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PII: S1464-343X(18)30197-3

DOI: [10.1016/j.jafrearsci.2018.07.001](https://doi.org/10.1016/j.jafrearsci.2018.07.001)

Reference: AES 3263

To appear in: *Journal of African Earth Sciences*

Received Date: 26 February 2018

Revised Date: 29 June 2018

Accepted Date: 2 July 2018

Please cite this article as: Beyarslan, M., Bingöl, A.F., Zircon U-Pb age and geochemical constraints on the origin and tectonic implications of late cretaceous intra-oceanic arc magmatics in the Southeast Anatolian Orogenic Belt (SE-Turkey), *Journal of African Earth Sciences* (2018), doi: 10.1016/j.jafrearsci.2018.07.001.

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# **Zircon U-Pb Age and Geochemical Constraints on the Origin and Tectonic Implications of Late Cretaceous Intra-Oceanic Arc Magmatics in the Southeast Anatolian Orogenic Belt (SE-Turkey)**

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## **ABSTRACT**

The Southeast Anatolian Orogenic Belt (SEAOB) exposes abundant intra-oceanic arc-system rocks. This system consists of ophiolites and arc-type volcanic and intrusive rocks (e.g., granitoids). The volcanics and plutonics have geochemical characteristics similar to modern intra-oceanic arc-system rocks. The petrogenesis of the granitoids and associated volcanic rocks has been widely related to the subduction of the southern branch of the Neotethyan beneath the Anatolian microplate. We report the first detailed SHRIMP zircon U-Pb chronology and a major and trace element geochemical study of the intra-oceanic arc magmatics (i.e. Elazığ magmatics) that out-crop extensively in the Elazığ-Malatya region and the Eastern part of the SEAOB. The volcanics, which show a low K-tholeiite and calc-alkaline affinity, have LA-ICPMS zircon U-Pb ages of 84–82 Ma. The plutonics, which show low K- tholeiite, calc-alkaline, and shoshonite affinity, have LA-ICPMS zircon U-Pb ages of 84–72 Ma. SHRIMP zircon U-Pb dating reveals that the volcanics and plutonics were formed in the Late Cretaceous. The geochemical and geochronological features indicate that the Elazığ magmatics formed in three stages. The first- and second-stage intrusives' geochemical characteristics indicate that these rocks are derived from an enriched lithospheric mantle source by a partial melting of the metasomatized mantle in a subduction setting, and the late-stage plutonics are shoshonitics formed in a collisional zone environment.

**Key words:** Southeast Orogenic Belt, intra-oceanic arc, Elazığ magmatics, geochemistry, geochronology, Neotethys

## **1. Introduction**

Intra-oceanic arcs are produced in the upper plate of a convergent margin when the subducted plate reaches melting depths (i.e. 100-150 km, Stern, 2010). The intra-oceanic arcs represent major sites of juvenile continental crust (e.g., tonalite-andesite arc magmatism);

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