

I have read through the updated version of “Exploring a link between the Middle Eocene Climatic Optimum and Neotethys continental arc flare-up” by Van der Boon et al., and the response to my original comments. I recognize that the authors have made a good faith effort to address my original concerns and that some assumptions are now better motivated (especially on the thickness of the Eocene rocks). I still disagree with some answers and observations. Please see below:

- The authors write as reply to my comment:

“Furthermore, Verdel (2009) shows in Figure 5 of Chapter 3 that most of the flare-up is during the middle Eocene for North, West and East Iran, and only in Central Iran extends also into the lower Eocene.”

Figure of Verdel’s thesis shows 3 ages for Central Iran  $52.9\pm 3.3$ ,  $50.0\pm 4.4$ ,  $54.7\pm 3.1$ , and one age for northern Iran  $52.2\pm 3.4$  Ma; all these ages fall within the error, so it is not clear to me what is the age of the Karaj Formation (maybe we should look at paleontological works on the Ziarat Formation). In any case the main point is to have an increase in magmatic flux around 42-40 Ma. Intense magmatism between 50 and 45 Ma or 55 and 45 Ma doesn’t help. To have an impact on MECO should be coeval and I guess that, despite all difficulties, your data seems to go in that direction.

- The authors write in the main text:

“Field studies have often suggested that the middle Eocene part makes up the bulk of the Eocene succession (e.g. Glaus, 1965), and volcanism climaxes during middle Eocene time (Berberian and King, 1981; Davoudzadeh et al., 1997; Verdel, 2009).” For Middle Miocene see comment above. Concerning the other

studies, if we exclude Verdel, what kind of data did the use? Paleontology? I think that this should be specified. If there is not any clear data-based evidence (like paleontology, possibly revised according to more recent biostratigraphy schemes), it will sound like a personal opinion, that probably fits with the general idea, but without data it will be just an opinion. In that case, I would probably remove that sentences.

- The authors write in the main text:

Indeed, the Eocene volcanism in Iran erupted in shallow marine basins, and through significant amounts of carbonate-rich rocks of Jurassic, Cretaceous, and Paleogene age (e.g. Berberian and King, 1981).

I think that the point is where are the magmatic chambers and how long does it take for the magma to get to the surface. Yes, there are limestones in the stratigraphic sequence (it is the case in most of the settings, if not all of the settings), but if the magma move quickly through these carbonaceous strata, I would not expect that much interaction. You may look at cases where a clear link between magmatism and interaction with the host rock was demonstrated. What conditions did you have? Are these conditions respected also in Iran?

- Finally, I must confess that I did not like the answer to the following comment

“Curiously, if the authors look at the Zachos et al., curve ( $\delta^{18}O$  curve vs age), they will see that the flare up in Iran coincides with the progressive Eocene cooling that culminates with the sharp temperature drop at the Eocene-Oligocene boundary (actually I think that such a curve, which is the base of all paleoclimatic reconstructions, should be shown also in this manuscript). To me this lack of correlation suggests that, although voluminous, the entire magmatic flare up in Iran did not have a strong impact on global climate, or at least that did not produce a change in the long-term global cooling trend. “

The comment intended to say that despite a prolonged phase of Eocene magmatism (ca. 55 or 50 Ma to ca. 38 Ma), we had a trend toward a colder climate (see Zachos curve), so it seems that there is a weak correlation between climate and magmatism in Iran (unless we demonstrate that all magmatism occurred around the MECO). I am aware the authors did their best to use available data to demonstrate that magmatism may have peaked around 42-40 and I am fine with their efforts. However, they replied

“As our radiometric age compilation shows in Figure 2C, the amount of radiometric ages drops rapidly between 35 and 32 Ma (the slope is nearly flat here). Also Figure 3 shows a drastic drop in igneous activity

around the Eocene-Oligocene transition. The flare-up in Iran precedes the Eocene-Oligocene transition by millions of years. On a side note, several of the authors are marine stratigraphers and paleoceanographers with ample experience on both the MECO and the Eocene-Oligocene Transition.”

Now, what is the link between a trend that seems to be in contrast with the flare up and the excellent experience of the authors in the field of MECO and the Eocene-Oligocene transition (note that the Eocene-Oligocene transition was just mentioned, but was not the focus of the comment)? I personally find this answer quite arrogant and irritating.

Anyway, I am happy to see that my comments helped.  
Best regards.