UCTD Salinity Profiles

This guide provides instructions on how to derive salinity profiles from UCTD data using Sea-Bird's SBE Data Processing software. From start to finish, the process involves at least these steps:

- Converting the ASCII data files downloaded from the probe via uCast or UCTDTerm into the Seabird format.
- Aligning the temperature and conductivity time series to reduce so-called spiking in the salinity profiles.
- Calculating salinity from the aligned C, T, and P data records.

Once the salinity data have been derived, it is possible to plot individual profiles within SBE Data Processing. Alternately, the data can be output in ASCII format for further handling or processing with other software/graphics applications.

1. Importing UCTD data

First, the UCTD data needs to be converted into a Seabird compatible data format. After starting the application, choose the **ASCII In...** menu item on the **Run** tab. This will bring up a window with two tabs.

Step 1 In the **File Setup** tab, enter the input directory where the data are located and select the data file.



표 ASCII In	
ile <u>O</u> ptions <u>H</u> elp	
File Setup Data Setup	
Program setup file	
C:\Program Files\Sea-Bird\SBEDataProcessing-Win32\ASCII_In.psa	
Open Save Save As Restore	
Input directory	
S:\PRODUCTION\Systems\Winch Systems\UCTD\Data\080809-Cape	
Input files, 1 selected	
254_1451_013.asc	Select
Output directory	
S:\PRODUCTION\Systems\Winch Systems\UCTD\Data\080809-Cape	Select
Name append	
Uutput hie 254_1451_013.cnv	
Not processing	
Start Process Exit	Cancel

Step 2 Now choose the **Data Setup** tab and enter the **scan interval variable** and **scan interval value** as shown below. The click on **Select Column Names...** .

ASCII In				
<u>File Options H</u> elp				
File Setup Data Setup				
Scan interval variable	Time, seconds	•		
Scan interval value	0.0625			
Select Column Name:	s			
Summer				
Start Process			Exit	Cancel



Step 3 The files downloaded from the UCTD probes contain data in four columns. The first column holds the scan number, the second columns lists conductivity in S/m, the third column temperature in degC, and the last column has the depth information in decibars. Now, add the Variable Names as shown below, click OK, and then Start Process. Ensure that the correct units are selected for the different physical variables. This will produce an output file with a ".cnv" extension which is used for further processing.



2. Aligning CT data

Since the conductivity and temperature sensors have different response times, the fast profiling can produce so-called spiking in the salinity data, when the temperature in the water column changes rapidly. In order to minimize these artifacts, the data from the two sensors must be corrected. This is accomplished simply by shifting the temperature data with regard to the conductivity data in time as shown in the steps below.

Step 1 Choose the Align CTD... command in the Run menu and select the file produced in the previous section. Choose a different output file name or enter a token in the Name append section unless you want to overwrite this file.

Align CTD	
e <u>O</u> ptions <u>H</u> elp	19 - Alex - Alex
File Setup Data Setup Header View	
Program setup file	
C:\Program Files\Sea-Bird\SBEDataProcessing-Win32\AlignCTD.psa	
Open Save Save As Restore	
Input directory	
S:\PRODUCTION\Systems\Winch Systems\UCTD\Data\080809-Cape	
Input files, 1 selected	
254_1451_013.cnv	Select
Output directory	
S:\PRODUCTION\Systems\Winch Systems\UCTD\Data\080809-Cape	Select
Number of Contract	
Name append	
Output file 254_1451_013.cnv	
Not processing	
Start Process Exit	Cancel

Step 2 Click on Enter Advance Values... in the Data Setup tab.

🕮 Align CTD		
<u>File Options Help</u>		
Ele Options Help File Setup Data Setup Header View [Enter Advance Values]		
Start Process	Exit	Cancel



Step 3 Enter the values shown below for conductivity and temperature. Click OK and Start Process. The output file created will the temperature values advanced in time by 0.09 s with regard to the conductivity values. Advancing the temperature record with regard to the conductivity data accounts for the slower response time of the temperature sensor. The optimal value is typically around 0.09s for UCTD free casts, but the lag should always be chosen such that the spiking in the salinity profile is minimized.

Variable Name [unit]	Advance [s]	Clear Al
Conductivity [S/m]	0	
Temperature [ITS-90, deg C]	0.09	

3. Calculating Salinity

Now we use the corrected time series to calculate the salinity profiles.

Step 1 Choose the **Derive...** command in the **Run** menu.

Derive		
Options Hel	3	
ile Setup Data	Setup Miscellaneous Header View	
Program setup	file	
C:\Program Fi	es\Sea-Bird\SBEDataProcessing-Win32\Derive.psa	
Open	Save Save As Restore	
Instrument cor	figuration file	
S:\PRODUCT	ION\Systems\Winch Systems\UCTD\Data\080809-Cape F	lattery\UCT
Select	Modify Match instrument configuration to in	put file
Input directory	INN\Sustems\\Winch Sustems\\ ICTD\Data\080809-Cane	
Input files, 1 se	lected	
254_1451_01	3lagC012.cnv	Select
Output director	y	
S:\PRODUCT	ION\Systems\Winch Systems\UCTD\Data\080809-Cape	Select
Name append		
Output file	254_1451_013lagC012SV[cnv	
Not processing		
24		
Start Dracad	-	



Step 2 In the panel shown above, select the file select UCTD.con as the instrument configuration file. This file is available on the software CD provided with each UCTD probe.

Look in	🔒 Data		-	+ 🗈 📸 🕶	
C:	Name			Date modified	Туре
Recent Places	🍌 agu148 📼 33.con			5/10/2010 4:13 PM 5/10/2010 4:12 PM	File folde Sea-Bird
	UCTD.con	1		6/30/2010 9:46 AM	Sea-Bird
Libraries Libraries Computer Computer Network		11			
	File name:	UCTD.con		•	Open
	Files of times	Instrument Configuration I	ilee /* vml		Cancel

- **Step 3** Now select the file CT aligned data file produced in the previous section. Choose a different **output file name** or enter a token in the **Name append** in the **File Setup** tab unless you want to overwrite the original data file.
- Step 4 Click on Select Derived Variables... in the Data Setup tab.





Step 5 Add the Variable Names for the quantities you would like to calculate, e.g. depth, descent rate, and salinity as shown below, and click OK. Then choose Start Process. In the example below, this will produce a file in Seabird format, with depth listed in first column, decent rate in the second column, and salinity in the third column.

Seq. #	Variable Name [unit]	-	Add		Shrink A
1	Depth [salt water, m]			Average Sound Velocity	-
2	Descent Rate [m/s]		Change	⊕ Density	Expand A
3	Salinity, Practical [PSU]		Delete	⊕ Depth	Shrink
4				Descent Rate Descent Rate	Junk
5			Insert	Geopotential Anomaly [1/Kg]	Expand
6				E Nitrogen Saturation	
7			Delete All	Oxygen Saturation, Garcia & Gordon	
8		_		⊕ Oxygen Saturation, Weiss	
9				Potential Temperature	
10				Potential Temperature Anomaly	
11				Salinity, Practical [PSU]	
12				Encoting Conductance [uS/cm]	
13				Specific Volume Anomaly [10]-8 * m^3/Kal	
14				Thermosteric Anomaly [10^-8 * m^3/Kg]	
15		-	Data		

4. Optional Steps

The SeaPlot command is used to plot individual profiles.

e <u>O</u> ptions	Help
e Setup Plot	Setup Y Axis X Axis 1 X Axis 2 X Axis 3 X Axis 4 Header View
Program setup	ile
C:\Users\jklini	e\Application Data\Sea-Bird\SBEDataProcessing-Win32\SeaPlot.psa
Open	Save Save As Restore
Input directory	
S:\PRODUCT	ON\Systems\Winch Systems\UCTD\Data\100511-Agulh
Input files, 1 se	ected
d0010jka090b	.cnv Select
Output to Pri Units Millime	nter _ Orientation Landscape _ I Print full pa ers ↓ Width 361 Height 203
, Output director	
S:\PRODUCT	ON\Systems\Winch Systems\UCTD\Data\100511-Agulh Select
Name append	
Output file	d0010jka090b
Not processing	



In order to convert the salinity data to an ASCII file, use the **ASCII Out** command in the **Run** menu:

Program setup f	
Open	Save Save As Restore
Input directory	
S:\PRODUCT	ON\Systems\Winch Systems\UCTD\Data\100511-Agulh
Input files, 1 sel	ected
0113jkjk090a.(cnv Select
Output directory	
S:\PRODUCT	ON\Systems\Winch Systems\UCTD\Data\100511-Agulh Select
Name append	
Output file	0113jkjk090a
Not processing	
Not processing	

Once you have selected the input data file, switch to the **Data Setup** tab:

🚥 ASCII Out	- - x
<u>File</u> <u>Options</u> <u>H</u> elp	
File Setup Data Setup Header View	
✓ Output header file Lines per page 60	
Output data file	
Exclude scans marked bad	
Label columns No column labels 💌	
Column separator Space 💌	
Julian days conversion format Julian days	
Convert elapsed and system time to mm/dd/year hh.mm:ss	
Add first column	
First column name	
First column value	
☐ Replace bad flag	
New bad flag value 9.99e+029	
Select Output Variables	
Start Process Exit	Cancel



Now select the desired quantities from the list of output variables:

Variable Name [unit]	Output	Select All
Scan Count	×	-
Conductivity [S/m]	×	<u>Clear All</u>
Temperature [ITS-90, deg C]	×	
Pressure [db]	×	
Depth [salt water, m]	×	
Descent Rate [m/s]	×	
Salinity, Practical [PSU]	×	
Flag		

