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Climate of the Past Discussions

Interactive comment on "Middle Miocene climate of southwestern Anatolia from multiple botanical proxies" *by* Johannes M. Bouchal et al.

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Final author comments

Response to Reviewer 1: Referee comment 1: The manuscript submitted by Bouchal et al. is of very high quality. I fully agree with the methods and conclusions. This will be a very useful paper on the mid-Miocene climate change according to floras in the Eastern Mediterranean.

Author's response: Thank you very much.

Referee comment 2: I have just two suggestions: - the nearby Catakbagyaka Langhian pollen flora of (Jiménez-Moreno, 2005 - phd thesis pp. 109 and 212) should be used in the discussion because it contains several mega or mega-mesothermal taxa and 20

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to 50% of herbs.

Author's response: Thank you for drawing our attention to the Çatakbagyaka flora/fauna. The uncertain age of the Çatakbagyaka vertebrate fauna (MN5-MN8) has recently been revised to MN7-8 (see references in our changed manuscript). We will refer to this locality in the revised text, considering it roughly coeval with Yeni Eskihisar and mentioning that the increased AP pollen ratios of the Çatakbagyaka flora fit with the general trend observed by us in the Yatagan Basin.

Author's changes in manuscript The following lines concerning the Çatakbagyaka locality will be inserted in section "3.4 Changes in ratios arboreal to non-arboreal pollen", line 235.

. . ...shows again a higher proportion of arboreal taxa (67%). Similarly, from the vertebrate locality Çatakbagyaka (revised age MN7+8, 12 km south of the Yatagan Basin) AP percentages range from c. 50% to c. 80% (Jiménez-Moreno, 2005; Mayda et al., 2016; Bouchal et al. 2017; Aiglstorfer et al. 2018).

and in section "4.4 Detection of Miocene global climatic changes in the terrestrial fossil record", line 394.

. . .Eskihisar pollen assemblage clearly belongs to MN7+8. Here, and in the nearby locality Çatakbagyaka woody taxa (including some warmth-loving taxa) are again more prominent. Thus, although the correlation. . ...

Referee comment 3: The herbs are often under-evaluated in pollen records that causes an significant bias to the ratio 'arboreal taxa/non-arboreal taxa' (see: Favre et al., 2008, Review of Palaeobotany and Palynology, 148, 13-35).

Author's response: We use the threshold values given by Favre et al. (2008) in the revised manuscript. In addition, we use the threshold values for local presence of European tree taxa (Lisitsyna et al., 2011 – reference in revised manuscript) to evaluate those pollen floras that are indicated as reflecting "herb-prevalent" environments based

on the values given by Favre et al.

Author's changes in manuscript The following lines concerning this comment will be inserted under "3.4 Changes in ratios arboreal to non-arboreal pollen", line 235.

We used the threshold (AP/NAP = 3.85) proposed by Favre et al. (2008) to separate between tree- and herb-prevalent environments. This ratio translates into AP percentages of close to 80% to predict reliably tree-prevalent landscapes. As can be seen in Supplementary Material S6, pollen zones 1 and 2 are largely dominated by forested environments. In the upper part of PZ2 (Tinaz, Eskihisar), PZ2/3 and PZ3 (Tinaz) herb-prevalent landscapes are inferred. However, it is noteworthy, that although NAP taxa are more abundant in these pollen zones, AP taxa remain to have fairly high percentages as well (Bouchal et al., 2016, 2017). For example, Fagus, Quercus deciduous and evergreen type, still are above the threshold values indicative of local tree presence (Lisitsyna et al., 2011). Hence, the opening of the vegetation in the upper parts of PZ2, and in PZ2/3, PZ3 may actually represent a coexistence of forest and open vegetation.

Referee comment 4: - Beerling & Royer (2011) and Mai (1995) are not in the Reference list;

Author's response: These will be added.

Referee comment 5: - I do not understand the reference to 'table S1' on lines 55 and407.

Author's response: We apologize. This has been misleading. We meant table S1 in the paper of Beerling & Royer, 2011. This will be clarified in the revised manuscript.

New references: Aiglstorfer, M., Mayda, S., and Heizmann, E. P. J.: First record of if late Miocene Moschidae from Turkey: Micromeryx and Hispanomeryx from Catakagyaka (Mugla, SW Turkey). Comptes Rendus Palevol. 17, 178–188, 2018.

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Jiménez-Moreno, G. (2005). Utilización del análisis polínico para la reconstrucción de la vegetación, clima y estimación de paleoaltitudes a lo largo de arco alpino europeo durante el Mioceno (21–8 Ma). PhD Thesis University Granada, Granada. 313 pages.

Lisitsyna, O.V., Giesecke, T., and Hicks, S.: Exploring pollen percentage threshold values as an indication for the regional presence of major European trees. Review of Palaeobotany and Palynology 166, 311–324, 2011.

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