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Geochemistry, geochronology, and cathodoluminescence imagery of the Salihli and Turgutlu granites (central Menderes Massif, Western Turkey): Implications for Aegean tectonics

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The Menderes Massif (western Turkey) is an important metamorphic core complex located in the Aegean region; geochemical and geochronological data from this extensional domain facilitates our understanding of large-scale extension of the Earth's lithosphere. S-type, peraluminous granites (Salihli and Turgutlu) that intrude the Alasehir detachment which bounds the northern edge of the central Menderes Massif may have been generated due to subduction of the Eastern Mediterranean floor along the Hellenic trench. In situ Th-Pb ion microprobe monazite ages from the granites range from 21.7±4.5 Ma to 9.6±1.6 Ma (±1s). The range is consistent with cathodoluminescence (CL) imagery that document complex textures within the samples. Salihli and Turgutlu granites share many similar characteristics, including multiple generations of plagioclase (some with shocked cores consistent with magma mixing), plagioclase replacing K-feldspar and the development of myrmekite, clear evidence for fluid infiltration, and multiple generations of microcracks and microfaults. The granites may have evolved from compositionally distinct magma sources, as Salihli samples in general contain allanite as the major accessory mineral, whereas Turgutlu granites contain monazite. However, the CL imagery document similar alteration textures. Ages reported here are similar to dates constraining extension reported elsewhere in the Aegean, but indicate a level of complexity when linking movement within the Menderes Massif to the large-scale geodynamic processes that created other metamorphic core complexes in the region. Difficulties exist in linking the ages obtained from the granites to specific tectonic events due to the presence of secondary alteration textures, generations of mineral growth, and multiple episodes of deformation.