Conceptual modeling of geothermal waters in the continental rift zones of the Menderes Massif, western Anatolia, Turkey

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From Early to Middle Miocene, the continental rift zones of Büyük Menderes, Gediz, and Kücük Menderes within the Menderes Massif, were formed by extensional tectonic features, and are represented by a great number of geothermal waters. Geothermal waters are related to faults which strike preferentially NW-SE and NE-SW and locate diagonal to general strike of the rift zones. These faults are probably generated by the compressional tectonic stress, which leads to the deformation of uplift between two extensional rift zones. Geothermal waters of Kizildere, Bayindir und Alaşehir represent excellent examples. In the area, meteoric waters percolate at fault zones and permeable rocks where meteoric waters are heated by a magmatic cooling and ascend to the surface due to their density caused by convection cells. The volatile components of CO_2, SO_2, HCl, H_2S, HB, HF, and He from the magma reach the geothermal water reservoir where an equilibrium between altered rocks, gas components, and geothermal waters performed. These geothermal waters are characterized by high CO_2, H_2S and NaCl contents. The geothermal waters are exploited for various uses consequently, i.e. for geothermal energy with a capacity of 1200 MWe, balneology, and green houses.