EGU22-638, updated on 03 Jul 2022
https://doi.org/10.5194/egusphere-egu22-638
EGU General Assembly 2022

Formation model of silica sinter deposits: an example from Western Turkey

Hatice Ercan[1], Ömer Işık Ece[2], Paul A. Schroeder[3], and Fatma Gülmez[2]
[1]KonyaTechnical University, Department of Chemical and Chemical Processing Technologies, Konya, Turkey (hunalercan@ktun.edu.tr)
[2]Istanbul Technical University, Faculty of Mines Department of Geological Sciences, Maslak 34469 Istanbul TURKEY
[3]University of Georgia, Department. of Geology, Athens GA 30602-2501 USA

Silica sinter systems occur in regions of magmatic intrusion, where silica-rich alkali chloride fluids rise to the Earth's surface. The Oligo-Miocene Etili silica deposits are one of the most well-known geothermal systems in Turkey, which occur mainly on E-W and NE-SW trending extensional faults with past associated magmatic activity. The mineralogical assemblage of the Etili epithermal system consists of kaolinite, halloysite, alunite +/- jarosite, and quartz. The most common silica polymorph detected in the sinters is □-quartz. No other silica polymorphs were observed and proximal apron lithofacies were the only facies preserved in the region. Other lithofacies were not preserved due to erosion and tectonism. The lithofacies observed in the Etili epithermal systems include; silica infiltrates, spring conduits, nodular and finely laminated geyserite, sinter clast breccia, silicified volcanic rocks, and epithermal veins.
Hydrothermal alteration assemblages aged using the 40Ar/39Ar dating method indicate three distinct periods of hydrothermal activities that took place in different vacinities of the Etili Fossil Silica Sinter Region. These include: a) Early stage in the western part of the Etili (32.4 ± 1.2 to 22.6 ± 0.22 Ma), b) Intermediate stage in the eastern part of the Etili (12.3 ± 0.3 to 15.2 ± 0.3 Ma) in the north of the Hamamtepe, and c) Late-stage to the south of the Etili (5± 0.18 to 7 ± 0.3 Ma). These chronological data indicate that the hydrothermal activity in the region started earliest in the west and shifted through to the east and/or south over time.
Keywords: epithermal system; hot spring; silica sinter; 40Ar/39Ar dating; hydrothermal alteration