

## **Comment on essd-2023-204 by Anonymous Referee**

### **General Comments**

The authors describe an extensive dataset of sea surface, atmospheric and seabed underway measurements collected in the Canadian Arctic waters during the 2021 scientific expedition performed by the research icebreaker Amundsen.

The processing methods and an overview of the data collected during that expedition are presented as well.

These data are particularly precious and relevant as they are part of a major long-term monitoring program of the area, started in 2003, to improve the understanding and the study of the unique processes taking place in the Canadian and Greenlandic Arctic.

Moreover, these observations can be useful to guide local decision makers to monitor risks associated to different activities (e.g., exploration and exploitation of oil and gas) and potentially beneficial for other ecological, geomorphological, sedimentological and management applications. Hence, this study certainly meets the ESSD criteria for data availability.

The presentation of the study sites and instruments is detailed. Figure 1 could be improved by the addition of general hydrodynamic features of the study area, based on available references.

Reference is made to hydrodynamic sensors and data, but no data is introduced and discussed.

In general, it may be useful to provide references on where the data and results of previous expeditions are available. The present manuscript is only focused on the 2021 expedition, in line with ESSD journal, but some long-term comments and/or comparison/analysis (e.g., studies of regional trends and variability) with respect to previous expedition could be shown here or in a future dedicated work.

### **Specific Scientific Comments**

Lines 26-28: Please add some details and reference about the referred unique ecosystems of the Arctic Ocean.

Lines 32-35: Reference is made to more than 1400 refereed scientific publications and 400 datasets resulting from CCGS Amundsen expeditions since 2003. Are these also publicly available on an annual basis? If yes, please add at least the most recent ones to the reference list or add a reference to where this information can be found.

Lines 41-42: Please add labels for Labrador Sea, the Baffin Bay, the Canadian Arctic Archipelago, and the Beaufort Sea in Figure 1. Also consider adding the main circulation features as detailed in Section 1.1, distinguishing between cold and warm waters.

Line 144: Please add reference to the Winkler method.

Line 151: Please add reference to the Seabird website or to the Seabird data processing software.

Section 2.2: Were collocated data from the CTD-Rosette and in-situ samples used for inter-comparison and correction of the Moving Vessel Profiler data, where available?

Line 254: If TS Diagram represented in Figure 5 are derived by transect profiles during leg 3 of 2021 expedition, it is not clear what is derived from Curry et al. (2011); Tang et al. (2004) in Fig. 5.

Figure 4, 5, 9: It is not clear what isolines represent as regards panel b.

Line 290: When you report: “Such dataset can be compare to the ones collected by the Amundsen during the 2021 expedition”, Do you mean that the 2 datasets are comparable or that you are going to compare them in a future works? If you intended the former, please rephrase and show results or comments on this.

Line 295: “Only the first 148 casts are presented in this paper”. Please explain.

### Technical Comments

In general, along the entire manuscript, please be consistent and consider that the symbol for the unit shall be placed after the numerical value in the expression for a quantity, with a thin space between them, e.g., 12 m, 10 °C.

Line 25: “1.5-3.7 °C” instead of the italics “1.5-3.7 °C”.

Line 48: “contacting the respective principal investigators (PI, as detailed in Table B1)”, instead of “contacting the respective principal investigators (as detailed in Table B1)”.

Page 35 - Table B1: Adjust the length of the last 2 columns to correctly display the terms in the last row.

Line 112: Add the full stop at the end of the sentence.

Line 128: Please modify: “are publicly available, after registration, at Guillot et al. (2022)” instead of “are publicly available at Guillot et al. (2022)”.

Line 149: “faulty sensor” instead of “faulty senor”.

Line 192 - Figure 3: Please use lowercase letters (a, b,...) to label parts of the figure (both in the image, in its caption and in the main text).

Line 236: Spatially/Vertically interpolated?

Lines 242-244 “The Davis Strait water masses have been extensively described in the past (Tang et al., 2004; Curry et al., 2011; Lehmann et al., 2019; Punshon et al., 2014) and the four main water masses of the region were observed (Fig. 5) during the sampling from the CCGS Amundsen” instead of “The Davis Strait water masses have been extensively described in the past and the four main water masses of the region were observed (Fig. 5) during the sampling from the CCGS Amundsen (Tang et al., 2004; Curry et al., 2011; Lehmann et al., 2019; Punshon et al., 2014)”.

Lines 246, 248, 252, 262, 265, 283, 284: “ $\mu\text{M}$ ” instead of the italics “ $\mu M$ ”.

Line 253: “Fig. 4b” instead of “Fig. 9b”.

Line 258: “at each stations along the NOW transect.” instead of “at each stations along the NOW transect, .”

Figure 4, 5, 9: “Isolines represent” instead of “Isolines represents”.

Line 265: “DO, ranging from 295-340  $\mu\text{M}$ ” instead of “DO,ranging from 295-340 $\mu M$ ”

Line 270: “TS-diagram (Figure 7). Different” instead of “TS-diagram (Figure 7).Different”

Lines 271-272: Please check this sentence: “Along the transect, two water masses defined by two sets of conservative temperature, on the left side of the figure”.

Figure 6 (d) and 7: Check the labelling of the extremes of the colour scale.

Line 289: “in order to facilitate their reuses” instead of “in order facilitate their reusise”.

Figure 10: Please add to the caption: “Isolines represent conservative temperature (isotherms, in °C)”. Please add a panel about conservative temperature if possible.

Line 311: AS acronym for absolute salinity already defined.

Figure 12: Please add unit in the legend.

Line 366: Please correct the italics.

Line 376: Link is missing.

Figure C2: Consider moving this Figure to the main text.