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Origin of mineral and thermal waters

title: **Hydrogeochemistry and origin of thermal-mineral waters
in Western Peloponnese (Greece)**

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In this study the hydrogeochemistry and the origin of thermal–mineral waters in west Peloponnese in Greece are presented. Thermal occurrences, mainly hypothermal, in western Peloponnese are related to the tectonic activity of the broader area. The region being very close to the Hellenic Trench is one of the most active (seismic and tectonic) regions in Greece. Deep fault systems or fissured zones induced by salt diapirism act as preferential pathways for the rise on the surface of ground waters, producing water occurrences with specific characteristics, such as rotten egg smell, relatively high temperature and total dissolved solids. According to studies the thermal emergences in west Peloponnese could be connected with petroleum-generation processes in the area, which could caused the increased concentrations of the dissolved hydrogen sulphide in the thermal waters. All these manifestations tend to occur in groups, each group being related to the same geological features.

Hydrochemical investigations took place in the study area have shown that Kaiafa, Kyllini, Vromoneri and Kounoupeleli springs are recognized as hypothermal–mineral waters with temperature ranges from 26.3 to 33.5°C. All the water samples present negative values of redox and pH between 6.84 and 8.43. According to electrical conductivity values, two groups are recognized. The first group shows values from 505 to 1350 $\mu\text{S}/\text{cm}$ and the second group from 3.7 to 20.5 mS/cm (Kaiafa, Kyllini, Vromoneri and Kounoupeleli samples). They present general hydrochemical type Na–Cl and are rich in H_2S as a result from sulphate ions reduction under suitable conditions. The radon concentrations are not high; Ranging from 2.8 KBq/m^3 to 15 KBq/m^3 are comparative with the radon values in other ground waters in the study area. According to the stable isotopic data Kaiafa, Kyllini and Vromoneri spring present meteoric origin. On the contrary Kounoupeleli spring is mixed water (60% meteoric water and 40% sea water).



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