

Tethyan evolution of the South Armenian Block: From NE Gondwana breakup to collision with Eurasia

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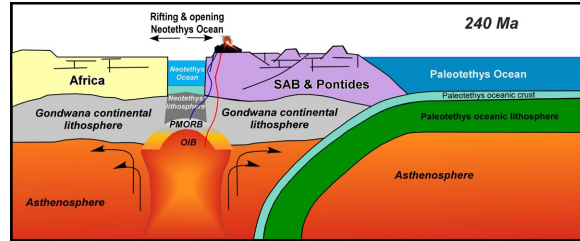
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The Arabian-Eurasian collision zone results from a complex geodynamic evolution that is partially preserved in large-scale terranes stretching from the Mediterranean to Tibet. Integral to the evolution is the Permian breakup of Gondwana and the formation of a collection of microcontinents, termed Cimmeria, which accreted to the southern Eurasian margin upon closure of the Palaeotethys and Neotethys oceans. One of these Gondwana-derived fragments is the South Armenian Block (SAB), a continental fragment presently separated from the former southern Eurasian margin and from the Taurides and Iran by ophiolite-bearing suture zones. Knowledge about the geodynamic evolution of the SAB within the Tethyan realm contains gaps, and because much of the SAB is covered by Cenozoic sediments, its relation to the neighbouring terranes of Central Iran, the Pontides and Taurides is unclear.

We report new geochronological, geochemical and palaeomagnetic data on magmatic intrusions into the Late Devonian sedimentary cover and metamorphic rocks of the basement of the SAB. These data are used to reconstruct the origin and better understand the geodynamic history of SAB from the Permian to the Cretaceous.

Similarities in zircon age distributions (~3.6 Ga to ~100 Ma) and their continental geochemical fingerprint firmly establish a Gondwanan origin for the SAB. Trondhjemite intrusions into the metamorphic basement at ~263 Ma exhibit an adakitic, slab-melt affinity and suggest formation in a SW-dipping active continental margin. Mafic intraplate intrusions dated ~246 Ma (OIB) and ~235 Ma (P-MORB) cutting the sedimentary cover are interpreted to indicate the early stages of breakup of the NE Gondwanan margin. Andesitic dykes at ~117 Ma testify to the melting of subduction-modified lithosphere. In contrast to most current geodynamic interpretations, we show that the SAB should be considered separate from the Taurides and that the Armenian ophiolite complexes are linked to the Eurasian forearc. We provide a new geodynamic interpretation of the SAB since the Permian, in which it started rifting from Gondwana alongside the Pontides and likely reached the Iranian margin in Early