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Comment

## ***Interactive comment on “The role of microorganisms and plants at different stages of ecosystem development for soil formation” by S. Schulz et al.***

### **Anonymous Referee #1**

Received and published: 22 March 2013

1. Does the paper address relevant scientific questions within the scope of BG? Yes  
2. Does the paper present novel concepts, ideas, tools, or data? Highlight the importance of microbial communities for primary succession  
3. Are substantial conclusions reached? yes  
4. Are the scientific methods and assumptions valid and clearly outlined? Yes  
5. Are the results sufficient to support the interpretations and conclusions? Good literature review  
6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Not applicable  
7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? yes  
8. Does the title clearly reflect the contents of the paper? Not entirely, see general comments  
9. Does the abstract provide a concise

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Interactive Discussion

Discussion Paper



and complete summary? yes 10. Is the overall presentation well structured and clear? yes 11. Is the language fluent and precise? Needs revision 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? There are too many abbreviations (C, N, SOM, OM, SOC, BP, OC, BSC). Even though most of them well known for soil scientists, they still need to be spelled out when mentioned for the first time. 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Figures are nice, but not explored in the text. 14. Are the number and quality of references appropriate? yes 15. Is the amount and quality of supplementary material appropriate? yes general comments This discussion papers deals with the role of microorganisms and plants during soil development, using the chronosequence found at Damma glacier as an example. The topic of this review is very interesting, as it highlights the key role of microorganisms already at the initial stages of development, before plants get established. There is however a mismatch between the title of this review and its contents, especially when it comes to plants. Plants and plant microbe interactions are very important for reaching the final stages of soil development, but these factors are not fully developed in the text. I would suggest to remove plants from the title, keep the major focus on microbes and discuss plants more in the plant-microbe interaction. I miss a general description of the stages of soil development, in terms of amount of biological crust, plant cover/types, nutrients, pH, etc. It could be added as a table, linked to figure 1. That would help illustrating many of the concepts/results presented in the review. Another major comment relates to the figures, which are very nice but hardly explored in the text. I would suggest sending it to a native English speaker. There are some very long or too short sentences, the use of English is not always correct (too many to be mentioned) and punctuation marks are not always properly used. specific comments P1868, L17-18: what do you mean by “the respectively set up of plant communities”? P1869, L3-12: please rephrase these sentences, they are too long and hard to read P1869, L29: delete “as” P1870, L12-16: please rephrase these sentences P1871, L3-5: replace “picture on” by “view of”. Delete “approaches” P1872, L23: delete “and can be considered as important

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Comment

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Interactive Discussion

Discussion Paper



Interactive  
Comment

contributors” which is a repetition of what you said earlier in this sentence. P1873, L2-5: replace “a predicting” by “the prediction”. If this field observations are rare, why not providing more details about what Tamburini et al 2010 found? P1874, L1: what do you mean by in abiotic initial soils? P1874, L19: delete C P1872, L22: I don’t think “we” is appropriated here, since the authors from the cited paper are not the same as the those writing these review.

P1872, L25: What do you mean by carboxyl C? P1876, L9: delete N after “contribute” P1876, L14-16: Is 6x106 copies of nifH low? Compared to what? P1877, L1-2: delete or rephrase this sentence, which has been already mentioned before. P1877, L7-10: Same as previous comment on nifH gene copy number, what kind of comparisons are you making to infer that this amount of amoA gene copies are too high? P1877, L13-15: How do you explain that? P1878, L9-10: I miss a general description of the sites (see general comment) P1879, L6: replace “plant available” by “available for plants” P1880, L5: delete anyhow (same in P1883, L21) P1880, L9-11: please elaborate more on how they differ P1881, L6: delete comma after although (same in P1882, L14 and L27) P1881, L14-15: How can these crusts be associated with vegetation patches and at the same time be absent in the sites (same page, line 7)? P1881, L20-25: How can crusted soils have 200% more N than uncrusted soils and at the same time be N limited? Do you mean that they have higher demand for N? In that case you should find lower N concentrations in the crusted soil. P1885, L18: connect the word “fingerprinting” Fig 2: how does that connect to fig 1? How come mineralization of biomass is bigger at initial than transient stages?

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Interactive comment on Biogeosciences Discuss., 10, 1867, 2013.

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