREE and LIL-element enrichment relative to ORG. Nd isotope analysis of one sample revealed positive epsilon values, suggesting

that the intrusion was derived from a depleted mantle with some contamination from continental crust.

We think that the granodiorite sill is a member of Andean-type magmatic arc, forming a 30 km wide and more than 200 km long arcuate belt in NW Turkey that post-date suturing along the İzmir-Ankara suture zone. The arc magmatism emplaced at the early stages of collapse of a deformation zone already formed in Early Eocene. The collapse was associated with flexural bending in response to the thickening of the crust at a collision front located further south. This subsidence event led to the formation of deepening upward marine basins and generation of arc magmatism, which shed volcanogenic input into the adjacent marine basins in NW Turkey. Northward migration of collisional bulge by continuing indentation of colliding blocks caused regional uplift and deformation which generated N-dipping foliation and ENE-WSW trending stretching lineation at mid-crustal levels in the Late Eocene-Oligocene times.