Continuous thermosalinograph oceanography along RV POLARSTERN cruise track PS118

Data Processing Report

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1 Introduction

This report describes the processing of raw data acquired by the thermosalinographs on board RV Polarstern during expedition PS118 to receive cleaned up and corrected salinity data. Detailed description of the processing of the data and the workflow is given in the general report “General Processing Report of Surface T/S Data RV Polarstern Cruises PS116, PS117, PS118, PS119 and PS120”.

Cruise details

Vessel name: RV Polarstern
Cruise name: PS118
Cruise start: 2019-02-09
Cruise end: 2019-04-10
Cruise duration: 60 days
Working area: Western Weddell Sea

2 Sensor Details

Following sensors were installed during cruise PS118. Only data from **TSG2** are uploaded to PANGAEA for cruise PS118 and are furthermore considered in this report (for reasoning see General Processing Report).

	TSG1	**TSG2**
Serial number	SBE21-3203	SBE21-3271
Installation	2018-10-16	2018-10-16
Deinstallation	2019-06-28	2019-06-28
Days installed	255	255
External temperature sensor	SBE38-110	SBE38-119

3 Processing Report

Database Extraction

Data source	DSHIP database (dship.awi.de)
Start of raw file	2019-02-09T04:00:00
End of raw file	2019-04-10T03:59:59
Number of lines in hexadecimal raw file	4841400
First dataset	2019-02-09T04:00:02
Last dataset	2019-04-05T15:03:11
TSG1 valid data	861937

Calculation of 10min means

The calculation of 10min means included the removal of outliers outside a 2-times standard deviation for each data interval. The number of outliers for each parameter are given here.

Number of outliers >2*std	
Internal temperature	30112
Conductivity	29007
External temperature	32611
Salinity	35734
Result after outlier removal	
Number 10-min-means	5866

Manual flagging

After processing the data were visually inspected. The whole data from a specific timestamp were deleted if there was only one parameter to be manually flagged. **100** data points were manually removed from the TSG2 dataset of PS118.

Assigning navigation data

Data from the corrected mastertrack of cruise PS118 were assigned to the 10min means of TSG2. A speed filter of 0.5 knots minimum speed is applied to avoid redundant data. See Figure 1 and Figure 2 for the processed and corrected data of TSG2.
Number of speed flags: 2572
Number of data in final output file: 3203

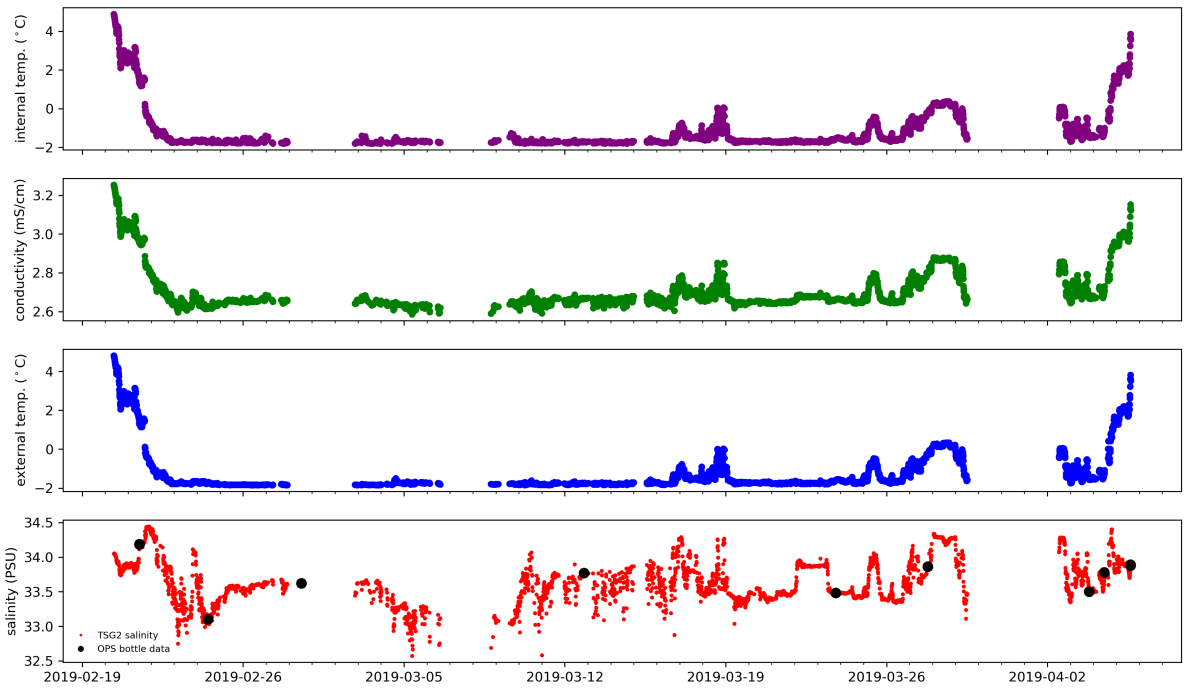

Figure 1: 10min means of data from TSG2

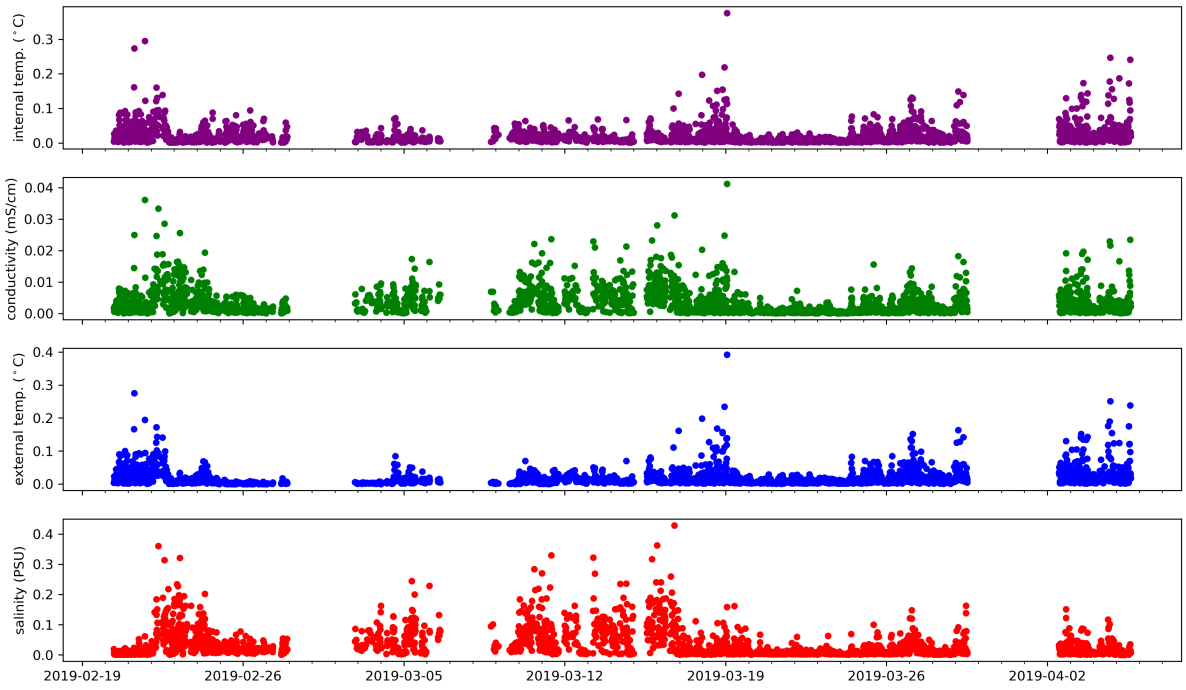

Figure 2: Standard deviations of 10min means of data from TSG2

Differences between internal and external temperature of TSG2 temperature sensors

Temperature differences between the internal and the external temperature sensors have to be small under normal circulation conditions. Means and standard deviations for the temperature differences as well as the number of data with a difference larger than 1 °C are given in the following table and are shown in Figure 3.

	TSG2 temperature difference	
	mean ± standard dev.	no. > 1°C
Spot values	0.0581 ± 0.1147°C	8179
10-min means	0.0583 ± 0.1136°C	56

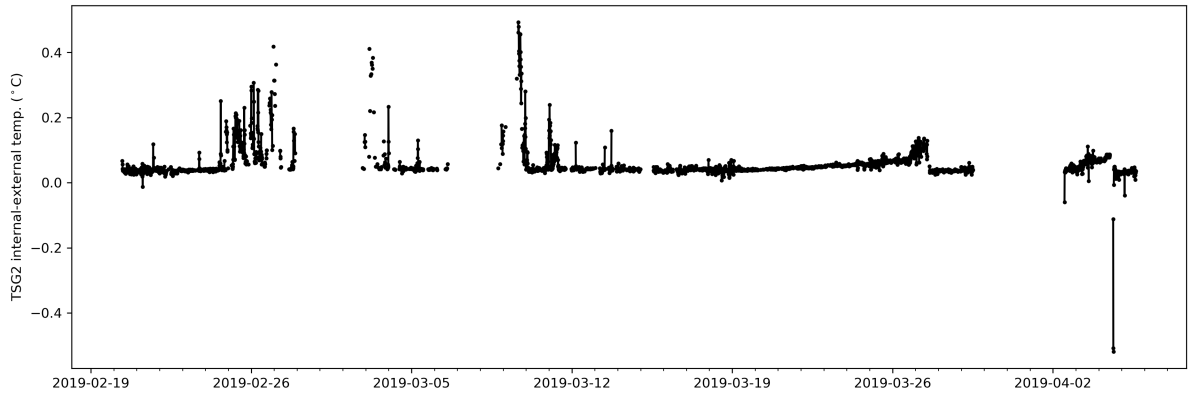

Figure 3: Differences between internal and external temperature sensors of TSG2

Result file

The result file is a plain text (tab-delimited values) file named **PS118_surf_oce.tab** with one data row in 10-min interval. For further information on the result file see the General Processing Report.

Comments

Data gaps due to system maintenance or system shutdown during harbour time:
- 27.03.2019 during 13:45 UTC to 14:30 UTC shutdown for cleaning of the system
- between 29.03.2019 12:51 UTC and 02.04.2019 12:00 UTC system operated in back flow mode causing incorrect external temperatures. Data were therefore removed.
- 04.04.2019 between 11:30 UTC and 15:45 UTC installation of new pump

Apart from this, data gaps are caused by speed flagging or manual removal of outliers.

4 Appendix

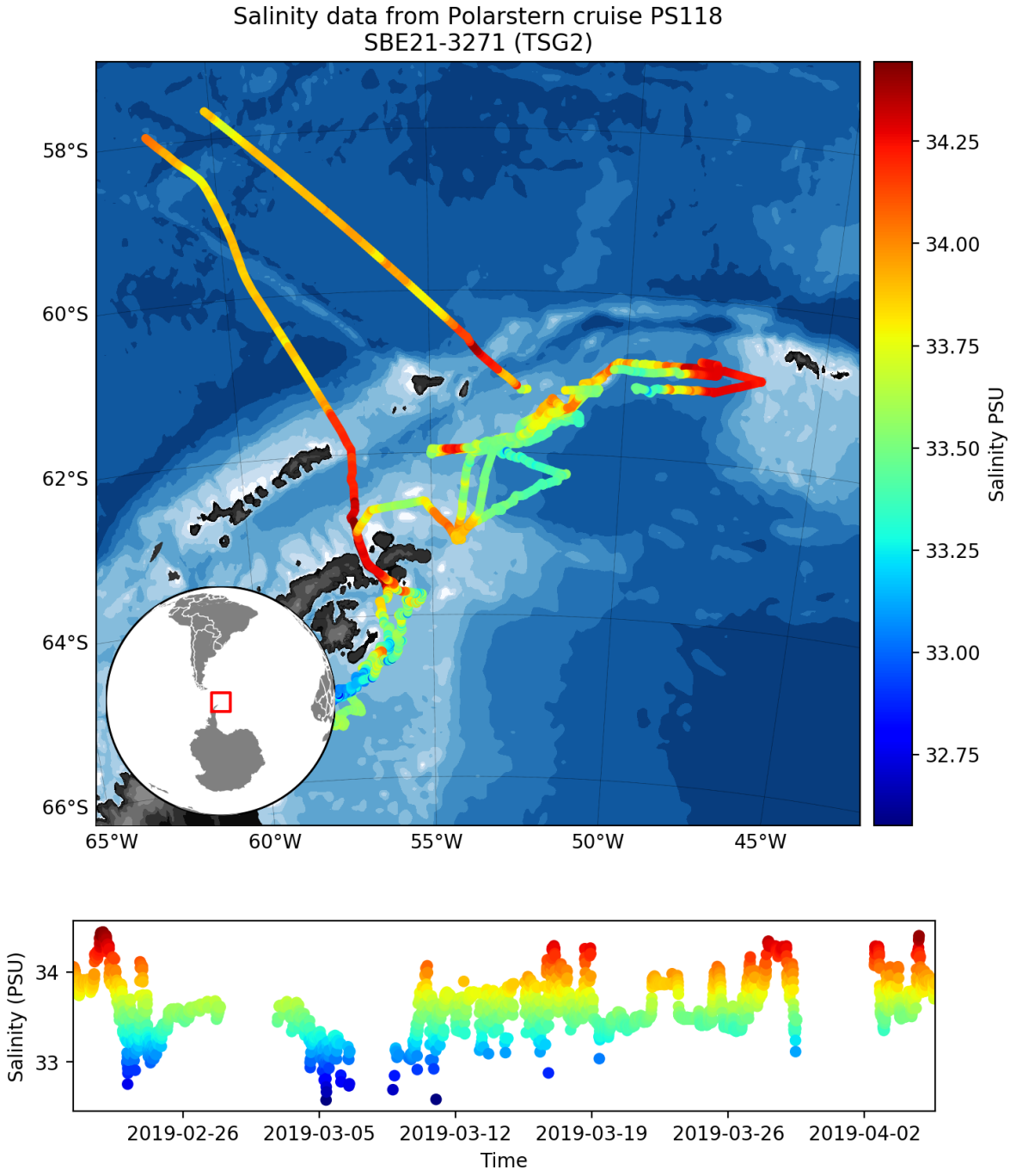

Figure 4: Salinity data from TSG2

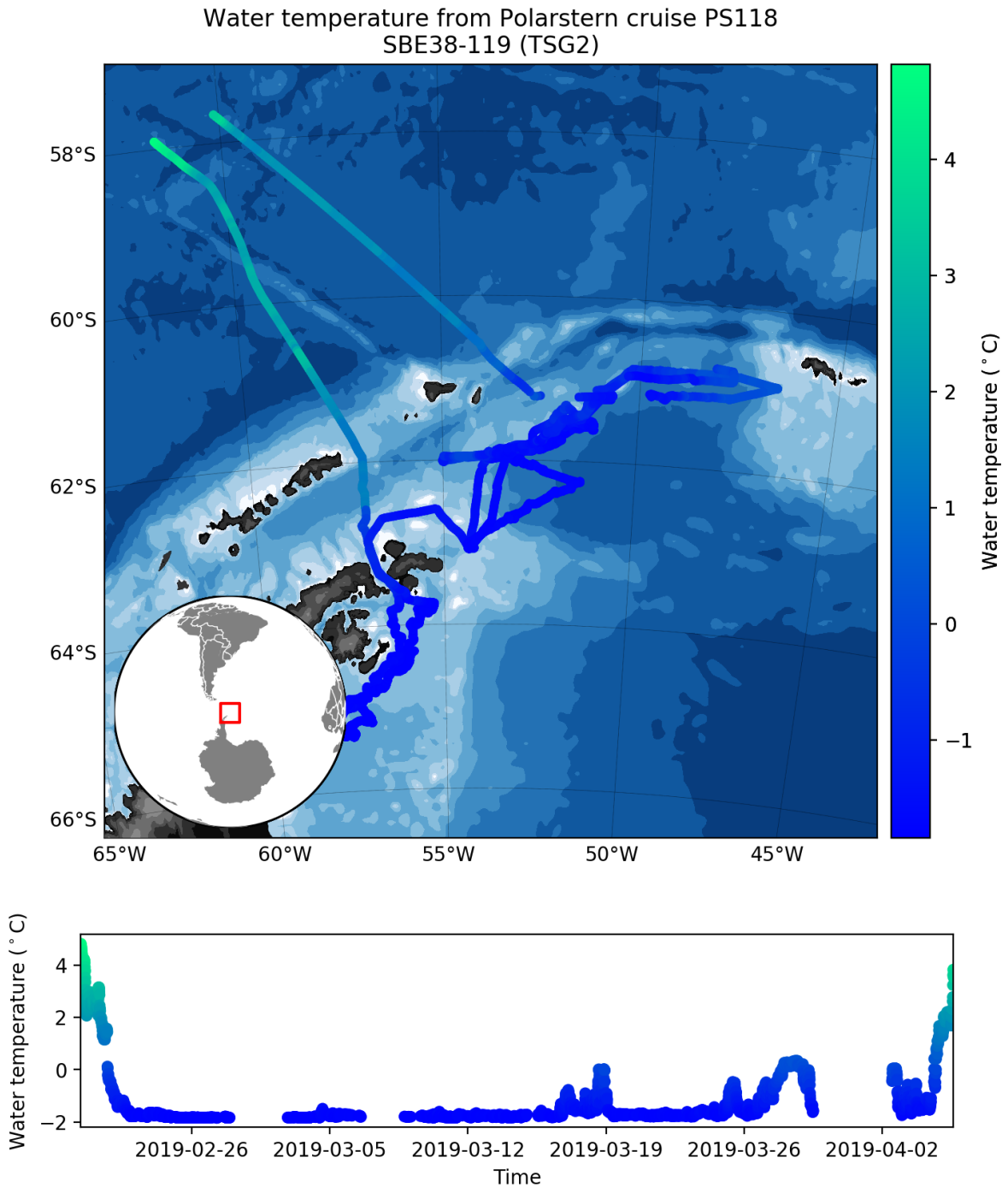

Figure 5: Temperature data from TSG2