

Interactive comment on “Magma storage and plumbing of adakite-type post-ophiolite intrusions in the Sabzevar ophiolitic zone, NE Iran” by K. Jamshidi et al.

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Dear editor

Thank you very much for the reviews on our manuscript Magma storage and plumbing of adakite-type post-ophiolite intrusions in the Sabzevar ophiolitic zone, NE Iran, by Jamshidi et al. We have now read and reflected on the reviewer's suggestions and have aimed to implement most of them in our revised version. Please find our detailed responses below, where we link our responses to the original comments by the referees. Moreover, we attach one version of the manuscript with all changes marked in green.

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Remarks by Reviewer #2

Review# I was very interested in reading this paper. There are lots of good issues in the manuscript, and is therefore indeed a valuable contribution, but it needs some minor modification. I think most of my comments can be addressed with a reasonable quantum of confidence, and therefore might also make the paper more appealing to a diverse audience.

Response: We appreciate the thorough and critical but encouraging comments provided by the referee.

Comment 1: Introduction; reference Khalatbari Jafari et al., 2013 is related to the Khoys ophiolite (NW Iran), not Sabzevar! Æ

Response: Regarding the reference Khalatbari Jafari et al., 2013, we think that this is a misunderstanding. We used the following article from Khalatbari Jafari et al., 2013 who worked on Sabzevar ophiolite, NE Iran: “Khalatbari Jafari, M., Babaie, H.A. and Gani, M (2013) Geochemical evidence for Late Cretaceous marginal arc-to-back arc transition in the Sabzevar ophiolitic extrusive sequence, northeast Iran, Journal of Asian Earth Sciences 70–71, 209–230.

Comment 2: As we are studying on the same region (on same rocks; adakitic-like and calc-alkaline lavas from NE Iran), it would be good to mention that these all these rocks (both northern intermediate rocks and northern adakitic-like dome) have same ages; Eocene. Our Ar-Ar as well as U-Pb zircon dating confirms this. So, it would be good if the authors lower their tone about the age of felsic domes.

Response: There are few articles that work on adakite magmatism in the Sabzevar zone. Rossetti et al (2014) obtained a late Paleocene to Eocene age for related felsic adakite rocks in the Soltanabad region (NE Sabzevar) based on U-Pb dating on zircons and $^{40}\text{Ar}/^{39}\text{Ar}$ on mica. We now refer to this work in the revised version of manuscript. However, it needs to be pointed out that the latter article focused on some adakitic

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domes in a geographically restricted region (Soltanabad), while our work comprise a diversity of subvolcanic rocks in a large scale area from northwest to southeast of Sabzevar ophiolitic belt. Because of the absence of a comprehensive dating study until now, we prefer not to specify the age of the post-ophiolitic rocks and refer to their age as Oligocene-Miocene based on stratigraphic relationship. The presence of xenoliths, that include what looks like Eocene tuffaceous siltstone, makes us consider a post-Eocene age at least for some of the subvolcanic rocks in question. As the referee mentioned, and according to Rossetti et al. (2014) plus our field research, we have now changed the proposed age bracket for these rocks from Oligocene-Miocene to post-Eocene.

Comment 3: Also these rocks are neither real-adakite, nor partial melts of thickened lower crust. As the authors also confirm this, the felsic rocks (domes) are amphibole plagioclase- dominated fractional products of more mafic rocks. This is in agreement also with our modeling as well as our Sr-Nd-Pb isotope data.

Response: We added 10 new geochemical analyses from three dacitic domes that outcrop in the southern part (Moghise region). These data, now added to table (1), was recently received from ACME laboratories (Canada). Using these new data, the compositional gap between southern and northern samples is now filled. So, as the referee mentioned, we now argue that the southern felsic samples may have been derived from the northern intermediate melt by crustal differentiation processes such as fractional crystallization or AFC. We have now reworded the section on the origin of southern adakite-like samples in the Discussion (section 5) and in the conclusions of the revised manuscript.

Comment 4: And finally I cannot see if the Sabzevar Ocean subducted toward the north. We have not trace of dominant arc volcanism-plutonism in northern Sabzevar ophiolites except some adakitic-like rocks (again felsic domes) that may are related to relaxation and doming of the region after the Tethys subduction and closure beneath the Iran or transition from compression to extension above the Tethys subduction zone. These rocks are widespread everywhere in Iran and change in composition from alka-

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line to adakitic like signature.

Response: Related to the question about lack of volcanism and plutonism in northern Sabzevar, it should be mentioned that there is a body of research that indicates the existence of volcanism of Eocene and post-Eocene age in the northern part of the Sabzevar ophiolitic zone, related to the northward subduction of the Sabzevar Oceanic plate (Spice et al., 1983; Lensch et al., Amini and Khan-Nazer, 2000; Ghasemi et al., 2011). Also, Shabaninan et al. (2012) suggested post-collisional melting of oceanic slab and/or mafic lower crust possibly triggered by an asthenospheric rise after slab break-off. Moreover, three ophiolitic boundaries exist from south to north of Sabzevar zone associated with a variety of volcanic and plutonic rocks. These boundaries are (1) the Kashmar ophiolite, (2) the Sheshtamad ophiolite, and (3) the Sabzevar ophiolite. The introduction section in the revised manuscript has now been modified to give a better overview of the volcanic and plutonic rocks found in northern Sabzevar.

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/6/C1187/2014/sed-6-C1187-2014-supplement.pdf>

Interactive comment on Solid Earth Discuss., 6, 2321, 2014.

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