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Structural controls on hydrothermal mineralization in the Menderes Massif, western Turkey

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The Menderes Massif in western Turkey is a lithospheric province within the Alpine-Himalaya orogen with a Proterozoic to recent tectonic history. The Menderes Massif hosts a variety of hydrothermal mineral deposits, including gold, copper, antimony, uranium and mercury. Most deposits formed during Miocene crustal extension, and there is ongoing tectonic and geothermal activity. Alteration of basement rocks and Cenozoic volcanic and sedimentary sequences is common in both fossil hy¬drothermal systems and active geothermal [U+FB01]elds. Here we present data that show how Miocene to recent hydrothermal activity in the Menderes Massif is structurally controlled on different scales. Overall, a large, lithosphere scale NE-trending wrench zone that defines the eastern margin of the Aegean continental backarc, controls Miocene to recent crustal deformation, volcanic, and hydrothermal activity. On a smaller scale, E-W trending normal fault systems strongly control the location of mineral deposits and geothermal fields. Along these E-W trending fault systems geothermal activity is localized on intersections with NE-trending structures and where smaller faults crosscut at high angles. The interaction between extensional tectonics and hydrothermal activity in an active system provides important insights into the structural control on fossil hydrothermal mineral systems in continental backarc settings.