Calcitic corals from the Red Sea as paleohydrological monitors

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While pristine aragonite corals provide information on sea level history and coastal tectonics, fossil corals that were altered to calcite (calcitified), can be used to establish the chronology of corals diagenesis by freshwater. Such diagenesis is possible provided the corals reside within the saturated zone of freshwater aquifers. Establishing the chronology of freshwater diagenesis in hyperarid areas, such as the Red Sea is extremely useful for reconstruction of past climate fluctuations. Here, we present a new open system U-Th dating method for calculating the time of deposition and the age of diagenesis of calcitic corals from the last interglacial uplifted reef terraces at the northern Red Sea. The calculated age of coral calcitification (~120 ka) is similar to closed system U-Th ages determined for aragonite corals from a nearby location[1]. These results suggest that the aragonite corals in this terrace resided in a coastal freshwater aquifer and recrystallized to calcite shortly after their initial formation. Therefore, it appears that wetter (than present) conditions prevailed during MIS5e in the currently hyperarid region of the northern Red Sea. Indication for enhanced runoff activity in this area is provided by $^{87}Sr/^{86}Sr$ ratios of foraminifers and fine detritus material from Red Sea cores[2].

[1] Scholz D., Mangini A. and Felis T. (2004), *EPSL* **218**, 163–178. [2] Stein M., Almogi-Labin A., Goldstein S. L., Hemleben C. and Starinsky A. (2007), *EPSL* **261,** 104-119.

Adakite-like volcanism in Boyabat Region, Turkey: Geochemistry and Petrogenesis

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Cretaceous aged Dodurga volcanics mainly include andesitic (trachyandesite, andesite), dacitic (dacite, trachydasite) volcanic rocks and volcaniclastics. Volcanic rocks have typical hypocrystalline porphyric texture and mineralogically contain amphibole, plagioclase (zoning-polysynthetic twinning), biotite, quartz and opaque minerals, in varying quantity.

Dodurga volcanics have subalkaline and calc-alkaline characteristics. Major, trace and rare earth element data exhibit fractional crystallization which is effective process, in generation of volcanic rocks. Furthermore, effects of crustal contamination and/or subduction zone process were also determined. MORB and Chondrite-normalized spider diagrams indicate LILE, LREE content enrichments, compared with HFS elements. Besides, negative anomalies, observed in Ta, Nb and Ti elements reveal fractional crystallization, subduction and/or crustal contamination effectively, in occurrence of the volcanics. In Dodurga volcanics, SiO_2 content varying between 61%-65.1% (averagely 63.3%), Al_2O_3 between 16.1%-17.8% (averagely 16.9%), Sr between 385.9-611.4 ppm (averagely 505.2 ppm), Y between 5-14.5 ppm (averagely 9.5 ppm), Yb between 0.5-1.3 ppm (averagely 0.9) and Zr/Sm ratio 46.2-89.5 (averagely 65.6) were determined. In $(Yb)_N$-$(La/Yb)_N$ and Y-Sr/Y diagrams, the majority of Cretaceous Dodurga volcanics scattered in adakite area and partially in the classic arc volcanics were observed. In primitive mantle-normalized spider diagrams, Dodurga volcanics have typically low Nb, Ce and positive Sr contents, compatible with adakite-like volcanics.

According to the partial melting modeling diagrams, the Cretaceous Dodurga volcanics were formed as low degree batch melting of spinel-lherzolite which was a shallow depth lithospheric resource. All geochemical data and especially La/Nb>1 and Ba/Nb>28 ratios show Dodurga volcanics to have typical island arc volcanic characteristics, derived from lithospheric resources.

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