

Clim. Past Discuss., author comment AC1
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Reply on RC1

Fabrizio Marra et al.

Author comment on "Terrestrial records of glacial terminations V and IV and insights on deglacial mechanisms" by Fabrizio Marra et al., Clim. Past Discuss.,
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Our paper deals with the deglaciation signal at global scale and the possible forcing mechanisms based on a sedimentary record spanning 450 - 350 ka. In contrast, the reviewer discusses details of the local geology which represent the effect of the morphotectonic processes acting after the Last Glacial Maximum and have no relation with those responsible for the emplacement of thick horizons of coarse gravel during time spans precisely bracketed by $^{40}\text{Ar}/^{39}\text{Ar}$ age constraints and coinciding with the glacial terminations V and IV.

We apologize for not having referred to the local literature which described the evidence of glaciation in the central Apennines. We have given it for granted that a significant ice sheet would have occurred during the glacial maxima on a mountain range culminating above 2000 m; however, this is not a justification for not having cited the valuable and detailed work by Giraudi (2011) and we make amend.

Once this is acknowledged, we must say that we have found the comments by this anonymous reviewer contradictory at places, and biased by a complete lack of perspective.

Indeed, the reviewer says that the paper should be rejected because it does not provide any evidence of the presence of the glaciers, except to point out him/herself on the widespread evidence of glacial forms in this region reported in the local literature.

Moreover, the reviewer throughout his/her excursus mentions a series of very local sedimentary processes and several morpho-structural features characterizing the post Last Glacial Maximum Liri basin, without considering that, due to an extremely intense extensional tectonic phase coupled with a regional uplift in the order of hundreds of meters occurred in the last 250 ky, the present features may be very different from those which characterized this region 450.000 and 350.000 years ago.

For example, the reviewer completely ignores the fact that there is no evidence for gravel deposition within the Liri Basin after 350 ka, as shown by the geologic record that we have precisely dated. Therefore, it is clear that the present-day morpho-tectonic and hydrographic features that the reviewer describes have no relationship at all with those characterizing this region 450 through 350 ka.

Indeed, the subject of our paper is represented by two several meters thick and several tens of kms wide coarse gravel horizons which the provided geochronologic constraints demonstrate are deposited during well circumscribed time spans, at 450 and 350 ka, broadly coinciding with the glacial terminations V and IV.

As a matter of fact, large glaciers were surely present (as also the reviewer agree) and, despite all the possible traps and accidents that affect the present day basin, huge amounts of very coarse gravel were transported from the higher portions of the basin and deposited in two ~4 m thick layers in an area stretching up to 30 km within the basin.

Therefore, we believe that all the objections raised by the reviewer are superseded by these facts, and his/her criticism relies on discussing hypothetical minor aspects of the sedimentary processes and of the present-day hydrographic and geomorphologic features of the basin which have no relation with the large-scale processes investigated in our paper, and which have no consequence and impact at a global scale.

Therefore, his/her comments must be rejected, apart from some useful indications for improving the clarity of the text and of the figures.

While believing that the considerations above are sufficient to highlight the inconsistency of the reviewer's arguments, and a hassle on the details of the local geology would not interest an international audience, a point-by-point rebuttal of all the sometimes finicky issues raised by the reviewer in his/her detailed comments will be posted in a while, for those who are concerned. Here we just remark that many objections, like that on the post-*quem* character of the ages and on the sedimentation rate, do not take into account the explanation and the argumentation provided in the text and seem to arise from an inaccurate reading or lack of understanding.