

# ***Interactive comment on “Annual proxy data from Lago Grande di Monticchio (southern Italy) contributing to chronological constraints and abrupt climatic oscillations between 76 and 112 ka” by C. Martin-Puertas et al.***

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We would like to thank Dr. Fletcher for his comments and suggestions on our manuscript “Clim. Past Discuss.10, 2595-2626, 2014 Annual proxy data from Lago Grande di Monticchio (southern Italy) contributing to chronological constraints and abrupt climatic oscillations between 76 and 112 ka”.

Especially, the manuscript have highly benefited from his expert advises on the climatic interpretation of the Monticchio pollen record and their implications on the climatic dis-

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cussion of the sedimentological and geochemical record presented in this study.

» Climatic interpretation of the MON events. In his revision, Dr. Fletcher shows a list of published examples from the Monticchio pollen record and other pollen records in the Mediterranean region, where the correlative stadial periods in the Mediterranean are interpreted as episodes of cooler but also drier conditions with a very marked seasonality (cold winters and dry summers). Based on this evidence we have reconciled the interpretation of our sedimentological (microfacies and varve thickness) and geochemical (Ti counts) proxies with the appropriate climate interpretation of the MON pollen data. Thus, we interpret the interval of increased varve thickness and Ti counts, which coincide with the pollen-based Mediterranean stadial periods, as periods of increased soil erosion because of forest reduction. Dr. Fletcher asks for addressing the issue of the seasonality (T or P), but unfortunately our annual-proxy data do not show a straightforward climate-proxy relationship (see next paragraph). Based on the synchronicity of the changes in the sediments and in the vegetation, we take the climate interpretation given by the pollen data to explain changes in the sediments and we use the annual-proxy data as indicators of climate variability, which allow us to provide absolute (timing) and relative (duration and velocity of the change) dating of the climate oscillations (stadial periods) more accurately and precisely than with the lower-resolution pollen record.

» Catchment dynamics. The heterogeneous nature of the sediments in the Monticchio varved record (i.e. organic varve sediments, reworked deposits and tephra layers) suggests multiple and very complex interactions among chemical elements. We found a strong parallels between the Ti and the varve thickness records and between those and the pollen record. As mentioned above, based on this good correlation we interpret our annual-proxy data as climate proxies but a more detailed reconstruction of the environmental and climate processes controlling these indicators is not fair. We agree Dr. Fletcher that the annual-proxy data shown in this study have the potential for a comprehensive discussion of the catchment dynamics, but we think this issue

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would deserve to be addressed in an additional manuscript. A well-supported study of the sedimentary processes operating on the lake Monticchio would imply further geochemical (e.g. TOC, TC, TN, Opal. . .) and isotopic analyses, as well as statistical treatment of the data. On the other hand, we would not expect that detailed reconstructions of the catchment dynamics have significant chronological implications, which do indeed be the main focus of our present study.

» Introduction. The introduction has been rewritten in the revised version as suggested by both referees (see response to Referee1).

Conclusion-Point 1. Proposing ideas about how and when millennial-scale variability emerges at the glacial inception, even being a very interesting challenge, is not within the scope of our study. In this study, we do not show annual-proxy data beyond 112 ka, so we cannot provide evidence for signs of millennial-scale variability coinciding with the DO 25 and the previous cooling episode GS 26.

Minor corrections and comments have been accepted.

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Interactive comment on Clim. Past Discuss., 10, 2595, 2014.

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