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Biogeosciences Discussions

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.

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GENERAL COMMENTS The authors compare the ensemble of micro-organisms, pollen and remnants of particles that they can observe in, or can isolate from snow, ice and aerosols sampled in very remote regions. In the introduction, the authors indicate that there is growing interest in the microbiology of remote sites in the hope of finding ancient organisms that might be indicators of processes contributing to evolution of microbial life and in climatic processes. One of the main conclusions concerns the absence of micro-autotrphs in their samples. The other main conclusion of this study concerns the ubiquity of different micro-organisms and remnants of organisms:

there are those that are widespread and often found as contaminants, and there are those specific to different types of remote sites.

The data presented here are the fruit of an apparently difficult sampling campaign and intensive laboratory observations. However, the results are presented in a form that does not clearly illustrate the specific objectives of their work. In the body of the current manuscript, the authors have not presented clear objectives. On the other hand, the abstract indicates that the goal of the study was to determine if micro-autotrophs are commonly transported by air masses and then stored in snow and ice. If this information had been presented clearly in the introduction (and the justification for this question), the rest of the paper would have been much easier to understand. (Please note that this reviewer reads the abstract AFTER she has read the body of the paper - in order to determine if the abstract reflects the content of the paper.) The discussion of the paper will also need to be modified to offer further interpretation and speculation about this result. The authors state that culturing methods are not the cause, yet they go on to state that the absence of sufficient cultural methods for algae and cyanobacteria is a great weakness. This gives the impression that they believe that cultural methods might in fact be the cause of their results. They need to clarify this point and offer suggestions for why micro-autotrophs would be absent from their samples. Overall, they need to strengthen the presentation of the results and the discussion to illustrate the scientific contribution made by this work.

SPECIFIC COMMENTS

p. 1781, L 3 : Change ‘build’ to ‘built’.

p. 1782, L 16-17: Change to: ‘In addition, various methods for the pre-concentration of ice and snow samples and various cultivation techniques were tested.

p. 1784, L 9: Change ‘occur’ to ‘occurs’. p. 1784, L 13: Change ‘samples’ to sample’. p. 1784, L 25: Change ‘corresponds with’ to ‘corresponds to’.

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p. 1785, L 5-8: It would be useful here to briefly describe the reason these different media are used: for culturing which types of organisms.

p. 1788, L 4-5: Change sentence to 'Very rarely found were colonies resembling Merismopedia ĚĚ.'

p. 1788, L 7: What is meant by "growing stages"?

p. 1788, L 7-8: Change sentence to: 'Only empty frustules of diatoms or their segments were recovered ĚĚ'

p. 1788, L 19-20: Change sentence to 'At first we thought this bacterium Ě.'

p. 1789, L 2-3: Change the first sentence of this paragraph to: 'The presence of microorganisms or of biotic remnants was determined by repeated measures of three types of samples (aerosol, snow, ice).

p. 1789, L 18: Change 'aren't' to 'were not'.

p. 1790, section 3.3: Overall this section needs some clarification. The authors present comments about the biotic components of the different types of samples and also about the overall composition. The difference between specific information and general information is not always clear. Furthermore, the title of this section is misleading: "Community composition": are these assemblages of micro-organisms veritable communities? This seems unlikely for the bulk of all types of samples (aerosols, snow, ice).

p. 1790, L 9: Change 'Between' to 'Among'. p. 1791, L 7: What is meant by 'local original ice'? p. 1791, L 9: Change 'fungi hypahe' to 'fungal hyphae'.

p. 1791, L 15-17: These last two sentences ('The Monte Carlo permutation ĚĚ the problem of contamination.') are troubling. Does this mean that there are no differences between the negative controls and the samples in terms of the micro-organisms and remnants present? The way this sentence is presented is shocking and suggests to the reader that the conclusions drawn from the results for ice cores are invalid. I doubt

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that this is really what the authors mean. This should be clarified.

p. 1792, section 3.5: Change title to ‘Interaction of dust and organisms or remnants’.

p. 1792, L 21: Change to “.. data on the presence/absence of dust are Ĕ.’

p. 1792, L 22-25: These last 2 sentences seem contradictory. The authors state that dust influences the occurrence of organisms (more dust, more organisms), but that coccoid bacteria, bacterial red clusters, yeasts, diatom valves and pollen in ‘both types of samples’. I assume that ‘both types of samples’ means with and without dust. So, if dust does not influence the occurrence of 5 of the different types of organisms, how can the authors state that dust influences the occurrence of organisms? Do they mean only unusual prokaryotes and fungal spores and hyphae?

p. 1793, L 6: Change ‘frequency’ to ‘frequencies’. Change ‘the richest in the presence of’ to the richest in terms of the presence of’.

p. 1793, L 9: Change ‘has been’ to ‘was’. Change ‘fungi’ to ‘fungal’. p.1793, L 12: Change ‘fungi’ to ‘fungal’.

p. 1794, L 1-2: Delete sentence: ‘We familiarized ourselves Ĕ.. design of our study.’ Obviously the authors did this. One assumes that the authors did the background work before setting up a study.

p. 1794, L 8: Change ‘cultivatable’ to ‘culturable’. p. 1794, L 11: Change ‘cultivate of both’ to ‘cultivate both’. p. 1794, L 17: Change ‘cyanobacteria and algae inoculum’ to cyanobacteia and algal inoculum’. p. 1794: L 29: Change ‘contamination’ to ‘contaminant’. p. 1795, L 1: Change ‘contamination’ to ‘contaminating’. p. 1795, L 29: Change ‘provenience’ to ‘origin’. p. 1796, L 22: Change ‘fungi’ to ‘fungal’.

p. 1798, L 6-7: Change ‘In addition, inside the studied Ĕ micro-autotrophs.’ To ‘In addition, inside the studies remote and extremely cold landscapes there are habitats where the occurrence of micro-autotrophs is occasionally very high.’

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Interactive Comment

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p. 1800, L 2: Change ‘ware’ to ‘were’.

p. 1800: L 7: What is ‘”luck” in information’? The authors need to find the appropriate term.

Table 1: Remove ‘is introduced’ from title.

Table 2: Remove ‘is shown’ from the title. Change ‘organisms’ to ‘organism’. Change ‘in the table show’ to ‘indicate’. Table 3: Similar modifications of text as for Table 2. Figs. 1, 4, 5: Remove ‘of photos’ from the title. Fig. 4: Change ‘fungi’ to ‘fungal’. Fig 6: These images are not in focus and should be removed if they cannot be replaced by in-focus images.

Interactive comment on Biogeosciences Discuss., 4, 1779, 2007.