

Data Paper

Yoichi Fukuda, Jun'ichi Okuno, Koichiro Doi, Choon-Ki Lee and Alessandro Capra. Absolute Gravity Measurements at Jang Bogo Station and Mario Zucchelli Station, Antarctica, in 2019. *Polar Data Journal*. 2021, 5, p.125–143. <https://doi.org/10.20575/00000032>.

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1st submission

Editor Start Date: 8/17/2021

Editor Stop Date: 9/3/2021

Reviewer #1 (8/19/2021–8/19/2021)

Reviewer #2 (8/24/2021–9/3/2021)

Reviewer #1: Anonymous

The authors describe absolute gravity measurements at four points at two Antarctic stations. I really appreciate the efforts the authors have made in collecting and processing the data and I am very happy to see that the full data package including raw data is shared with the community. I hope the data will be used in future for the important scientific questions that can be addressed with the data. I have uploaded a PDF with some remarks for improvement. It's mainly wording and some suggestions for the figures. The only "major" point if one wants to call it that way is that if you calculate the vertical gradient and you have measured at several heights, you may consider calculating the gradient with a second-degree polynomial. That would be a good addition.

Thank you for your valuable contribution! I recommend acceptance after having dealt with my minor/technical remarks.

P2, add "results of":

P3, "even after including the uncertainties due to the vertical gravity gradients." Bit out of place. remove or extra sentence

P3, "However, the number of absolute gravity reference points in Antarctica is still quite small, and the number of points with repeated measurements is even more limited", How small (quantity) and compared to what (it's all relative)? Please add a sentence with additional explanation, i.e. adding numbers.

P3, "Add a sentence in the beginning that there are mainly two types of absolute instruments are currently in use: FG5 and A10."

P4, "can be moved up after the (new) sentence introducing the FG5 and A10"

P4, "Figs"

P4, "an MGL A10-036"

P5, "estimated"

P5, It'd be great if you can say something about the volume (cubic meter) of the tent and the building so that the reader gets a feeling of which area was at 20 and 0 degrees Celsius. Also, can you add the average outside temperature?

P6, "a LaCoste & Romberg Model D-58"

P7, Why not using a second-degree polynomial when you have measured at 3 heights?

P8, it

P11, "reduce white background behind JBS och MZS" "Add letters A and B to the upper and lower figure part, respectively, and use it in the caption."

P19, "reduce white background behind JBS"

P21, "reduce white background behind MZS"

"Please add exact geographical coordinates of the IAGS and TNBAS points, either figure or caption."

"Please add exact geographical coordinates of the IAGS and TNBAS points, either figure or caption."

Reviewer #2: Anonymous

This paper presents very important gravity measurements in Antarctica. The manuscript nicely describes the data set. I also had a look at the landing page and the data set on ADS, which are organised tidily. I see no major issues in this manuscript.

The only concern is that there is no format description of the "gsf" binary files in this paper. In my quick look at the references 11 and 12, they do not contain it either. It should be stated or trackable even if the majority of its users will simply use the g9 software.

Authors Response:

We thank the reviewers for their valuable comments. Their suggestions are really constructive and useful. Therefore, we followed them, and revised the manuscript accordingly. All our responses are shown in red and one-by-one responses are inserted into reviewer's comments.

Response to Reviewer #1;

I have uploaded a PDF with some remarks for improvement. It's mainly wording and some suggestions for the figures. The only "major" point if one wants to call it that way is that if you calculate the vertical gradient and you have measured at several heights, you may consider calculating the gradient with a second-degree polynomial. That would be a good addition.

Thank you again for your comments and suggestions.

Regarding the gradient with a second-degree polynomial, we added the description and the formula for calculating the gradient at a height (h). However, we would like to use the linear gradient value for the calculation of the gravity value in this paper, because of the consistency of the data processing at the other points. In particular, the value has been already employed in Fukuda et al. 2021, and we think it is also important to keep the consistency with it.

The responses for the other comments/suggestions in the PDF are as follows:

P2, add "results of":

Revised.

P3, "even after including the uncertainties due to the vertical gravity gradients." Bit out of place. remove or extra sentence

Removed the sentence as suggested.

P3, “However, the number of absolute gravity reference points in Antarctica is still quite small, and the number of points with repeated measurements is even more limited”, How small (quantity) and compared to what (it's all relative)? Please add a sentence with additional explanation, i.e. adding numbers.

Added the approximate number as “around 20”.

P3, “Add a sentence in the beginning that there are mainly two types of absolute instruments are currently in use: FG5 and A10.”

P4, “can be moved up after the (new) sentence introducing the FG5 and A10”

Revised as suggested.

P4, “Figs”

Revised.

P4, “an MGL A10-036”

Revised.

P5, “estimated”

Revised to “determined”.

P5, It'd be great if you can say something about the volume (cubic meter) of the tent and the building so that the reader gets a feeling of which area was at 20 and 0 degrees Celsius. Also, can you add the average outside temperature?

We added the description about the volume of the tent. The approximate temperature of the building (~0 °C or below) was already described, so we did not add anymore.

P6, “a LaCoste & Romberg Model D-58”

Revised.

P7, Why not using a second-degree polynomial when you have measured at 3 heights?

We added the description. See above.

P8, it

We added “it” as suggested.

P11, “reduce white background behind JBS och MZS” “Add letters A and B to the upper and lower figure part, respectively, and use it in the caption.”

Revised as suggested.

P19, “reduce white background behind JBS”

P21, “reduce white background behind MZS”

Revised as suggested.

“Please add exact geographical coordinates of the IAGS and TNBAS points, either figure or caption.”

We added the exact coordinates of the points, in the caption of Fig. S2.

“Please add exact geographical coordinates of the IAGS and TNBAS points, either figure or caption.”

We added the exact coordinates of the points, in the caption of Fig. S4.

Reponse to Reviewer #2;

The only concern is that there is no format description of the "gsf" binary files in this paper. In my quick look at the references 11 and 12, they do not contain it either. It should be stated or trackable even if the majority of its users will simply use the g9 software.

Thank you again for your comments.

We think there is no official description about the binary file format, and we could not include it in the text. Instead, as described in the g9 user manual (reference 12), the software has a function to export the “gsf” and “fg5” binary data in ASCII format. Therefore, we might have an option to include the exported ASCII files in the dataset. However, we dare not do so, because the g9 software is more convenient for the raw data processing and there is almost no benefit to include the ASCII format large size raw data files. We think the “drop.txt” files can be used for almost all requirements of the additional data processing. We added the related descriptions in the text.

2nd submission

Editor Start Date: 9/12/2021

Editor Stop Date: 9/13/2021

Reviewer #1 (9/13/2021–9/13/2021)

Reviewer #2 (9/13/2021–9/13/2021)

Reviewer #1: Anonymous

The authors did a nice job. I am happy with the revision and recommend acceptance. I have technical remarks though that the authors should address during typesetting/proofreading:

l50: Now a day -> Nowadays

l52&54: there are now two sentences starting with "Although". You may consider rephrasing one of the two sentences.

Fig. S2 caption: space missing after JBSAG2

Fig. S4 caption: longitude information got lost for TNBAB.

Corrected according to above comments.

Editorial Office's note

Calculate checksum date: 9/14/2021

Algorithm:SHA256

Hash link: <http://id.nii.ac.jp/1434/00000032> > hash list