Data Paper

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1st submission

Editor Start Date: 2/3/2022

Editor Stop Date: 2/28/2022

Reviewer #1 (2/5/2022–2/16/2022)

Reviewer #2 (2/14/2022–2/28/2022)

Reviewer #1: Tamotsu Hoshino

Dear Authors,

This is important basic data for Polar microbiology, and I did not find any problem in your manuscript. Therefore, I recommend to publish in your manuscript in Polar Data Journal.

Reviewer #2: Anonymous

The authors report the dataset of functional gene composition of soil microbial communities at three sites along a latitudinal gradient in Canadian arctic region. The dataset is original and unique, and is worth publishing in Polar Data Journal after several revisions.

L35. Add a brief explanation of GeoChip 5.0M to help readers who are unfamiliar to this assay.

L37. Spell out KW.

L40. Specify 'most' of the functional genes. What was the proportion of those from bacteria with respect to the total number of genes?

L41. Please explain what are the DNA and cDNA samples. They seem to be different. Which or both were the same as GeoChip 5.0M?

L44. This should be Figure 1. Number the figure as the order of their appearance.

L44-45. 'Useful' here does not make sense to me. Clearly state if this is the first report of the functional gene pool of soil microbes in the Arctic or if there is previous reports relating to this. The originality of the research should be mentioned.

L48. Brief site description will be helpful, including landform, vegetation or dominant plant species, disturbance history,

and the layout of plot or transect.

L49. Specify the month and year of your 'summer'.

L55. Please indicate the number of samples collected at each site. Also indicate the number of sample (n=xx) in Figure 2.

Figure 2. Explain in the main text what are 'GeoChip 5.0M gene categories'.

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Authors Response:

We would like to thank the editor and both the reviewers for taking their time to review our paper and provide meaningful feedbacks and comments.

Response to reviewer #2;

The authors report the dataset of functional gene composition of soil microbial communities at three sites along a latitudinal gradient in Canadian arctic region. The dataset is original and unique, and is worth publishing in Polar Data Journal after several revisions.

L35. Add a brief explanation of GeoChip 5.0M to help readers who are unfamiliar to this assay.

We have added a short description of GeoChip5.0M at Line 36-39.

L37. Spell out KW.

We have spelled out the KW in whole at Line 41.

L40. Specify 'most' of the functional genes. What was the proportion of those from bacteria with respect to the total number of genes?

We have added Figure 2 to the manuscript in order to explain and summarize the data discussed in Lines 46-48.

L41. Please explain what are the DNA and cDNA samples. They seem to be different. Which or both were the same as GeoChip 5.0M?

DNA are fragments of genetic materials that can persist in the environment even after the death of the organism while RNA can only be expressed by living organisms. In our study, both DNA and RNA were extracted simultaneously from the soil sample and RNA is converted to a more stable form called, cDNA, for downstream analyses. We have added a short line to clarify our objectives in sampling DNA and cDNA samples (Line 45-46).

L44. This should be Figure 1. Number the figure as the order of their appearance.

Thank you for pointing out this mistake. We have corrected it in the revised manuscript.

L44-45. 'Useful' here does not make sense to me. Clearly state if this is the first report of the functional gene pool of soil microbes in the Arctic or if there is previous reports relating to this. The originality of the research should be mentioned.

Our objectives and motivations for this research have been listed in a clearer manner in Lines 50-52.

L48. Brief site description will be helpful, including landform, vegetation or dominant plant species, disturbance history, and the layout of plot or transect.

We have added a brief descriptions on the three sampling sites in Lines 59-64.

L49. Specify the month and year of your 'summer'.

The month and year of the sampling are now listed in the Lines 56-57.

L55. Please indicate the number of samples collected at each site. Also indicate the number of sample (n=xx) in Figure 2.

The number of samples per sampling area is added to Line 63 as well as in Figure 3 (Formerly Figure 2).

Figure 2. Explain in the main text what are 'GeoChip 5.0M gene categories'.

The Geochip functional gene categories are the main categories for the functional genes e.g. Metal homeostasis, Nitrogen cycling,etc. as listed in the Figure 3. More information about the gene categories can be found in the paper published by Shi et al., 2019. We have listed this citation in Line 39 should the reviewer and future readers need further clarifications on this matter.

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2nd submission

Editor Start Date: 3/7/2022

Editor Stop Date: 3/10/2022

Editor Comments to the Author: Norio Kurosawa

The authors have properly revised the manuscript in response to the reviewer's comments. The current manuscript is acceptable for publication in the Polar Data Journal.