

## Review of Mouslopoulou et al.

### General Comments

The Mouslopoulou et al. paper deals with a topic that has both environmental and tectonic implications, focusing on a well-expressed sea-side alluvial fan. Compared to the other fans that make up the coastal bajada of south Crete that develops ca 20 km further east, Domata fan is a relatively small one (area c. 0.2 km<sup>2</sup>), along with a string of other isolated fans that border the steep southern Cretan coast. Nonetheless, its stepped morphology, with an escarpment running roughly parallel to the present-day coastline may be indicative of processes that significantly affect fan-shape evolution, as the 'marine trimming' suggested by the authors. Indeed, Mouslopoulou et al. have tried to link fan evolution to climatic changes, coupled with uplift rate scenarios for the past few kyr and come up with a scenario that ties the evolutionary stages of the fan to successive marine high- and lowstands.

To achieve such a target, one has to resort to high-res geochronology, something that is not always feasible. Here lies, in my opinion, the main drawback of Mouslopoulou et al.'s work, which is found in their sampling strategy and the resulting dating accuracy: while the latter may not be the authors' fault, the former is a weak point in this work. Sampling did not include the body of the 'lower fan': this might clarify –and probably strengthen the authors' distinction of the Domata fan in an 'upper' and a 'lower' one. (Of course, this might not help, either, as the results from the other samples contain significant errors).

Having said these, I acknowledge the fact that the number of dated samples (and possibly the range of dating methods applied) are dictated by research funding; nonetheless, one has to make do with what they have, I'm afraid.

At any rate, the resulting OSL ages contain significant errors (as also acknowledged by the authors: P.8, l. 14); it is also unclear whether standard deviation and standard error refer to 1- $\sigma$  or 2- $\sigma$ . Hence, temporal resolution is too poor to support such a detailed evolution scenario, whose resolution is as high as 1kyr, while most ages overlap significantly and the correlation of successive events to KDE<sub>max</sub> is not satisfactorily constrained.

The lithostratigraphy of the Domata fan is poorly described; lithostratigraphic logs are missing –and these could help place the obtained samples in a coherent geological context. Moreover, it might clarify any probable lithological or other difference between the units described as "upper" and "lower" fan. This could also be aided if appropriate figures (esp. photographs) were included, to show the lithological composition of the fan(s). Panoramic photos are fine, but some close-ups would be very useful for the reader to understand the distinction made between Upper and Lower Fans. Figure 8 (b and c) focus on the soil cover and do not serve this purpose.

Between Domata and Sougia (c. 9 km to the west) there is a number of fans in practically the same a geomorphological and geological environment (the same could also be supported for the bajada the east, with Sfakia fan being its westernmost member). Processes suggested in this paper (i.e. "marine trimming") are not localized ones and affect extended tracts of land. So if such a process was responsible for the modification of the Domata fan, why it is not found elsewhere along this coast?

The authors did not take into account the work by Pope et al., (2016), on the nearby, well-studied Sfakia fan. This may be due to the fact that the m/s postdated the publication date of

this paper, but nonetheless, the authors should take it into consideration in their revised version.

### **Specific Comments**

Page 4, l. 20-21. Bedrock geology is grossly misrepresented, both in terms of lithology and age. Klados Gorge runs through platy crystalline limestones with phyllite intercalations and chert-bearing dolomites, chert-nodule-bearing limestones and quartzitic sandstones and shales, not through the platform carbonates of the Tripolis Unit (which is a Mesozoic carbonate platform). Moreover, the aforementioned lithologies (i.e. Kingilos group) belong to the metamorphosed Plattenkalk Unit, also known as Mani Unit. (e.g. Creutzburg and Siedel, 1975; Fassulas et al., 1994; and Jolivet et al., 1996) .

This suffices to explain the occurrence of quartz detritus in the Domata fan; the authors, however, did not seem to wonder why a purely carbonate-fed fan (as they describe it), contains so much quartz!

P.3, l.20. Please use appropriate term instead of “vertical deformation”.

P.21, Figure 2. How confident are the authors that the quasi-planar landforms west of the gorge are marine benches? Is there any piece of evidence supporting this suggestion?

P25, Figure 6b. The red dashed line that is suggested to represent a low terrace riser on the west side of the river seems rather ambiguous; it is hard to say from this photo.

### **Technical Corrections**

N/A

### **References cited**

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