



Geothermal fluid inventory around the Sea of Marmara

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In the frame of the MARsite project, we aim to monitor potential changes in the fluid regime related to seismo-tectonic activities in the Marmara region. To this end it is mandatory to properly document the status quo by assessing the geochemical and isotopic features of the discharged fluids. This will allow to (i) constrain the origin of the fluids, (ii) identify fluid-rock interaction, and (iii) determine the main end-members (crustal, mantle-derived, radiogenic) and their mixing proportions. Fluid samples (gas and water) were taken from major thermal and mineral water sources around the Sea of Marmara. Water samples were analysed for main chemical components at laboratories of TÜBİTAK and INGV. Gas and isotopic analyses were performed at INGV Palermo.

No natural thermal waters, and only a very few mineral waters occur to the North of the Sea of Marmara. Water temperatures range between 14 and 83 °C. The specific electrical conductivities of the waters range between some hundreds to several thousand $\mu\text{S}/\text{cm}$. The gas phase revealed new and unique characteristics which might be related to the complex tectonic setting of the region. We found three main gas-systems respectively dominated by CO_2 (areas of Bursa and Balıkesir), N_2 (Canakkale and Tekirdag) and CH_4 (only over the area of Iznik lake). The helium isotopic ratios range from 0.1 to 3.8 R_{ac} (= isotopic ratio normalized to atmosphere and corrected for atmospheric contamination) with the highest contribution found at a natural spring located at the eastern part of the Ganos fault in the Tekirdag region. It is worthy of note that the lowest values are well above the value of 0.05 R_{a} assumed to be representative of crustal fluids thus implying a widespread degassing of mantle helium. The presence of deep permeable lithospheric structures and/or possibly active faults may explain the observed results.