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The Cryosphere Discussions

Interactive comment on "Dust from the dark region in the western ablation zone of the Greenland ice sheet" *by* I. G. M. Wientjes et al.

M Stibal

marek.stibal@bristol.ac.uk

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This is a very interesting paper. Its main strength, in my opinion, is the analysis of the surface debris that suggests local sources rather than long-distance transport of volcanic or desert materials. The idea of the dust cropping out of the ice is also quite interesting as it carries some biological and biogeochemical implications.

I have some comments and questions on Section 3.3 though. First, the microbial data here are limited to a few pictures of cryoconite granules with attached cyanobacteria, and presumably only light microscopy was used to inspect the samples. It is important to realise that organisms visible under the microscope (in this case cyanobacteria and algae) are only a small part of all microbes present. That no microbes were observed in the sample from S4 does not mean there aren't any, and certainly the results presented

here are in no way quantitative. Second, no activity measurements were done, and so the claims about increasing activity with altitude are purely speculative (but not necessarily wrong). Third, no albedo measurements were done (?), so the claims about the significance of cyanobacteria and in situ primary production for it are not substantiated here. And last, the conversion of TOC to organic matter and comparison of these converted OM values with others obtained by gravimetry after furnacing is problematic in my opinion. TOC only would be much safer here. Also, are your TOC:N ratios molar?

I also suggest that the authors have a look at a recently published paper in which material from a very similar transect is analysed for organic C and microbial abundance (Stibal et al. 2010, Annals of Glaciology 51(56):1-8). Papers describing cyanobacteria and algae on the GrIS have also been published (Uetake et al. 2010, Polar Science; Yallop & Anesio, Annals of Glaciology).

Interactive comment on The Cryosphere Discuss., 4, 2557, 2010.