

Geochronology and geochemistry of the Beypazari granitoid pluton

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The Beypazari granitoid pluton was emplaced in a Late Cretaceous volcanic arc in north central Turkey. This pluton provides important evidence for collision during the closure of the NeoTethys Ocean, a major event in Earth history. Exposures crop out in the Central Sakarya Zone, a continental sliver trending from east to west for approximately 1500 km and extending 200 km from north to south. A generally accepted tectonic model for emplacement is northward subduction of NeoTethyan oceanic plate, wherein a metasomatized mantle source melted the overriding continental crust and was contaminated by upper crust during ascent. During the Eocene, crustal shortening and uplift of the Anatolian Plateau subsequent to closure of the NeoTethys resulted in isostatic instability. Collision with the Arabian Plate in the Miocene triggered activation of the North Anatolian Fault, a right-lateral strike-slip system that propagated from the east and extends 1200 km to the west. Westward displacement of Turkey accommodated by the North Anatolian Fault is likely a consequence of collision in the east combined with extension and gravitational collapse in the west. The pluton is a calc-alkaline, metaluminous, volcanic arc granitoid, ranging in composition from granite and granodiorite to quartz monzonite and monzonite, with cross-cutting aplite dikes and mafic enclaves. This poster presents preliminary geochemical results and geochronological analyses, including the first U/Pb ion microprobe zircon ages and the first cathodoluminescence (CL) images used to interpret zircon ages from the Beypazari granitoid. Dated zircons from host rock samples are Cretaceous to Eocene (102.8 ± 16.8 Ma to 48.9 ± 2.7 Ma). Aplite dike ages generally range from Paleocene to Oligocene (65.2 ± 8.2 Ma to 32.2 ± 4.9 Ma); however, two zircons from one sample are Late Miocene (5.6 ± 0.3 Ma) and Pliocene (5.0 ± 0.3 Ma). Whole-rock CL imagery reveals calcite precipitated in microcracks, providing evidence for post-crystallization brittle deformation. Individual zircons in host rock display oscillatory (igneous) zoning in CL, and young zircon CL images are cloudy, which may indicate metamorphic recrystallization related to interaction with late stage hydrothermal fluids. Analysis and interpretation of these young zircons can offer useful insights into the role of igneous and metamorphic processes in recording the consolidation and evolution of Turkey.

Keywords: zircon geochronology, cathodoluminescence, Beypazari granitoid, central Turkey, subduction