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Hydrogeological, hydrogeochemical and isotope geochemical features of thermal waters in Kuşadası, Turkey

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Most of the research on geothermal resources in Turkey has been carried out in continental rift zones of the Menderes Massif, mainly in the rift zone of the Büyük Menderes area. In this area, a 750 MWe potential of geothermal energy production is expected. In the study area, (i) a 1: 25.000 scale geological map was reconstructed, (ii) hydrogeological location and features of geothermal waters were identified comprehensively, (iii) the groundwaters and geothermal waters have been described hydrogeochemically, and (iv) the origin of groundwaters and geothermal waters was explained. Finally, the intrusion of sea water into groundwaters in Kuşadası and surroundings has been recognized due to the drop of groundwater table caused by the excessive use of groundwaters in the study area. In this study, the hydrogeological, hydrogeochemical and isotopic signatures of the thermal waters in Kuşadası and surroundings, will be presented. In the study area, the basement rocks are impermeable Paleozoic mica schists of the Menderes Massif. The Mesozoic marbles are ascribed either to groundwater aquifers or to thermal waters reservoirs. These rocks are covered by the Kuşadası formation consisting of a sequence of claystones, conglomerates and carbonate rocks. This upper Kuşadası formation plays an important role as cap rocks. The existence of active faults and basic volcanic rocks of Pliocene age points to the existence of high heat flows and geothermal gradients. As a youngest geological formation, the alluvium is a very good aquifer. Nowadays, there is the risk of sea water intrusion into the local groundwaters due to the drop of groundwater table caused by groundwater overexploitation in the study area.

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