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Interactive comment on “Composition of microbial communities in aerosol, snow and ice samples from remote glaciated areas (Antarctica, Alps, Andes)” by J. Elster et al.

Anonymous Referee #2

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I read through the paper and, in general, it looks good. I'm very surprised in this day and age that they didn't try to use molecular methods to identify the microorganisms in their study. This has been the accepted/preferred method for well over a decade now. It would have been nice to see them use it in addition to the microscopy. For example, saying that there are 'cocci' or 'rods' isn't very informative since there can be loads of different species with the same phenotype. They do recognize this limitation at the end of the paper and highlight it as what needs to be done in future studies. At the very least, they might want to discuss the limitations of their methodology a bit more early on.

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Another comment regards the 'unusual pigmented prokaryote', which they find very abundant in all samples. The light micrographs, especially Figure 1a-c, definitely do not look cellular or biological to me. It looks more to me like a mineral grain of some source. I'm also not convinced by the TEM image. They mention that these 'organisms' disperse more in the culture media, but still that is not saying much. I think they need to discuss this more in the paper—the fact that it has this very unnatural morphology and may indeed be non-biological. It might also be a good idea for them to expound on the HPLC data, if they are convinced that it is an organism.

They went to the trouble of comparing 3 different concentration methods (filtration, centrifugation and lyophilization) and state that they all worked well, but statistical analyses showed there were significant differences. What were those differences? The authors should expound on this a bit so we are aware what the major findings were. It would help future groups maybe decide which concentration method would be best for their needs.

Lastly, I'm not sure they can really say anything definitive about the diversity of heterotrophic organisms since they did not use growth media targeted for these types of organisms (eg. yeast) and given the limitation on morphological examinations alone. Also, I'm not a statistician, so I can't comment specifically on their statistics. They look pretty straightforward.

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