

Data Paper

Ryosuke Makabe, Shintaro Takao, Kunio T. Takahashi and Tsuneo Odate. Chlorophyll a and macro-nutrient concentrations during the icebreaker Shirase cruise of the 59th Japanese Antarctic Research Expedition. Polar Data Journal. 2020, 4, p.145–168. <https://doi.org/10.20575/00000020>.

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1st submission

Editor Start Date: 9/1/2020

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Reviewer #1 (9/2/2020–9/2/2020)

Reviewer #2 (9/3/2020–9/17/2020)

Reviewer #1: Toru Hirawake

Authors compiled and reported oceanographic data of JARE 59 monitoring program. It is precious dataset and worthy to open to public. Text body in this manuscript seems to be same as that of the report of JARE58 which has already reviewed and published. If this Journal permit authors to use same descriptions as that of previously published report, I have no comment to the text body.

I have some comments on graph and dataset.

Unit of PAR in graphs should be "micro mol photons $m^{-2} s^{-1}$ " (please add 'photons').

Latitude presented by negative value for the southern hemisphere is fine for a digital dataset, but negative latitude shown in figures with a unit of 'degree N' is not appropriate for the Antarctic science.

There is no descriptions on data files and columns of data.

CHL BULK is rounded off to the first decimal place. Could you change it to the second decimal place?

There is no data of size fractionated chlorophyll a "concentration" in dataset (only % of each size). It was measured independently from bulk chl.a. Therefore, the concentrations are not CHL BUK x CHL size%.

Reviewer #2: Naho Miyazaki

General comments to Authors:

First of all, I would like to express to respects for authors and involved researcher energetic study who has not only been continuously involved in the Antarctic JARE research for about 60 years, but also has performed sampling and

analysis in harsh circumstances. The main contribution of the paper is the annual series data set of biological oceanography reliably captures rapid changes in the global environment and is expected to contribute to the improvement of marine education. I would like to recommend that this paper be accepted in Polar Data Journal after minor revision.

Major comments:

In order to observe changes in ocean characteristics in the South Sea, it is possible to provide important baseline data by collecting continuous data due to the location of exchanges with ice and the Antarctic continent as well as seawater and atmosphere. Pumping seawater has been used for several purposes since more than half a century ago, and methods are being developed to allow sampling from ships. The Methods section does not clearly explain (or no references) of the navigation measurement system used in Shirase. For example, how many meters to take water, what kind of piping to take water, pumping speed, etc. You can better understand the interpretation of these data by providing us with the details.

P.6 Line 126 "JARE59_Ch&Nuts" that data in Filename is JARE59_Chl_Nuts_BtlSample.csv

CTD and macro-nutrients CSV data of the sea surface (0 m) are all "-999". Knowing the physical environment and macro-nutrient concentrations, makes it easier to explain the mechanism by which large phytoplankton dominate when high chlorophyll concentrations. For example, Stn.L06 which is shown a relatively high concentration of chlorophyll-a on the sea surface, lacks of surface data set, despite vertical data are available. The CSV data collected with the Niskin sample are shown all the chlorophyll data, but the missing for surface CTD and macro-nutrients data. Is there a special reason?

Minor comments:

P.4 Line 60 and 70

Indent in the paragraph after the line break.

P.5 Line 92

Please describe specifications as the product name and the manufacturer of membrane filters.

P.5 Line 94

Please describe the specification as the manufacturer of N, N-dimethylformamide.

P.6 Line 109

It is difficult to know about the CV% for precision of macro-nutrient measurements. It would be reasonable to list as example; precision and the detection limits were ± 0.02 and $0.02 \mu\text{mol kg}^{-1}$ for nitrate.

P.7 Line 155

Siemens, SI symbol is "S". Conductivity unit is S/m or S m⁻¹. In several places, SI unit symbol and parts per notation are mixed in this paper. Please check journal posting rules and/or Ocean observation guidelines for handling of dimensionless quantities.

P.7 Line 167

Need one space between Sigma- θ and (kg m⁻³)

P.8 Line 161

Indent in the paragraph after the line break.

P.11 Line 233

Legends of Figure 12. PAR (d, Not available)

Figure 10 The horizontal axis is "Longitude (°E) ".

Figure 11 The horizontal axis is "Longitude (°E) ".

Authors Response:

We revised the MS according to reviewer's comments as followings (in red).

Response to reviewer #1;

Authors compiled and reported oceanographic data of JARE 59 monitoring program. It is precious dataset and worthy to open to public. Text body in this manuscript seems to be same as that of the report of JARE58 which has already reviewed and published. If this Journal permit authors to use same descriptions as that of previously published report, I have no comment to the text body.

I have some comments on graph and dataset.

Unit of PAR in graphs should be "micro mol photons m⁻² s⁻¹" (please add 'photons').

Corrected accordingly.

Latitude presented by negative value for the southern hemisphere is fine for a digital dataset, but negative latitude shown in figures with a unit of 'degree N' is not appropriate for the Antarctic science.

We had already published the series of data paper unifying to "degree N". We decided to show it in current manner to avoid confusions for user of this series.

There is no descriptions on data files and columns of data.

CHL BULK is rounded off to the first decimal place. Could you change it to the second decimal place?

The significant figures for Chlorophyll a is usually used in the first decimal place. So, we cannot change it.

There is no data of size fractionated chlorophyll a "concentration" in dataset (only % of each size). It was measured independently from bulk chl.a. Therefore, the concentrations are not CHL BUK x CHL size%.

Actually, we have independent measurements of each size class. But we decided to show only the fraction (%) avoiding confusion due to presence of two different bulk values.

Reponse to reviewer #2;

First of all, I would like to express to respects for authors and involved researcher energetic study who has not only been continuously involved in the Antarctic JARE research for about 60 years, but also has performed sampling and analysis in harsh circumstances. The main contribution of the paper is the annual series data set of biological oceanography reliably captures rapid changes in the global environment and is expected to contribute to the improvement of marine education. I would like to recommend that this paper be accepted in Polar Data Journal after minor revision.

Major comments:

In order to observe changes in ocean characteristics in the South Sea, it is possible to provide important baseline data by collecting continuous data due to the location of exchanges with ice and the Antarctic continent as well as seawater and atmosphere. Pumping seawater has been used for several purposes since more than half a century ago, and methods are being developed to allow sampling from ships. The Methods section does not clearly explain (or no references) of the navigation measurement system used in Shirase. For example, how many meters to take water, what kind of piping to take water, pumping speed, etc. You can better understand the interpretation of these data by providing us with the details.

The collecting depth was added in the revised MS. But the pumping speed for water sample did not be measured because the tap for the Chl. a and nutrients measurements was temporally opened.

P.6 Line 126 "JARE59_Ch&Nuts" that data in Filename is JARE59_Ch_Nuts_BtlSample.csv

All file names in the MS have been corrected.

CTD and macro-nutrients CSV data of the sea surface (0 m) are all " - 999" . Knowing the physical environment and macro-nutrient concentrations, makes it easier to explain the mechanism by which large phytoplankton dominate when high chlorophyll concentrations. For example, Stn.L06 which is shown a relatively high concentration of chlorophyll-a on the sea surface, lacks of surface data set, despite vertical data are available. The CSV data collected

with the Niskin sample are shown all the chlorophyll data, but the missing for surface CTD and macro-nutrients data.

Is there a special reason?

CTD measurements cannot covers just surface (0 m), and we did not salinity measurements of the water collected by using a bucket. Therefore, we cannot calculate nutrients in $\mu\text{mol}/\text{kg}$ (The values in $\mu\text{mol}/\text{L}$ are shown even at 0 m depth). This has been fixed since JARE61 by measuring salinity of the surface water.

Minor comments:

P.4 Line 60 and 70

Indent in the paragraph after the line break.

I cannot find any error in this place.

P.5 Line 92

Please describe specifications as the product name and the manufacturer of membrane filters.

These informations have been added.

P.5 Line 94

Please describe the specification as the manufacturer of N, N-dimethylformamide.

Added.

P.6 Line 109

It is difficult to know about the CV% for precision of macro-nutrient measurements. It would be reasonable to list as example; precision and the detection limits were ± 0.02 and $0.02 \mu\text{mol kg}^{-1}$ for nitrate.

The detailed analytical methods can be referred to Shimada et al. (2020).

P.7 Line 155

Siemens, SI symbol is "S". Conductivity unit is S/m or S m^{-1} . In several places, SI unit symbol and parts per notation are mixed in this paper. Please check journal posting rules and/or Ocean observation guidelines for handling of dimensionless quantities.

We changed the unit from "s/m" to " S m^{-1} ".

P.7 Line 167

Need one space between Sigma- θ and (kg m^{-3})

Corrected accordingly.

P.8 Line 161

Indent in the paragraph after the line break.

We have unified the indent through the MS.

P.11 Line 233

Legends of Figure 12. PAR (d, Not available)

The data after 6th March, 2018 was not collected due to mechanical trouble of the sensor. This has been described in Material and methods section and the legends of Figure 12.

Figure 10 The horizontal axis is "Longitude (°E) ".

Corrected.

Figure 11 The horizontal axis is "Longitude (°E) ".

Corrected.

2nd submission

Editor Start Date: 10/14/2020

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Editorial Office's note

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