Data Paper

Keishi Shimada, Kunio T. Takahashi, Yujiro Kitade, and Tsuneo Odate (Deceased). Physical and chemical oceanographic data during *Umitaka-maru* cruise of the 61st Japanese Antarctic Research Expedition in January 2020. Polar Data Journal. 2025, 9, p. 53–80. https://doi.org/10.20575/00000063.

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1st submission

Editor Start Date: 12/27/2024

Editor Stop Date: 4/3/2025

Reviewer #2: (1/6/2025–1/30/2025)

Reviewer #3: (4/2/2025–4/2/2025)

Reviewer #2: Anonymous

This paper presents high-quality physical and chemical oceanographic monitoring data in the Indian Sector of the Southern Ocean. Such continuous routine data is valuable for detecting changes in the ocean environment under the ongoing climate change and understanding the Southern Ocean's current/future state and global climate. Therefore, I think the paper is worth publishing as a data report after the minor revisions suggested below.

Minor comments and suggestions:

1. Background & Summary

Line 39–40 - please define "mid," "deep," and "abyssal" layers with specific depth ranges.

3. Materials, methods and technical validation

Line 85 - Is there any reason not to comply with TEOS-10 (absolute salinity)? I suggest adding a brief comment on this issue for readers.

3.4.2 Quality control

Line 150 - Please indicate the manufacturer of the Standard Sea Water.

8. Appendix

Line 353–357 - "t" (the elapsed time since the cruise started) is missing in Eq.C2. Please correct the equation or the following sentences.

Figures:

Fig.1 - Add some labels for major topographic and geographic features, such as the Australian-Antarctic Basin, the South Australian Basin, Antarctica, etc.

Fig.7 - Why are the profiles displayed on the middle and bottom panels for station KC5 broken at a depth far from the seafloor? Sensor data on the top panel are displayed normally to the near seafloor.

Reviewer #3: Anonymous

The authors compiled physical and chemical data obtained during the cruise of Umitaka-maru in 2020.

The method is accurate and well standardized. Data file and format is clearly described. Validation is also sufficient.

Therefore, I recommend accept this manuscript for publication in this journal after very minor correction below.

L89–90

A TSG system developed by CT&C Co. Ltd. was used to observe sea surface temperature and conductivity (and hence salinity) along the complete cruise track....

It is better to show the system measured temperature and conductivity of pumped up water, not just sea surface water.

Furthermore, I could not find the depth of an intake.

L153–155

Are 554, 5862, 0.0-0001 and 0001 count value? 0.0 seems to be real number and 0001 is not like value.

What is the STANBY and ZERO value?

To what did the value changed from?

Authors Response:

Response to reviewer #2:

We would like to thank reviewer #2 for her/his thorough reading of our manuscript and positive assessment with very constructive comments. All points helped us a lot. We believe that your points are now implemented and helped us a lot to improve our manuscript. Our response follows (in red), one by one, the list of the reviewer's comments.

1. Background & Summary

Line 39–40 - please define "mid," "deep," and "abyssal" layers with specific depth ranges.

Thank you for pointing this out. We added the following sentences, accordingly. Also, abbreviations "AAB" and "SAB" are added to the preceding sentences.

"Here, abyssal layers indicates a few hundreds to 1000 m thick layer above sea floor, and mid to deep layers roughly indicates 500–3000 m in the AAB and 2000–4000 m in the SAB, respectively."

3. Materials, methods and technical validation

Line 85 - Is there any reason not to comply with TEOS-10 (absolute salinity)? I suggest adding a brief comment on this issue for readers.

We adopted salinity (PSS-78) considering the direct consistency with Standard Sea Water, of which the certification value is provided in salinity (PSS-78). We have implemented this point by adding following sentence and relevant reference 15 (McDougall et al. 2012).

"Please note that we adopt salinity (PSS-78) in this manuscript considering direct consistency with Standard Sea Water (SSW), which is used for validation, while Absolute Salinity15 is widely used recently."

3.4.2 Quality control

Line 150 - Please indicate the manufacturer of the Standard Sea Water.

This is reasonable. We added the manufacturer (Ocean Scientific International Ltd.) into the sentence (Line 155–156 of the revised manuscript), accordingly.

8. Appendix

Line 353–357 - "t" (the elapsed time since the cruise started) is missing in Eq.C2. Please correct the equation or the following sentences.

Thank you for pointing out this inconsistency. We removed the description of "t" (the elapsed time since the cruise started) form the text, accordingly.

Figures:

Fig.1 - Add some labels for major topographic and geographic features, such as the Australian-Antarctic Basin, the South Australian Basin, Antarctica, etc.

Thank you for providing this idea. We added the labels for geographic features to fig. 1, accordingly.

Fig.7 - Why are the profiles displayed on the middle and bottom panels for station KC5 broken at a depth far from the seafloor? Sensor data on the top panel are displayed normally to the near seafloor.

Unfortunately, the Niskin bottle assigned for the deepest layer was broken due to rough sea condition and hence, we could not obtain sea water sample from deepest layer at KC5. To reduce the ambiguity, we added following sentences.

"At KC5, however, we could not obtain sea water sample at the deepest layer due to the Niskin bottle trouble." (Line 134-135 in the revised manuscript)

"As mentioned in the section 3.3, near bottom data for CTD water sampling data at KC5 is missing (fig. 7) due to the Niskin bottle trouble." (Line 262-264 in the revised manuscript)

Response to reviewer #3:

We would like to thank reviewer #3 for her/his thorough reading of our manuscript and positive assessment with very constructive comments. All points helped us a lot. We believe that your points are now taken and helped us a lot to increase understandability our manuscript. Our response follows, one by one, the list of the reviewer's comments.

L89–90

A TSG system developed by CT&C Co. Ltd. was used to observe sea surface temperature and conductivity (and hence salinity) along the complete cruise track....

It is better to show the system measured temperature and conductivity of pumped up water, not just sea surface water. Furthermore, I could not find the depth of an intake.

It is likely that our points did not convey well. To reduce the ambiguity, we added following sentence.

"The details of TSG system are provided in Appendix A." (Line 95–96 in the revised manuscript)

Also, relevant sentence (Line 93–94 in the original manuscript) was modified as follows.

"Appendix A also provides the details of salinity calibration, and a comparison between TSG and bottle salinity is summarized in Fig. 2." (Line 97–99 in the revised manuscript)

L153–155

Are 554, 5862, 0.0-0001 and 0001 count value? 0.0 seems to be real number and 0001 is not like value.

What is the STANBY and ZERO value?

To what did the value changed from?

It is likely that the sentence was not precise and insufficient.

The values are indicators of the salinometer condition rather than some sort of physical quantity, and the main point we want to describe here is that the salinometer operated properly and stably throughout the cruise. Thus, we modified the relevant sentences as follows.

“The standardization control for the salinometer was fixed at 554 during the cruise. The values of STANBY and ZERO are 5862±0001 and 0.0-0001±0001, respectively. “

Also, following sentences are added after the sentence.

“Thus, the salinometer operated properly and stably throughout the cruise (please refer to manufacturer manual; https://guildline.com/media/k2/attachments/OM8400B-L1-00.pdf) for detail).”

2nd submission

Editor Start Date: 4/14/2025

Editor Stop Date: 4/30/2025

Reviewer #2: (4/23/2025–4/30/2025)

Reviewer #3: (4/15/2025–4/15/2025)

Reviewer #2: Anonymous

The revised manuscript is improved to be readable and understandable. I appreciate their responses and revisions and recommend that the manuscript is published.

Please find below a minor editorial suggestion for consideration.

- "Fig." and "fig." are mixed in the manuscript, so they should be unified.

Corrected according to the above comment.

Editorial Office’s note

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