

## ***Interactive comment on “Microbial colonisation in diverse surface soil types in Surtsey and diversity analysis of its subsurface microbiota” by V. Marteinson et al.***

**Anonymous Referee #1**

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General comments: In this manuscript Marteinson et al aimed to investigate the microbial colonisation of surface soil and subsurface microbiota in Surtsey Island; a new volcanic island created by series of volcanic eruptions from 1963 to 1967. The research question address in this paper is very interesting and within the scope of Biogeosciences Journal and particularly the special issue on Geological and biological development of volcanic islands. Authors correctly argue that Surtsey Island provides a unique laboratory for the investigation of biological establishment and succession on newly deposited volcanic substrata on the surface and sub-surface. Interestingly, authors have chosen contrasting methods to explore microbial community in surface and sub-surface soils. The viable counting of total environmental and predetermined

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heterotrophic bacteria types (Coliforms, E Coli, Enterobacteriaceae) was chosen for surface soils and more detailed sequencing was conducted on subsurface soil.

Overall this manuscript examined an interesting question but not successful in presenting an interesting science story. Although Science question is well detailed in introduction, described the methodology and results adequately, presenting a clear science story in discussion is weak. There are some paragraphs in discussion nearly repetition of results or methods. Discussion needs to be rewritten with clear science story.

Specific comments

More detailed description of Surtsey Island (Location, climate, vegetation types, animal colonies etc) is required in Material and methods section. Authors indicate few previous studies on ecology of Surtsey Island. The general findings of those studies can be included to description of the island.

As indicated in the title exploration of diversity of microbial colonisation in diverse surface soil types in Surtsey was generally not achieved. This would have been the most interesting finding. This could have been achieved if the authors used sequencing approach/ clone library for surface soil types.

The finding of number of bacteria count increasing at soil types with bird droppings and with vegetation is interesting but not novel. Also the authors claim for coliforms and faecal coliforms inability to survive long period in soil is from their finding of inability to produce viable cells in medium rather than not detecting viable cells from soils. Perhaps these microbes are difficult to cultivate in medium.

Authors claim that correlation was observed between N deficits and the number of microorganisms in surface soil samples. However, there is no illustration is this or indication of statistical significance of the correlation in the text. The data for SR samples in Table 2 do not supports this either. The N% in samples SR 15-17 is in the range of 0.02-0.06% but have the bacterial counts 106-108 which are similar to samples with

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0.7% N.

What is the reason of bell shape of temperature and depth (Figure 5) What is informed from CO<sub>2</sub> flux measurements? What is the reason for examination of predetermined microbes (coliforms, E coli, Enterobacteriaceae, salmonella, jejuni/coli, etc)?

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