Continuous thermosalinograph oceanography along RV POLARSTERN cruise track PS114 (ARK-XXXII/1)

Data Processing Report

Contents

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1 Introduction

This report describes the processing of raw data acquired by the thermosalinographs on board RV Polarstern during expedition PS114 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 PS106, PS107, PS108 and PS109".

Cruise details

Vessel name:	RV Polarstern
Cruise name:	PS114 (ARK-XXXII/1)
Cruise start:	2018-07-10
Cruise end:	2018-08-03
Cruise duration:	24 days
Working area:	Fram Strait, East Greenland

2 Sensor Details

Sensors installed during cruise PS114 are shown in the following table. TSG2 had to be exchanged during the first part of the cruise due to malfunction. Only data from **TSG1** are uploaded to PANGAEA for cruise PS114 and are furthermore considered in this report (for reasoning see General Processing Report).

	TSG1	TSG2-A	TSG2-B
Serial number	SBE21-3189	SBE21-3190	SBE21-3191
Installation	2018-06-15	2018-06-15	2018-07-17
Deinstallation	2018-10-16	2018-07-17	2018-10-16
Days installed	123	32	91
External temperature sensor	SBE38-118	SBE38-137	SBE38-137

3 Processing Report

Database Extraction

Data source	DSHIP database (dship.awi.de)
Start of raw file	2018-07-10T05:00:00
End of raw file	2018-08-03T05:59:59
Number of lines in hexadecimal raw file	2075728
First dataset	2018-07-11T11:42:02
Last dataset	2018-08-02T13:15:42
TSG1 valid data	466692

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	14497
Conductivity	12995
External temperature	15433
Salinity	18504
Result after outlier removal	
Number 10-min-means	3176

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. **0** data points were manually removed from the TSG1 dataset of PS114.

Assigning navigation data

Data from the corrected mastertrack of cruise PS114 were assigned to the 10min means of TSG1. 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 TSG1.
Number of speed flags: 966
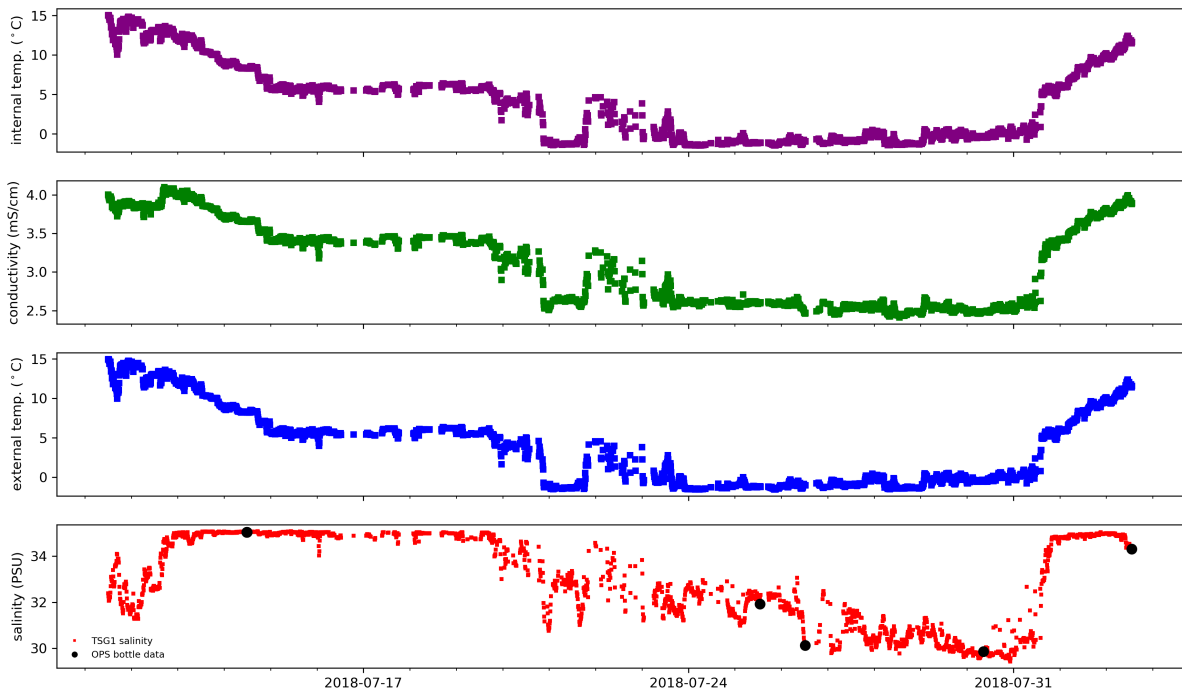**Number of data in final output file**: 2210
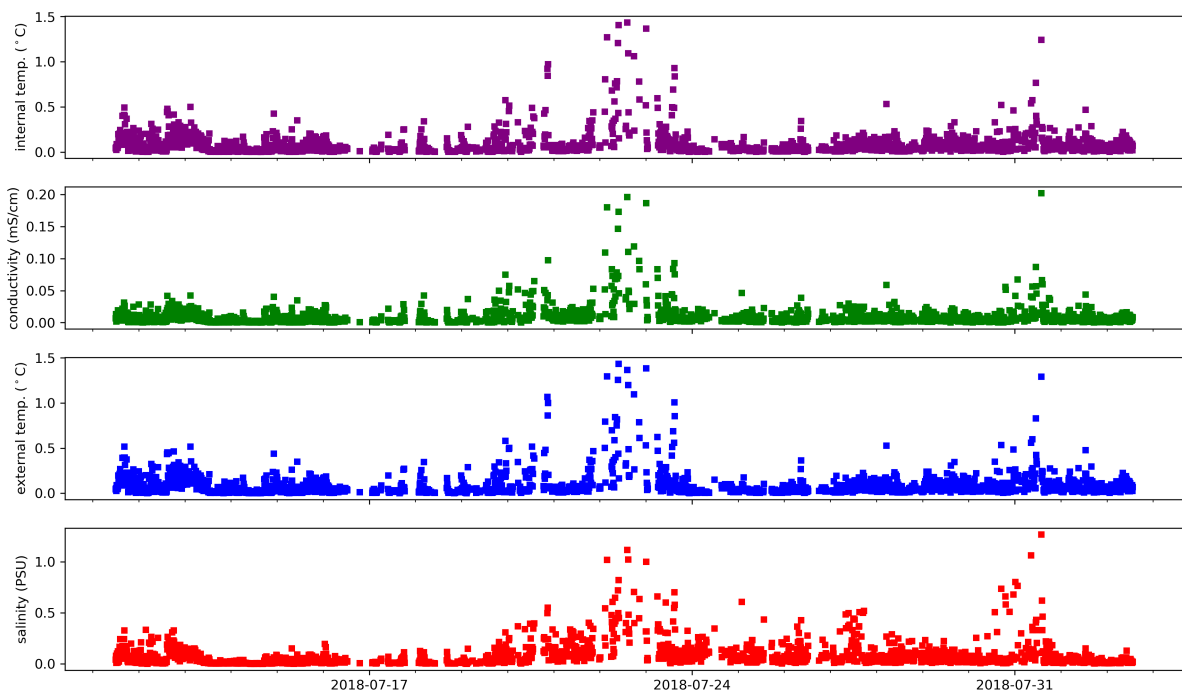
Figure 1: 10min means of data from TSG1

Figure 2: Standard deviations of 10min means of data from TSG1

Differences between internal and external temperature of TSG1 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.

	TSG1 temperature difference	
	mean $\pm$ standard dev.	no. > 1°C
Spot values	0.0701 ± 0.0224°C	0
10-min means	0.0742 ± 0.0112°C	0
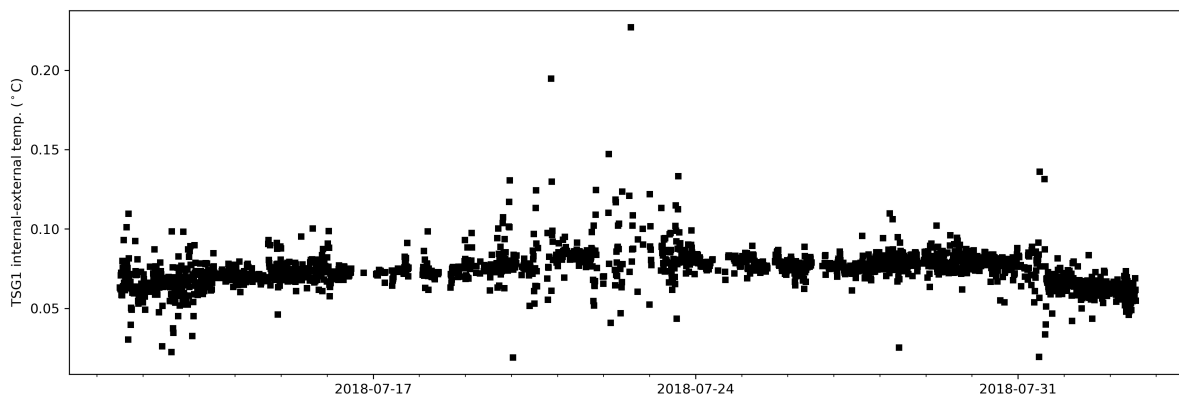
Figure 3: Differences between internal and external temperature sensors of TSG1

Result file

The result file is a plain text (tab-delimited values) file named **PS114_surf_oce.tab** with one data row in 10-min interval. For further information on the result file see the General Processing Report.

4 Appendix

Figure 4: Salinity data from TSG1

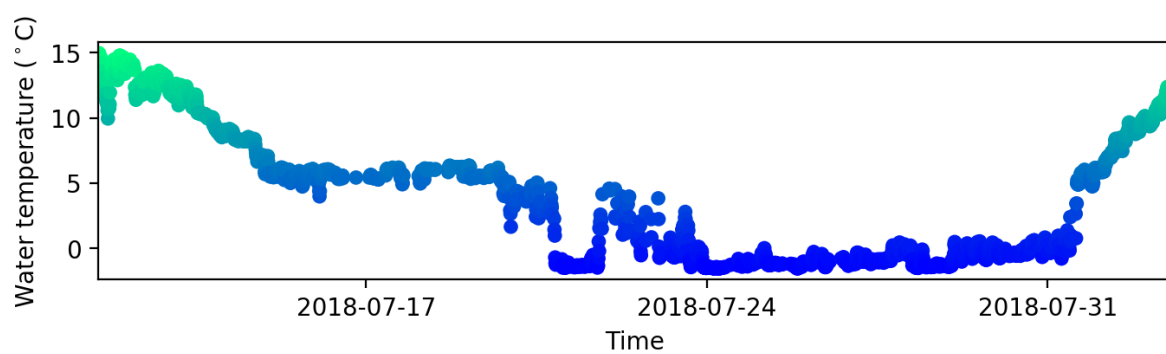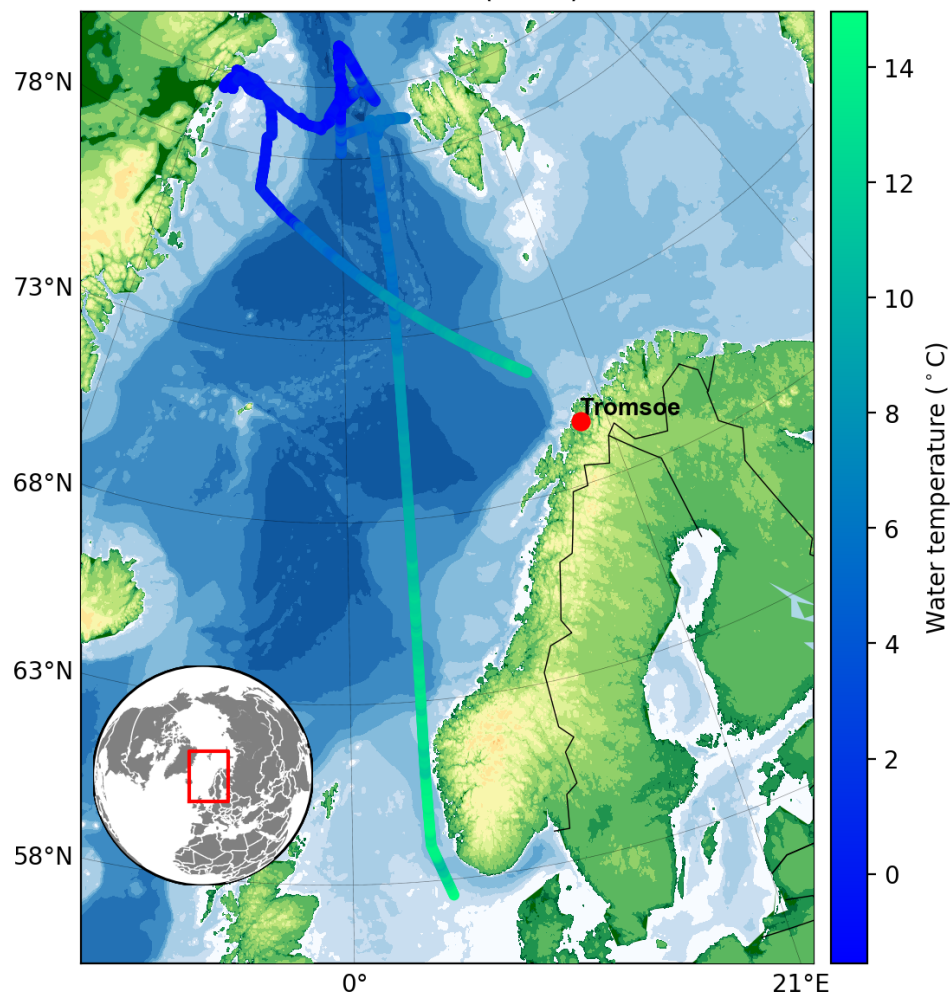Figure 5: Temperature data from TSG1