Lithogeochemical Characterization of Akkoy and Edremit Geothermal Fields as Prospective CO2 Storage Sites: A Preliminary Study

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CO2 Capture and Storage (CCS) is regarded as one of the most effective measures for the mitigation of the unfavourable effects of anthropogenic CO2 emissions on climate change. The implementation of CCS in geothermal fields which are considered as natural analogues for CO2 storage sites, can contribute to the reduction of CO2 emissions as well as increasing the energy production within the context of Enhanced Geothermal Systems (EGS). Given that experimental studies of CCS have certain limitations regarding the time span and reservoir conditions, the geochemical modelling studies are highly important. The geochemical modelling studies require the use of “input data” including i) modal mineralogy of the reservoir rocks and ii) hydrogeochemistry of the reservoir fluid, the variations in the former (both type and amount) particularly affecting the modelling results.

This study is concerned with a preliminary lithogeochemical characterization of the reservoir levels of two geothermal fields (Akköy-Denizli and Edremit-Balıkesir) from western Anatolia, aiming to establish an input database for a prospective geochemical modelling in EGS. In this regard, drill cuttings belonging to the reservoir levels of the relevant fields are examined both macroscopically and microscopically, followed by the laboratory analyses of the samples using XRF (X-Ray Fluorescence), XRD (X-Ray Diffraction), and confocal Raman Spectroscopy techniques. The results obtained from the analyses are evaluated for the identification and quantification of the present minerals. Since the fields Akköy and Edremit have different reservoir lithologies (schist-calcschist-marble and agglomerate units, respectively), the results provide a means of comparison for the effect of mineralogical changes in possible CO2 addition to the systems.