

## ***Interactive comment on “Influence of aeolian activities on the distribution of microbial abundance in glacier ice” by Y. Chen et al.***

**Anonymous Referee #1**

Received and published: 10 November 2014

This paper presented the microbial concentrations of two Tibetan ice cores to deduce its connection with dust and temperature. Though this topic is quite interesting, and much progress has been achieved during the passing more than 10 years, it seems that the current version of this paper is just echoing the previous sayings. For instance, the main content in the sections of Results and Discussion is redundant of what was said in the section of Introduction. And the conclusion is not convincing, mainly due to the low resolution of sampling in intervals of 15–30 cm, which may cover multi-year deposition because of the low accumulation rates at the Muztag Ata glacier and the Dundee ice cap. Thus it's probably impossible to identify its seasonality, saying nothing of comparison with "the cooling autumn and warming spring-summer seasons".

Other comments: In Discussion 4.1, the microbial depth profiles might be modified by

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post-deposition processes, especially for the Dundee ice core, because melting happens in summer at the glacier snow surface.

In Discussion 4.3, broad ranges of microbial density are evident for each studied sites, so it's improper to only give a fixed number (average concentration?) without indicating its corresponding range.

Page 14532, Line 25: "that causes climatic changes Basin (Wake et al., 1993; Davis et al., 2005)", I can not understand this sentence.

Page 14536, Line 17: "B1 to B7" should be "A1 to A7".

Page 14540, Line 5: The lowest microbial cell density occurred in the Rongbuk Glacier which contained  $9 \times 10^6$  cells mL<sup>-1</sup>. But in Fig. 5, the number is  $9.4 \times 10^4$  cells mL<sup>-1</sup>.

Page 14540, Line 18-25: "in the Arctic glacier, Kongsvegen, with  $2 \times 10^5$  cells mL<sup>-1</sup> (Amato et al., 2007). ... By contrast, the relatively low cell density in the polar glaciers may be indicative of a decrease in the microbial input due to the longer transport distance from non-polar environments" cell density is  $3.7 \times 10^5$  cells mL<sup>-1</sup> in Palong Glacier,  $2.2 \times 10^5$  cells mL<sup>-1</sup> in Muztagata (Fig. 5), which does not support the argument of "the relatively low cell density in the polar glaciers"

In Conclusions, "Physical–chemical and microbiological data from three ice cores presented here", where is the third core?

Figure 1 and Figure 5 can be merged.

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Interactive comment on Biogeosciences Discuss., 11, 14531, 2014.

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