

# Surface T/S Data RV "Heincke"

## HE447

### Data Processing Report

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# 1 Introduction

This report describes the processing of raw data acquired by the thermosalinograph on board RV "Heincke" during expedition HE447 to receive cleaned up and drift corrected salinity data.

# 2 Workflow

The different steps of processing are visualized in Figure 2. Unvalidated data of sensor, internal and external temperature are extracted from the DAVIS SHIP data base (<https://dship.awi.de>) in a 1-second interval for cruises from 2009 to 2014. The Salinity was calculated by applying the Practical Salinity Scale 1978 (PSS-78). Furthermore the sound velocity was derived by using the Del Grosso equation.

As first step, a basic cleanup was performed to remove missing or flagged data. Since the salinity measurements in coastal areas (e.g. rivers and ports) are less reliable, measurements in a buffer of 2 nautical miles (NM) along the coast are filtered. In the norwegian area (fjords) the buffer is set to 200 meters (0.108 NM). After the exclusion of data outside the speed interval of 0.5 kn to 15 kn, the salinity is driftcorrected with lab calibration data. In the next processing step the difference between the external and internal temperature is taken to identify an improper usage of the thermosalinograph. This filter is ignored if more than 90% of the data would get removed. After despiking, a visual screening is performed to enhance the data quality. In the last step the temporal resolution is reduced to 5-minutes-means.



Figure 1: Workflow of TSG data processing

### 3 Cruise details

Vessel name      RV "Heincke"  
Cruise name      HE447  
Cruise start      16.06.2015 Bremerhaven  
Cruise end        05.07.2015 Bremerhaven  
Cruise duration   19 days

### 4 Sensor

Thermosalinograph:    Seabird SEACAT SBE21 (SN: —)  
External Temperature:   SBE38

## 5 Processing Report

### Database Extraction

Data source	DSHIP database (dship.awi.de)
Exported values	1728001
First dataset	2015-06-16T00:00:00 UTC
Last dataset	2015-07-06T00:00:00 UTC

### Automatic Validation

The following thresholds were applied for the automatic flagging of the position data:

Min. speed	Minimum 0.5 kn between two datapoints.
Max. speed	Maximum 15 kn between two datapoints.
GeoBuffer	0.1080 NM around Norway, 2 NM anywhere else
Temperature	Maximum T-difference of 5 K.

### Flagging result

Filter	Data left (abs.)	Data left (rel.)	Data removed (abs.)	Data removed (rel.)
Raw data	1728001	100 %	—	—
Basic	61100	3.54 %	1666901	96.46 %
Geo	0	0.00 %	1728001	100.00 %
Speed	—	—	—	—
Temperature	—	—	—	—
Despike	—	—	—	—
Manual	—	—	—	—
5-min-Mean	—	—	—	—

### Sensordrift

Last calibration	—
Current calibration	—
Start of deployment	—
End of deployment	—
Scaled drift	—
Minimal offset	— [PSU]
Maximal offset	— [PSU]

### Comments

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## Process evolution

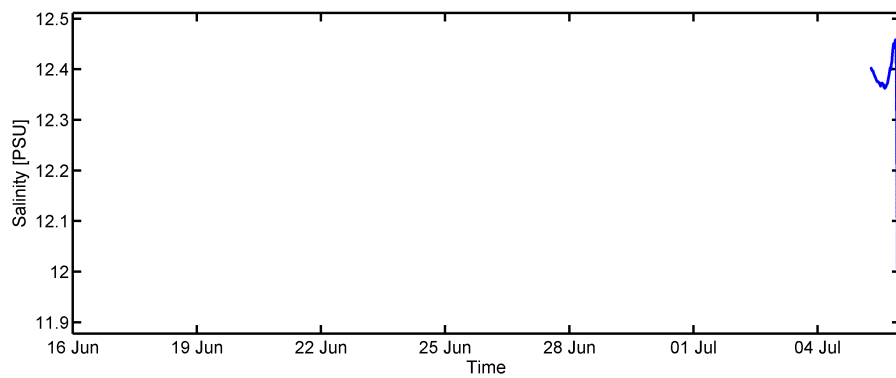


Figure 2: Raw salinity data.

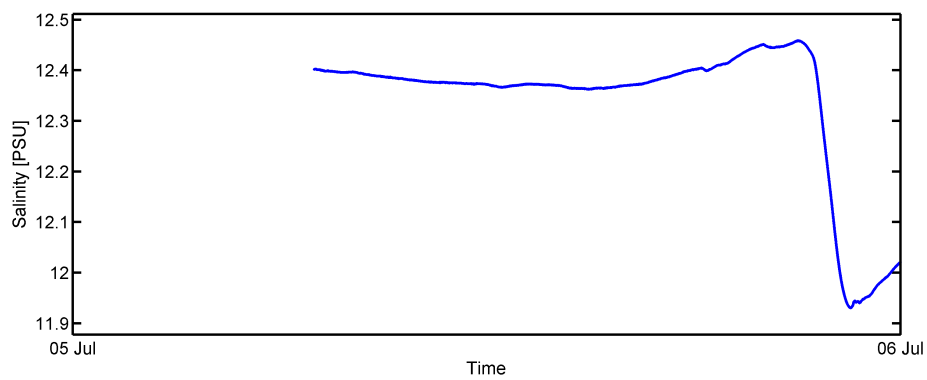


Figure 3: Salinity after basic filter.

## Result file

Processing Report (HE447\_TSG.pdf):  
This PDF document.