Surface T/S Data RV "Heincke"

HE482
Data Processing Report

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## Report History

<table>
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<th>Version No.</th>
<th>Author</th>
<th>Date</th>
<th>Comments or Changes</th>
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<td>FIELAX GmbH</td>
<td>11.04.2016</td>
<td>first edition</td>
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<td>27.02.2018</td>
<td>Flow Rate Filter added; minor text changes</td>
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1 Introduction

This report describes the processing of raw data acquired by the thermosalinograph on board RV "Heincke" during expedition HE482 to receive cleaned up and drift corrected salinity data.

2 Workflow

The different steps of processing are visualized in Figure 1. Unvalidated data of conductivity sensor, internal and external temperature are extracted from the DAVIS SHIP data base (https://dship.awi.de) in a 1-second interval. The salinity was calculated using conductivity and internal temperature by applying the Practical Salinity Scale 1978 (PSS-78).

As a first step, a basic cleanup was performed to remove missing or flagged data. Then, too low flow rates are taken as indicator for an improper usage of the thermosalinograph. 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, data with differences between external and internal temperature sensor > 5 K are removed. After despiking, a visual screening is performed to enhance the data quality. Then, the temporal resolution is reduced to 5-minutes-means. In the last step, the 5-minute-means of salinity and external temperature are exported.

Figure 1: Workflow of TSG data processing
3 Cruise details

Vessel name     RV "Heincke"
Cruise name     HE482
Cruise start    13.04.2017 Bremerhaven
Cruise end      17.04.2017 Bremerhaven
Cruise duration 5 days

4 Sensor

Thermosalinograph: Seabird SEACAT SBE21 (SN: 3333)
External Temperature: SBE38
### 5 Processing Report

#### Database Extraction

<table>
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<tr>
<th>Data source</th>
<th>DSHIP database (dship.awi.de)</th>
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<td>First dataset</td>
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<td>Last dataset</td>
<td>2017-04-17T23:59:59 UTC</td>
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#### Automatic Validation

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

- **Min. flow rate**: Minimum 2.5
- **Min. speed**: Minimum 0.5 kn between two datapoints.
- **Max. speed**: Maximum 40 kn between two datapoints.
- **GeoBuffer**: 0.1080 NM around Norway, 2 NM anywhere else
- **Temperature**: Maximum T-difference of 5 K.

#### Flagging result

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<th>Filter</th>
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<td>5-min-Mean</td>
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</tbody>
</table>

#### Sensor drift

- **Last calibration**: 31.05.2016
- **Current calibration**: 05.09.2017
- **Start of deployment**: 01.12.2016
- **End of deployment**: 07.07.2017
- **Scaled drift**: $8.0923e-004$ [PSU/month]
- **Minimal offset**: — [PSU]
- **Maximal offset**: — [PSU]

#### Comments

Sensor No. 3333 exchange ahead from schedule due to broken conductivity cell. No reasonable post cruise calibration possible.
Process evolution

There is no salinity data to be visualized.

Result file

Processing Report (HE482_TSG.pdf):
This PDF document.