

Interactive comment on “Determining the Plio-Quaternary uplift of the southern French massif-Central; a new insights for intraplate orogen dynamics” by Oswald Malcles et al.

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Modified manuscript is provided in supplement.

Q1: This paper presents original data on an interesting geomorphological subject where quantification is difficult and rare. The overall conclusion that South Massif Central has seen an incision and related uplift of about 80 m/Myr in the last 4 Ma, associated with a tilt toward the south is sound and deserves publication. However, the way the data is presented is far from satisfactory (missing information, hard to understand figures, neglected data without justification, etc., see details below) and thus I suggest important revisions to be performed before acceptance. English needs also

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significant improvement. I point a few points below.

A1: We took into consideration your comments and suggestions. We hope that our revisions and our answers below will clarify our work. The English has been reviewed. We would like to emphasize that one of the authors is a native English speaker (Australia).

Q2: details “ $83.4+17.3/-5.4$ ” is too precise! $83+17-5$ is enough. . .

A2: Agree, and change accordingly.

Q3: Burial dating using Terrestrial cosmogenic nuclides (TCN) are nowadays: change are to is. Line 38 (and elsewhere): “can’t” cannot is more advisable.

A3: Corrected

Q4: Fig.1 lacks latitude longitude and some landmarks (even myself who works in the area was not sure to locate the main structures) like main rivers, cities, . . .

A4: Additional information has been added to the map, trying to find a balance between information and clarity. See revised figure.

Q5: A geological map could be useful.

A5: At the scale of the study region and given the topic of the manuscript, we think that a topographic map is much more useful than a geological map to observe the overall morphology (besides, we mentioned clearly in the introduction and the tectonic setting that the geology of the studied area corresponds mainly to Mesozoic to lower Cenozoic limestones plateaus).

Q6: Also the localization of studied sites is poorly precised in this figure.

A6: Given the scale of Figure 1, it is not possible to locate precisely the studied points. We gave their precise geographical coordinates in the figure captions.

Q7: Could they be also indicated in e.g. fig.9?

A7: Yes, we added them.

Q8: Line 123-124: sentence needs a verb!

A8: “Creating” changed to “creates”.

Q9: Line 166-169 : strange practice to give results in the methods section (2.1) Please move them to section 2.2!

A9: We did it (see revised manuscript lines 211-214)

Q10: Line 216: 83 ± 35 is enough precise. A table of paleomagnetic results with statistical parameters is mandatory. A10: We added the table in the supplementary material.

Q11: Fig.6 is hard to understand (especially not knowing how much paleomagnetic sites are available). I figure that on paleomag polarity is represented arbitrarily by a set of points fitted with chosen incision rate, allowing to see if the polarity is consistent with the scale, indicated as vertical grey strips. This is very badly explained !

A11: Almost all the part 2.2.2, the figure and the captions have been reworked for better clarity.

Q12: Line 219 “First, we note a good agreement between samples located at the same elevation,” I really don’t get how you derive such assertion!

A12: We added explanation Line 2541-242: “samples located at the same elevation and being part of the same stratigraphic layer (Camus, 2003). This syngenetic deposition allow, as best explanation to prevent from a possible partial endokarstic reworking”. Indeed, Some sampling sites are located at slightly different elevation but inside the same gallery and, as part of the same sedimentary layer they have to display the same polarity, that is the case. This consistency is not on its own a proof that the clay didn’t sediment in different period (with same polarity) but it is by far the most reasonable explanation. See supplementary material with analysis details.

Q13: Line 223-225: about this reverse-normal sequence, there is no way to see it on Fig.6! Again the table is mandatory! You have to comment on the reverse polarity at

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≈40 m that you assign to Brunhes period. Why not putting Matuyama there?

A13: Given the poor quality of the data, we skipped it from the interpretation. See supplementary material.

Q14: Line 243: “Using a similar approach for the Rieutord crystalline samples,” I don’t get what you mean!

A14: We added simple explanations in the paragraph: “Using a similar approach for the Rieutord crystalline samples where we minimize the residual between the observed and the modeled ages based on the same incision-rate range than for the paleomagnetic samples”.

Q15: How do you compute average dip and azimuth of your geomorphological surfaces? If it’s arithmetic mean, that not acceptable. You have to make it using directional statistics (and show us a stereogram of dip lines)

A15: Given values are indeed not arithmetic mean. We checked again the computation and minor errors have been fixed (Average dip changed from $0.61 \pm 0.41^\circ$ with an azimuth of $N150 \pm 40^\circ E$ tot $0.60 \pm 0.40^\circ$ with an azimuth of $N128 \pm 36^\circ E$). It does not change the interpretation. Errors was due to mistake in downward sign for 2 surfaces. Because of very low dip angle of the plane, the conventional representation through stereogram is useless and won’t provide the information brought by the histograms.

Q16: Is Fig.9 all markers or only the robust ones? The second option (38 data; but I count 45 on fig.9!) seems right. But then the azimuths exhibit in fig.9 does not fit Fig.10. There are northward dips!

A16: Fig. 9 doesn’t display only the robust values. We added different color in order to decipher in between the two sets. Note that some surfaces cannot be shown on the map because of their small size and their closeness. See revised figure 9.

Fig.10 scale “surface density” is a number of surfaces? Please make this clear.

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A10: Yes. Modified accordingly.

Please also note the supplement to this comment:

<https://www.solid-earth-discuss.net/se-2019-99/se-2019-99-AC2-supplement.pdf>

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2019-99>, 2019.

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