

# Surface T/S Data RV Polarstern PS109 (ARK-XXXI/4) 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 PS109 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:** PS109 (ARK-XXXI/4)  
**Cruise start:** 2017-09-16  
**Cruise end:** 2017-10-14  
**Cruise duration:** 28 days  
**Working area:** Northeast Greenland Shelf

## 2 Sensor Details

Following sensors were installed during cruise PS109. Only data from **TSG1** are uploaded to PAN-GAEA for cruise PS109 and are furthermore considered in this report (for reasoning see General Processing Report).

	<b>TSG1</b>	<b>TSG2</b>
Serial number	SBE21-3191	SBE21-3271
Installation	2016-11-19	2017-06-23
Deinstallation	2017-10-11	2017-10-11
Days installed	326	110
External temperature sensor	SBE38-110	SBE38-119

### 3 Processing Report

#### Database Extraction

Data source	DSHIP database (dship.awi.de)
Start of raw file	2017-09-12T04:00:00
End of raw file	2017-10-14T05:59:59
Number of lines in hexadecimal raw file	2772000
First dataset	2017-09-12T04:00:04
Last dataset	2017-10-11T14:12:51
TSG1 valid data	635588

#### 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	21201
Conductivity	20567
External temperature	22407
Salinity	23045
Result after outlier removal	
Number 10-min-means	4237

#### 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. **89** data points were manually removed from the TSG1 dataset of PS109.

#### Assigning navigation data

Data from the corrected mastertrack of cruise PS109 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:** 1060

**Number of data in final output file:** 3088

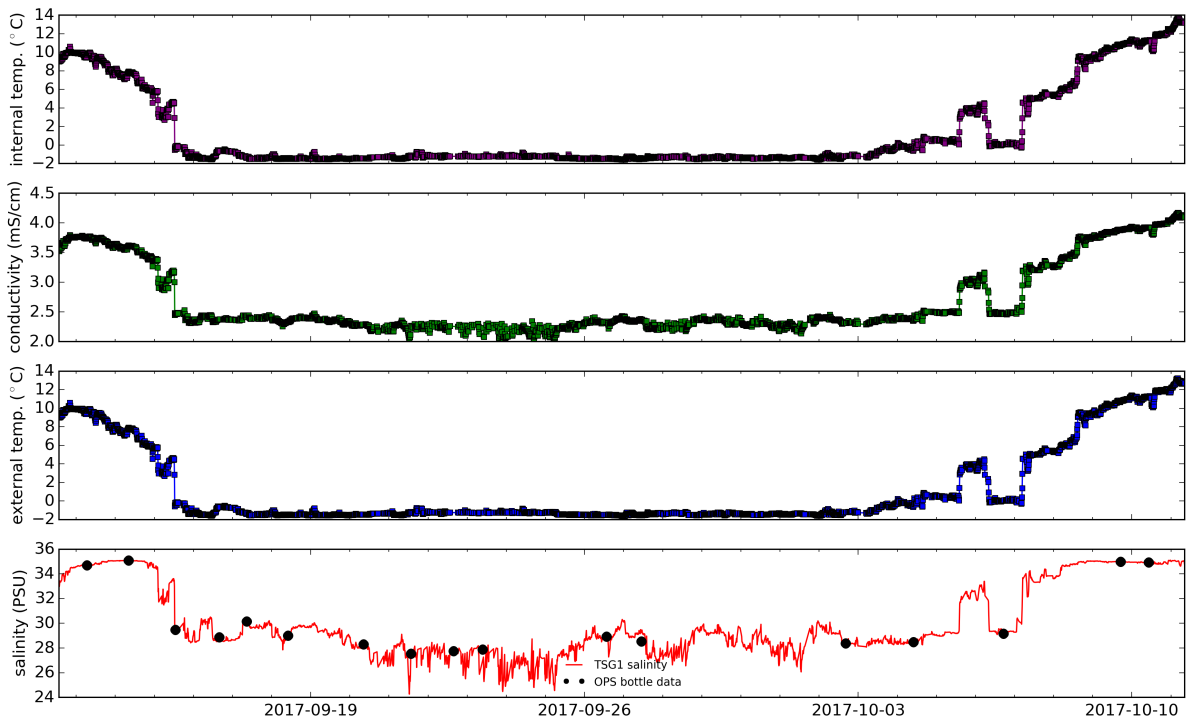


Figure 1: 10min means of data from TSG1

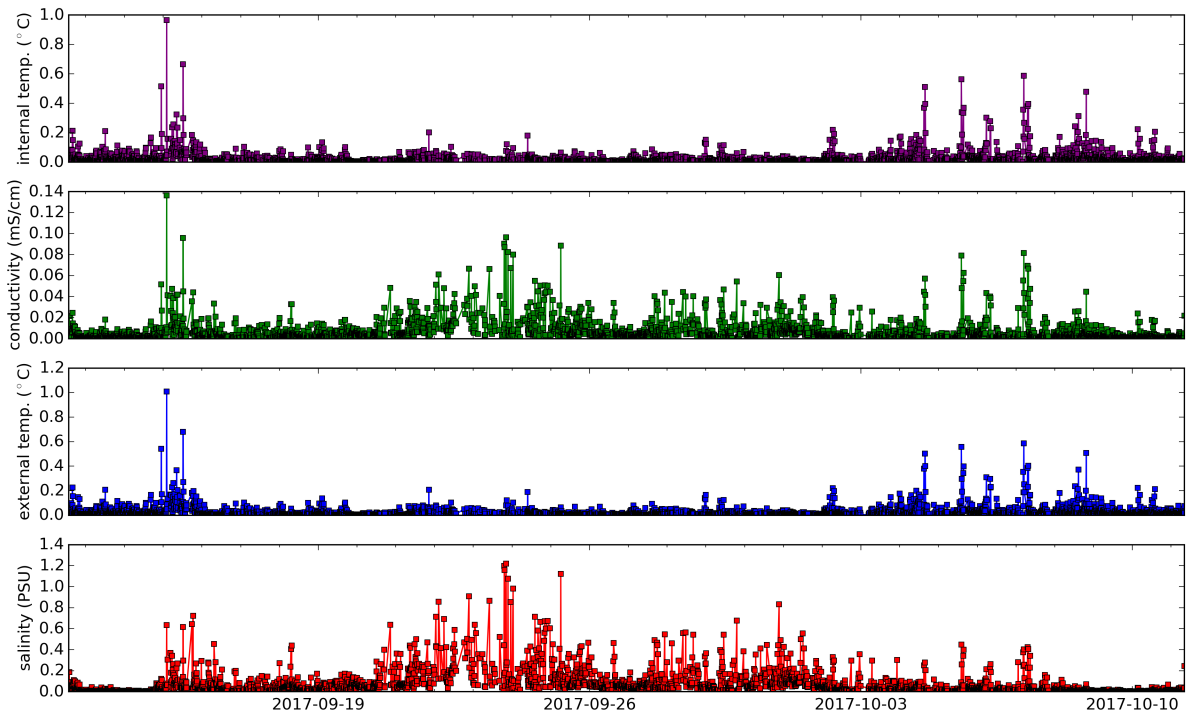


Figure 2: Standard deviations of 10min means of data from TSG1

## 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
<b>Spot values</b>	0.0554 $\pm$ 0.1309°C	855
<b>10-min means</b>	0.0554 $\pm$ 0.1282°C	6

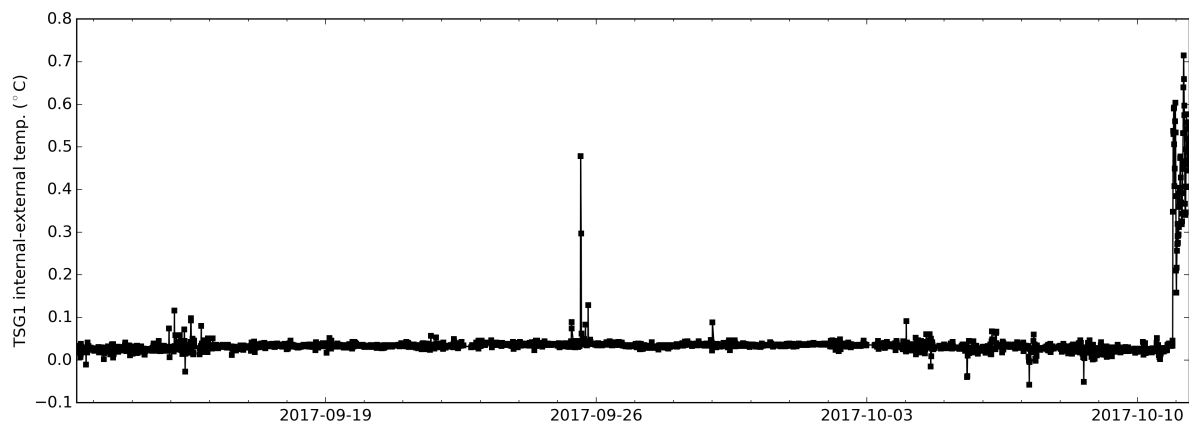


Figure 3: Differences between internal and external temperature sensors of TSG1

## Result file

The result file is a plain text (tab-delimited values) file named **PS109\_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

Salinity data from Polarstern cruise PS109  
SBE21-3191 (TSG1)

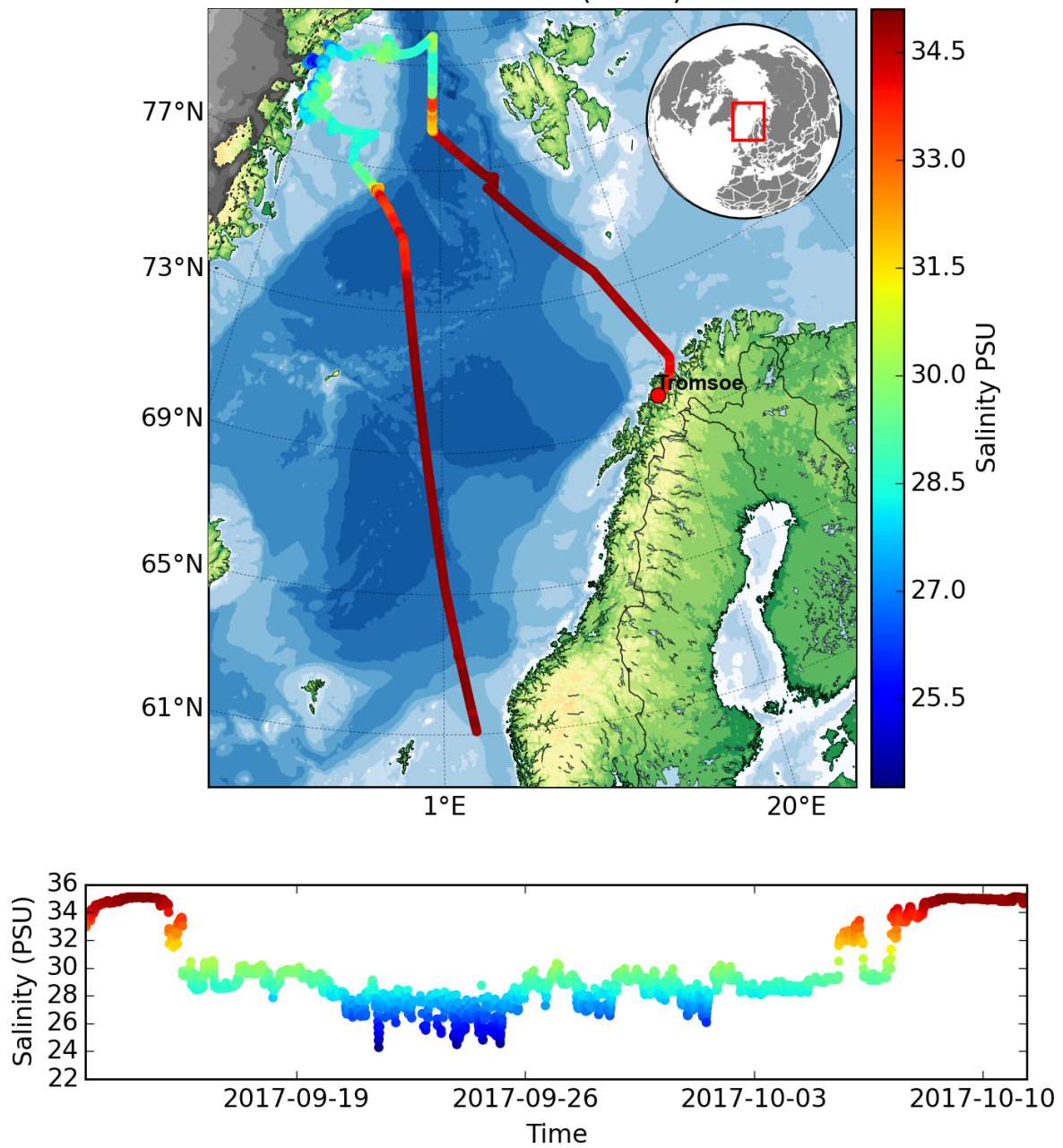


Figure 4: Salinity data from TSG1

Water temperature from Polarstern cruise PS109  
SBE38-110 (TSG1)

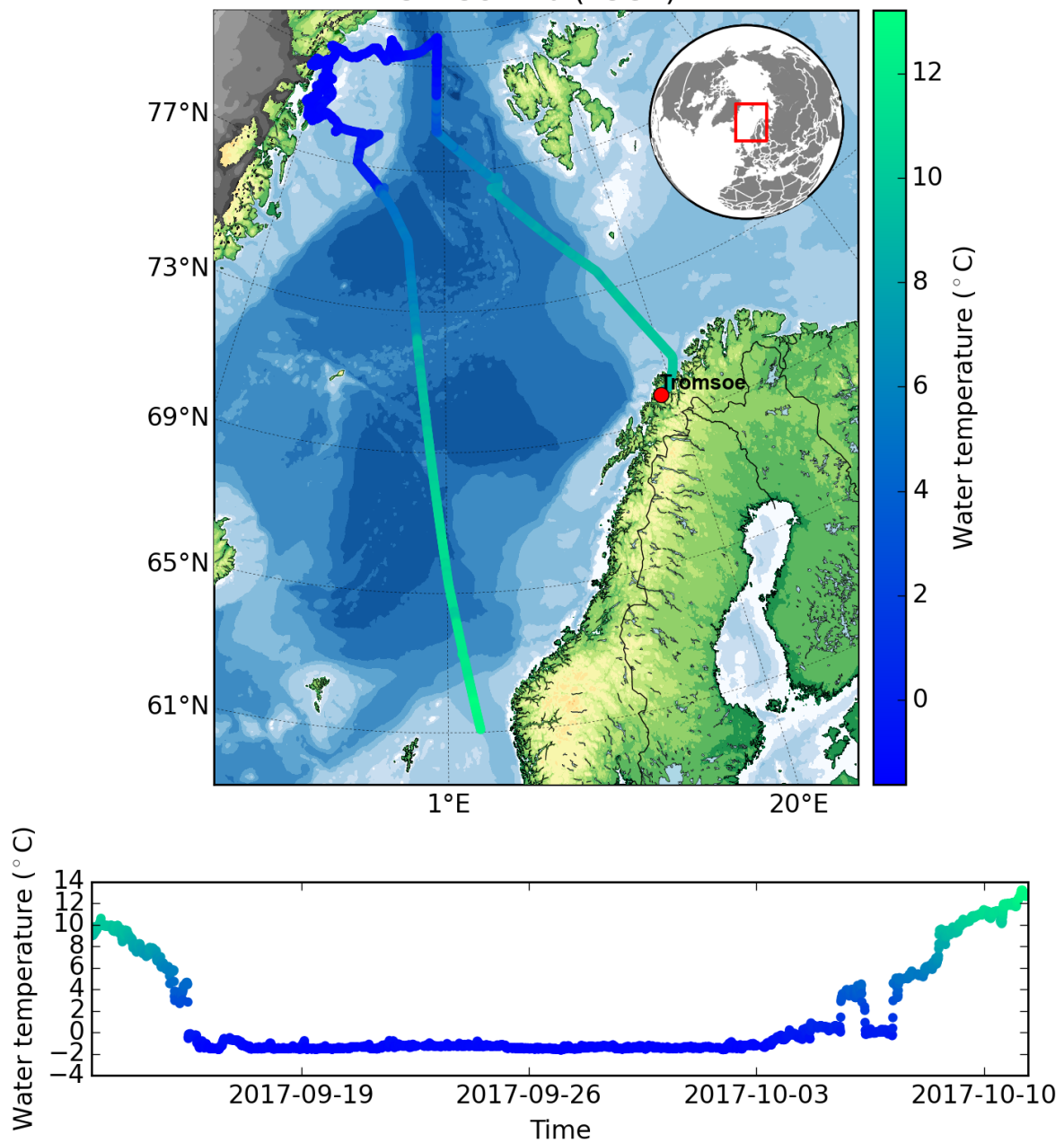


Figure 5: Temperature data from TSG1