gases were extracted from the water samples, measured volumetrically and analyzed by gas chromatography. The DIC was precipitated as barium carbonate and analyzed for both δ13C and 14C. The DIC had δ13C values of -3 to -1‰, similar to those observed for carbonates in the tills. If these heavy δ13C values are used in readily available groundwater dating models without accounting for the effects of microbial methane formation, the resultant calculated age is unrealistically young.

Preliminary results show a positive correlation (r² = 0.91) between the δ13C of the DIC and the concentration of methane in the water. With this correlation, a more realistic estimate of the water-rock interaction can be calculated and used for correcting the 14C age of the groundwater.

**ISOTOPIC ANALYSIS OF CARBON IN A GEOTHERMAL SYSTEM**

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The Surdulica geothermal system in the southeast part of Yugoslavia belongs to the granodiorite aquifer. Geothermal waters are in a range of 60°-130°C, and show bicarbonate sodium content, slightly alkaline (pH = 7.0-7.5), mineralized (1.1-1.3 gr/L), with high fluoride and silica concentrations. The carbonate content of water increases with depth to the bottom of the system. Spring waters from altitudes higher than 800 m (top of the system, 1922 m asl) contain HCO₃ and CO₂ lower than 80 mg/L and 10 mg/L, respectively. During water flow, carbonate content fluctuates from 200 mg/L at the middle elevations (600 m asl) to 500 mg/L in geothermal waters reaching, in some parts of the aquifer, values of 3 g/L for HCO₃ and 500 mg/L for dissolved CO₂.

According to these data, the isotopic content of total dissolved inorganic carbon (TDIC) also changes. At the surface vegetation cover, δ13C = -27‰ and 14C content of 120 pMC were recorded. Data on 13C concentration vary from -15‰ in the springs at the middle elevations up to the interval of -5 to 0.5‰ for geothermal waters at the bottom.

In the surface water zone, we discovered infiltration of water at the top of the system (above 1300 m asl) with 30-50 pMC. The hot thermal spring zone in the foothills of the massif (400 m asl) is characterized by tritium-free water with very low 14C content (2-7 pMC). Because of the evident influence of dead carbon, 14C dating of these geothermal waters is difficult. For A₀ = 85 pMC, the ages were estimated in the range of 10,000-28,000 years.

**14C MEASUREMENTS ON LAMINATED LAKE SEDIMENTS**

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With the development of the AMS technique, 14C measurements on laminated lake sediments became especially interesting because the measurement of milligram-size samples is now possible. The selection of well-defined terrestrial macrofossils (leaves, needles, seeds of trees) from the sediment, excludes “hard water” contamination.

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