

***Interactive comment on* “Bacterial diversity in Himalayan glacial ice and its relationship to dust” by S. Zhang et al.**

S. Zhang et al.

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We thank Dr. Shivaji for his constructive comments. In the following, comments are addressed in the same order as in the reviews:

Question 1: The main focus of the paper is on bacterial diversity, DGGE by itself can definitely provide subjective information on changes in bacterial diversity. But if this information is to be used effectively by microbiologists, it would be essential also to clarify what are the different types of microorganisms present at the various depths. At least those microorganisms which are dominating and predominant at each depth could be identified by PCR and sequencing of the DGGE bands.

Response: The individual DGGE bands from the gel were excised and reamplified. We finally got six 16S rDNA sequences with the accession number of AM292074-

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AM292079. We got the following results: 1. Half of the sequences are very similar to the uncultured eukaryote sequences, suggesting that the corresponding lineages are uncultured groups of bacteria. But half of the sequences are with low similarity (87-95%) to the known sequences in GenBank. Thus their corresponding bacteria are probably undescribed. 2. The dominance of α -proteobacteria in the ER ice core was consistent to that in the Muztagh Ata ice core from the northwestern Tibetan Plateau (Xiang et al., 2004), water, ice and sediment samples from the Bench Glacier of Alaska and the John Evans Glacier of Canada (Skidmore, et al., 2005). 3. Band sites 1-4 occurred within the ER ice core depth ranges 32.11-32.47m, 32.47-32.72m, 33.89-34.34m 37.89-38.24m, and 43.15-43.45m, which coincide with the periods of high Ca²⁺ concentrations. Thus it is likely that nutrition served by dust is a determinant factor for the bacteria corresponding to these band sites.

Question 2: Fig. 2, change "13 among the 50 samples in gray" to "13 gray samples".

Response: Change has been made accordingly.

Question 3: Legend to Fig. 3, details of each lane should be given. If possible the unique bands at each depth should also be indicated.

Response: Details of the band sites in each lane were given in the revision.

Question 4: Fig. 6 is not needed and the results could be included in the text.

Response: Change has been made accordingly.

Question 5: Fig. 8 also is not needed and the results could be included in the text.

Response: Change has been made accordingly.

Question 6: A few typographical errors have been noticed all through the text. For instance, Page 3434, line 20, "presented" should be "present".

Response: Change has been made accordingly.

Question 7: Page 3436, line 3, "was drilled to the bedrock on the col" should be "was drilled through the bedrock on the col".

Response: It's very common to say "to the bedrock" among the ice core communities, e.g., Kaspari et al., *Geophys. Res. Lett.*, 34, L16701, doi:10.1029/2007GL030440, 2007.

Question 8: What is "col"?

Response: "col" stands for a saddle on the glaciers. It's also commonly used among the ice core communities, e.g., Kaspari et al., *Geophys. Res. Lett.*, 34, L16701, doi:10.1029/2007GL030440, 2007.

Question 9: Why have the investigators used only a small part of the 16S rDNA gene for their diversity studies. They should have normally used at least a 1 Kb fragment for this purpose.

Response: Primers 341f and 518r (*Escherichia coli* numbering) is in the V3 variable region of the 16S rDNA gene and is well documented in the literature for amplification of a broad range of bacteria, including their application in a clinical setting (Miller et al., 1996; Schabereiter-Gurtner et al., 2001; Temmermann et al., 2003). In addition, the best fragment length for DGGE analysis is in the range 100-500bp (Wang and Li, 2007).

Question 10: " μ L" should be changed to " μ l" all through the text. Further " μ " need not be in italics.

Response: Change has been made accordingly.

Question 11: Page 3440, "nightly exposure" is not the right expression. It should be changed.

Response: In the revision, we have changed this sentence to "surfaces exposed to UV light overnight".

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