

# Continuous thermosalinograph oceanography along RV POLARSTERN cruise track PS116

## Data Processing Report

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Contact:

Gerd Rohardt  
Alfred-Wegener-Institute  
Am Handelshafen 12, D-27570 Bremerhaven, GERMANY  
Mail: [info@awi.de](mailto:info@awi.de)

Processing Agency:

FIELAX  
Gesellschaft für wissenschaftliche Datenverarbeitung mbH  
Schleusenstr. 14, D-27568 Bremerhaven, GERMANY  
Tel: +49 (0) 471 30015 0  
Fax: +49 (0) 471 30015 22  
Mail: [info@fielax.de](mailto:info@fielax.de)

## 1 Introduction

This report describes the processing of raw data acquired by the thermosalinographs on board RV Polarstern during expedition PS116 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:** PS116  
**Cruise start:** 2018-11-11  
**Cruise end:** 2018-12-11  
**Cruise duration:** 30 days  
**Working area:** Atlantic Ocean

## 2 Sensor Details

Following sensors were installed during cruise PS116. Only data from **TSG2** are uploaded to PANGAEA for cruise PS116 and are furthermore considered in this report (for reasoning see General Processing Report).

	<b>TSG1</b>	<b>TSG2</b>
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	2018-11-10T09:00:00
End of raw file	2018-12-11T05:59:59
Number of lines in hexadecimal raw file	2667600
First dataset	2018-11-12T15:36:47
Last dataset	2018-12-10T06:28:58
TSG1 valid data	736569

## 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	19397
Conductivity	19464
External temperature	20534
Salinity	26464
Result after outlier removal	
Number 10-min-means	3340

## 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. 4 data points were manually removed from the TSG2 dataset of PS116.

## Assigning navigation data

Data from the corrected mastertrack of cruise PS116 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:** 41

**Number of data in final output file:** 3295

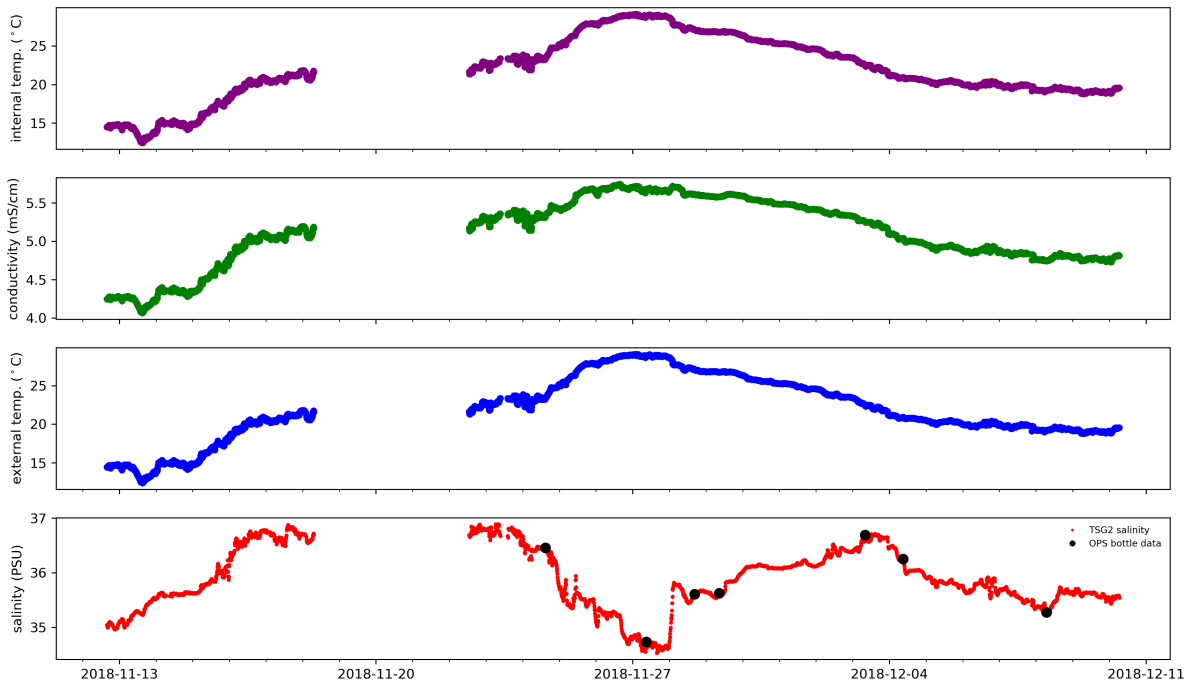


Figure 1: 10min means of data from TSG2

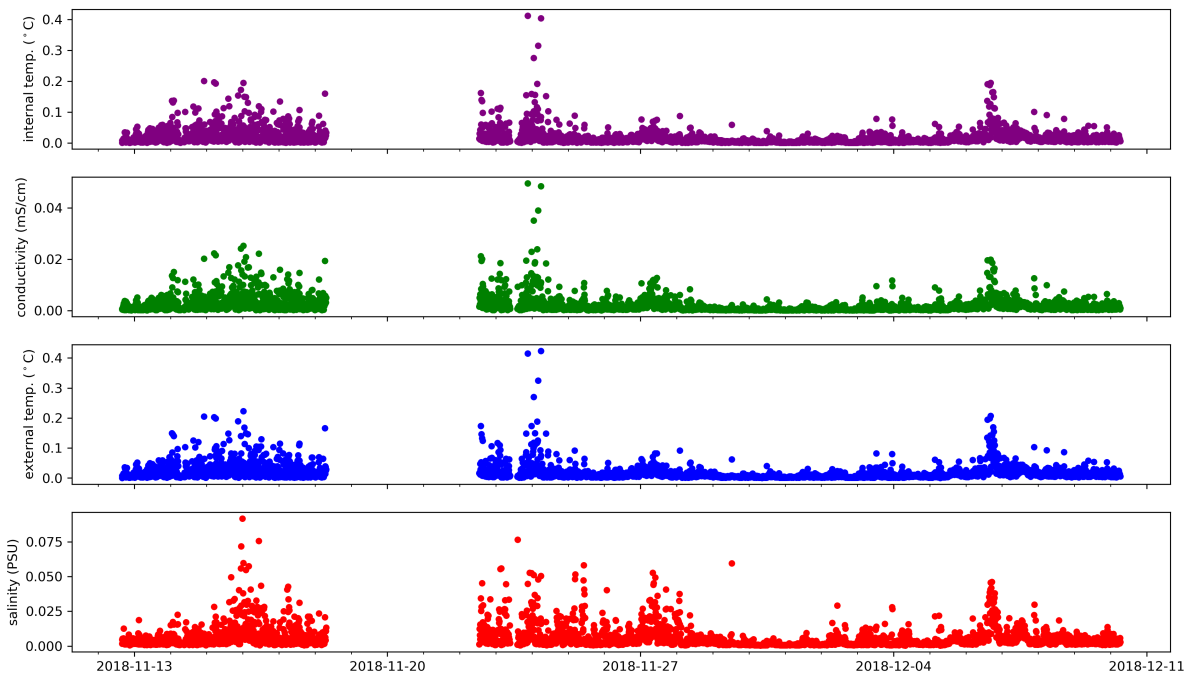


Figure 2: Standard deviations of 10min means of data from TSG2

## 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
<b>Spot values</b>	0.0263 ± 0.0120°C	0
<b>10-min means</b>	0.0258 ± 0.0095°C	0

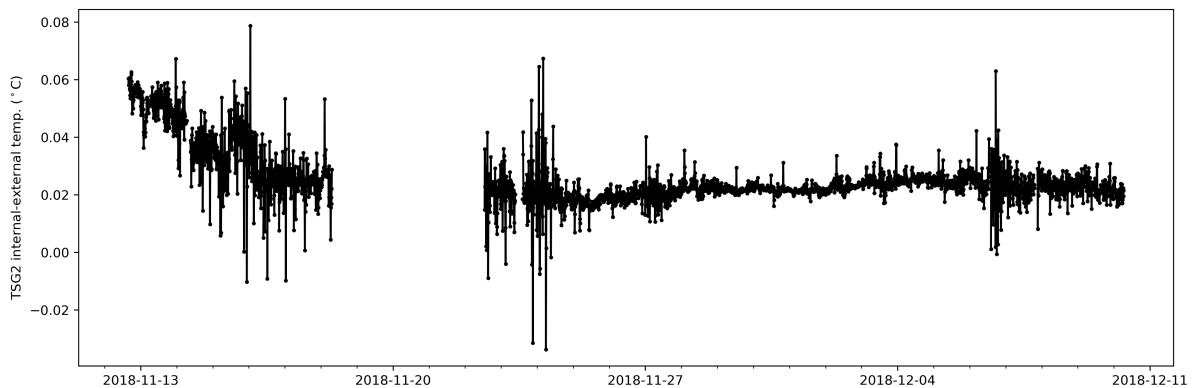


Figure 3: Differences between internal and external temperature sensors of TSG2

## Result file

The result file is a plain text (tab-delimited values) file named **PS116\_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 caused by system maintenance or system shutdown during harbour time:

18.11.2018 - 22.11.2018 harbour of Las Palmas

23.11.2018 system maintenance due to pollution of TSG2

07.12.2018 pollution of TSG1

10.12.2018 system maintenance due to pollution of TSG1

Apart from this, data gaps are due to speed flagging or manual flagging of outliers.

## 4 Appendix

Salinity data from Polarstern cruise PS116  
SBE21-3271 (TSG2)

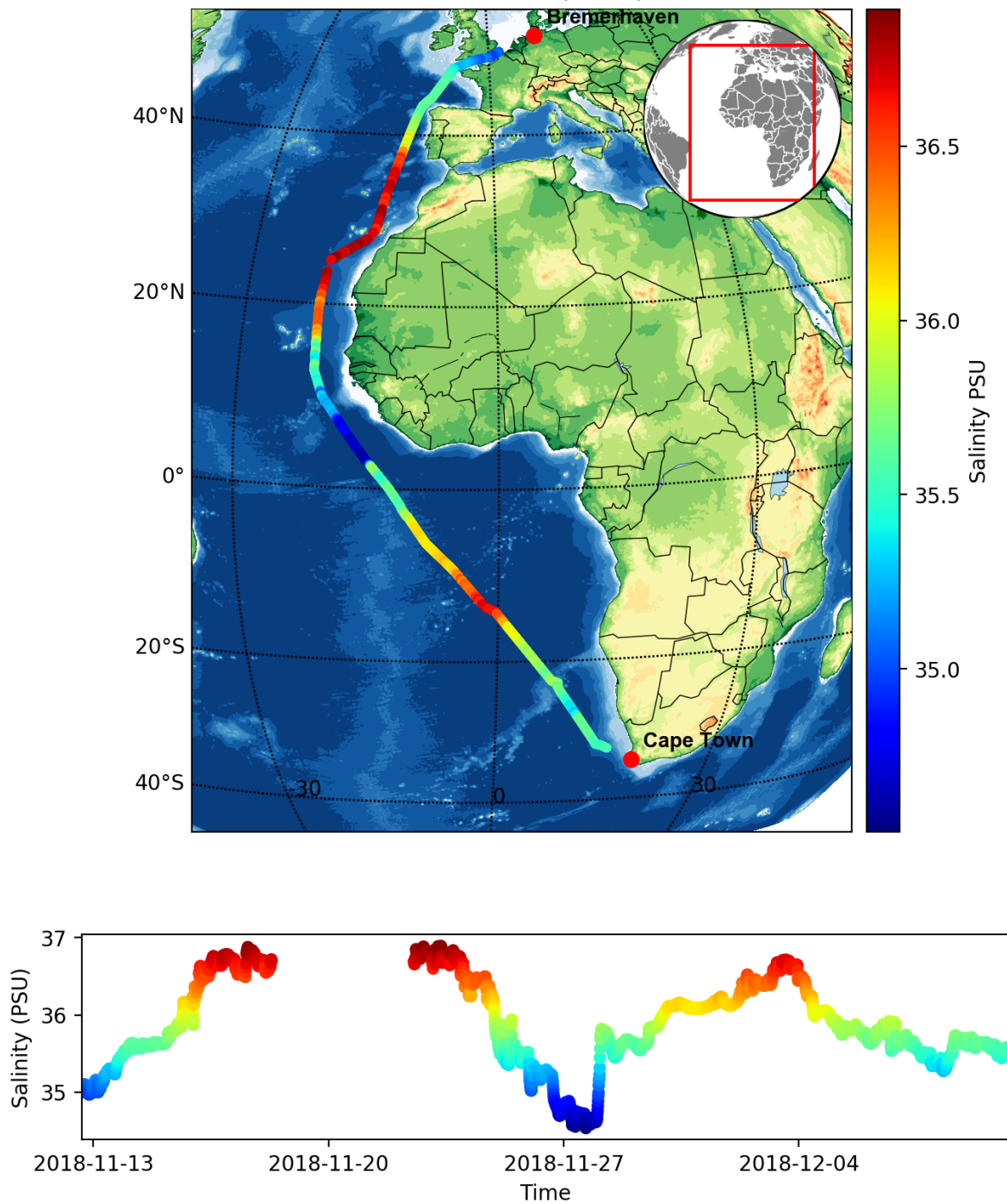


Figure 4: Salinity data from TSG2

Water temperature from Polarstern cruise PS116  
SBE38-119 (TSG2)

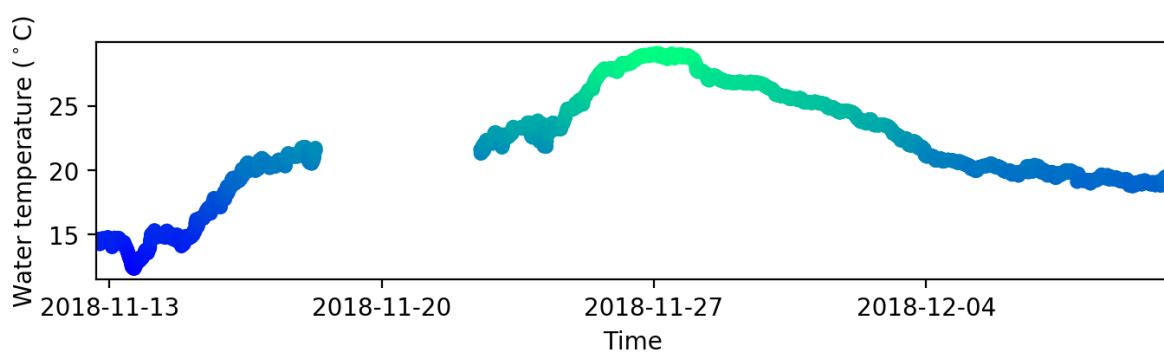
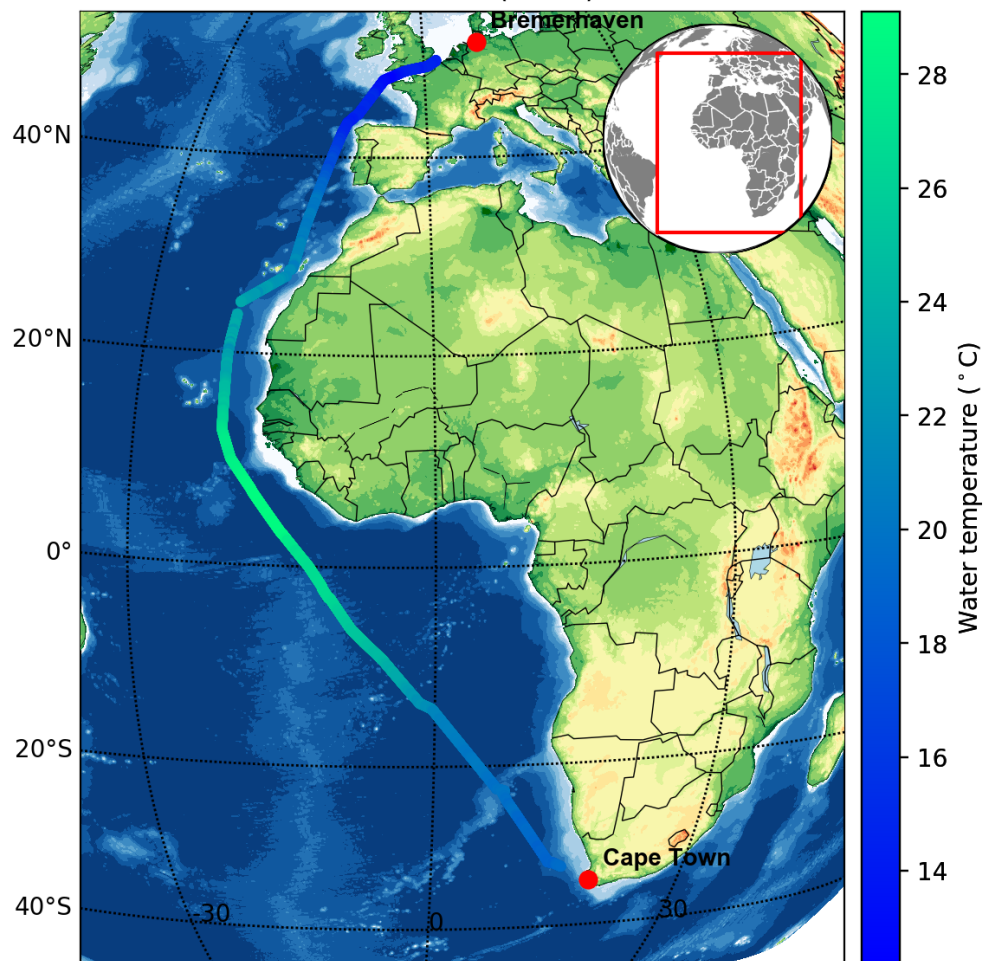


Figure 5: Temperature data from TSG2