

Interactive comment on “A new-resolution pollen sequence at Lake Van, Turkey: Insights into penultimate interglacial-glacial climate change on vegetation history” by Nadine Pickarski and Thomas Litt

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General comment:

This is a very interesting work, clearly presented and well discussed. It provides new detailed information on the vegetation development and climate changes in the eastern Mediterranean region in the time interval 250-130 ka.

My main concern relates to the succession of vegetation types claimed for the warm stages in the paragraphs “forested periods” and “conclusions”. At lines 212-214 it is stated that “the vegetation succession starts with the colonization of open habitats by pioneer trees, such as *Betula*, followed by sclerophyllous *Pistacia* cf. *atlantica* and a gradual expansion of deciduous *Quercus*”. “The ensuing ecological succession at Lake Van is documented by high percentages of dry-tolerant and/or cold-adapted coniferous species (lines 235-236). This succession is not clearly visible in any of the forest phases: deciduous *Quercus* is always starting before or at the same time of *Betula*. *Pistacia* is almost missing in the forest phase corresponding to MIS 7c. *Pinus* develops after *Quercus* in MIS 7e, but it is coeval in MIS 7c and is very sparse in MIS 7a. I suggest to avoid this generalization, which may be of interest in central Europe, far away from glacial refugia, but is not appropriate for the Lake Van region. Similarly, I do not find in the diagrams the most depleted (negative) $\delta^{18}O_{bulk}$ values at the base of each early temperate stage (lines 218-219): this is true at the onset of MIS 7e, but the next time interval with low values of $\delta^{18}O$ is found during the cold stage of MIS 7d, and the following low values are recorded during the warm stage of MIS 7a. Thus, the suggested generalization is not convincing.

Minor corrections:

Line 55: Roucoux et al., 2008, 2011

Changed.

Line 56: Tzedakis et al., 2003b, 2006

Changed.

Line 79: there is no correspondence of rainfall values with table I. Besides, Van is not in the north-east (Erciș is in the NE)

Good remark, thank you! We checked the rainfall values and revised the sentence as follows: ‘At Lake Van, rainfall decreases sharply from south-west (c. 1232 mm a⁻¹ in Bitlis) to north-east (c. 421 mm a⁻¹ in Erciș; Table 1)...’ (now line 84-85).

Line 82: the vegetation cover around Lake Van

Done.

Line 87: dominated by dwarf-shrub steppes

Changed.

Line 122: HCl

Changed.

Line 131: diagram of selected taxa. You may consider to add here that the complete list of data will be available on PANGAEA

We added the link to the PANGAEA database at the end of this section (now line 156-157).

Line 139: on bulk sediment samples

Done.

Line 163: (max. ~70 %)

Thank you. It should be read: ‘...Chenopodiaceae (max. ~76), ...’.

Lines 212-213 and 235-237: see general comments

We generally improved the section of ‘forested periods’ and avoid all generalization of the forest succession for the Lake Van region. Furthermore, we also avoided the phrases ‘... the most depleted oxygen isotope values occur at the start of each early temperate phase.’ (Concerning the isotope signature see also to the detailed reply to Referee#3)

For better understanding, we added the Terminations (TIII at 250 ka, TIIIA at 222 ka, and TII at 136 ka) after Barker et al. (2011) and applied by Stockhecke et al. (2014) for the Lake Van sequence. Here, the beginning of TIIIA occurs right before the expansion of Poaceae, *Artemisia*, and the shift from positive to negative isotope values within PAZ Vb (MIS 7d).

Line 236: that suggest a cooling

Done.

Line 240: in other words: : :: : :this sentence seems incomplete

Due to general changes/improvements of this section (‘forested periods’), we removed this rephrase.

Line 250: from a variety of factors

Removed. See reply above.

Line 274: species

Done.

Line 280: tolerates

Done.

Line 347: Between 193 and 157 ka BP

Done.

Line 350: an age of ~189 ka BP is probably too precise with respect to the chronological setting of the record. Better say ~189 ka BP

Changed.

Line 371: shares

Done.

Line 373: refers

We changed the word in ‘refer’.

Line 408: colder but wetter climate conditions during MIS 6e than during MIS 3

Done.

Line 422: a unique record

Changed.

Lines 428-430: see general comments

See reply above.

Line 439: wetter conditions than during MIS 3
Done.

Lines 441-444: In the last sentence of the conclusions it would be better to emphasize what is new in your record instead of remarking what was already known