Microbial diversity in Oylat Cave and their roles on biogeochemical cycling

YASEMIN GULECAL* AND MUSTAFA TEMEL

Istanbul University, Istanbul, Turkey
(*correspondence: ygulecal@istanbul.edu.tr)

The subsurface of the Earth is one of the major habitats and contains a significant proportion microbial life [1, 2]. However, our overall knowledge about the life forms and biogeochemical processes contained within it is rather scarce, mainly because of the difficulties in approaching this habitat. One relatively easy way to approach this habitat is to investigate karst terrains, which expand over ~20% of the Earth's subsurface [3]. Since caves are one of the most prominent features of karst terrain, they may serve as noteworthy entries and virtual "windows" into subsurface habitats [4]. Recent work has revealed interesting insights into the diversity and resilience of different life forms in caves may be revealed and how to recognize biosignatures for subsurface life on other planetary bodies [for example,5-6].

Our studying area which is Oylat Cave in Bursa (Turkey) has been developed at the intersection of two fault zones striking along WNW-ESE and NE-SW directions in recrystalized limestone unit of Permian-Triassic age. Clastics and carbonate sediments are in the Oylat Cave developed due to karstification. The aim of study was to investigate the microbial diversity and their roles of biogeochemical cycling.We have not only used the geochemical analyses but also genetic tools. In addition, this study reports the first microscopic investigations on the microbial communities encountered in the microbial biofilm Oylat Cave.

[1] Whitman *et al*., (1998). *Proc. Natl. Acad. Sci. USA* **95**: 6578–6583. [2] Roussel *et al*, (2008). *Science* **320**:1046 [3] Ford and Williams, (2007) *Karst Hydrogeology and Geomorp*. Wiley, New York. [4] Engel *et al*., (2009) *ISME J.* **4**(1): 98–110. [5] Boston *et al*., (2001) *Astrobiol. J.* **1**(1): 25–55. [6] Tewari *et al*., (2001) *I.C.T.P., Trieste, Italy*. Kluwer Academic, Dordrecht, pp. 251–254.

Geochronology of Cenozoic intrusive rocks of NW Anatolia: Topkaya-Eskişehir, Turkey

B. GÜLLÜ* AND Y.K. KADIOĞLU

Ankara Univ., Department of Geol., Eng., & YEBIM Ankara, Turkey (*correspondence: bgullu@ankara.edu.tr)

The intrusive rocks of Northwest Anatolia mainly exposed at Sivrihisar, Karakaya and Topkaya region of Eskisehir in Sakarya continent. Topkaya (Eskişehir) Granitoid is intruded into the metamorphic basement and obducted ophiolitic suite in the composition of granodiorite, monzogranite and cutting by felsic and mafic dykes. They have MME ranging from 1cm up to 60cm in sizes [1].

The $^{40}Ar/^{39}Ar$ age data reveal 44.30 ± 0.47 Ma for granodiorite of Topkaya granitoid. The isotopic ratio of granitoids and mafic dykes of the Topkaya have almost same $(^{87}Sr/^{86}Sr)_i$ and $\varepsilon_{Nd\ ratio}$ $((^{87}Sr/^{86}Sr)_{i\text{-granodiorite}}$=0.705593-0.706133, $\varepsilon_{Nd\text{-granodiorite}}$= -0.6, -0.7; $((^{87}Sr/^{86}Sr)_{i\text{-mafic dyke}}$ =0.705677-0.705706, $\varepsilon_{Nd\ mafic\ dyke}$= -0.39, -0.4).

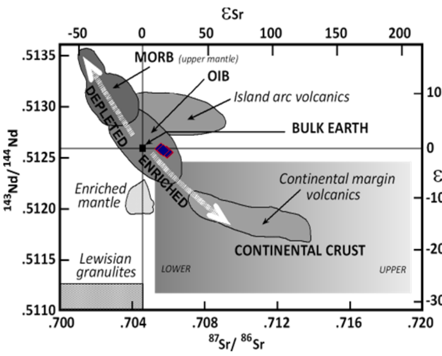

Figure 1: Isotope correlation diagram. The positions of the main tectonic environments and isotopic reservoirs taken from [2], [3], [4].

Discussion and Results

The $^{40}Ar/^{39}Ar$ age and geochemistry may be interpreted to reflect the time of magmatism since the level of emplacement was shallow enough such that rapid cooling would have occurred.

The granitoid exhibited initial rates $^{87}Sr/^{86}Sr$ always less to 0.708, suggesting represent I-type granites [5]. Sm-Nd data show distinct isotopic signatures, to the granitoid and mafic dykes. Both units exhibited εNd initials values clear negative, suggesting crustal contribution with mantle products in the source.

The authors wish to thank Ankara University for support BAP 09B4343016 Project.

[1] Güllü & Kadıoğlu (2010) IV. *Ulusal Jeokimya Sempozyumu* 55-56. [2] Zindler & Hart (1986) *Chemical Geodynamics* 493-571. [3] Faure (1986) PIG., **589**. [4] Rollinson (1993) UGD., **352**. [5] Chappell & White (1974) Two contrasting granite types, *Pac. Ged.* **8**, 173-4.