

Name: SOP for vessel:sonne:smb_sonne:sbe_45_0664 (7528)

Version: 1.0

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Status: This is a **public version**. Certain sensitive information, such as server names, addresses, and exact paths and storage locations that is not meant for others than AWI associates was removed in that document.

Changelog:

1. 2022-10-06

- initial publication

1. Contacts/Responsible Persons

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2. Purpose & Scope

Description: This SOP describes device configuration, parameter characteristics, transmission and processing of its output, ingest procedure, storage, data access possibilities, and publishing. Intended user groups are device owners, technicians, and data managers.

Comment: This item is managed and processed by the Deutsche Allianz Meeresforschung (German Marine Research Alliance), please see www.allianz-meeresforschung.de for further information.

3. Item Description

Short Name: SBE_45_0664

Long Name: SBE 45 Micro thermosalinograph

URN: vessel:sonne:smb_sonne:sbe_45_0664

ID: 7528

UUID: 943bf7e1-2d6a-467d-a42c-9808f8b472bf

Description: Thermosalinograph for measurement of temperature and conductivity from underway vessels. Integrates with the optional remote temperature sensor SBE 38.

Serial No.: 0664

Manufacturer: Sea-Bird Scientific

PID/Handle: <https://hdl.handle.net/10013/sensor.5dcbfc60-051e-467d-a7b9-d98353771ad7>

4. Parameter Description

Short Name: conductivity

Long Name: conductivity

45 **full URN:** vessel:sonne:smb_sonne:sbe_45_0664:conductivity

ID: 87872

UUID: 7c030502-bcfd-495e-99a8-00ce132222f5

Type: conductivity

Unit: S/m

50 **Comment:**

Measurement Properties: none

Short Name: salinity

Long Name: salinity

55 **full URN:** vessel:sonne:smb_sonne:sbe_45_0664:salinity

ID: 87873

UUID: 978ba644-4d33-457e-9e9b-b41178106992

Type: salinity

Unit: PSU

60 **Comment:**

Measurement Properties: none

Short Name: water_temperature

Long Name: internal water temperature

65 **full URN:** vessel:sonne:smb_sonne:sbe_45_0664:water_temperature

ID: 87874

UUID: a91ac59d-21a8-4cb1-855c-b65187bef187

Type: water temperature

Unit: °C

70 **Comment:**

Measurement Properties: none

Short Name: sound_velocity

Long Name: internal sound velocity

75 **full URN:** vessel:sonne:smb_sonne:sbe_45_0664:sound_velocity

ID: 87875

UUID: fb9d9258-2e1e-4ea7-962e-2a9d93120d32

Type: sound velocity

Unit: m/s

80 **Comment:**

Measurement Properties: none

5. Processing

85 This instrument measures temperature and electrical conductivity of sea water. Using those two properties salinity (and additionally sound velocity) are estimated (Sea-Bird Electronics 2020b). Usually, an additional temperature sensor SBE38 (Sea-Bird Electronics 2020a) is related to the SBE45. All data are stored through the data management system DAVIS-SHIP (DSHIP). After the cruise all data are transferred to the DSHIP land system. From there data are obtained for further evaluation.

90 5.1. Acquisition

The SBE45 is installed within the Self-cleaning Monitoring Box (SMB) in the Reinseewasserlabor (Bergmann 2022). The SMB is directly flushed with sea water through the two deep inlets in about 4m depth. At the two inlets the two additional SBE38 temperature sensors are installed.

Auxiliary Files:

95 **Name:** *"Sonne" research vessel manual*

Type: Manual

Description: General overview on the research vessel Sonne with detailed information on onboard scientific devices

URL: <https://attachment.rrz.uni-hamburg.de/882d41d5/S0-Handbuch.pdf>

Last Modification: Jan. 2022

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Name: *SBE45 MicroTSG Thermosalinograph*

Type: Manual

Description: User manual of SBE45 MicroTSG Thermosalinograph

URL: <https://www.seabird.com/asset-get.download.jsa?id=54627862504>

105 **Last Modification:** 2020

Name: *SBE38 Digital Oceanographic Thermometer*

Type: Manual

Description: User manual of SBE38 Digital Oceanographic Thermometer

110 **URL:** <https://www.seabird.com/asset-get.download.jsa?id=54627862501>

Last Modification: 2020

5.2. Extraction

115 Data are extracted from the DSHIP land system at BSH (dship.bsh.de). The data are stored per cruise and extracted likewise. Together with accompanying system parameters like latitude, longitude, ships speed, and flow rate through the system, all relevant SBE45 parameters are extracted in one-second resolution. Output of the extraction is the usual DSHIP export, consisting of a folder with three files, (1) a *.dat ASCII-data file, (2) a *.xml order-file and (3) a *.sys log-file.

120 **Auxiliary Files:** none

5.3. Conversion

The aforementioned DSHIP-Export is processed with Python with the following steps: (1) parsing of the data file with the output of a Geodataframe using the time as index, (2) checking for dummy-values, (3) comparison of position data against Mastertrack, (4) checking whether position data are in an EEZ, (5) averaging into one-minute

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means, (6) several quality tests (global range test, spike test, gradient test, test of adjacent values, flow speed test), and (if applicable) (7) calibration of temperature and salinity data with independent data (direct samples or CTD data from inlet depth).

Software: -

130 **Network Share Name:** - ← *public version, input cropped*

Filename Convention: -

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Auxiliary Files:

Name: -

135 **Type:** -

Description: -

URL: -

Last Modification: -

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6. Ingest

Ingest is part of the O2A process chain (Koppe et al. 2015, Gerchow et al. 2017) and is the starting point to collect, store, and redistribute data and metadata.

There is no automated data transfer available for this workflow. All data must be retrieved manually from BSH.

145 **Protocol:** MDM

Project path: *public version, input removed*

Campaign Data: yes

Filename Convention: per campaign

Expected Data Interval: per campaign

150 **Ingest Data Interval:** per campaign

Mapping: -

Save Directory: -

json/xml:

Script: -

155 **Script call:**

Repository: -

7. Storage

7.1. Raw Data

160 **Location** *public version, input cropped*

Backup Policy: does not apply

7.2. Near Real-Time Data

Info: no NRT for this workflow

165 **Service:** [link to near real-time data service](#)

7.3. Publications and further Reading

Publication: Schlundt 2022, Brix et al. 2022, Brix et al. 2021, Berndt and Schlundt 2021, Beck and Schlundt 2022

Further Reading: This device and workflow is part of DAM, please check <https://www.allianz-meeresforschung.de/> for further information.

References

- Beck, Aaron and Michael Schlundt (July 2022). "Continuous thermosalinograph oceanography along RV SONNE cruise SO279". en. In: DOI: 10.1594/PANGAEA.946377. URL: <https://doi.pangaea.de/10.1594/PANGAEA.946377> (visited on 09/21/2022).
- 175 Bergmann, Klaus (Jan. 2022). "*Sonne*" research vessel manual. en. URL: <https://attachment.rrz.uni-hamburg.de/882d41d5/S0-Handbuch.pdf> (visited on 11/25/2022).
- Berndt, Christian and Michael Schlundt (Feb. 2021). "Continuous thermosalinograph oceanography along RV SONNE cruise SO277". en. In: DOI: 10.1594/PANGAEA.928567. URL: <https://doi.pangaea.de/10.1594/PANGAEA.928567> (visited on 09/21/2022).
- 180 Brix, Saskia, Michael Schlundt, Simon Tewes, and James Taylor (Nov. 2021). "Continuous thermosalinograph oceanography along RV Sonne cruise SO280". en. In: DOI: 10.1594/PANGAEA.938476. URL: <https://doi.pangaea.de/10.1594/PANGAEA.938476> (visited on 09/21/2022).
- Brix, Saskia, Michael Schlundt, Simon Tewes, and James Taylor (May 2022). "Continuous thermosalinograph oceanography along RV SONNE cruise SO276". en. In: DOI: 10.1594/PANGAEA.943865. URL: <https://doi.pangaea.de/10.1594/PANGAEA.943865> (visited on 09/21/2022).
- 185 Gerchow, Peter, Roland Koppe, Ana Macario, Antonie Haas, Christian Schäfer-Neth, Hans Pfeiffenberger, and Angela Schäfer (Nov. 2017). "O2A - Data Flow Framework from Sensor Observations to Archives". In: *EPIC3 Digital Infrastructures for Research 2017, Brussels, 2017-11-30-2017-12-01Brussels, DI4R 2017 conference*. Brussels: DI4R 2017 conference. URL: <https://indico.eui.eu/indico/event/3455/session/1/contribution/114/material/slides/1.pdf> (visited on 01/21/2020).
- Koppe, Roland, Peter Gerchow, Ana Macario, Antonie Haas, Christian Schäfer-Neth, and Hans Pfeiffenberger (June 2015). "O2A: A Generic Framework for Enabling the Flow of Sensor Observations to Archives and Publications". In: *OCEANS 2015 Genova*. DOI: 10.1109/OCEANS-Genova.2015.7271657. URL: <https://epic.awi.de/id/eprint/38295/>.
- 195 Schlundt, Michael (May 2022). "Continuous thermosalinograph oceanography along RV SONNE cruise SO278". en. In: DOI: 10.1594/PANGAEA.943794. URL: <https://doi.pangaea.de/10.1594/PANGAEA.943794> (visited on 09/21/2022).
- Sea-Bird Electronics (2020a). *SBE38 Digital Oceanographic Thermometer*. URL: <https://www.seabird.com/asset-get.download.jsa?id=54627862501> (visited on 11/22/2022).
- 200 Sea-Bird Electronics (2020b). *SBE45 MicroTSG Thermosalinograph*. URL: <https://www.seabird.com/asset-get.download.jsa?id=54627862504> (visited on 11/22/2022).