GEOCHEMICAL SURVEY ON GEOTHERMAL SYSTEM OF AEDIPSOS, CENTRAL GREECE

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Geothermal energy is an important renewable energy source, especially in areas with intense volcanic-tectonic activity and high geothermal gradient such as Greece. Specifically, in central Greece, along the North Euboean Gulf coast, several significant geothermal sites exist with representative example the thermal spring of Aedipsos. Considering that the assessment of a potential utilization of geothermal fields based on the reliable estimation of deep reservoir origin and temperature, a geochemical survey on the thermal fluids released by the above geothermal systems was undertaken.

Thermal and cold water samples were collected from Aedipsos. Temperature, pH and conductivity were measured directly in the field. Isotope analyses of water samples $\delta^{18}O$ and $\delta^{2}H$ were performed in Stable Isotope Unit, Nanoscience and Nanotechnology Institute, NCSR "Demokritos" Greece.

According to chemical data Aedipsos thermal waters belong to Na-Cl water chemical type characterized by the intense participation of Li^+ (mean 1.1 mg/L) and B^+ (mean 8.2 mg/L) ions parallel to low concentration of Mg^{2+} (mean 360 mg/L). Both Li^+-B^+ constitute conservative ions with the first to be a more pronounced tracer in intense water-rock interaction at high temperatures. Li/Cl and B/Cl (Figure 1 and Figure 2) ratios presented much higher than those of sea water implying the existence of major secondary processes in the deep groundwater circulation pattern. The Li/B (mean 0.14) ratio presented to Aedipsos thermal waters suggests the influence of a crustal source (Dotsika E., 1991).

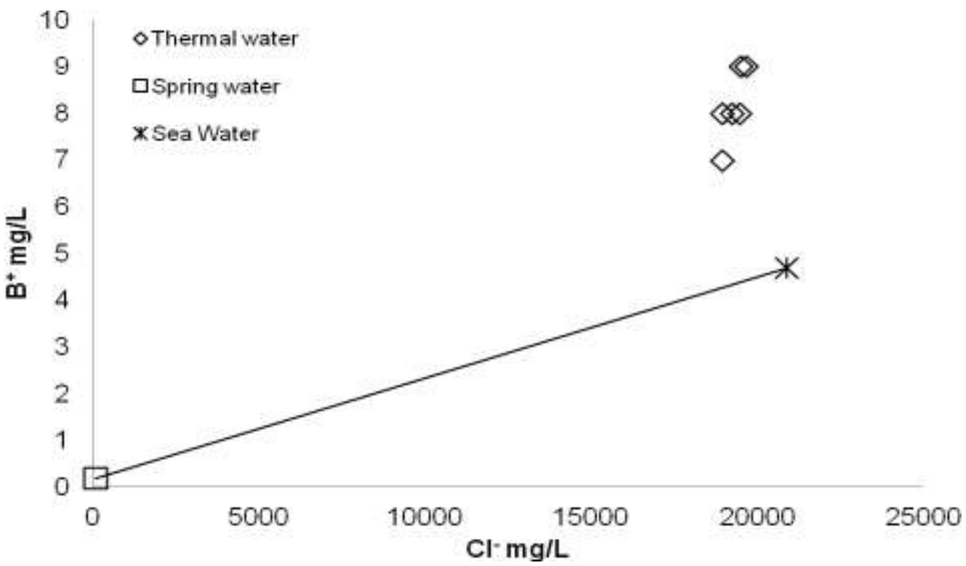

Figure 1: B^+ versus Cl^- contents for spring and thermal waters from Aedipsos

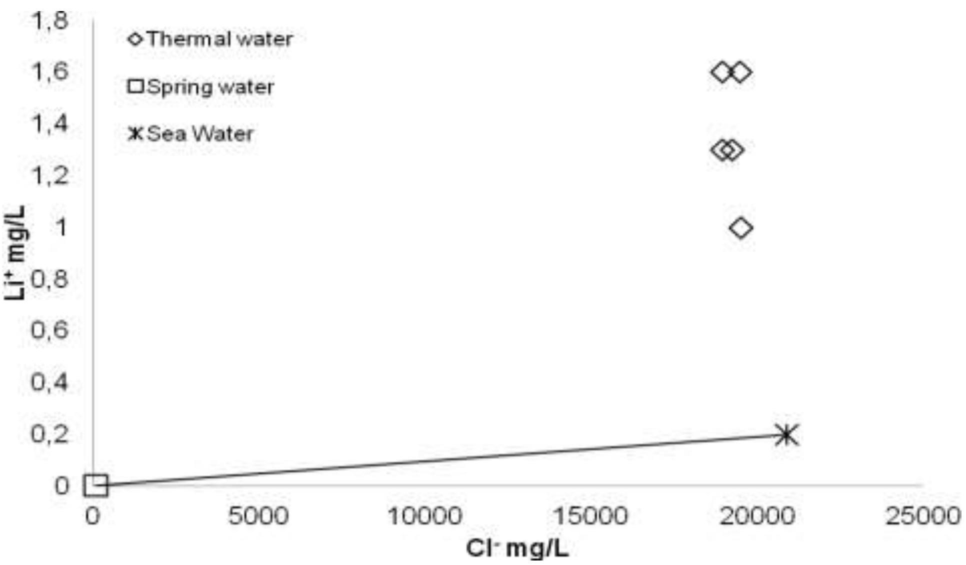

Figure 2: Li^+ versus Cl^- contents for spring and thermal waters from Aedipsos

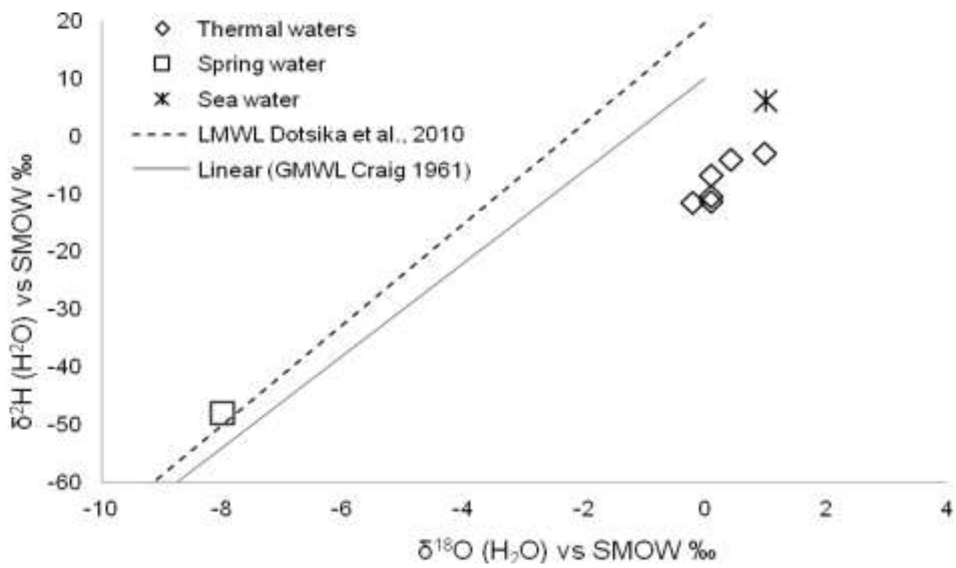

Figure 3: $\delta^2H_{(H2O)}$–$\delta^{18}O$ SMOW‰ for spring and thermal waters from Aedipsos

Moreover, Aedipsos samples present $\delta^{18}O$‰ values close to that of seawater reflecting a seawater origin. However, this doesn't seem to apply for δ^2H values. Isotopic and chemical data indicate that Aedipsos thermal waters mixed with a deeper geothermal fluid that probably contains a marine member. Chemical and isotopic geothermometers applied on the Aedipsos thermal water where suggested the probable existence of a deep geothermal reservoir of high enthalpy (Dotsika, E., 1991).

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