Name: SOP for vessel:meteor:tsg_meteor:sbe_21_3388 (7544)
Version: 1.0
Valid from: 2022-10-06
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. 2023-01-12
    - 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_21_3388
Long Name: SBE 21 Thermosalinograph
URN: vessel:meteor:tsg_meteor:sbe_21_3388
ID: 7544
UUID: 142661e1-6163-4157-a81f-c5f83f7ec45e
Description: Thermosalinograph for measurement of temperature and conductivity from underway vessels. Integrates with the optional remote temperature sensor SBE 38.
Serial No.: 3388
Manufacturer: Sea-Bird Scientific
PID/Handle: https://hdl.handle.net/10013/sensor.1e6ff4cb-ac64-44d2-bfb8-ff97f6e3efd5

4. Parameter Description

Short Name: conductivity
Long Name: conductivity
full URN: vessel:meteor:tsg_meteor:sbe_21_3388:conductivity
ID: 87913
UUID: 37f80c1d-441a-4239-b8ef-2ce29593a522
Type: conductivity
Unit: S/m
Comment:
Measurement Properties: none

Short Name: rt
Long Name: Rt
full URN: vessel:meteor:tsg_meteor:sbe_21_3388:rt
ID: 87914
UUID: 6589cdad-3fa4-43d2-b857-cfb914958e88
Type: factor
Unit: none
Comment:
Measurement Properties: none

Short Name: salinity
Long Name: salinity
full URN: vessel:meteor:tsg_meteor:sbe_21_3388:salinity
ID: 87915
UUID: e46c897b-2d4b-4bbe-a721-0096de08e0c6
Type: salinity
Unit: PSU
Comment:
Measurement Properties: none

Short Name: sound_velocity_external
Long Name: external sound velocity
full URN: vessel:meteor:tsg_meteor:sbe_21_3388:sound_velocity_external
ID: 87916
UUID: 73b3917d-eb23-47db-8205-400dc4e2ffdc
Type: sound velocity
Unit: m/s
Comment:
Measurement Properties: none

Short Name: water_temperature
Long Name: internal water temperature
full URN: vessel:meteor:tsg_meteor:sbe_21_3388:water_temperature
ID: 87917
UUID: 8956492d-fa72-49ab-8fe5-0951bfde9c22

Type: water temperature
Unit: °C
Comment:
Measurement Properties: none

Short Name: voltage_1
Long Name: first voltage
full URN: vessel:meteor:tsg_meteor:sbe_21_3388:voltage_1
ID: 87918
UUID: 85532255-6bf0-4d8d-95cc-36d1f0c895c9
Type: voltage
Unit: V
Comment:
Measurement Properties: none

Short Name: sound_velocity_internal
Long Name: internal sound velocity
full URN: vessel:meteor:tsg_meteor:sbe_21_3388:sound_velocity_internal
ID: 87919
UUID: f3b8027c-6557-4c9b-960d-501e1ef6cb74
Type: sound velocity
Unit: m/s
Comment:
Measurement Properties: none

Short Name: voltage_2
Long Name: second voltage
full URN: vessel:meteor:tsg_meteor:sbe_21_3388:voltage_2
ID: 87920
UUID: 004f1f30-4720-4f19-a302-3c5178c05d31
Type: voltage
Unit: V
Comment:
Measurement Properties: none

Short Name: density
Long Name: density
full URN: vessel:meteor:tsg_meteor:sbe_21_3388:density
ID: 87921
UUID: 4bff6125-18e7-4227-8596-f7efcab5191d
Type: density
Unit: kg/m3
Comment:
Measurement Properties: none

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5. Processing

This instrument measures temperature and electrical conductivity of sea water. Using those two properties salinity (and additionally sound velocity) are estimated (Sea-Bird Electronics 2015). Usually, an additional temperature sensor SBE38 (Sea-Bird Electronics 2020) is related to the SBE21. All data are stored through the data management system DAVIS-SHIP (DSHIP). After the cruise all data are transfered to the DSHIP land system. From there data are obtained for further evaluation.

5.1. Acquisition

The SBE21 is installed within the Bodenmessraum (Bergmann 2021). The SBE21 is directly flushed with sea water through the two deep inlets in about 5m depth. At the two inlets the two aditional SBE38 temperature sensors are installed.

Auxiliary Files:

Name: *"Meteor" Bordhandbuch für Expeditionsteilnehmer*
Type: Manual
Description: General overview on the research vessel Meteor with detailed information on onboard scientific devices
URL: https://fiona.uni-hamburg.de/d1574276/meteorhandbuch.pdf
Last Modification: Jan. 2021

Name: *SBE21 SeaCAT Thermosalinograph*
Type: Manual
Description: User manual of SBE45 MicroTSG Thermosalinograph
URL: https://www.seabird.com/asset-get.download.jsa?id=54627862330
Last Modification: 2015

Name: *SBE38 Digital Oceanographic Thermometer*
Type: Manual
Description: User manual of SBE38 Digital Oceanographic Thermometer
URL: https://www.seabird.com/asset-get.download.jsa?id=54627862501
Last Modification: 2020

5.2. Extraction

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.
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 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: -

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

Filename Convention: -

-

Auxiliary Files:

Name: -

Type: -

Description: -

URL: -

Last Modification: -

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.

Protocol: MDM

Project path: *public version, input removed*

Campaign Data: yes

Filename Convention: per campaign

Expected Data Interval: per campaign

Ingest Data Interval: per campaign

Mapping: -

Save Directory: -

json/xml:

Script: -

Script call:

Repository: -

7. Storage

7.1. Raw Data

Location *public version, input cropped*

Backup Policy: does not apply

7.2. Near Real-Time Data

Info: no NRT for this workflow

Service: link to near real-time data service

7.3. Publications and further Reading

Publication: Wollschläger and Schlundt 2022, Menapace and Schlundt 2021, Koschinsky and Schlundt 2021, Hübscher and Schlundt 2022, Hansteen and Schlundt 2022, Grevemeyer and Schlundt 2022, Geldmacher and Schlundt 2022, Dürkefälden and Schlundt 2021, Achterberg and Schlundt 2022

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

References

Achterberg, Eric Pieter and Michael Schlundt (July 2022). "Continuous thermosalinograph oceanography along RV METEOR cruise M176/2". en. In: DOI: 10.1594/PANGAEA.946388. URL: https://doi.pangaea.de/10.1594/PANGAEA.946388 (visited on 09/21/2022).

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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, 2017-11-30-2017-12-01Brusseles, DI4R 2017 conference*. Brusseles: DI4R 2017 conference. URL: https://indico.egi.eu/indico/event/3455/session/1/contribution/114/material/slides/1.pdf (visited on 01/21/2020).

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Hübscher, Christian and Michael Schlundt (July 2022). "Continuous thermosalinograph oceanography along RV METEOR cruise M177". en. In: URL: https://doi.pangaea.de/10.1594/PANGAEA.946412 (visited on 09/21/2022).

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Koschinsky, Andrea and Michael Schlundt (Nov. 2021). "Continuous thermosalinograph oceanography along RV Meteor cruise M169". en. In: DOI: 10.1594/PANGAEA.938474. URL: https://doi.pangaea.de/10.1594/PANGAEA.938474 (visited on 09/21/2022).

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