CTD-Training

Last changes 05 06 2020
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Last changes 20 11 2019

Content:
• Where is the CTD – Abfüllraum and Windenleitstand
• Normal operation
  • Prepare a CTD cast
  • During the Cast
  • Commands in German
  • Echo sounder and computing the real depth
  • Salinity samples
  • End of profile
  • Salinometer

Getting started:
• Seasave – configuration
• ManageCTD – configuration and processing
• Ocean Data View (optional software)
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Getting started:
• Seasave – configuration
• ManageCTD – configuration and processing
• Ocean Data View (optional software)

This presentation is the main document for all CTD related work. Go through this presentation first!
If needed, check the additional information in:
• CTD_Assembly
• Videos: CTD_assembly_vertical
  CTD_assembly_horizontal
• Settings_SeaSave_ManageCTD
• Setup_SBEDataProcessing and the related
  Setup_SBEDataProcessing_Screen Shots
• Howto_SamplingSalinityDensity
• Howto_Salinometer
• Several application notes from Seabird
• Cleaning_ColdConditions
• CTD_shelter
Polarstern working Deck

MilliQ is stored in the Chemielabor
Abfüllraum
Always secure the CTD/RO with two lashing straps. Do not bend the frame!

Controller
The control switches are locked if the red knob is locked.

The red belt is for safety. It runs through the handles around the water samplers and holds the sampler if the mounting may break.
Polarstern D-Deck (one above working deck)
Monitor from the winch. It displays e.g. lowering speed, rope length, load etc.

Winch operator

CTD operators

Echo sounder

Computer with Dship- info (about everything...)

CTD operators
Prepare a CTD cast

Abfüllraum: Prepare the Rosette

• Open the water samplers (next slide)

• Close the air valves. Only hand tight! Remember to open and close these during sampling.

• Close the petcocks

• Visual inspection

• Get everything ready (e.g. salinity bottles)
Prepare a CTD cast

• Open and detach the hocks from the Nylon string

• Lift the upper lid straight up, carefully bend it back, and lay it on the bottle edge. If that makes a loud noise you are not careful enough. Grab the top-Nylon string and hook onto the right hook of the carousel. The hooks are numbered.

• When all top lids are down, the bottom lids come next. Carefully pull them down, bend them back, and lay them on the bottle edge and don’t make noise. Attach the hook again to that Nylon string that you removed it from in the first step.
Prepare a CTD cast

Windenleitstand:

- Prepare the protocols
- Get informed about:
  - Station – and cast number
  - Samples to be taken
  - Expected water depth
  - Any information from former CTD watch?
- Prepare the PC
  - Start Seasave and
  - Go to *Real-Time Data* and click *Start.*
Prepare a CTD cast

Windenleitstand:
- Prepare the protocols
- Get informed about:
  - Station – and cast number
  - Samples to be taken
  - Expected water depth
  - Any information from former CTD watch?
- Prepare the PC
  - Start Seasave and
  - Go to Real-Time Data and click Start. This window will open. Make sure Begin archiving data immediately is selected. Enter the filename and check for correct path.
  - Press Start. This window will open.
  - Enter the specific information and then...WAIT!
    Data acquisition will start when you click ok. But first you need to be on station and switch the CTD on, when it is overboard. The Crew wants you to wait until none is touching the Rosette anymore (high voltage).
CTD Cast

Abfüllraum

- Remove sensor flushing syringe. Be careful not to pull the connection of Cond and Temp sensor apart.
- Put on helmet and live vest
- Take CTD/RO outside on deck using the Laufkatze (overhead crane). Assist the crew.
- Put the CTD on deck and return Laufkatze back into the Abfüllraum

Windenleitstand:

- Switch on the CTD at the CTD deck unit when none is touching the CTD frame anymore (high voltage). The CTD deck unit is located right behind you in a reg.
- Start data acquisition clicking OK
- Ask the winch operator to: “Mit 0.5m/s auf 22 m fieren, dann stopp.”
- Observe pump status switching from OFF to ON If the pump does not turn on, go deeper into a more salty layer. The pump needs saltwater to turn on.
- Wait at least 1 minute (for UVP) and until the temperature and salt values look reasonable. Then ask the winch operator to: “Hieven an die Oberfläche, dann fieren mit 0.5.”

Fieren – veer (lower down)
Hieven – heave (pull up)
Monitor the COND difference during the cast.
Use COND difference as an indicator for the lowering speed. Recommended lowering speed:

0-500 m: 0.5 m/s
Below 500 m: 1.0 m/s

If you see interesting structures or gradients in deeper layers you should reduce the speed to 0.5 m/s.

Strongly reduce the speed during rough sea state.

The difference in conductivity should be < 0.006.

If the difference changes over the time of your cruise there is something wrong. Check the document Cleaning_ColdConditions.pdf
If the difference increases unexpectedly, ask the winch operator to stop and wait. Something might be stuck in one of the pumps. Command: “Stopp”. Explain the reason for stopping: “Messfehler”

• Wait until the difference is normal. If it does not get better, get the CTD back up into a layer where the signal was ok and wait again.
• Go up as far as you need to go, to repeat the part of the profile that was contaminated: “Hieven um xx meter”
• If it was necessary to heave for more than 30m, you need to do the starting procedure for the UVP again (next page)
• Then continue ”Fieren mit 1“

Messfehler – measurement error
1 – eins
2 – zwei
3 – drei
4 – vier
5 – fünf
6 – sechs
7 – sieben
8 – acht
9 – neune
10 – zehn
CTD Cast

UVP starting protocol:
lower CTD with 0.5 m/s for more than 22 m
Wait for 2 Minutes

Continue the cast.
CTD approaching the sea floor

Frequently check the echo sounder water depth at the display and computer behind you.

- Watch the altimeter reading
- 100 – 150m above seafloor reduce winch speed.
- Altimeter starts reading 80 to 30 m above seafloor
- The transmissometer might show a signal when you approach the seafloor
- 30 to 50 m above bottom reduce winch speed
  Command: “Weiter mit 0.3”
- Ca 20m above bottom “Achtung”
- Ca 10m above bottom “Stopp – Auf Tiefe”

Inform the winch operator about the end of profile (“auf Tiefe”) because he will inform the bridge.

Be careful and check whether you are taking the profile over smooth or steep bottom topography.

The height in which you should stop depends on the sea state and bottom roughness. The more experience you have the closer you might dare to go. But never touch the bottom! 10m above the bottom is the absolute minimum.
The water depth measured by the echo sounder is based on the mean sound velocity (svel) which is likely set to 1500 m/s. Ask the bridge electronic engineer or the lab engineer for that value – you need it when you correct the echo sounder reading incase you like to do this.

In polar waters, svel is smaller than 1500 m/s. Therefore the true water depth is less then the echo sounder reading.

Echo sounder reading = 5215 m
Svel\textsubscript{used by echo sounder} = 1500 m/s
SVEL\textsubscript{CTD} = 1494 m/s (from previous cruise or profile)

Z\textsubscript{true} = 1494/1500 \times 5215 = 5194 m – is the true water depth. As the altimeter usually detects the bottom in only 40m distance you can expect a signal at:

Z\textsubscript{first expected altimeter reading} = Z\textsubscript{true} – 40 m = 5194 – 40 m = 5154 m. Reduce the profiling speed 100m before that depth.

If you get no altimeter signal:
Stop at the depth that you computed before. In this example 5154m and wait about 1 Minute. The altimeter might see the bottom when it is not moving. If you get no signal go about 20m deeper (5154 + 20 m) and end the profile there.

If the altimeter fails repeatedly (3 to 4 times), change the cable. If this does not solve the problem, change the altimeter.
Water samples

• Teams who are interested in water sampling have to agree on a sampling strategy and set up the water budget. They need to take the salinity samples into account. You are responsibly for getting them.

• One representative for the other teams should sit next to you during the last part of the downcast and the upcast. You and that person decide, in the interest of everyone (!), where the samples will be taken.

• Observe the hydrographic structure during down cast and determine the depth for taking water samples. Coordinate sampling depth with the representative next to you.

• Salinity samples must be taken in homogeneous layers. Check document Howto_SamplingSalinity.pdf

  • Short version:
    • Take samples from homogeneous layers only
    • Take samples in two different depths, if possible
    • Get your sample from the CTD into your little bottle as quickly as possible.
    • Take 2 samples from each water sampler. That means you end up with 2 samples from each depth.

  • Taking the sample:
    • Rinse the bottle 3 times (half fill, close, shake, empty)
    • Fill the bottle until 2-3cm below cap
    • Rinse the rubber-lid again!
    • Close the bottle with rubber lid
    • Clean bottle with fresh water
    • Secure the rubber lid with alu-cap

• If you have deep water left over, save the water for rinsing the CTD. The water should be from a layer, where no biological activity is expected. There is more about cleaning the sensor in Cleaning_ColdConditions.pdf
Water samples

- How or when to close the bottles is always under discussion. Stopping the CTD and closing the bottle right away is the worst you can do. Either you wait long enough or you close on the fly. For MOSAiC we agreed (telecon 17.09.2019) to do the following to save time (if you have good reasons to do otherwise please document what you did):

  - Slow down at least 30m before you want to close the bottle to 0.3m/s.

  - At least 10m before you want to close the bottle you ask the winch driver to go as slow as possible “So langsam wie möglich”
    - If you close several bottles in one depth, stop the CTD at the target depth “stop” and wait for 60 seconds. Then close the bottles and continue.  
    - If you only close on bottle you can do so on the fly

  - After closing your bottles continue the cast with up to 1.0 or 1.5m/s

  - The minimum depth of the last bottle depends on the sea state. Communicate with the winch operator.

  - After firing the last bottle you say: “CTD an Deck“ which means CTD on deck.

Remark:
For the winch operator it is important to know the distance to the next stop such that he can chose the speed. It makes sense to go with 1.5 m/s if the distance is 500 m while it is not useful for a distance of 50 m.
End of CTD cast

**Abfüllraum**

- Bring out the Laufkatze and assist the crew.
- Bring the CTD inside.
- In rough sea state, secure CTD with two lashing straps.
- Flush the sensors 2 times with ocean salt water and fix the syringes somewhere at the Rosette, such that the water stays in the sensor cycle. Use deep water left over from other stations. If possible, filter it first using a 0.5 micron filter. If it is colder then -10°C, handle the CTD as described in Cleaning_ColdConditions.pdf
- Take salinity samples.
- When everyone is done with sampling, secure CTD with two lashing straps. Clean the rosette, release hooks and the bottles (the inside of bottles !) with fresh water. Inspect O-rings. Repair if necessary

**Windenleitstand**:

- Stop Seasave acquisition at the surface by going to *Real-Time Data* and click *Stop*
- Switch off CTD deck unit before anyone can touch the CTD (high voltage)
- Continue the protocol and go down to the Abfüllraum. Hang the sampling protocol somewhere, where everyone can see it. Help the other person if needed.
- Finalize the protocol noting anything regarding leaking bottles, damages or other stuff. Repair if necessary.
- Backup all files to the server.
- Process data in ManageCTD and put the results on the server. The other groups will be happy to get the data.
There are glass bottles, plastic lids, and alu-cap for closing the bottles. The crimping tool is used to secure the alu-cap. The purpose of the alu-cap is to tighten the lid and prevent outgassing. This is especially needed for deep samples!
You can use the plastic lid 3 times.
The crimping tool must be maintained frequently, rinse with fresh water, dry and use oil (Silikon-Spray).

The glass bottles for salinity samples are usually stored in gray boxes.
Salinity samples

Salinity samples are measured with the OPS. The sampled need to be prepared as described in *Howto_Salinometer*. The process takes a day so read the manual well in advance.
CTD Configuration
Deck Unit Back Panel

1. AC VOLTAGE
2. AC Input
3. Fuse: 120V=2 AMP, 240V=1 AMP
4. SBE 11 INTERFACE
   - IEEE-488
   - RS-232
5. TAPE RECORDER
   - RECORD
   - PLAY
6. SERIAL DATA UPLINK
7. MODEM CHANNEL
8. SEA CABLE
   - Fuse 0.5 AMP
   - CAUTION: HIGH VOLTAGE
9. REMOTE OUT
10. NMEA INPUT
11. SURFACE PAR INPUT

PAR surface unit
CTD Configuration

Top end cap

Bottom end cap

Optional connector MCBH-6M (WS)
3/8" length base, 1/2-20 thread

Standard connector XSG-3-BCL-HP-SS
3/8" length base, 1/2-20 thread

Optional connector MCBH-2M (WS)
3/8" length base, 1/2-20 thread

Standard connector XSG-2-BCL-HP-SS
3/8" length base, 1/2-20 thread

Optional connector MCBH-3M (WS)
3/8" length base, 1/2-20 thread

Standard connector XSG-3-BCL-HP-SS
3/8" length base, 1/2-20 thread

G.O. 1015 Rosette (standard)

Pin Signal
1 Return
2 V4 signal
3 V4 return

Pin Signal
4 V4 signal
5 V4 return
6 +15V out

温度传感器1

Conductivity Sensor 1

Temperature Sensor 1

Conductivity Sensor 2

Pressure Port

Bottom Contact
Pin Signal
1 Common
2 Signal
3 + input voltage

Pump
Pin Signal
1 -
2 +

Temperature Sensor 2

Temperature Sensor 1

Conductivity Sensor 2

Optional connector MCBH-3M (WS)
3/8" length base, 1/2-20 thread

Standard connector MCBH-3M (WS)
3/8" length base, 1/2-20 thread

Standard connector VSG-2-BCL-HP-SS
3/8" length base, 1/2-20 thread

Standard connector XSG-2-BCL-HP-SS
3/8" length base, 1/2-20 thread

Optional connector MCBH-2M (WS)
3/8" length base, 1/2-20 thread

Standard connector AG-306-HP-SS
3/8" length base, 1/2-20 thread

Optional connector MCBH-6M (WS)
3/8" length base, 1/2-20 thread

Water Sampler or SEARAM

Pin Signal
1 Return
2 FS-222 out to water sampler
3 RS-222 in from water sampler

Pin Signal
4 Date to SEARAM
5 N/C
6 +15V out/in

Auxiliary Sensor Connector 4

Pin Signal
1 Return
2 V4 signal
3 V4 return

Pin Signal
4 V4 signal
5 V4 return
6 +15V out

Auxiliary Sensor Connector 3

Pin Signal
1 Return
2 V4 signal
3 V4 return

Pin Signal
4 V4 signal
5 V4 return
6 +15V out

Auxiliary Sensor Connector 2

Pin Signal
1 Return
2 V2 signal
3 V2 return

Pin Signal
4 V2 signal
5 V2 return
6 +15V out

Auxiliary Sensor Connector 1

Pin Signal
1 Return
2 V1 signal
3 V1 return

Pin Signal
4 V1 signal
5 V1 return
6 +15V out

Top end cap
The CTD has 4 connectors. Each connector has two channels. So we can operate 8 sensors using y-cables. We do actually operate 9 ;)

Polarstern CTD configuration:
AUX1 : Oxy1 + PAR (underwater)
AUX2 : FL.Chla. + Transmissiometer
AUX3 : FL.CDOM + Oxy2
AUX4 : SUNA + Altimeter + Rhodamine

Ocean City configuration:
AUX1 : Oxy1 + PAR (underwater)
AUX2 : FL.Chla. + Transmissiometer
AUX3 : FL.CDOM + Oxy2
AUX4 : SUNA + Methane + Rhodamine
The CTD has 4 connectors. Each connector has two channels. So we can operate 8 sensors using y-cables. We do actually operate 9 ;) 

Polarstern CTD configuration:  
AUX1: Oxy1 + PAR (underwater)  
AUX2: FL.Chla. + Transmissiometer  
AUX3: FL.CDOM + Oxy2  
AUX4: SUNA + Altimeter + Rhodamine  
Altimeter is on channel 6  
Rhodamine is on channel 7  
Suna gets power only  

Ocean City configuration:  
AUX1: Oxy1 + PAR (underwater)  
AUX2: FL.Chla. + Transmissiometer  
AUX3: FL.CDOM + Oxy2  
AUX4: SUNA + Methane + Rhodamine  
Methane is on channel 6  
Rhodamine is on channel 7  
Suna gets power only  

There is an extra manual on how to configure Seasave for data recording  
Settings_SeaSave_DataProcessing_ManageCTD.pdf
If changed a sensor...

Check the documents Settings_SeaSave_ManageCTD.pdf
You need to change the sensor specific settings in:
• Seasave data recording software (before the next measurement)
• SensorWeb (before the next measurement)
• Tell data support on-board to upload the “new device” into DShip
• ManageCTD data processing software (after the next measurement)

- Note that you changed a sensor in the CTD paper protocol
- Change the serial numbers in the table at the top of the paper protocol
- Note that you changed a sensor in the MOSAiC_Ocean_logbook.xlsx

- Write to Sandra.Tippenhauer@awi.de and Rohardt@awi.de explaining what happened, why you changed the sensor, any issues you had and how many backup sensors you have left.
ManageCTD
ManageCTD

ManageCTD is the user interface for the data processing. It executes a number of routines of SBEData Processing.

ManageCTD should be installed. If not check the manual *Settings_SeaSave_DataProcessing_ManageCTD.pdf*

Start ManageCTD and check whether you cruise already exists and is shown in the cruise list on the left. If not, go to *file* and click *New Cruise*. Creating a new cruise will create a bunch of folders in the directory C:\CTD\...

You will configure seasave such that it saves all the raw data in folder ..\conf1\raw. If sensors need to be changed or additional sensors are installed, you have a new configuration. Create a new folder for that (conf2). This is described in *Settings_SeaSave_DataProcessing_ManageCTD.pdf*

Edit the ini-file. You find it under C:\ManageCTD\ManageCTD.ini (see next slide)

Within ManageCTD you can cut the first part of the profile where the CTD was still at the surface. Some further processing steps can be made.

ManageCTD includes some routines for import and visualization in OceanDataView. For this purpose raw- and processed data must be saved in the given directory structure.
Edit the ManageCTD.ini

Cruise specific settings are given in the INI-file.
You find it under C:\ManageCTD\ManageCTD.ini

[DRIVE]
seasave_drv = c
seasoft_drv = c
server_drv = z

[SOURCE]
template_dir = C:\Software\Seabird\Templates
compare_dir = C:\bck\geberco = C:\PERPLEX-V5\PERPLEX-Datasets\geberco\gridone.grd
tpath = C:\SoftwareSBE

[BACKUPPATH]
backup_path = CTDBACKUP

[STARTUP]
default_cruise = PS1...
default_conf = conf1

[DSHIP]
enabled = true
ebook_file = C:\CTD\PS1...\DShip-Out.txt
isuch = CTD/RO
action = on ground/max depth
filetype = 1

[SETTINGS]
nrows = NaN
svdws = 1500.0

[DESPIKE]
denschwelle = 0.004
cdata = ctdmat
minpres = 100
tdiff = 1
sdiff = 0.01
dendiff2 = 0.001
shiftvalue = 0.0037

[ODV]
sensorpair = 2
crnum = PS1...

[TOOLSETTINGS]
summarytype = short
window = 1
limit = 0.5

[TSPLITSETTING]
dlevel = 500
nrdens = 10

[CLEANUPSETTINGS]
order = 2
cwindow = 10
nstd = 1
std1 = 2
% std2 = 0.5
ManageCTD

• During startup ManageCTD scans all folders and shows all profiles saved in folder e.g. C:\CTD\PS..\conf1\raw. For an update View -> Refresh scans again all folders.

• The “X” in the columns indicates which processing step was made already.

• The following processing steps must be executed:
  • Job -> CTDjob: starts SBEDataProcessing and cuts the first part of the profile where the CTD was still at the surface; *.cnn
  • Job -> CTDheader: merges header information and cnv-file; *.hdr.
  • Job -> CTDd spike: view profile and remove spikes, *.dsp.
  • Job -> dsp2odv: creates and imports file for ODV; *.dsp to *.txt.

• But... before all this works you have to go through Setup_SBEDataProcessing.pdf and the related Setup_SBEDataProcessing_ScreenShots
Go to Job -> CTDjob
A Matlab Script reads the ASCII file and creates the plot for determining the begin of profile. Check pressure, salinity and temperature to find the pump switching on. Zoom in pressure as you like, click R and mark the record where you think the profile starts. The Number of selected record appears in the yellow filed.

Then click A and select the last value of the altimeter that you find trustworthy. There might be spikes. The altitude that you selected will appear in the blue field.

Now click truncate, wait until the process is down and then click close.
ManageCTD processing steps - CTDheader

- To be able to read the header, you first need to get a header file. Export the header from dship.
  - Go to a browser and find DSHIP. There is a link on the fs-polarstern.de page. They keep changing the page so it might differ from this guide. Sorry.
  - Go to ActionLog Extraction
  - Select a time frame and click NEXT (or click the small globe and select your cruise. I don’t know whether this is possible only after the cruise)
  - You can change the device selection but you can also keep them all. Click Next
  - Keep these settings (see picture on the right) and place you order. Choose a file name and user name as you like. But remember the names. You need them for downloading.
  - Wait a few minutes until the system has your file ready.
  - Go back to the start page of DSHIP and select Extraction Download

- There will be three files. You only need the .dat file. Save it in the directory of you cruise C:\CTD\cruise, rename it to .txt and open it with a text editor. It should contain a list of all devices and actions that you selected.

- Now, back to ManageCTD. Go to Utilities, select Dship Ebook, navigate to you file, and click open. This will produce a file called Dship-Out.txt
As they keep changing the system, this might not work. In that case contact Gerd.Rohardt@awi.de and Sandra.Tippenhauer@awi.de
We will help you to find a workaround.
• Edit the field cruise, ship, and SN.

• Update the variables:
  • Open the processed .cnv-file. It is in C:\CTD\cruise\conf\..*.cnv
  From row 21 or so onwards, you find a list like the one below.
  • Enter unit and column as given in the cnv-file. The numbering is a bit confusing.. For the example given below: # name 0 = prDM: Pressure... you write dbar and column 1
  That means that the pressure is given in the first column, Temperature 1 is given in the second column, Temperature 2 in the third, and so on..
  • In the current version of ManageCTD we do not have enough rows for all variables. We never used the CTD with that many sensors. Decide which ones you want to name here. I do not know what the program will do with the other columns. Please report to Gerd.Rohardt@awi.de or Sandra.Tippenhauer@awi.de
  • When you are done, go to File and save. The info will be saved in CTDheader.ini in the folder C:\CTD\cruise and will be used in the following steps.

```
# name 0 = prDM: Pressure, Digiquartz [db]
# name 1 = t050C: Temperature [ITS-90, deg C]
# name 2 = t150C: Temperature, 2 [ITS-90, deg C]
# name 3 = c0mS/cm: Conductivity [mS/cm]
# name 4 = c1mS/cm: Conductivity, 2 [mS/cm]
# name 5 = sal100: Salinity, Practical [PSU]
# name 6 = sal11: Salinity, Practical, 2 [PSU]
# name 7 = scan: Scan Count
# name 8 = altM: Altimeter [m]
# name 9 = sbec0NL/L: Oxygen, SSE 43 [ml/l]
# name 10 = fIECO-AFL: Fluorescence, WET Labs ECO-AFL/FL [mg/m^3]
# name 11 = CStarTr0: Beam Transmission, WET Labs C-Star [%]
# name 12 = v0: Voltage 0
# name 13 = v2: Voltage 2
# name 14 = v6: Voltage 6
# name 15 = v7: Voltage 7
# name 16 = nbin: number of scans per bin
# name 17 = flag: flag
```

[Dship Ebook] reads the extracted header data from Dship and displays it here.
• If you open the Dship-Out.txt file you find a list of all actions. Check how the CTD-profile was called. In this example it is *CTD/RO*. Edit the ini-file again (page 26)
You find the file under C:\ManageCTD\ManageCTD.ini

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Station</th>
<th>Action</th>
<th>Location 1</th>
<th>Location 2</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010/12/06</td>
<td>20:42:59</td>
<td>PS77/0021-1</td>
<td>PIES Pressure Inverted Echosounder on deck</td>
<td>50° 15.57' S 1° 26.65' E</td>
<td>3875.0 0.7</td>
<td></td>
</tr>
<tr>
<td>2010/12/06</td>
<td>20:55:00</td>
<td>PS77/0021-2</td>
<td>CTD/RO CTD/rosette water sampler in the water</td>
<td>Winde EL31, G.Rohard 50° 15.63' S 1° 26.76' E</td>
<td>3868.0</td>
<td></td>
</tr>
<tr>
<td>2010/12/06</td>
<td>22:28:00</td>
<td>PS77/0021-2</td>
<td>CTD/RO CTD/rosette water sampler on ground/max depth</td>
<td>Winde EL31, 3887m 50° 15.61' S 1° 26.64' E</td>
<td>3870.2</td>
<td></td>
</tr>
<tr>
<td>2010/12/06</td>
<td>22:29:00</td>
<td>PS77/0021-2</td>
<td>CTD/RO CTD/rosette water sampler hoisting</td>
<td>50° 15.60' S 1° 26.65' E</td>
<td>3871.2</td>
<td></td>
</tr>
<tr>
<td>2010/12/06</td>
<td>23:42:59</td>
<td>PS77/0021-2</td>
<td>CTD/RO CTD/rosette water sampler on deck</td>
<td>50° 15.61' S 1° 26.78' E</td>
<td>3866.5</td>
<td></td>
</tr>
<tr>
<td>2010/12/07</td>
<td>00:08:00</td>
<td>PS77/0021-3</td>
<td>PIES Pressure Inverted Echosounder information</td>
<td>A. Macrander, Ausbringen ANT 11-4 50° 15.46' S 1° 25.15' E</td>
<td>3901.5</td>
<td></td>
</tr>
</tbody>
</table>

• Open the *ManageCTD.ini* file with a text editor and find the relevant section [DSHIP]
• The processing step *CTDheader* will use the variable *isuch* defined in *ManageCTD.ini* and look for this name in the Dship-Out.txt file.
• Modify the variables *isuch* and *action* according to the name used in the station book.
• Save changes to *ManageCTD.ini* file and run CTDheader.
Now it should show you a list of the CTD-profiles recorded until now. If there are stations missing or wrong stations in there, you have to check the variable `isuch` and `action` again (previous page).

Double click the station that you are processing at the moment. This will copy the information into the yellow fields. Check whether the water depth and the Records are in the same order of magnitude. If not you might have selected the wrong station.

Go to `File` and click `Save & Exit`.
The step Despike plots some of the processed variables from one profile. It marks data points showing unstable stratification with a red dot or with red square, depending on some threshold set in the C:\ManageCTD\ManageCTD.ini file.

In Despike you can play around with overlaying data from first and second sensor, display Temp, Salt, and Density or show the T/S-plot. You can also remove spikes but you might want to leave that to an experienced user. You can zoom by clicking into the window directly.

The Button [use 1] or [use 2] defines which pair of temp and cond is used. C:\CTD\cruise\Sensor_pair.txt.

Backup the processed files to the public-Server

ManageCTD.ini

[DESPIKE]
denschwelle = 0.004
cdata = ctdmat
minpres = 100
tdiff = 1
sdiff = 0.01
dendiff2 = 0.001
shiftvalue = 0.0037
Additional Information
ManageCTD processing steps – dsp2odv

The processing step *dsp2odv* creates a file which can be imported into ODV (Ocean Data View Version 4.xx, a freeware. You get it at [https://odv.awi.de](https://odv.awi.de)). That file will be saved in the folder: C:\CTD\cruise\work
Continue on next page... if you are not planning to use ODV you do not need this.

There is a section for this in the ManagCTD.ini
If you have questions contact Gerd.Rohardt@awi.de

ManageCTD.ini

[ODV]
sensorpair = 1 or 2 your choice
crnum = PS... your cruise name
Steps for the first profile (all following profiles see next page)

1. If you executed `dsp2odv`.

2. Drag and drop the newly created text file from C:\CTD\cruise\work to the ODV icon. ODV automatically starts, confirm with OK and close ODV. This will create a Data-folder and an .odv-file in the work folder.

3. Move the Data-folder and the ODV-file to C:\CTD\cruise\odv

4. Execute the processing step Import to ODV.
Import of all following profiles into ODV:

1. Select profile. Execute the processing step *dsp2odv*
2. Start ODV
3. In the ODV menu go to *Import -> ODV Spreadsheet* and select the profile .txt-file in the folder C:\CTD\cruise\work.
4. Confirm all further steps with *OK*.
5. Close ODV.
6. Select profile in *ManageCTD*, execute *Import to ODV*. 
www.pangaea.de/software/

Software

The Software on this page is provided by the PANGAEA Network for the visualization, exploration and interpretation of scientific data. The tools are freeware, its use in combination with the PANGAEA Information System is recommended.

- **PanMap** is a mini-GIS (Geographical Information System) to draw point and vector data in maps.
- **PanPlot** enables the user to plot data versus time or space in multivariable graphs.
- **Pan2Aplic** is a tool to convert and compile single files or folders of output files (asciitab-separated data files with or without metaleader) downloaded from the information system PANGAEA to other formats used by applications, e.g. for visualization or further processing.
- **Some useful tools** for converting ASCII files to some special formats.
- **PanCount** is an Excel-sheet to use the keyboard as a counting device.
- **PaleoTools** is an extended software package for quantitative paleoenvironmental reconstructions.

**Software on other websites**

- **CoPal** (Cologne Radiocarbon Calibration & Palaeoclimatic Research Package) is a Radiocarbon Calibration Program (Bernhard Werner).
- **C2** is a Windows program for analysing and visualising palaeoenvironmental data (Steve Juggins).
- **noja** is an R package for analysis of Quaternary Science data (Steve Juggins).
- **MacDiff** is a programme for analysis and display of x-ray diffractograms (Rainer Petschick).
- **ODV** (Ocean Data View) is a software package for the exploration and visualization of oceanographic data (Reiner Schlitz).
- **OST** (Ocean Sneaker's Tool) was written to generate table organized ASCII data files and to display them on windows systems (Jan Schulz).
- **Seacarb**, a R package to calculate parameters of the seawater carbonate system (Aurélien Proye and Jean-Pierre Gatius).
- **Statistical analysis of climate time series: a bootstrap approach.** The bootstrap is an adaptive, computing-intensive resampling method able to extract quantitative information from such time series. (Manfred Mudelsee).
- **Tilia** is designed to record and display - in conjunction with Tilia-Graph - stratigraphic/pollen data (Eric Grimm).
- **Triplot** is a ternary diagram plotting software based on MS-Excel (David Graham).
... or use the Matlab-Script „CTDtab2mat“, which converts the TAB-file into a list of single MAT-files.

```matlab
>> load('E:\ANT_CTD\ANT IX\3\122_1.mat')
>> S
S =
    PRES: [206x1 double]
    TEMP: [206x1 double]
    COND: [206x1 double]
    SALT: [206x1 double]
    PTEM: [206x1 double]
    SIGT: [206x1 double]
    OXYG: [206x1 double]
    OSAT: [206x1 double]
    ATTN: [206x1 double]
    NOBS: [206x1 double]
    FLUO: [206x1 double]
    CAST: 1
    DATETIME: '15-Jan-1991 09:49:00'
    LAT: -71.0567
    LON: -11.7733
    WATERDEPTH: 422
    INSTITUTE: 'AWI'
    INST_COUNTRY: 'Germany'
    SN: '1069'
    INSTRUMENT: 'MARK IIIB'
    STATION: 122
    CRUISE: 'ANT IX'
    LEG: '3'
    SHIP: 'POLARSTERN'
```
ManageCTD
Utilities

Dship Ebook
Converts extracted data from Dship to be used for CTDheader.

Multi Station ODV
A number of dsp-files can be selected to create one import file for ODV.

Summary
Create a header summery list from all CTD profiles.

Backup
Backup selected files on external hard disk or on server drive.

Mean SVEL
Display mean sound velocity profile, add to a summary list too.

SV Posidonia
Retrieve sound velocity profile for import into the Posidonia system.

SV Hydrosweep
Retrieve sound velocity profile, e.g. for Hydrosweep.

Check Double Sensors
Check die differences between the double sensors vs. time.

Find Profiles
Comparing files if the used file names differ from the names given in Dship.
CTD-processing and installations on board

Preparing the CTD system

CTD measurements at sea and preliminary processing

Salinity measurements with OPS

Post-cruise calibration

Final checkup: e.g. comparison with CTD data from other cruises

Archiving in Pangaea data base

Post-processing: e.g. comparing OPS with pre-/post-calibration
CTD-processing and installations on board

Bridge

Windenleitstand

- Echo Sounder Display (digital)
- Echo Sounder Monitor („analog“)

NMEA

- Messdaten-Verteiler
- CTD deck unit SBE11

PC

- Monitor
- COM1-3

On-Board Computer

- CTD/RO
- Backup DShip

Monitor

- Monitor

Dship Info Terminal

- Phone 100

Winch-Monitor

- >Rope length
- >Fier-/ Hiev-Speed
- >Load
<table>
<thead>
<tr>
<th>Instrument</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTD underwater unit</td>
<td>SBE911plus</td>
</tr>
<tr>
<td>Carousel water sampler</td>
<td>SBE32</td>
</tr>
<tr>
<td>Double sensor package with pumps</td>
<td>SBE5T(pump)</td>
</tr>
<tr>
<td></td>
<td>SBE3plus(temperature)</td>
</tr>
<tr>
<td></td>
<td>SBE4c(conductivity)</td>
</tr>
<tr>
<td>Oxygen sensor</td>
<td>SBE43</td>
</tr>
<tr>
<td>Transmissometer</td>
<td>WetLabs CStar, 25cm</td>
</tr>
<tr>
<td>Fluorometer</td>
<td>WetLabs, EcoFLR</td>
</tr>
<tr>
<td>Altimeter</td>
<td>Benthos, PSA 900D</td>
</tr>
<tr>
<td>mechanical bottom switch</td>
<td>Seabird</td>
</tr>
<tr>
<td>CTD deck unit</td>
<td>SBE11</td>
</tr>
</tbody>
</table>