Magmatic evolution of the Eastern Anatolian High Plateau, E. Turkey

M. KESKIN[1]*, V. OYAN[2], V.A. LEBEDEV[3], A. CHUGAEV[3], S.C. GENC[4], E.V. SHARKOV[3], E. UNAL[2] AND N. AYSAL[1]

[1]İstanbul University, Faculty of Engineering, Dept. of Geol. Engineering, 34320 Avcilar, Istanbul, Turkey (*correspondence: keskin@istanbul.edu.tr)
[2]Van YYU, Faculty of Engineering and Architecture, Dept. of Geol. Engineering, Zeve Campus, Van, Turkey
[3]RAS, IGEM, Staromonetny per., 35, Moscow 119017, Russia
[4]Istanbul Technical University, Faculty of Mines, Dept. of Geol. Engineering, 34469 Maslak, Istanbul, Turkey

The Eastern Anatolia High Plateau is an actively-deforming continental collision zone with a long-lasting volcanism from the end of Middle Miocene to historical times. It hosts some of the largest volcanic centers and plateaus of the circum Mediterranean region (e.g. Mt. Ararat, Nemrut, Tendurek and Suphan). Eastern Anatolia is a unique place in the world where the continental crust, most of which is represented by an accretionary complex, directly overlies the asthenospheric mantle [1]. So, the region is devoid of a lithospheric mantle. This unusual setting has been proposed to be linked to a major slab-steepening & breakoff event [1, 2].

To better understand the magma genesis and the geodynamic setting, we have been conducting a series of projects in E Anatolia since 2007, carefully studying the stratigraphy of the volcanoes and conducting radiometric datings and geochemical analyses. Results from our new and rather comprehensive database have revealed that the volcanism initiated around the N of Lake Van in the south at ~15 Ma with the eruption of calc-alkaline lavas containing a distinct subduction signature. The geochemical character of the volcanism changed from calc-alkaline to alkaline both in time (from Mid. Miocene to Quaternary) and space (from N to S), while the subduction signature temporally diminished. Our melting models suggest a region-wide temporal change from garnet- to spinel-dominated mantle mineralogy and an increase in the degree of melting. Our AFC and EC-AFC models indicate a significant crustal involvement increasing to the south. These findings may imply that the steepening of the slab has been a much faster event than we previously anticipated and the magma generation might have been influenced by the reformation of a new lithospheric mantle.

[1] Şengör *et al*. (2003) *GRL*, **30** (24) 8045. [2] Keskin (2003) *GRL*, **30** (24) 8046.

^{230}Th-^{234}U-^{238}U disequilibria along the river catchments from the Iberian Belt (Spain) affected by acid mine drainage (AMD)

M. KETTERER[1]*, A. HIERRO[2], L. BARBERO[3], M. OLÍAS[4], J.P. BOLIVAR[2], M. CASAS-RUIZ[5] AND M. BASKARAN[6].

[1]Chemistry and Biochemistry Department, Northern Arizona, University, Flagstaff, AZ 86011-5698, USA (*correspondence: Michael.Ketterer@nau.edu)
[2]Dpto. de Física Aplicada, Universidad de Huelva, Spain (almudena.hierro@dfa.uhu.es, bolivar@uhu.es)
[3]Dpto de Ciencias de la Tierra, Universidad de Cádiz, Spain (luis.barbero@uca.es)
[4]Dpto. Geología y Paleontología, Universidad de Huelv Spain (manuel.olias@dgyp.uhu.es)
[5]Dpto. de Física Aplicada, Universidad de Cádiz, Spain (melquiades.casas@uca.es)
[6]Department of Geology, Wayne State University, Detroit, MI, USA (baskaran@wayne.edu)

The Tinto and Odiel Rivers can be used as a natural laboratory to investigate how changes in the aqueous environment affect the mobility of U-series nuclides. These rivers have very low pH's of < 3 for most of their courses, as a result of acid mine drainage (AMD) processes. These AMD conditions generate preferential leaching of ^{234}U compared to ^{238}U from minerals in the background geological setting. Dissolved ^{238}U activities vary from 10 to 850 mBq/L, with the highest ^{238}U activities as well as the highest $^{234}U/^{238}U$ ratios (approaching 3.0) being present under the most acidic conditions. The acidic environment also promotes the dissolution of ^{230}Th, whose activities are up to several orders of magnitude higher than are commonplace in most natural waters. The mobilities of U and Th decrease as pH increases, resulting in precipitation of uranium-bearing minerals in the estuary. The high concentrations of sulfate appear to have an important role in complexation of dissolved Th. These results direct relevance to predicting the mobility behavior of other particle-reactive actinides under acidic conditions in the surface environment.