

Data Paper

Naohiko Hirasawa, Masataka Shiobara, Toshiyuki Murayama, and Hiroshi Kobayashi. Ship-borne ceilometer measurements over the northwestern Pacific and the Indian sector of the Southern Ocean, and at Syowa Station, Antarctica, in the summers of 2010/11 to 2019/20. *Polar Data Journal*. 2022, 6, p.66–79.

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1st submission

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Reviewer #1 (5/9/2022–5/22/2022)

Reviewer #2 (6/15/2022–7/11/2022)

Reviewer #1: Takashi Yamanouchi

Comments to the submission "Ship-borne ceilometer measurements over the northwestern Pacific and the Indian sector of the Southern Ocean, and at Syowa Station, Antarctica, in the summers of 2010/11 to 2019/20" by N. Hirasawa et al. (General comments)

It is very important to make a data open and publish manuscript describing the specifications of data, so this manuscript is greatly appreciated. However, there are some points to be revised or clarified.

1. The importance of ceilometer data (scientific meaning) should be briefly described first in the Abstract although described in Background and summary section.
2. In the Background and summary section, the information as for the project should also be informed (just as referred in Acknowledgements).
3. Data formats are explained, but no examples of data are shown. It might be helpful to show some figures, such as an example of time height distributions of back scatter coefficient.
4. What are the actual data, the instantaneous intensities or backscatter coefficients? Together with cloud base height and so on.
5. What is the meaning of "unique format", and is the word "unique" appropriate? Then, what is the substantial difference between Vaisala format and unique format.

(Minor comments)

1. Line 83: The final phrase, "the EEZ of South Africa was added on the return route", is not clear.
2. Line 88: It may be effective to refer to Fig. 2 (b).

3. Line 90-91: What is the emission rate (time interval) of laser pulses? And how it relates to the "temporal interval of the data" in Table 2?
4. Line 216: The meaning of this sentence is not clear.
5. Line 222: The meaning of this sentence is not clear.
6. Line 150 and 231: "srad" might be steradian, but why not just "sr"?
7. Table 1: The first two row of JARE 57, Syowa Station to Sydney should be marked with *, which should be inserted in the sentence of Line 270-272 or at the bottom of the Table.

Reviewer #2: Anonymous

This paper, "Ship-borne ceilometer measurements over the northwestern Pacific and the Indian sector of the Southern Ocean, and at Syowa Station, Antarctica, in the summers of 2010/11 to 2019/20" describes about ceilometer measurements data over ship between Australia and Syowa Station, Antarctica.

I agree this description is satisfied for reading and using data overall.

I have some comments below,

1. P.2 L.40 JARE-52, November 2010 to April 2011 is corrected.
2. P.4 "4. Data Records"

I had some difficulties to under stand this chapter. Because you did not mention about the detail of data contents will be explained at "5. Technical validation".

"Line 5" and "Line 6" have many contents but the description has a lot of lacks. I did understand them at "5 chapter".

So you should touch "later mention" at "4 chapter".

3. Figure 2 (b), (c) indicates their different visibilities as csv-format. You would show the difference between (a) and (b)(c), but I opened some csv files and the appearance of them are different from this figure.

Could you make the figure to be real?

Authors Response:

Dear Editor and Reviewers,

Thank you for giving helpful comments.

We have revised the manuscript in line with your comments and here are our responses to your comments one by one.

We have submitted two types of manuscripts as follows. One is the completed revised version and the other is the version with records of the revisions (adding "_e" to the end of the file name). In our response below, line numbers indicating revisions are given with respect to the completed version.

There were unnecessary files left in some directories at the time of the first submission, and we have deleted them.

Also, some files had unnecessary data left, and I have deleted them from the files.

Naohiko Hirasawa and Co-Authors

Response to reviewer #1;

Comments to the submission "Ship-borne ceilometer measurements over the northwestern Pacific and the Indian sector of the Southern Ocean, and at Syowa Station, Antarctica, in the summers of 2010/11 to 2019/20" by N. Hirasawa et al.

(General comments)

It is very important to make a data open and publish manuscript describing the specifications of data, so this manuscript is greatly appreciated. However, there are some points to be revised or clarified.

Thank you for giving helpful comments.

We have revised the manuscript in line with your comments and here are our responses to your comments one by one.

1. The importance of ceilometer data (scientific meaning) should be briefly described first in the Abstract although described in Background and summary section.

Answer:

Thank you for this comment. We added to the abstract about the significance of the ceilometer observations in lines 23-26.

“The ceilometer observation provides information of clouds and precipitation especially under clouds on the oceans, where very little information are, and the data are significant to identify the present state of the warming climate and to estimate the future change of the climate.”

2. In the Background and summary section, the information as for the project should also be informed (just as referred in Acknowledgements).

Answer:

Thank you for this comment. We added the information of the project to Background and summary section in lines 45-51. And, related to that, we slightly changed the wording of the acknowledgments.

“During the period, the ceilometer observation was continued in conjunction with several scientific projects as follows: “Aerosol-mediated material cycle processes in Antarctic coastal region and the Southern Ocean” (Project No.: AP-11) on JARE-52 (December 2010–March 2011) to JARE-57 (December 2015–March 2016), “Changing of East Antarctic aerosols in global biogeochemical environment” (Project Nos.: AP0910 and AP0932) and “Mechanism of variation in surface condition of the ice sheet and heat and moisture budget in east Antarctica” (Project No.: AP0911) on JARE-58 (December 2016–March 2017) to JARE-61 (December 2019–March 2020).”

3. Data formats are explained, but no examples of data are shown. It might be helpful to show some figures, such as an

example of time height distributions of back scatter coefficient.

Answer:

Thank you for this comment. We added figures of time-height sections of backscatter coefficients for a month-long (February 2020) and a day-long (February 22, 2020) to Figure2a and b. As a result, Figure 2 in the first manuscript has been moved to Figure 3. A description with the Fig.2 was added in lines 134-140.

4. What are the actual data, the instantaneous intensities or backscatter coefficients? Together with cloud base height and so on.

Answer:

Thank you for this comment. We have responded to this comment together with another comment about lines 90-91 and Table 2.

The actual data for one record (every 30-90 s) is a vertical profile of processed backscatter coefficients that are originally obtained at a frequency of 6.5 kHz and up to three cloud base heights that are detected through an analysis of the manufacturer's algorithm with the measured backscatter coefficients.

The revised parts in response to this comment are in lines 103-106, in Table 2, and lines 131-132.

5. What is the meaning of "unique format", and is the word "unique" appropriate? Then, what is the substantial difference between Vaisala format and unique format.

Answer:

Thank you for this comment. As mentioned above, the data records provided by the manufacturer contain various information other than observation data. In addition, the vertical profile of the backscatter coefficients is recorded in hexadecimal notation, and in many cases it is converted to decimal notation and used for analysis. Therefore, we have created two kinds of files and will publish them that contain the observation data converted to decimal notation and the date and time, and that were added the latitude and longitude information that were not in the manufacturer outputs. The data formats recorded in these files are necessarily different from that of the manufacturer. We express such our data format as "unique". However, since what is important here is not the format, but the content and notation of the data, we have removed the phrase "unique format" from the text and the caption of (new) Figure 3 as follow:

We revised the latter part of abstract as "daily files with decimal expression processed in the projects, and annual cruise files with hourly averaged and decimal expression processed in the projects." in lines 33-35.

And we replaced "(3) Daily files processed using a unique format" with "(3) Daily files with decimal expression" in line 212 and "(4) Annual cruise files processed using a unique format" with "(4) Annual cruise files with hourly and decimal expression" in line 224.

(Minor comments)

1. Line 83: The final phrase, "the EEZ of South Africa was added on the return route", is not clear.

Answer:

Thank you for this comment. Taking into account your comments on Table 1 below, we have revised the paper as follows.

1. Lines 92-94 in text:

“On JARE-57, since the Shirase went to Cape Town after departing from Syowa Station and then went to Sydney through the Antarctic area, the cruise route with the data is divided into three portions (*1, *2, and *3 in Table 1) by the EEZs of South Africa.”

2. Table 1 and in lines 302-304 in the caption:

2. Line 88: It may be effective to refer to Fig. 2 (b).

Answer:

Thank you for this comment. We have referred to Fig.1b in line 99.

3. Line 90-91: What is the emission rate (time interval) of laser pulses? And how it relates to the "temporal interval of the data" in Table 2?

Answer:

Thank you for this comment. According to the User's guide by Vaisala (the 11th reference), the emission frequency (inverse of the emission rate) is 6.5 kHz and the most frequent measurement interval is 6 seconds. We, the users, can choose the recording interval from 6 to 120 seconds, which is the "temporal interval of the recorded data in this archive". For the current data, different intervals have been chosen for each cruise, and the range (30s to 120s) is listed in Table 2.

We add this explanation to the text (lines 103-106) and the relevant terms to Table 2.

4. Line 216: The meaning of this sentence is not clear.

Answer:

Thank you for this comment. We have simplified the expression and have replaced “When extremely intense backscattering is observed at a certain altitude, it is often not possible to observe beyond that altitude and it is up to the users to determine from the vertical profile data whether such a situation is occurring.” with “Therefore, care should be taken if there are such layers of high backscatter coefficients in the vertical profile.” (Lines 239-240)

5. Line 222: The meaning of this sentence is not clear.

Answer:

Thank you for this comment. We have deleted this subsection because we would only describe the general characteristics that result from averaging operation.

6. Line 150 and 231: "srad" might be steradian, but why not just "sr"?

Answer:

Thank you for this comment. Because “srad” is adapted in the manufacturer's manual and we followed it. But we agree this with you. In revised manuscript, we have replaced “srad” with "sr".

7. Table 1: The first two row of JARE 57, Syowa Station to Sydney should be marked with *, which should be inserted in the sentence of Line 270-272 or at the bottom of the Table.

Answer:

Thank you for this comment. We have revised Table 1, the caption, and the relevant lines in the text (lines 92-94).

Response to reviewer #2;

This paper, "Ship-borne ceilometer measurements over the northwestern Pacific and the Indian sector of the Southern Ocean, and at Syowa Station, Antarctica, in the summers of 2010/11 to 2019/20" describes about ceilometer measurements data over ship between Australia and Syowa Station, Antarctica.

I agree this description is satisfied for reading and using data overall.

Thank you for giving helpful comments.

We have revised the manuscript in line with your comments and here are our responses to your comments one by one.

I have some comments below,

1. P.2 L.40 JARE-52, November 2010 to April 2011 is corrected.

Answer:

Thank you for this comment. We have replaced "April 2021" with "April 2011". (Line 43)

2. P.4 "4. Data Records"

I had some difficulties to under stand this chapter. Because you did not mention about the detail of data contents will be explained at "5. Technical validation".

"Line 5" and "Line 6" have many contents but the description has a lot of lacks. I did understand them at "5 chapter".

So you should touch "later mention" at "4 chapter".

Answer:

Thank you for this comment. We agree with you. We have moved lots of the contents in section 5 in the previous manuscript into section 4(1) in the revised manuscript. And we remove the section entitled, "Information provided by the manufacturer for data quality". Also, we have revised section 5(4) of the previous manuscript and have placed it in section 5(2) with the title of "Unit of the recoded backscatter coefficients".

3. Figure 2 (b), (c) indicates their different visibilities as csv-format. You would show the difference between (a) and (b)(c), but I opened some csv files and the appearance of them are different from this figure.

Could you make the figure to be real?

Answer:

Thank you for this comment. Figure 2b and c are shown to explain the contents of the first parts of the first lines of

“20170131.DAT” and “JARE58_latlon.DAT”, respectively. Both are displayed in 4 lines in the figure, but in the file, they are recorded in 1 line, respectively. We think such displays are confusing, so we revised the figure caption. For example, for Figure 2b:

“The first part of the first line of the “20170131.DAT” (for 31 January 2017) under the directory named as “JARE58/10_daily/”. The display is in 4 lines but they are recorded in 1 line in the actual file.” in lines 287-289.

Also, we have added a sentence in text as “The 4 lines in the figure are recorded in 1 line in the actual files.” in lines 215-216 and 229-230.

2nd submission

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Editorial Office’s note

Calculate checksum date: 9/15/2022

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