Available online at www.sciencedirect.com
ScienceDirect
Chemical Geology 245 (2007) 120–129
CHEMICAL GEOLOGY INCLUDING ISOTOPE GEOSCIENCE
www.elsevier.com/locate/chemgeo

Discussion

Comment on "Volcanostratigraphy and petrogenesis of the Nemrut stratovolcano (East Anatolian High Plateau): The most recent post-collisional volcanism in Turkey" by Özdemir et al. [Chemical Geology 226 (2006) 189–211]

H. Evren Çubukçu [a,b,*], Erkan Aydar [a], Alain Gourgaud [b]

[a] Hacettepe University Dept. Geological Engineering, 06800 Beytepe, Ankara, Turkey
[b] Université Blaise Pascal, UMR-CNRS 6524, Laboratoire 'Magmas et Volcans', 5 rue Kessler, 63038 Clermont-Ferrand, France

Received 27 May 2007; received in revised form 29 June 2007; accepted 7 July 2007

Editor: D. Rickard

Keywords: Eastern Anatolia; Nemrut; Peralkaline; Volcanostratigraphy; Mineralogy; Geochemistry; Continental rifting

The paper by Özdemir et al. (2006) provides a number of geochemical data of the active Nemrut stratovolcano. However, we believe that a number of points should be discussed and, to some degree, corrected.

Although Özdemir et al. (2006) propose that the Nemrut stratovolcano is the most recent volcanic eruption center (1441 A.D.) in the East Anatolian High Plateau, Karakhanian et al. (2002) documented younger historical volcanic activities (1692 — Mt. Nemrut, 1840 — Mt. Ararat, 1855 — Mt.Tendurek). Hence, Mt. Nemrut is not the most recent volcanic eruption center in the East Anatolian High Plateau.

1. Volcanostratigraphy

Volcanostratigraphic evolutionary stages should be based either on 1) huge volcano-tectonic discontinuities such as caldera collapses, or 2) cessation of the activities of magma chambers. The latter can occasionally be observed as dramatic changes in magma characteristics. Özdemir et al. (2006) propose three major evolutionary stages (pre-caldera, post-caldera and late stages). Özdemir et al. (2006) describe post-caldera rift zone activity as a major evolutionary stage. Their "Late Stage" comprises of a ~5 km N-S striking extensional fissure with bimodal basalt–rhyolite flows which is thought to be formed circa 1441 (Karakhanian et al., 2002). These fissure zone volcanics do not exhibit any significant variation in magma type (similar chemistry and mineralogy with central vent volcanics) and fissure is not a huge volcano-tectonic deformation. Such an event can not be considered as a "major evolutionary stage" as Özdemir et al. (2006) propose in page 192. Therefore, the late stage of Özdemir et al. (2006) is a post-caldera activity of Nemrut volcanism. Furthermore, the order of volcanostratigraphical units proposed by Özdemir et al. (2006) is erroneous concerning the latest products of the stratovolcano. During our field studies, the basaltic lava flow, which has been defined as the latest product [unit #21 in volcanostratigraphy of

DOI of original article: 10.1016/j.chemgeo.2007.07.009.
* Corresponding author. Hacettepe University Dept. Geological Engineering, 06800 Beytepe, Ankara, Turkey. Tel.: +90 312 297 77 17; fax: +90 312 299 20 34.
E-mail address: ecubukcu@hacettepe.edu.tr (H.E. Çubukçu).

doi:10.1016/j.chemgeo.2007.07.012

Özdemir et al. (2006)], was observed to be overlain by approximately 10 m thick vitreous rhyolitic flow along the N-S trending Nemrut extensional fissure (Fig. 1a). Moreover this rhyolite flow has utilized the same crack system with the basalt to reach the surface (Fig. 1b).

The term "obsidian" corresponds to a physical facies property rather than chemical composition. Throughout their paper Özdemir et al. (2006), use this term as a rock name instead of physical property and present them as if they are different than trachytes and rhyolites.

Özdemir et al. (2006) define monzonitic intrusions exposed in topographic lows within the caldera. They have neither given any petrographical/mineralogical description nor geochemical analysis of this unit. It should be noted that the exposure of a magma chamber which is the plutonic equivalent of the caldera volcanics require significant erosion (Cole et al. 2005). The Nemrut Stratovolcano is not eroded, is still active (Aydar et al. 2003) and is very young compared to the calderas with plutonic outcrops (i.e. Bodrum Caldera, Ulusoy et al. 2004), which does not meet the criteria stated above. In addition, the locations which Özdemir et al. (2006) define as monzonitic outcrops are the regions of caldera fill with very young (<10 kA, Notsu et al. (1995)) volcanic units. Furthermore, in their stratigraphic columnar section, Özdemir et al. (2006) suggest that the monzonite (Unit 18) is younger than intra-caldera vitrophyre rhyolite (Unit 16, Age: <0.01 Ma). Such young volcanism inhibits the erosion which would lead any plutonic body to outcrop. In addition, the area mapped (~0.4 km^2) as monzonite by Özdemir et al. (2006) is within intra-caldera maars whose post-caldera products contain abundant holocrystalline fragments. These intra-caldera maars are among the centers of post-caldera phreatic–phreatomagmatic

Fig. 1. a) Post-caldera basalt is overlain by rhyolite in the north of N-S extending Nemrut rift. b) Post-caldera rhyolite is observed to flow from the same cracks as earlier basalts (mentioned as scoria flow in Özdemir et al., 2006; E:258462 N:4285213). c)Pre-caldera dyke; note the structural relationship with the wall rock. d) Decimeter sized enclaves of intermediate composition with irregular rounded margins.