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Climate
of the Past
Discussions

Interactive comment on "Vegetation dynamics in the Northeastern Mediterranean region during the past 23 000 yr: insight from a new pollen record from the Sea of Marmara (core MD01-2430)" *by* V. Valsecchi et al.

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We would like to thank referee 1 for suggestions and for carefully checking typing/editing errors. Concerning 4 main points that were mention in the supplementary material here some reflections:

1. Referee 1: Page 4193: Line 7: Hippophaë can indicate the dominance of unstable slopes, soil erosion and fluvial activities (e.g. Kolstrup, 1980; Djamali et al., 2008). In forestry, it is cultivated to stabilize the slopes. In lower latitudes it forms a major

constituent of the landscape during the Pleniglacial.

In our sequence Hippophäe is present whit remarkable pollen percentages between 22.5-19.5 cal ka. We agree with referee 1 and related reference (Djamali et al., 2008), indeed during the glacial Hippophaë was most probably the dominant arboreal/shrub in the landscape and the landscape was not that open. We will make changes accordingly on page 4190 lines 19-20 and page 4193 line 7.

2. Referee 1: Page 4194: Line 3: I would be more careful using this statement: "e.g. colder and drier than the conditions during the LGM." Isn't the dominance of cool dinocysts an indication of more input of cold waters resulted from the melting of mountain glaciers or more snowfall in the Caucasus and Pontic region? Can the peak of Artemisia be related just to more snowfall? Artemisia is known to be favored by important amounts of snowfall. These are some reflections that the authors can consider in interpreting their spectra. The following paper shows that the traditional interpretation of Artemisia curves may not becompletely reliable: Subally, D., Quézel, P., 2002. Glacial or interglacial: Artemisia, a plant indicator with dual responses. Review of Palaeobotany and Palynology 120, 123-130.

In our pollen diagram Artemisia was interpreted as indicator of dry/steppic conditions. In contrast, referee 1 is suggesting that increase in Artemisia might be related to more snowfall. Our interpretation is based on the fact that Artemisia pollen is found together with other pollen types indicating dry conditions: Chenopodiaceae and Ephedra. High pollen percentage values of Artemisia, Poaceae, Chenopodiaceae and Ephedra are found in modern pollen samples of sites bordering steppe and desert regions in the eastern Mediterranean (Mudie et al., 2002). At the moment pollen identification at species level of Artemisia is not possible in order to disentangle wet/dry Artemisia species (Subally and Quézel, 2002). However, the analysis of an independent climatic indicator, dinocysts, from the same core MD01-2430 (Londeix et al., 2009) support our interpretation. An increase of thermophilic dinocysts including subtropical/tropical coastal species and increase in Caspidinium rugosum which is link to an increase in meltwater and therefore a warming phase (Londeix et al., 2009) occurred between 20.6 and 19.5 cal ka. At that time the increase of temperate tree pollen percentage is concomitant with low pollen percentages of Artemisia. At ca. 18.4 cal ka thermophilic dinocysts decrease while cool dinocyst are present with stable values, and a peak in C. rugosum concentration is recorded (Londeix et al., 2009) still indicating the presence of meltwater. From ca. 16.4 thermophilic dinocysts are present with very low proportion and C. rugosum is not recorded indicating cold and dry conditions (Londeix et al., 2009). At that time a peak in Artemisia pollen percentage and other steppic plants is recorded confirming that our interpretation of Artemisia is reasonable and that climatic conditions during the second part of HS 1 (17-15 cal ka) where harsher than those during the last part of LGM. We will include this discussion in the text on page 4193.

3. Referee 1: Page 4198: Lines 7-16 Please also read the following paper: Wright, H.E. Jr., Ammann, B., Stefanova, I., Atanassova, J., Margalitadze, N., Wick, L. et al., 2003. Late-glacial and early-Holocene dry climates from the Balkan Peninsula to southern Siberia. In: Tonkov S (ed.) Aspects of Palynology and Palaeoecology, Festschrift in Honour of Elissaveta Bozilova. PENSOFT Publishers, 127–136.

We thank referee 1 for suggesting this paper and we will include on page 4198, line 12, the hypothesis of changes from summer to winter precipitation during the early Holocene for sites located in Taurus/Zagros Mountains (according with, Wright et al., 2003; Djamali et al., 2010). Indeed this might also explain the apparent contradiction between high lake levels in Anatolia and the dominance of Artemisia and Chenopodiaceae in the pollen diagrams.

4. Referee 1: Page 4198: Lines 19-24 Subtropical monsoon intensifications have been invoked to explain the long summer months in eastern and southern Mediterranean. Please consult these citations: Magny, M., Peyron, O., Sadori, L., Ortu, E., Zanchetta, G., Vannière, B., Tinner, W., 2011. Contrasting patterns of precipitation seasonality during the Holocene in the south- and north-central Mediterranean. Journal of Quaternary Sciences doi: 10.1002/jqs.1543.

Djamali, M., Akhani, H., Andrieu-Ponel, V., Bracconnot, P., Brewer, S., de Beaulieu, J.-L., Fleitmann, D., Fleury, J., Gasse, F., Guibal, F.,Jackson, S.T., Lézine, A.-M., Médail, M., Ponel, P., Roberts, N., Stevens, L., 2010. Indian Summer Monsoon variations could have affected the early Holocene woodland expansion in the Near East. The Holocene 20, 813-820.

We thank again referee 1 for suggesting these papers and we will include on page 4198 an additional explanation on how the strengthening/weakening of the Indian Summer Monsoon is related to the spring precipitation in the Near East (Djamali et al., 2010). Additionally to this, we will add a further comment related to the dry phase found in the south-central Mediterranean during the Late Holocene (after 4.5 cal ka) (Magny et al., 2012) that we also identified in our pollen record (decrease in temperate pollen percentages).

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Interactive comment on Clim. Past Discuss., 8, 4183, 2012.