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Interactive comment on "Unravelling the enigmatic origin of calcitic nanofibres in soils and caves: purely physicochemical or biogenic processes?" *by* S. Bindschedler et al.

Anonymous Referee #1

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Calcitic nanofibers have been repeatedly observed in diverse environments and might be used as biological and/or environmental proxies if the mechanisms leading to their formation can be better understood. The manuscript offers a very detailed and balanced review of past research on calcite nanofibers. It sets very clearly the important issues that have to be tackled. Moreover, it provides new data from experiments mimicking the production of organic fibers and a very well articulated scenario of their formation. I only have few minor suggestions/comments:

- P979, L10 and L14: under controlled conditions

- L17: calcite: no capital letter

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- P982, line 19-0 “related but non-genetic origin Âż : I do not understand what Âń non-genetic Âż means here. You should rephrase or skip that word. What would be a non-genetic origin since you define afterwards genetic as relating to the origin.

- The papers you cite to illustrate the idea that there is a controversy regarding the putative existence of nanobacteria are quite “one-sided” (supporting existence) and do not really give much credit to the debate. You may cite alternatively or equally: Schieber and Arnott, Geology, 2003; Martel et al. PNAS 2008;)

P985: - L4: There is also further discussion on the involvement of an organic polysaccharide-like template in Benzerara et al, 2005 in GCA. - L8: organimineralization or biologically-influenced biomineralization as defined by Dupraz et al., 2009

-P986, L10: should read “the conclusion drawn. . .”

- P993: Do we know if all glucanases have intrinsically an optimal activity at acidic pH? Could some species adapted to calcareous environments have enzymes with an optimal activity at higher pH? There are examples (not chitinases) that I know of such as phosphatase for which there are acid and alkaline phosphatases.

- P995, Accordingly, Benzerara et al 2005 in GCA suggested moreover based on some spectroscopic measurements at the nm-scale that some organic molecules may be associated with this amorphous ca-carbonate (ACC) layer and stabilize the ACC. They concluded about polysaccharides but it may be something else alternatively since it was only based on the presence of some functional groups such as carboxylics groups.

- P996 L27; "by" instead of "through" - P998: moreover, even if you could find high densities of bacteria locally in shc environments would not it be strange that all of them are calcified and none remains intact? - L 25: Skip “To note that” and start by “This does not. . .”

Interactive comment on Biogeosciences Discuss., 11, 975, 2014.