SOCIB Balearic Islands Coastal Observing and Forecasting System

Data Pre-processing

SBE processing software configuration

SOCIB-Data Center Facility

Document type:	Standard Operational Procedure
Date:	2016-06-05

Description:	PSA files configuration for SBEprocessing batch process
Authors:	C. Munoz, K. Reeve
Supervision:	C. Troupin, J. Allen
Involved Personnel:	DCF, RVF, ETD

DOCUMENT VERIFICATION LIST

Date:	Checked by (name)	SOCIB division	Ref.
2016-06-13	C. Troupin	SOS	

DOCUMENT DISTRIBUTION LIST

Date:	Distribution to:
2016-06-13	@datacenter

CHANGE RECORD

ver	Date	Description	Author	Checked by
1.0.0	2016-06-05	First version document	C. Munoz	C. Troupin
1.1.0	2016-06-22	Add new settings in steps	C. Munoz	C. Troupin

Index of contents

1. INTRODUCTION:

The aim of this document is to describe a standardized procedure to configure the batch process of the SBEprocessing software in order to process the CTD profiles data acquired during the RV SOCIB cruises.

This procedure is applicable to the following SOCIB instruments:

- SCB-SBE9001. sn 09P63579-1023
- SCB-SBE9002. sn 09P63579-1031

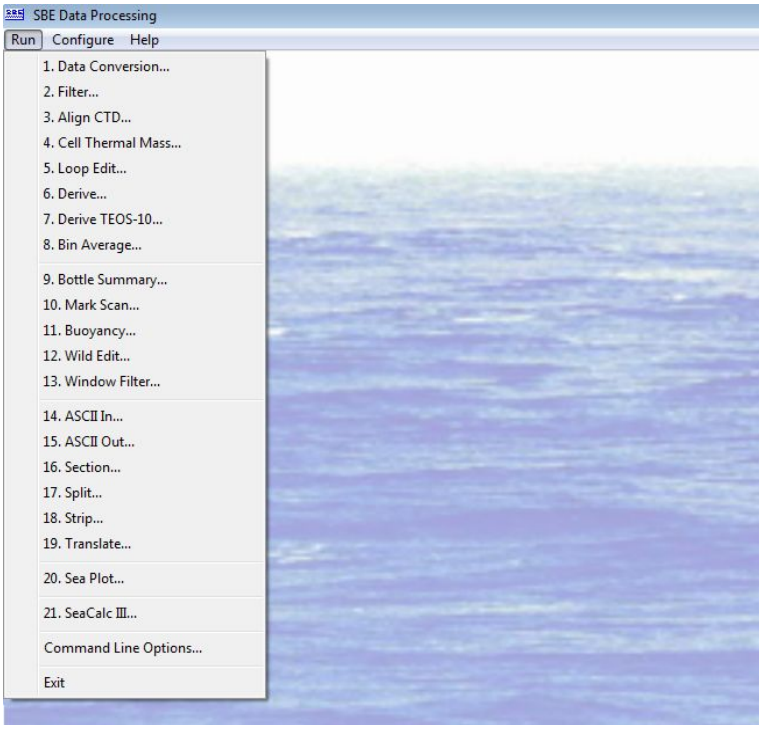
2. REQUIRED FEATURES

- Desktop or laptop.
- Internet connection.
- Vessel home access.
- Windows Operating System.
- SBE Data Processing software.

3. PROCEDURE DEVELOPMENT

The following sections show the proper configuration of the psa files executed in the batch process.

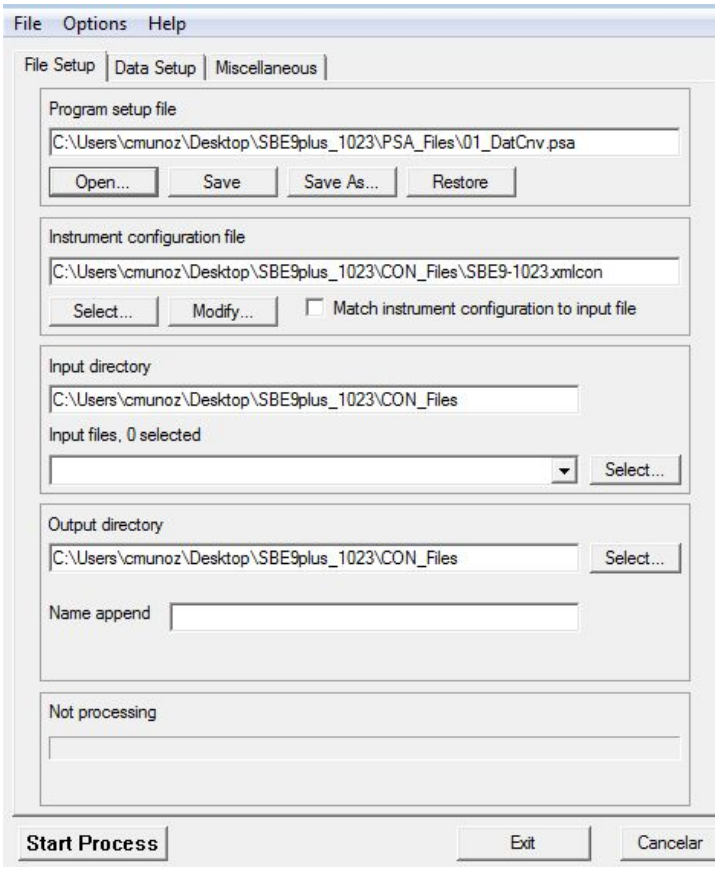
- Open SBEprocessing software and configure the psa files from the following sections through the RUN menu.



3.1. 01_DatCnv

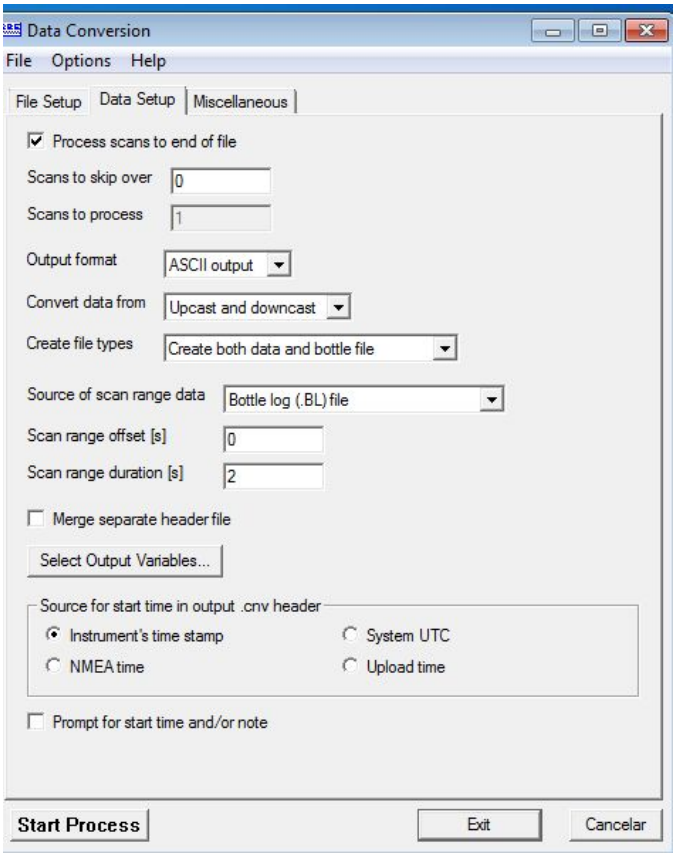
FILE SETUP

- **Program Setup File:** Save as 01_DatCnv.psa. Must be contained in PSA_Files directory.
- **Instrument Configuration File:** Copy the cruise xmlcon file in CON_Files directory and rename it as SBE9-1023 or SBE9-1031 depending on which process you are.
- **Input Directory:** Set it in Step00_hex_files directory.
- **Output Directory:** Set it in Step01_cnv_files directory.



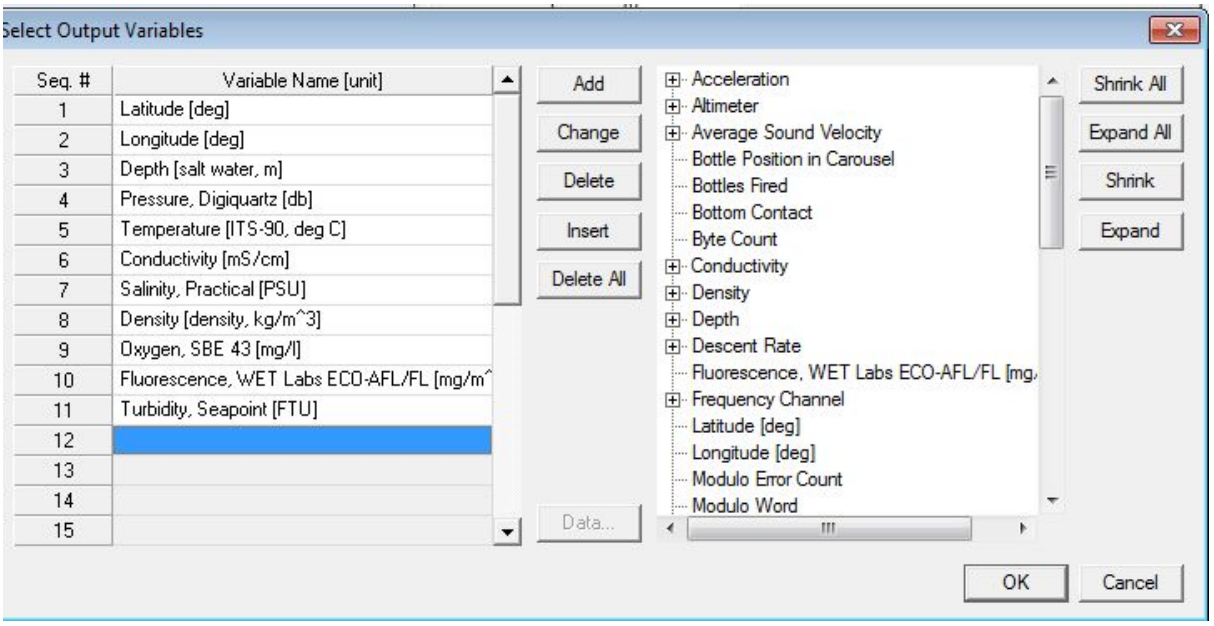
DATA SETUP

- **Process scans to end file:** TRUE
- **Scans to skip over:** 0
- **Scans to process:** 1
- **Output format:** ASCII output
- **Convert data from:** Upcast and Downcast
- **Create file types:** Create both data and bottle file
- **Source of scan range data:** Bottle log (.BL) file
- **Scan range offset:** 0
- **Scan range duration:** 2
- **Merge separate header file:** FALSE
- **Source for start time in output .cnv header:** Instrument's time stamp
- **Prompt for start time and/or note:** FALSE



OUTPUT VARIABLES SCB-SBE9001 SBE9_1023_201303

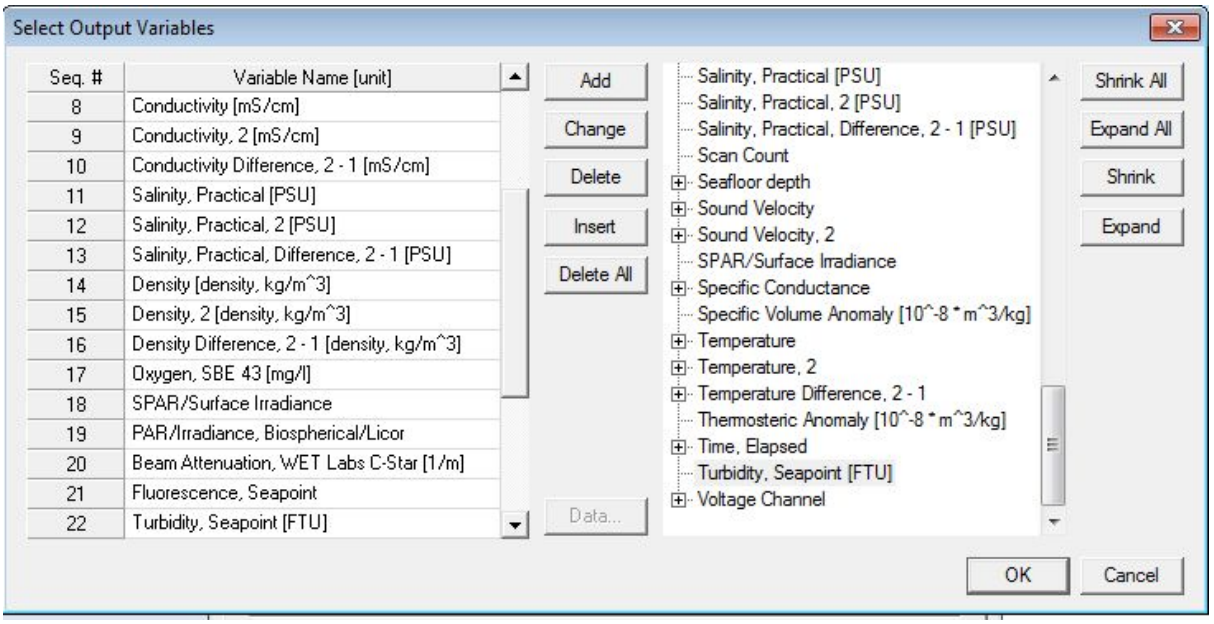
- Add the following variables with the following order and variables:
    - Latitude (deg)
    - Longitude (deg)
    - Depth (salt water, m)
    - Pressure, Digiquartz (db)
    - Temperature (ITS-90, deg C)
    - Conductivity (mS/cm)
    - Salinity, Practical (PSU)
    - Density (density, kg/m³)
    - Oxygen, SBE43 (mg/L)
    - Fluorescence, WET Labs ECO-AF/FL(mg/m3)
    - Turbidity, Seapoint (FTU)



OUTPUT VARIABLES SCB-SBE9001 SBE9_1023_201306

- Add the following variables with the following order and variables:
    - Latitude (deg)
    - Longitude (deg)
    - Depth (salt water, m)
    - Pressure, Digiquartz (db)
    - Temperature (ITS-90, deg C)
    - Temperature, 2 (ITS-90, deg C)
    - Temperature Difference, 2 - 1 (ITS-90, deg C)
    - Conductivity (mS/cm)
    - Conductivity, 2 (mS/cm)
    - Conductivity Difference, 2 - 1 (mS/cm)
    - Salinity, Practical (PSU)
    - Salinity, Practical, 2 (PSU)
    - Salinity, Practical, Difference, 2 - 1 (PSU)
    - Density (density, kg/m³)
    - Density, 2 (density, kg/m³)
    - Density Difference, 2 - 1 (density, kg/m³)
    - Oxygen, SBE43 (mg/L)
    - SPAR/Surface Irradiance
    - PAR/Irradiance, Biospherical/Licor
    - Beam Attenuation, WET Labs C-Star (1/m)
    - Fluorescence, Seapoint

- Turbidity, Seapoint (FTU)

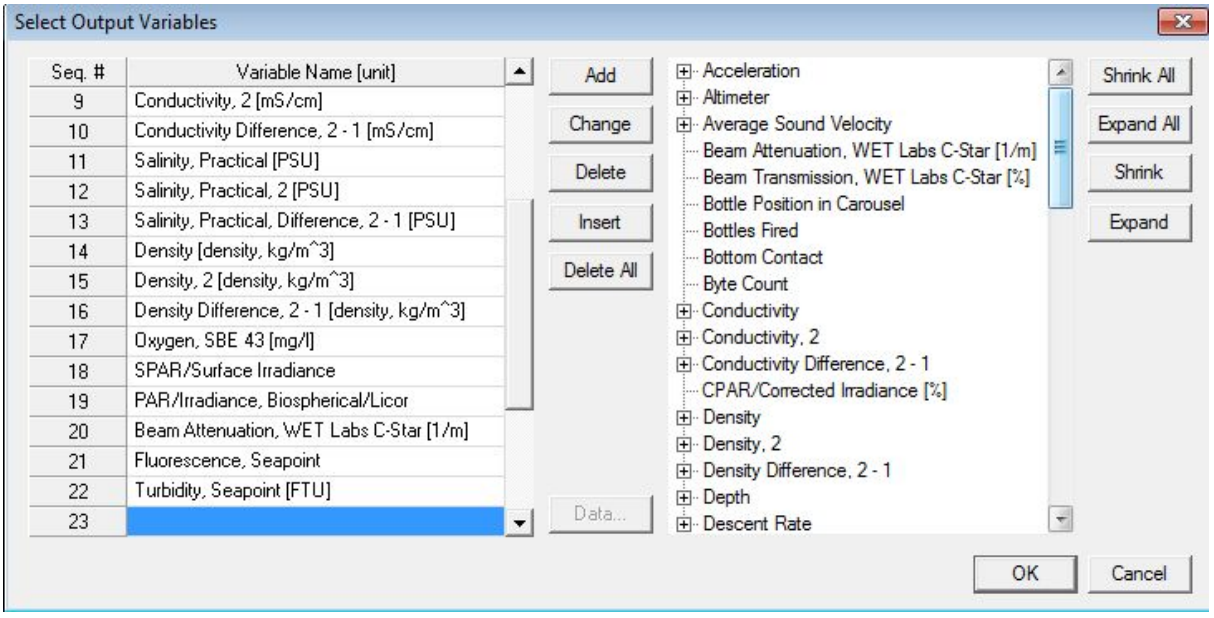


OUTPUT VARIABLES SCB-SBE9002 SBE9_1031_201402

- Add the following variables with the following order and variables:

  - Latitude (deg)
  - Longitude (deg)
  - Depth (salt water, m)
  - Pressure, Digiquartz (db)
  - Temperature (ITS-90, deg C)
  - Temperature, 2 (ITS-90, deg C)
  - Temperature Difference, 2 - 1 (ITS-90, deg C)
  - Conductivity (mS/cm)
  - Conductivity, 2 (mS/cm)
  - Conductivity Difference, 2 - 1 (mS/cm)
  - Salinity, Practical (PSU)
  - Salinity, Practical, 2 (PSU)
  - Salinity, Practical, Difference, 2 - 1 (PSU)
  - Density (density, kg/m³)
  - Density, 2 (density, kg/m³)
  - Density Difference, 2 - 1 (density, kg/m³)
  - Oxygen, SBE43 (mg/L)

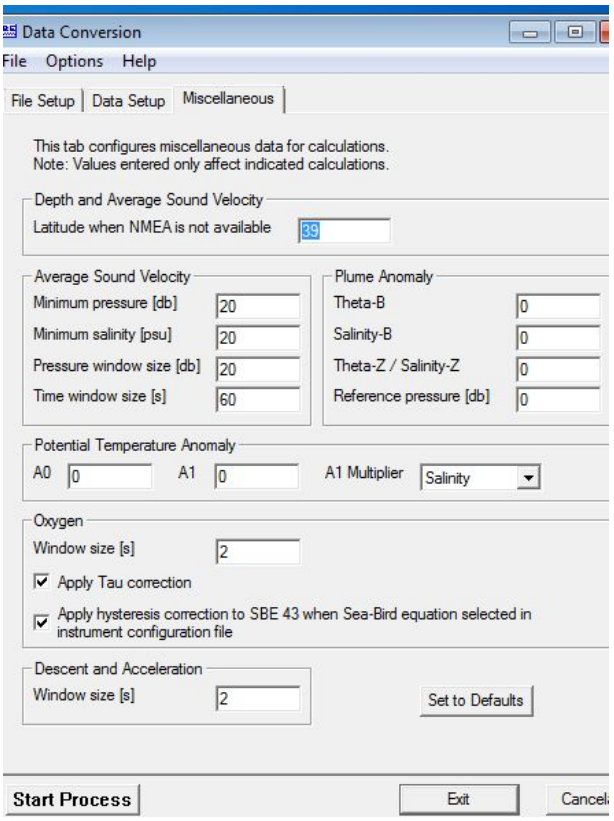
- SPAR/Surface Irradiance
- PAR/Irradiance, Biospherical/Licor
- Beam Attenuation, WET Labs C-Star (1/m)
- Fluorescence, Seapoint
- Turbidity, Seapoint (FTU)



MISCELLANEOUS

- **Latitude when NMEA is not available:** 39
- **Minimum pressure (db):** 20
- **Minimum salinity (psu):** 20
- **Pressure window size (db):** 20
- **Time window size (s):** 60
- **Theta-B:** 0
- **Salinity-B:** 0
- **Theta-Z/Salinity-Z:** 0
- **Reference pressure (db):** 0
- **A0:** 0
- **A1:** 0
- **A1 multiplier:** Salinity
- **Oxygen window size (s):** 2
- **Apply Tau correction:** TRUE
- **Apply hysteresis correction to SBE43:** TRUE

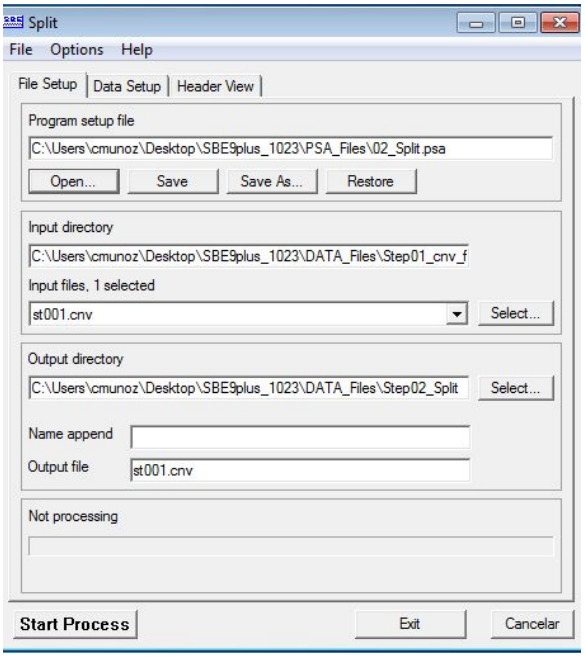
- **Descent and acceleration window size (s):** 2



3.2. 02_Split

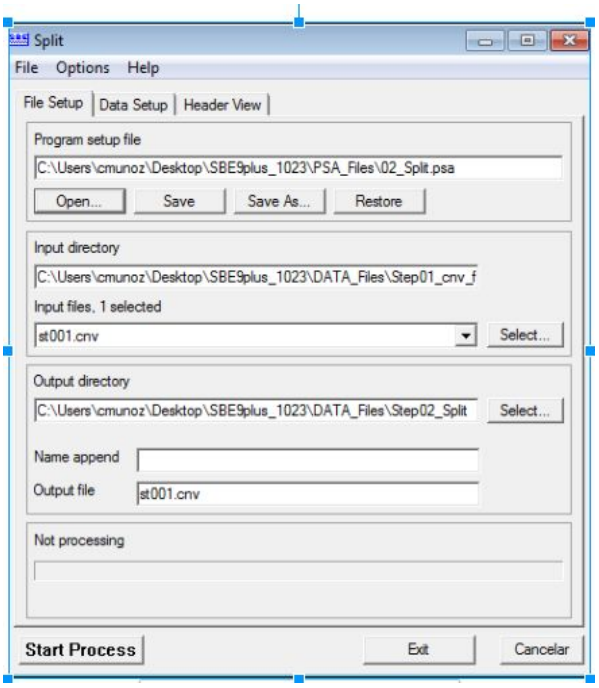
FILE SETUP

- **Program Setup File:** Save as 02_Split.psa. Must be contained in PSA_Files directory.
- **Input Directory:** Set it in Step01_cnv_files directory.
- **Output Directory:** Set it in Step02_Split directory.



DATA SETUP

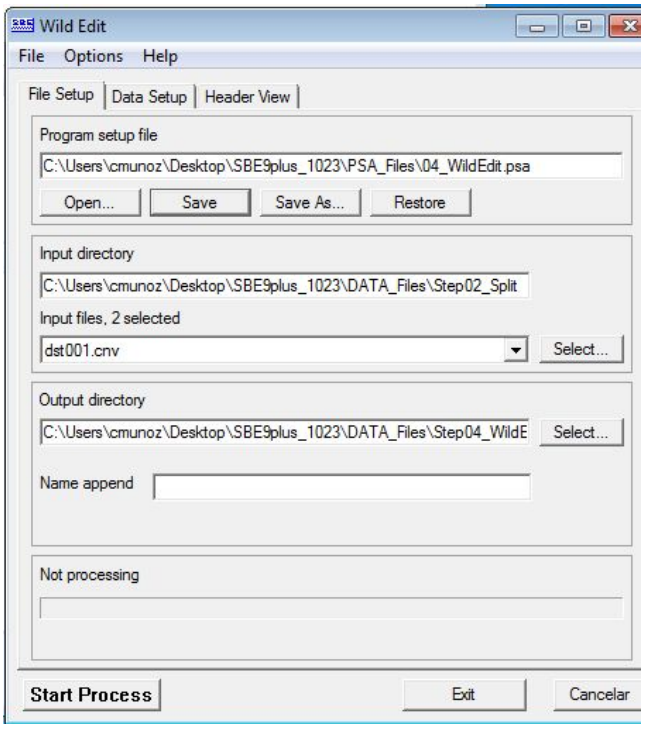
- **Output files:** Upcast and downcast
- **Exclude scans marked bad:** TRUE



3.3. 04_WildEdit

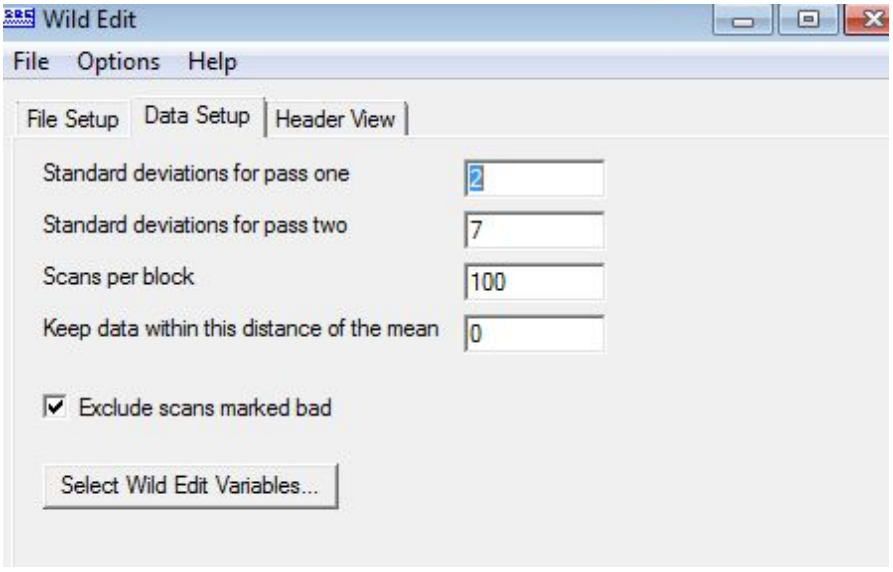
FILE SETUP

- **Program Setup File:** Save as 04_WildEdit.psa. Must be contained in PSA_Files directory.
- **Input Directory:** Set it in Step02_Split directory.
- **Output Directory:** Set it in Step04_WildEdit directory.



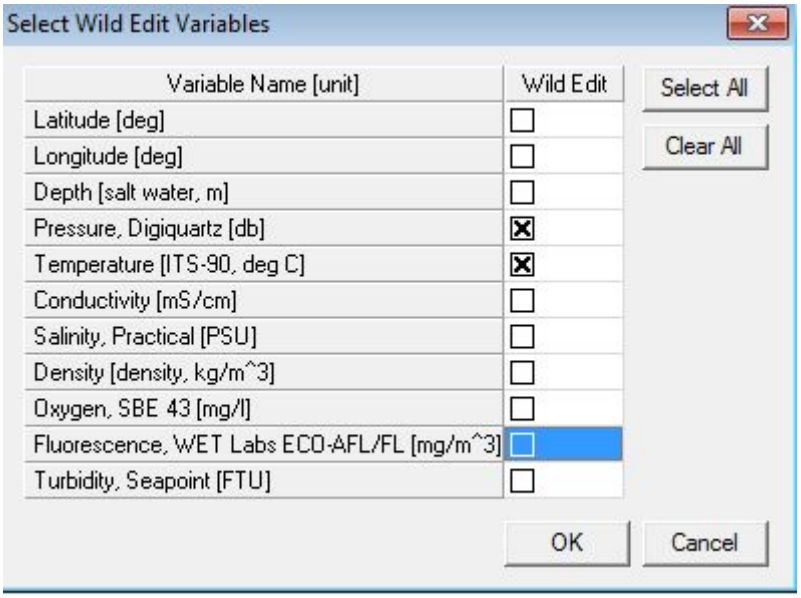
DATA SETUP

- **Standard deviations for pass 1:** 2
- **Standard deviations for pass 2:** 7
- **Scans per block:** 100
- **Keep data within this distance of the mean:** 0
- **Exclude scans marked bad:** TRUE



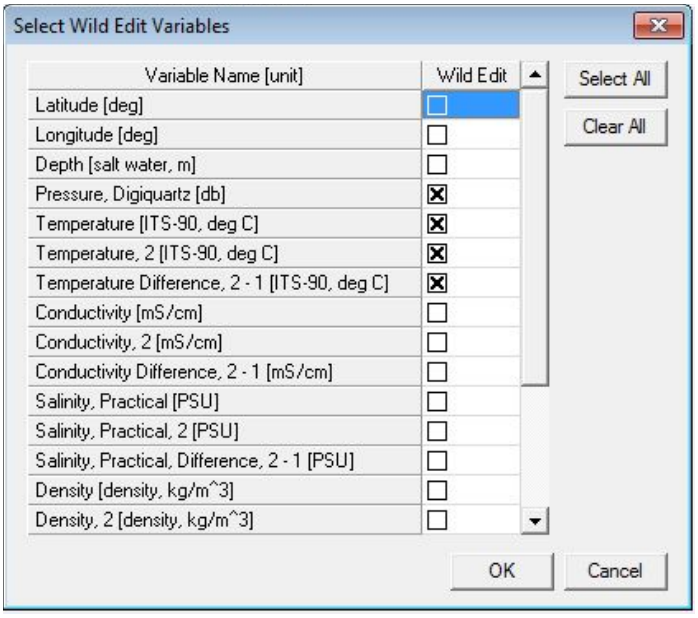
SELECT WILD EDIT VARIABLES SCB-SBE9001 SBE9_1023_201303

- Add the following wild edit variables with the following order:
    - Pressure, Digiquartz (db)
    - Temperature (ITS-90, deg C)



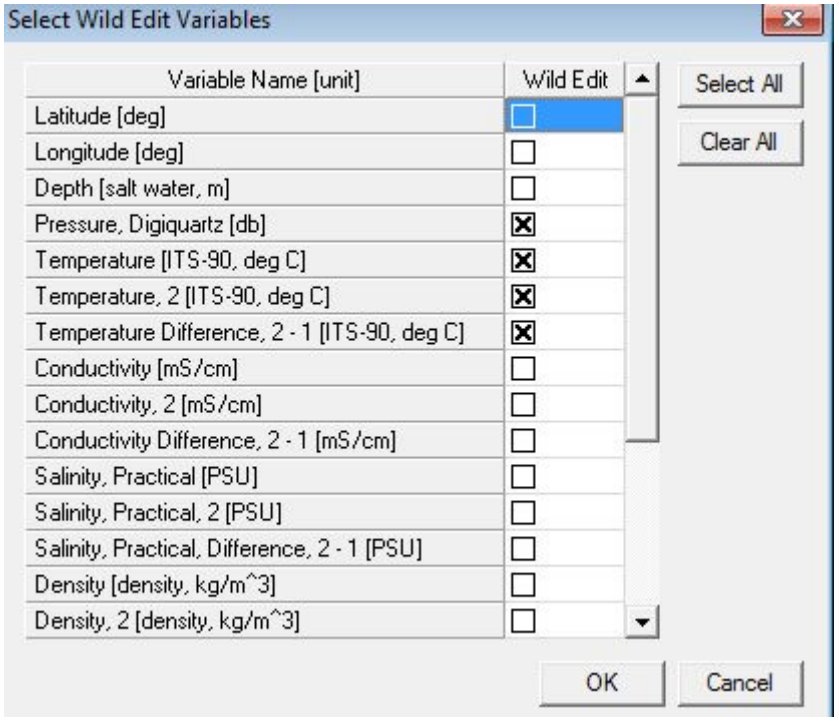
SELECT WILD EDIT VARIABLES SCB-SBE9001 SBE9_1023_201306

- Add the following wild edit variables with the following order:
    - Pressure, Digiquartz (db)
    - Temperature (ITS-90, deg C)
    - Temperature, 2 (ITS-90, deg C)
    - Temperature Difference, 2 - 1 (ITS-90, deg C)



SELECT WILD EDIT VARIABLES SCB-SBE9002

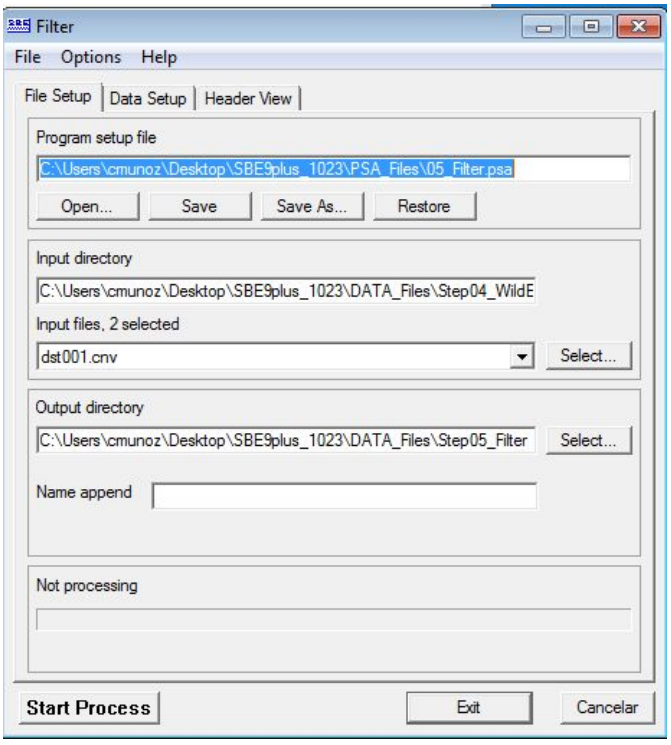
- Add the following wild edit variables with the following order:
    - Pressure, Digiquartz (db)
    - Temperature (ITS-90, deg C)
    - Temperature, 2 (ITS-90, deg C)
    - Temperature Difference, 2 - 1 (ITS-90, deg C)



3.4. 05_Filter

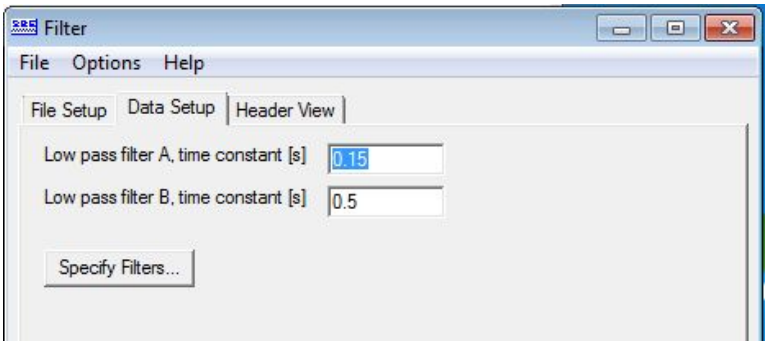
FILE SETUP

- **Program Setup File:** Save as 05_Filter.psa. Must be contained in PSA_Files directory.
- **Input Directory:** Set it in Step04_WildEdit directory.
- **Output Directory:** Set it in Step05_Filter directory.



DATA SETUP

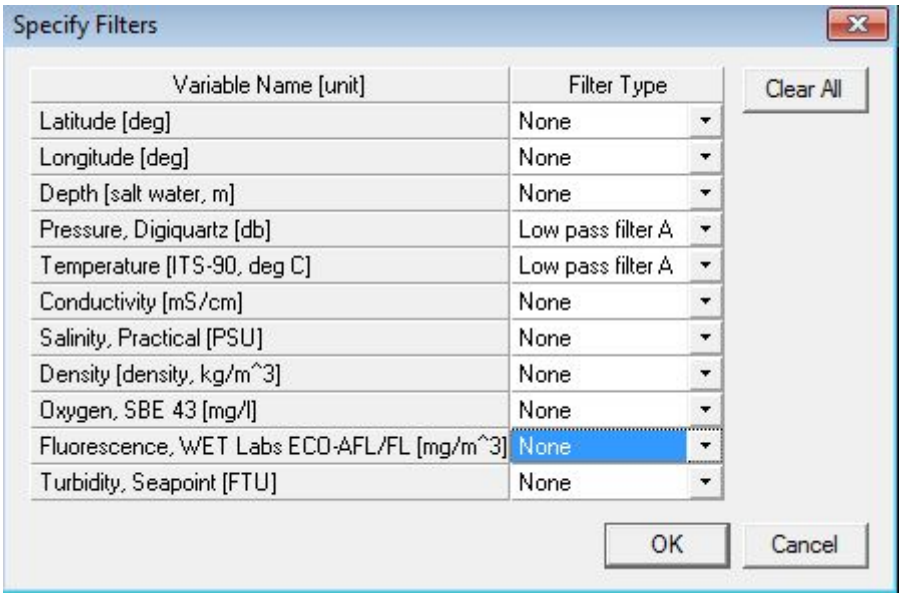
- **Low pass filter A, time constant (s):** 0.15
- **Low pass filter B, time constant (s):** 0.5



SPECIFY FILTERS SCB-SBE9001 SBE_1023_201303

- set the following filter variables with the following types:

  - **Latitude (deg):** None
  - **Longitude (deg):** None
  - **Depth (salt water, m):** None
  - **Pressure, Digiquartz (db):** Low pass filter A
  - **Temperature (ITS-90, deg C):** Low pass filter A
  - **Conductivity (mS/cm):** None
  - **Salinity, Practical (PSU):** None
  - **Density (density, kg/m3):** None
  - **Oxygen, SBE43 (mg/L):** None
  - **Fluorescence, WET Labs ECO-AF/FL(mg/m3):** None
  - **Turbidity, Seapoint (FTU):** None

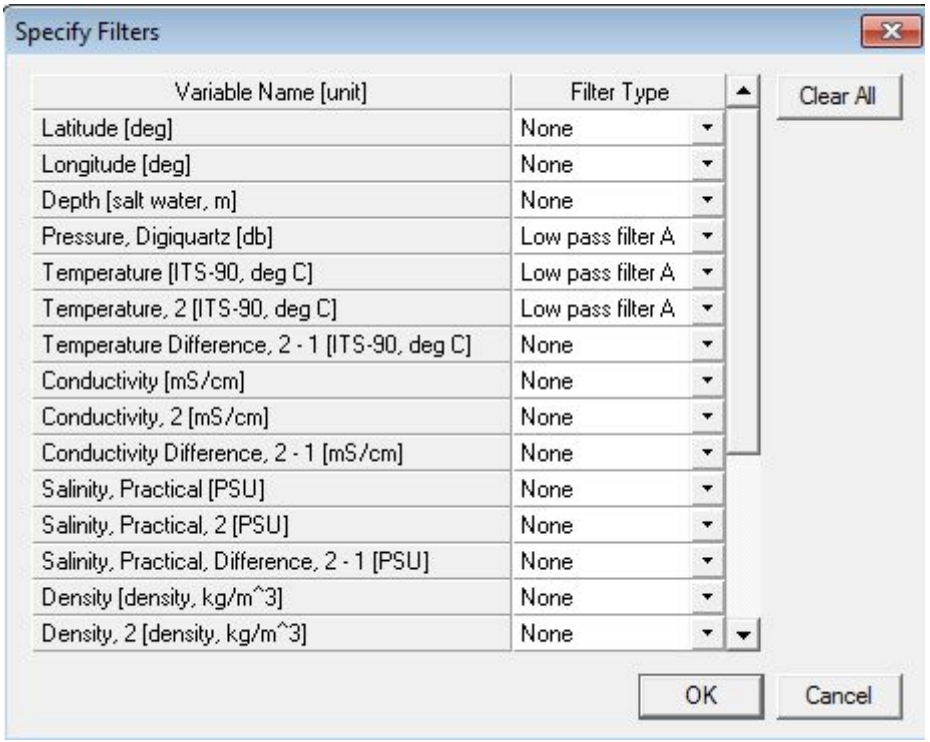


SPECIFY FILTERS SCB-SBE9001 SBE_1023_201306

- Set the following filter variables with the following types:

  - **Latitude (deg):** None
  - **Longitude (deg):** None
  - **Depth (salt water, m):** None
  - **Pressure, Digiquartz (db):** Low pass filter A
  - **Temperature (ITS-90, deg C):** Low pass filter A

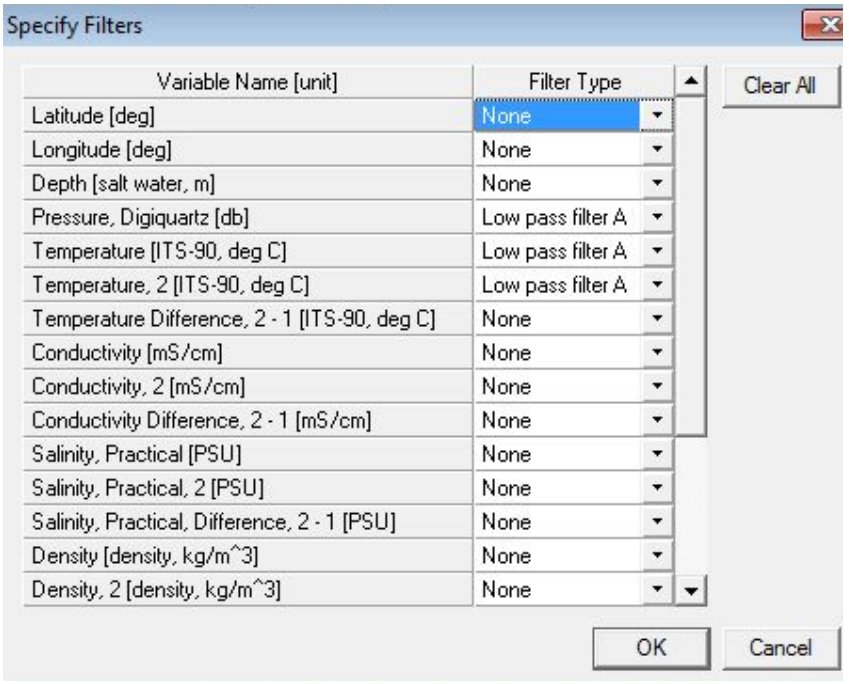
- **Temperature, 2 (ITS-90, deg C):** Low pass filter A
- **Temperature Difference, 2 - 1(ITS-90, deg C):** None
- **Conductivity (mS/cm):** None
- **Conductivity, 2 (mS/cm):** None
- **Conductivity Difference, 2 - 1 (mS/cm):** None
- **Salinity, Practical (PSU):** None
- **Salinity, Practical, 2 (PSU):** None
- **Salinity, Practical, Difference, 2 - 1 (PSU):** None
- **Density (density, kg/m^3):** None
- **Density, 2 (density, kg/m^3):** None
- **Density, Difference, 2 - 1 (density, kg/m^3):** None
- **Oxygen, SBE43 (mg/L):** None
- **PAR/Irradiance, Biospherical/Licor:** None
- **Beam Attenuation, WET Labs C-Star (1/m)** None
- **Fluorescence, Seapoint:** None
- **Turbidity, Seapoint (FTU):** None



SPECIFY FILTERS SCB-SBE9002

- Set the following filter variables with the following types:

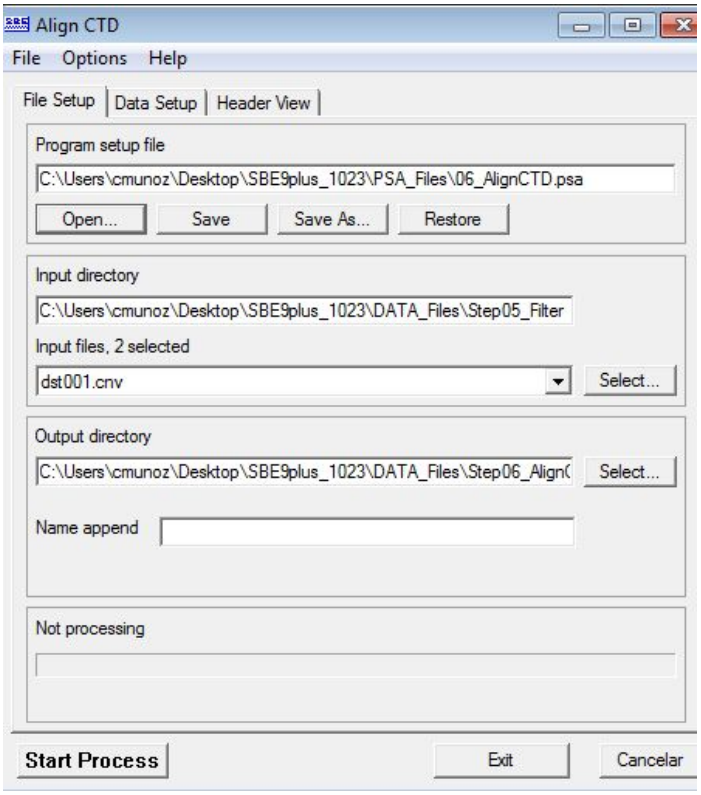
  - **Latitude (deg):** None
  - **Longitude (deg):** None
  - **Depth (salt water, m):** None
  - **Pressure, Digiquartz (db):** Low pass filter A
  - **Temperature (ITS-90, deg C):** Low pass filter A
  - **Temperature, 2 (ITS-90, deg C):** Low pass filter A
  - **Temperature Difference, 2 - 1(ITS-90, deg C):** None
  - **Conductivity (mS/cm):** None
  - **Conductivity, 2 (mS/cm):** None
  - **Conductivity Difference, 2 - 1 (mS/cm):** None
  - **Salinity, Practical (PSU):** None
  - **Salinity, Practical, 2 (PSU):** None
  - **Salinity, Practical, Difference, 2 - 1 (PSU):** None
  - **Density (density, kg/m^3):** None
  - **Density, 2 (density, kg/m^3):** None
  - **Density, Difference, 2 - 1 (density, kg/m^3):** None
  - **Oxygen, SBE43 (mg/L):** None
  - **SPAR/Surface Irradiance:** None
  - **PAR/Irradiance, Biospherical/Licor:** None
  - **Fluorescence, Seapoint:** None
  - **Turbidity, Seapoint (FTU):** None



3.5. 06_AlignCTD

FILE SETUP

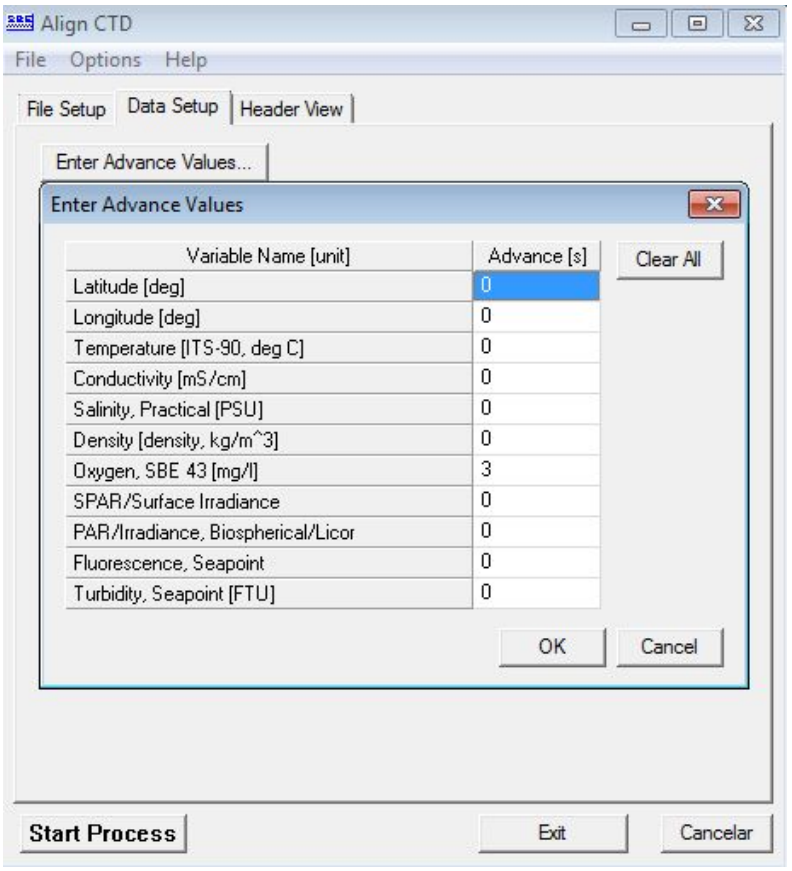
- **Program Setup File:** Save as 06_AlignCTD.psa. Must be contained in PSA_Files directory.
- **Input Directory:** Set it in Step05_Filter directory.
- **Output Directory:** Set it in Step06_AlignCTD directory.



DATA SETUP

- Set the following advanced values:

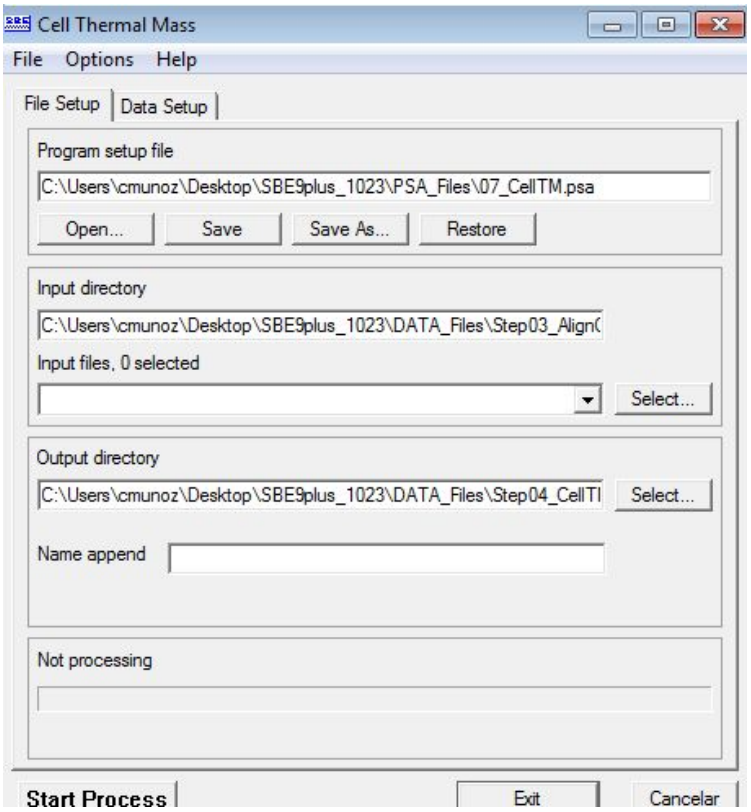
  - **Latitude (deg):** 0
  - **Longitude (deg):** 0
  - **Depth (salt water, m):** 0
  - **Pressure, Digiquartz (db):** 0
  - **Temperature (ITS-90, deg C):** 0
  - **Conductivity (mS/cm):** 0
  - **Salinity, Practical (PSU):** 0
  - **Density (density, kg/m3):** 0
  - **Oxygen, SBE43 (mg/L):** 3
  - **SPAR/Surface Irradiance:** 0
  - **PAR/Irradiance, Biospherical/Licor:** 0
  - **Fluorescence, Seapoint:** 0
  - **Turbidity, Seapoint (FTU):** 0



3.6. 07_CellTM

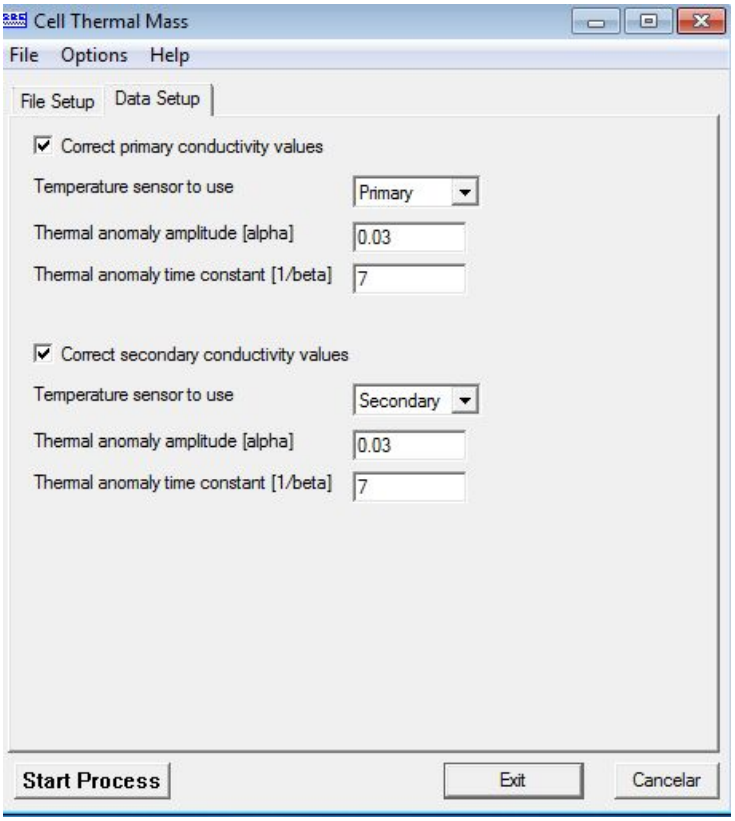
FILE SETUP

- **Program Setup File:** Save as 07_CellTM.psa. Must be contained in PSA_Files directory.
- **Input Directory:** Set it in Step06_AlignCTDdirectory.
- **Output Directory:** Set it in Step07_CelTM directory.



DATA SETUP

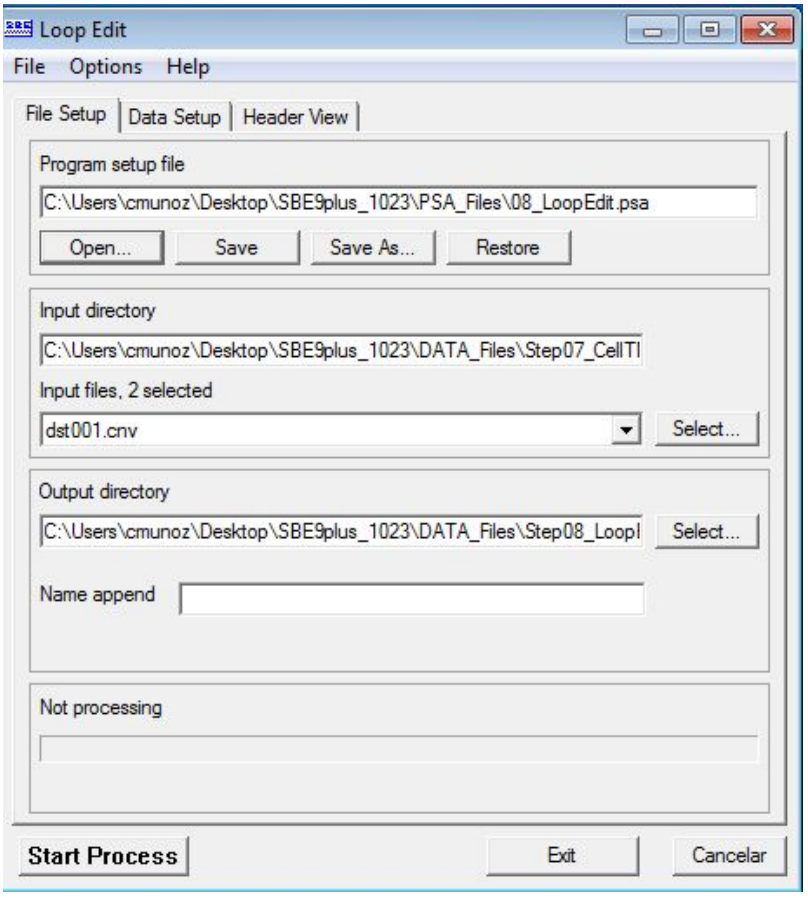
- **Correct primary conductivity values:** TRUE
- **Temperature sensor to use:** primary
- **Thermal anomaly amplitude (alpha):** 0.03
- **Thermal anomaly time constant (1/beta):** 7
- **Correct secondary conductivity values:** TRUE
- **Temperature sensor to use:** secondary
- **Thermal anomaly time constant (1/beta):** 7
- **Correct secondary conductivity values:** TRUE



3.7. 08_LoopEdit

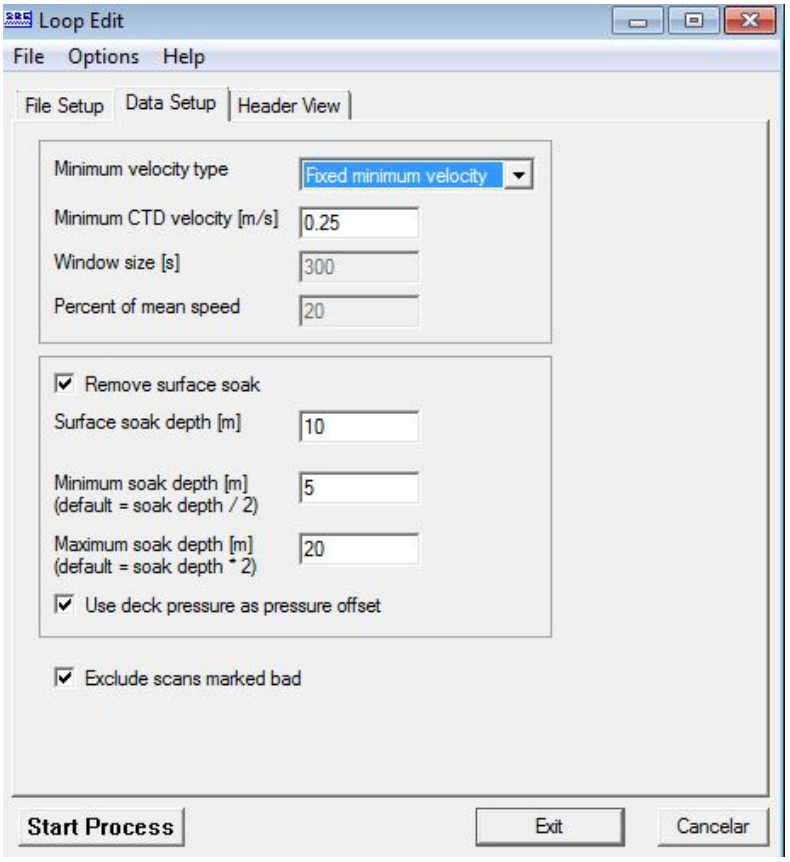
LOOP EDIT FILE SETUP

- **Program Setup File:** Save as 08_LoopEdit.psa. Must be contained in PSA_Files directory.
- **Input Directory:** Set it in Step07_CellTMdirectory.
- **Output Directory:** Set it in Step08_LoopEdit directory.



LOOP EDIT DATA SETUP

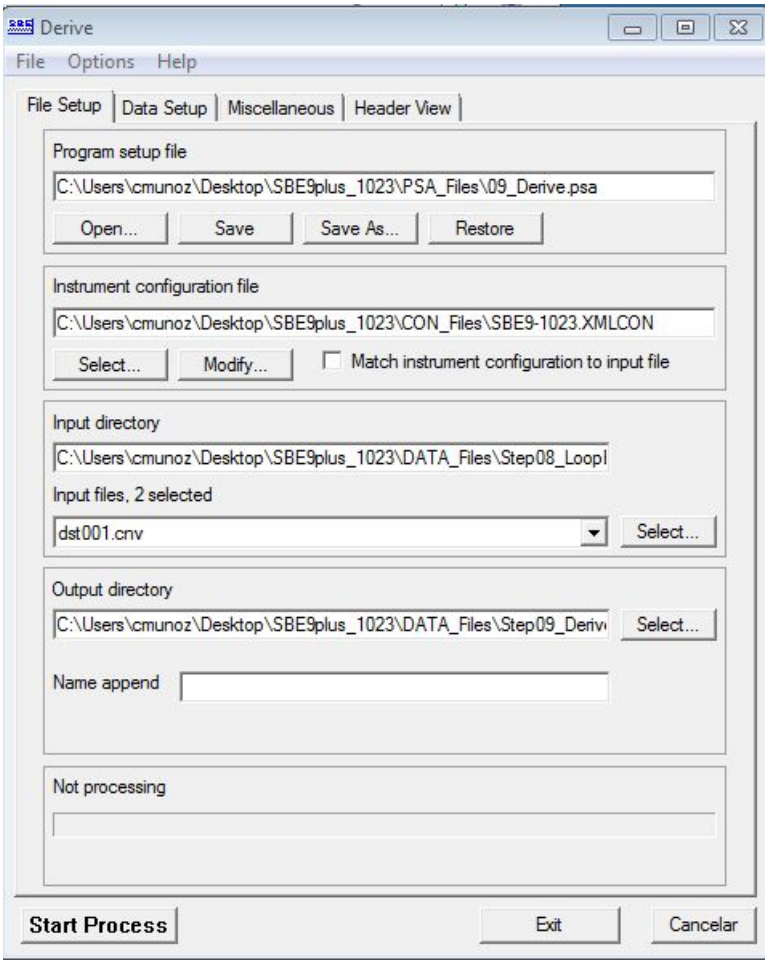
- **Minimum velocity type:** Fixed minimum velocity
- **Minimum CTD velocity (m/s):** 0.25
- **Window size (s):** 300
- **Percent of mean speed:** 20
- **Remove surface soak:** TRUE
- **Surface soak depth (m):** 10
- **Minimum soak depth (m):** 5
- **Maximum soak depth (m):** 20
- **Use deck pressure as pressure offset:** TRUE
- **Exclude scans marked bad:** TRUE



3.8. 09_Derive

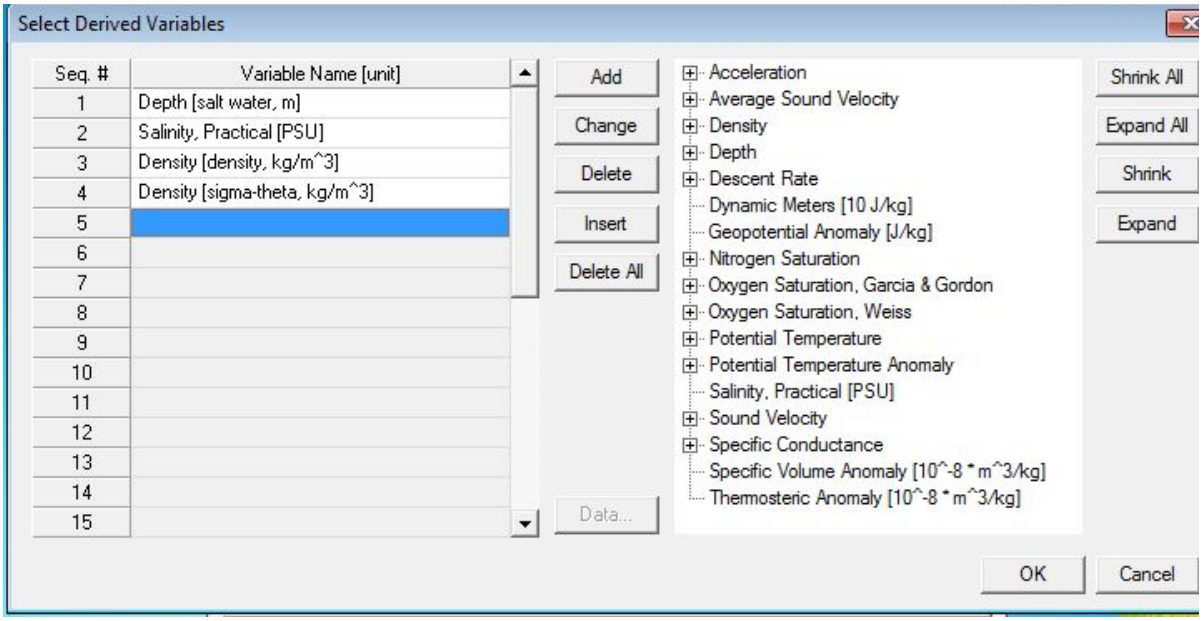
DERIVE FILE SETUP

- **Program Setup File:** Save as 09_Derive.psa. Must be contained in PSA_Files directory.
- **Instrument Configuration File:** SBE9-1023 or SBE9-1031 depending on which process you are. Must be in CON_Files.
- **Input Directory:** Set it in Step08_LoopEdit directory.
- **Output Directory:** Set it in Step09_Derive directory.



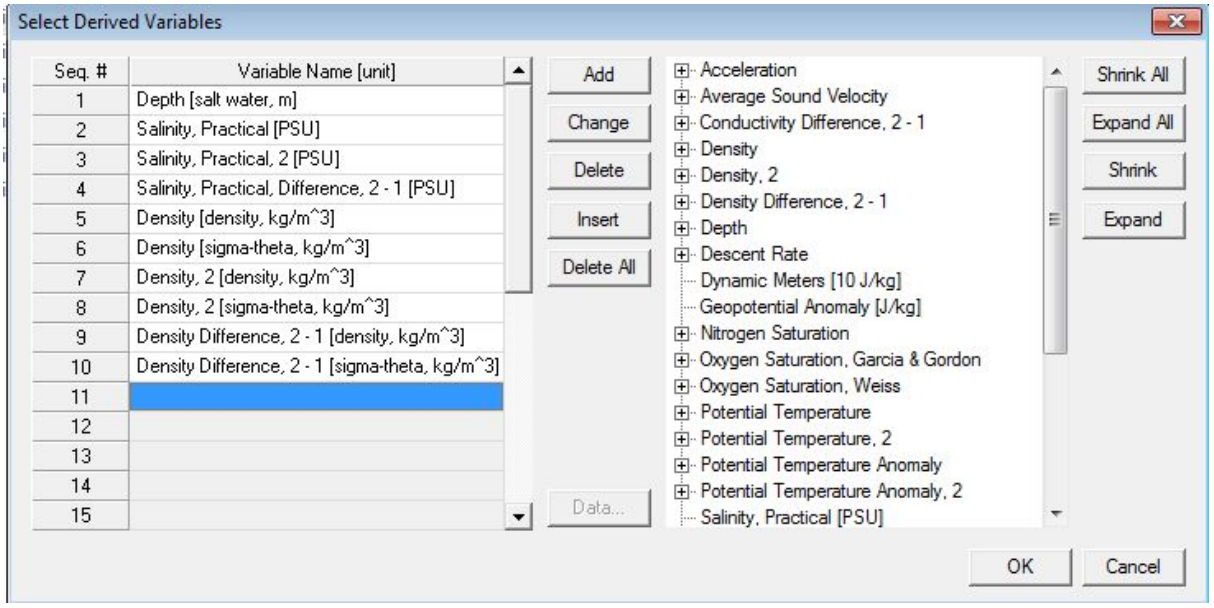
DERIVE DATA SETUP SCB-SBE9001 SBE9_1023_201303

- Set the following derived variables with the order described:
    - Depth (salt water, m)
    - Salinity, Practical (PSU)
    - Density (density, kg/m³)
    - Density (sigma-theta, kg/m³)



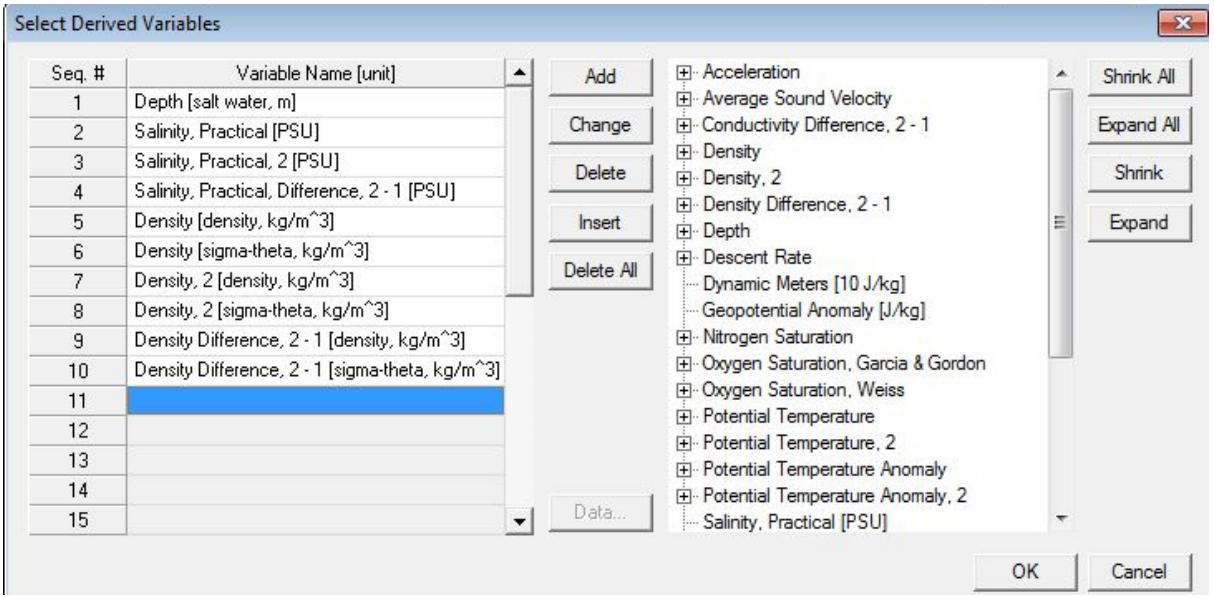
DERIVE DATA SETUP SCB-SBE9001 SBE9_1023_201306

- Set the following derived variables with the order described:
    - Depth (salt water, m)
    - Salinity, Practical (PSU)
    - Salinity, Practical, 2 (PSU)
    - Salinity, Practical, Difference, 2 - 1(PSU)
    - Density (density, kg/m³)
    - Density (sigma-theta, kg/m³)
    - Density, 2 (density, kg/m³)
    - Density, 2 (sigma-theta, kg/m³)
    - Density, Difference, 2 - 1 (density, kg/m³)
    - Density, Difference, 2 - 1 (sigma-theta, kg/m³)



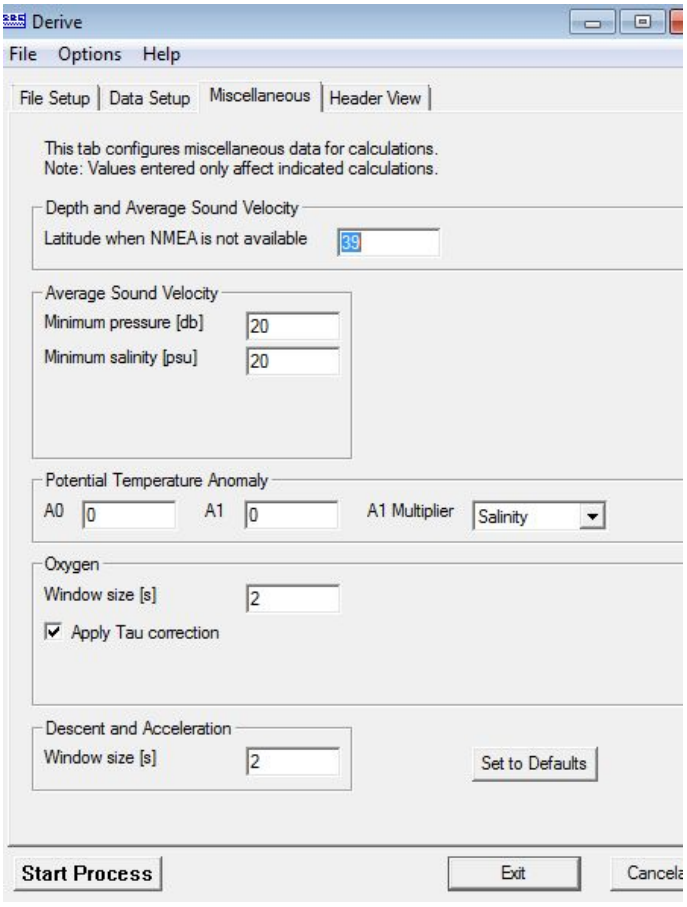
DERIVE DATA SETUP SCB-SBE9002 SBE9_1031_201402

- Set the following derived variables with the order described:
    - Depth (salt water, m)
    - Salinity, Practical (PSU)
    - Salinity, Practical, 2 (PSU)
    - Salinity, Practical, Difference, 2 - 1(PSU)
    - Density (density, kg/m³)
    - Density (sigma-theta, kg/m³)
    - Density, 2 (density, kg/m³)
    - Density, 2 (sigma-theta, kg/m³)
    - Density, Difference, 2 - 1 (density, kg/m³)
    - Density, Difference, 2 - 1 (sigma-theta, kg/m³)



DERIVE MISCELLANEOUS

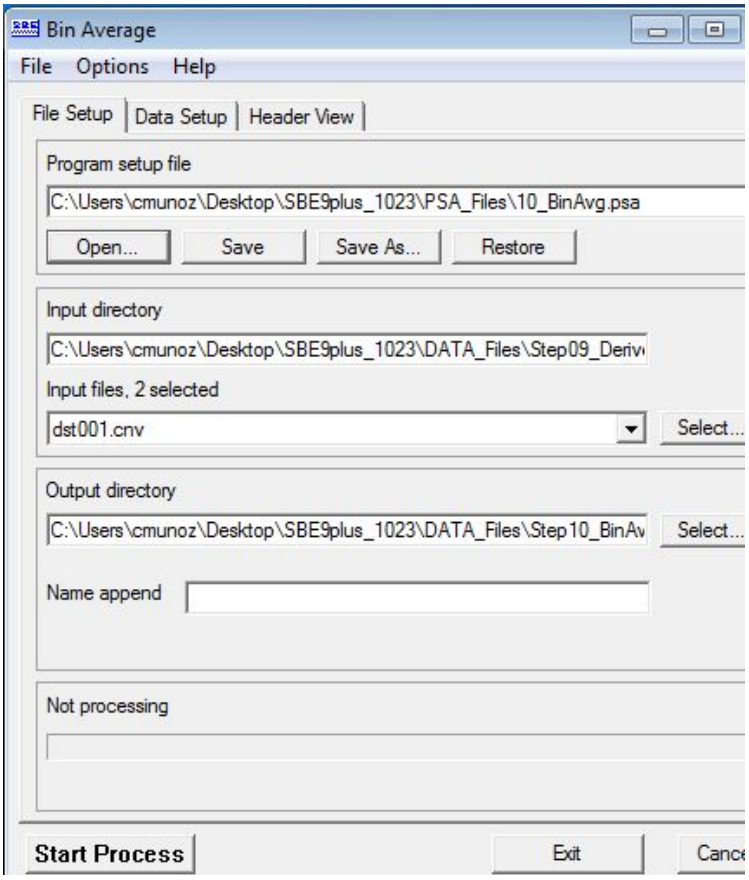
- **Latitude when NMEA is not available:** 39
- **Minimum pressure (db):** 20
- **Minimum salinity (psu):** 20
- **A0:** 0
- **A1:** 0
- **A1 multiplier:** Salinity
- **Oxygen window size (s):** 2
- **Apply Tau correction:** TRUE
- **Descent and acceleration window size (s):** 2



3.9. 10_BinAvg

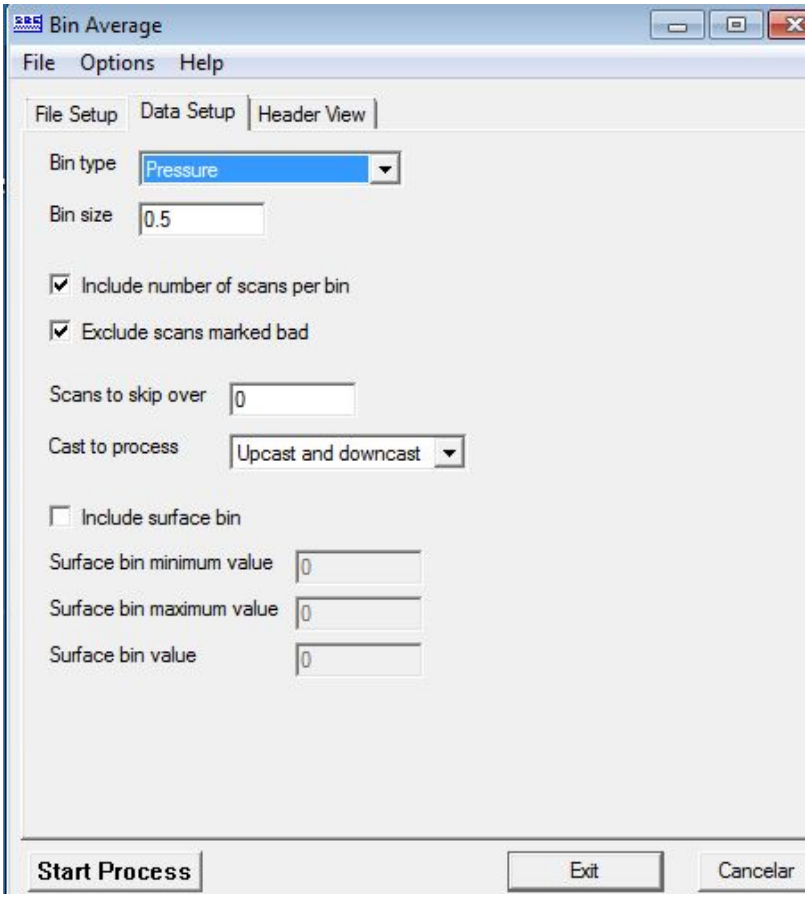
FILE SETUP

- **Program Setup File:** Save as 10_BinAvg.psa. Must be contained in PSA_Files directory.
- **Input Directory:** Set it in Step09_Derive directory.
- **Output Directory:** Set it in Step10_BinAvg directory.



DATA SETUP

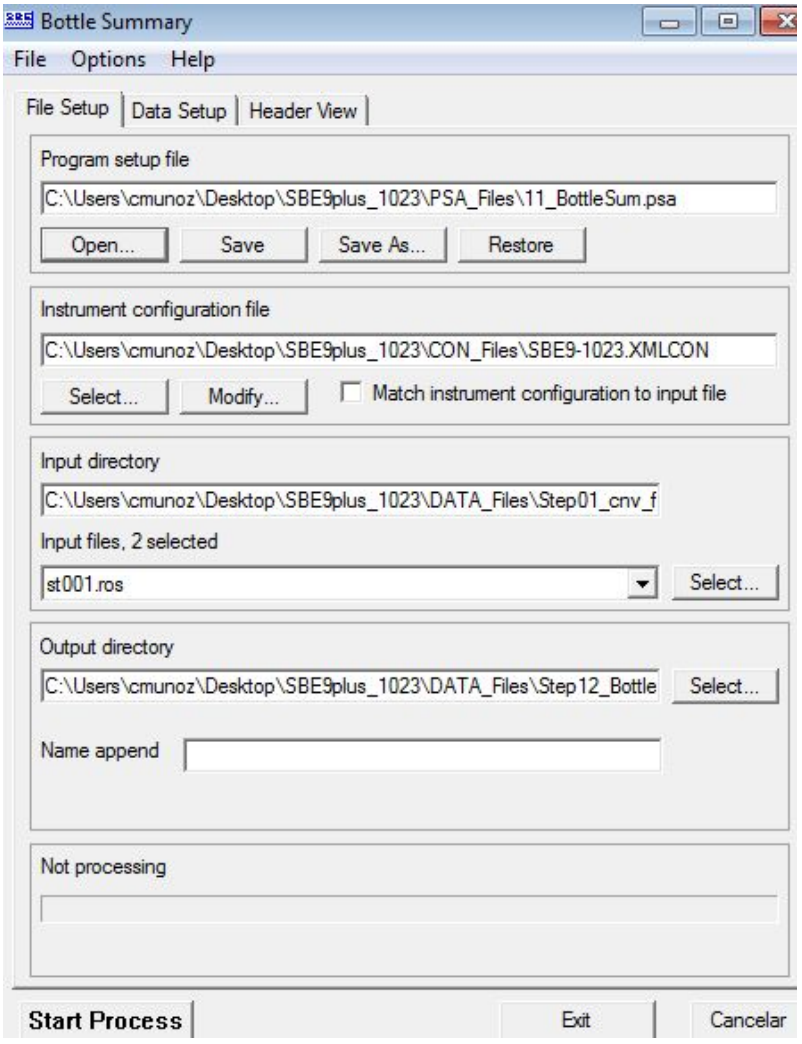
- **Bin type:** pressure
- **Bin size:** 0.5
- **Include number of scans per bin:** TRUE
- **Exclude scans marked bad:** TRUE
- **Scans to skip over:** 0
- **Cast to process:** upcast and downcast
- **Include surface bin:** FALSE
- **Surface bin minimum value:** 0
- **Surface bin maximum value:** 0
- **Surface bin value:** 0



3.10. 11_BottleSum

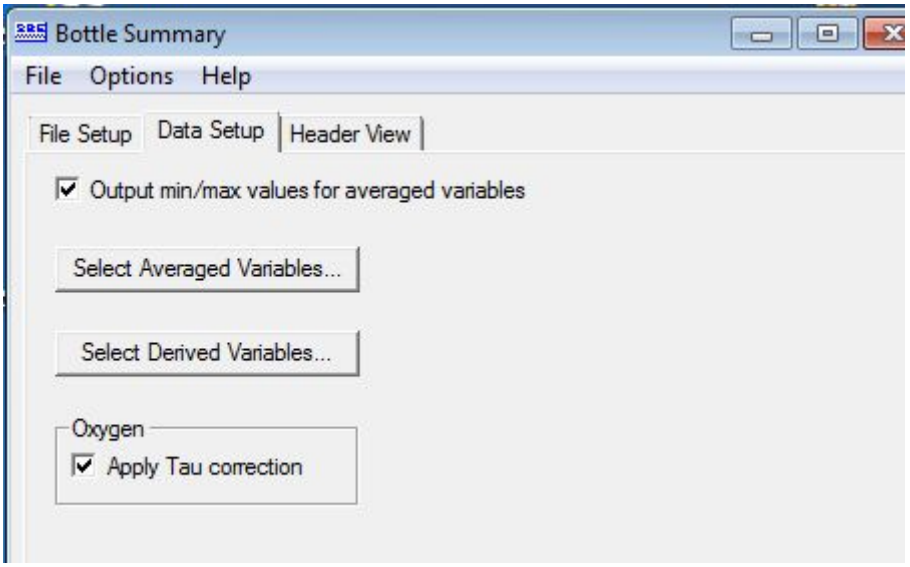
FILE SETUP

- **Program Setup File:** Save as 11_BottleSum.psa. Must be contained in PSA_Files directory.
- **Instrument Configuration File:** SBE9-1023 or SBE9-1031 depending on which process you are. Must be in CON_Files.
- **Input Directory:** Set it in Step01_cnv_files directory.
- **Output Directory:** Set it in Step12_Bottle directory.



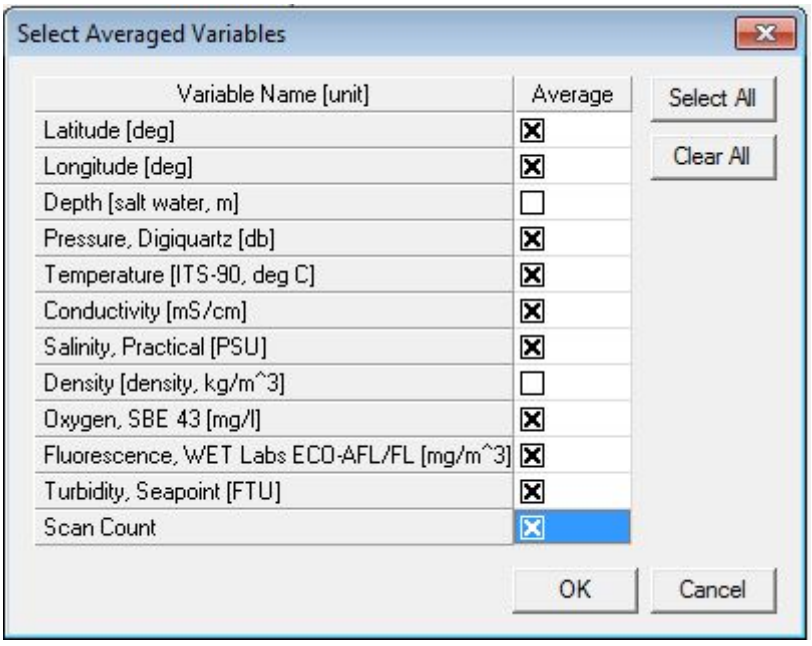
DATA SETUP

- **Output min/max values for averaged variables:** TRUE
- **Apply oxygen tau correction:** TRUE



SPECIFY AVERAGED VARIABLES FOR SCB-SBE9001 SBE_1023_201303

- Select the following averaged variables:

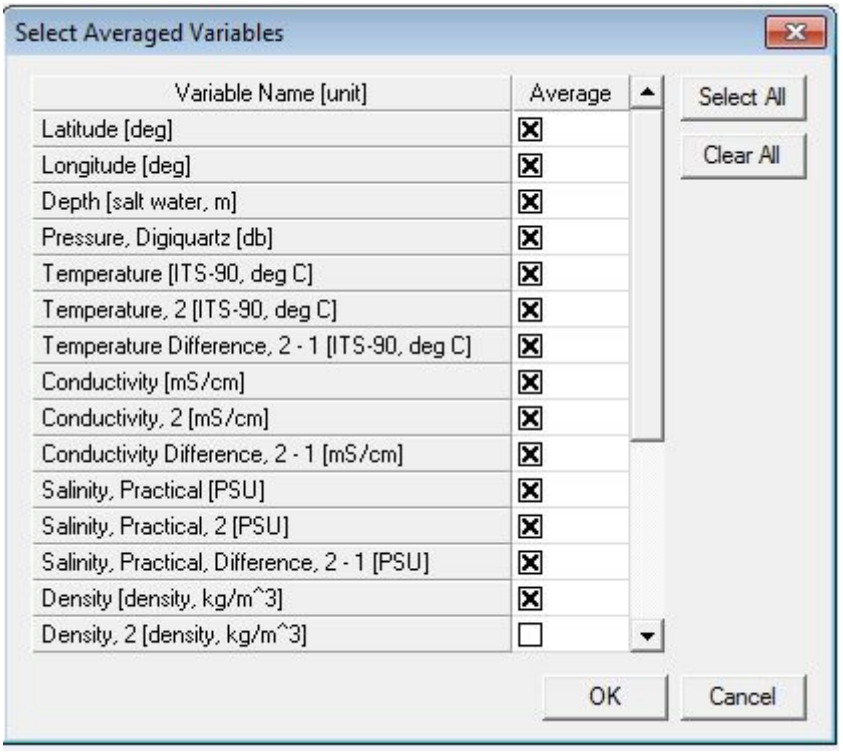


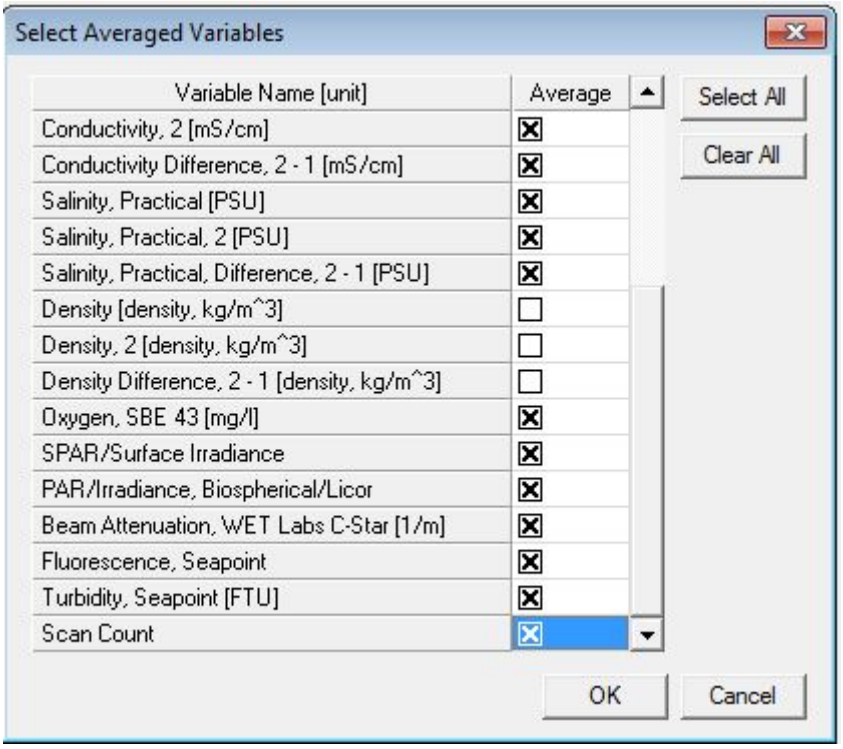
  - Latitude (deg)
  - Longitude (deg)
  - Pressure, Digiquartz (db)
  - Temperature (ITS-90, deg C)
  - Conductivity (mS/cm)

- Salinity, Practical (PSU)
- Oxygen, SBE 43 (mg/l)
- Fluorescence, Seapoint
- Turbidity, Seapoint (FTU)
- Scan Count

SPECIFY AVERAGED VARIABLES FOR SCB-SBE9001 SBE_1023_201306

- Select the following averaged variables:

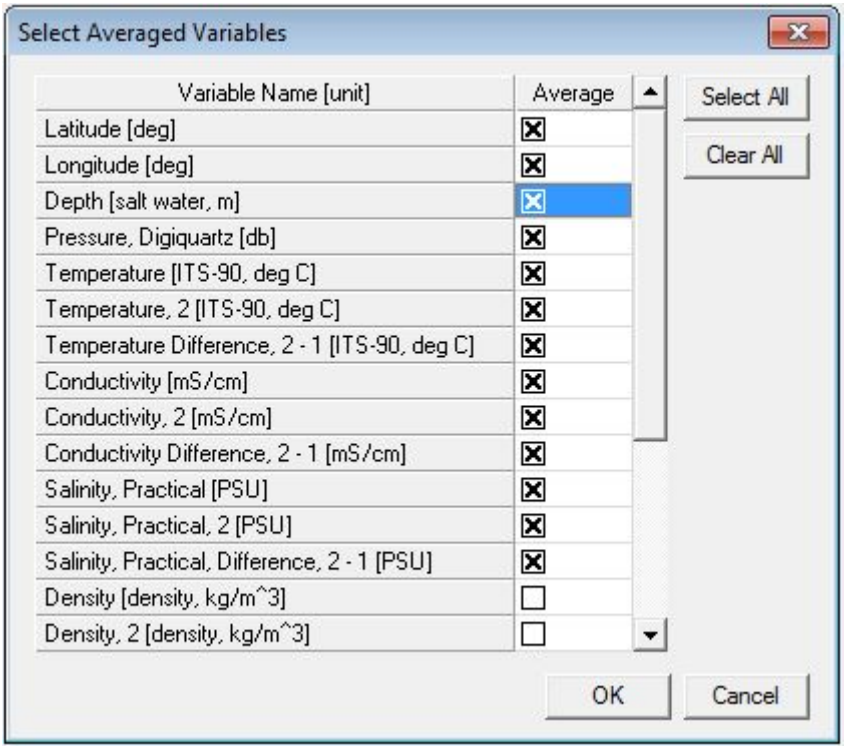


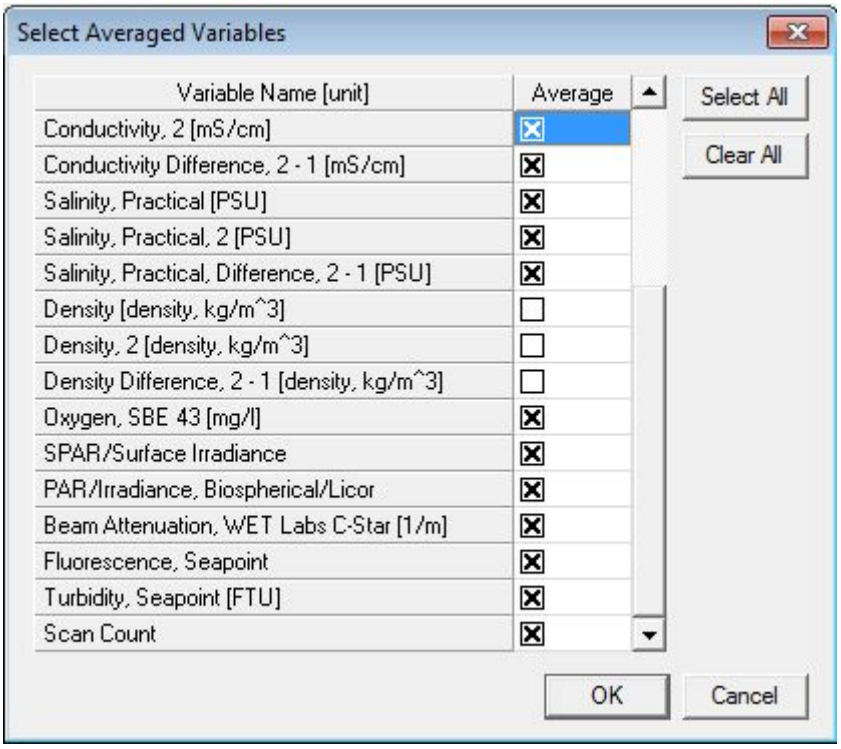


- Latitude (deg)
- Longitude (deg)
- Depth, Salt water (m)
- Pressure, Digiquartz (db)
- Temperature (ITS-90, deg C)
- Temperature, 2 (ITS-90, deg C)
- Temperature Difference, 2 - 1 (ITS-90, deg C)
- Conductivity (mS/cm)
- Conductivity, 2 (mS/cm)
- Conductivity Difference, 2 - 1 (mS/cm)
- Salinity, Practical (PSU)
- Salinity, Practical, 2 (PSU)
- Salinity, Practical, Difference, 2 - 1 (PSU)
- Oxygen, SBE 43 (mg/l)
- SPAR/Surface Irradiance
- PAR/Irradiance, Biospherical/Licor
- Beam Attenuation, WET Labs C-Star (1/m)
- Fluorescence, Seapoint
- Turbidity, Seapoint (FTU)
- Scan Count

SPECIFY AVERAGED VARIABLES FOR SCB-SBE9002 SBE_1031

- Select the following averaged variables:

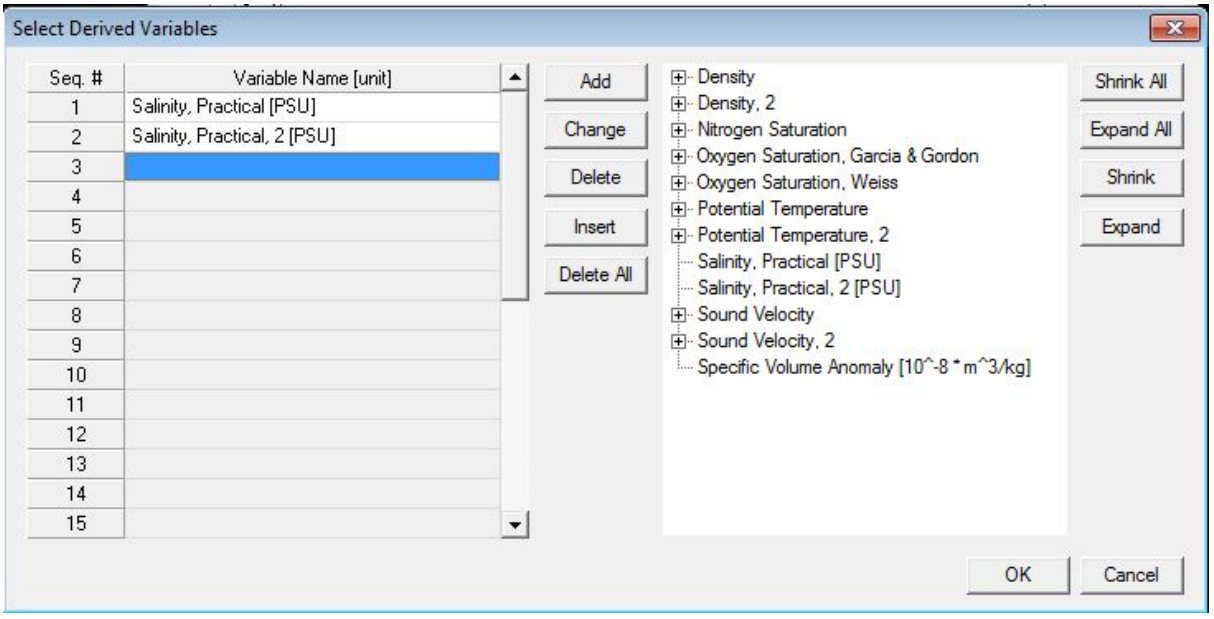




- Latitude (deg)
- Longitude (deg)
- Depth, Salt water (m)
- Pressure, Digiquartz (db)
- Temperature (ITS-90, deg C)
- Temperature, 2 (ITS-90, deg C)
- Temperature Difference, 2 - 1 (ITS-90, deg C)
- Conductivity (mS/cm)
- Conductivity, 2 (mS/cm)
- Conductivity Difference, 2 - 1 (mS/cm)
- Salinity, Practical (PSU)
- Salinity, Practical, 2 (PSU)
- Salinity, Practical, Difference, 2 - 1 (PSU)
- Oxygen, SBE 43 (mg/l)
- SPAR/Surface Irradiance
- PAR/Irradiance, Biospherical/Licor
- Beam Attenuation, WET Labs C-Star (1/m)
- Fluorescence, Seapoint
- Turbidity, Seapoint (FTU)
- Scan Count

- Select the following derived variable:

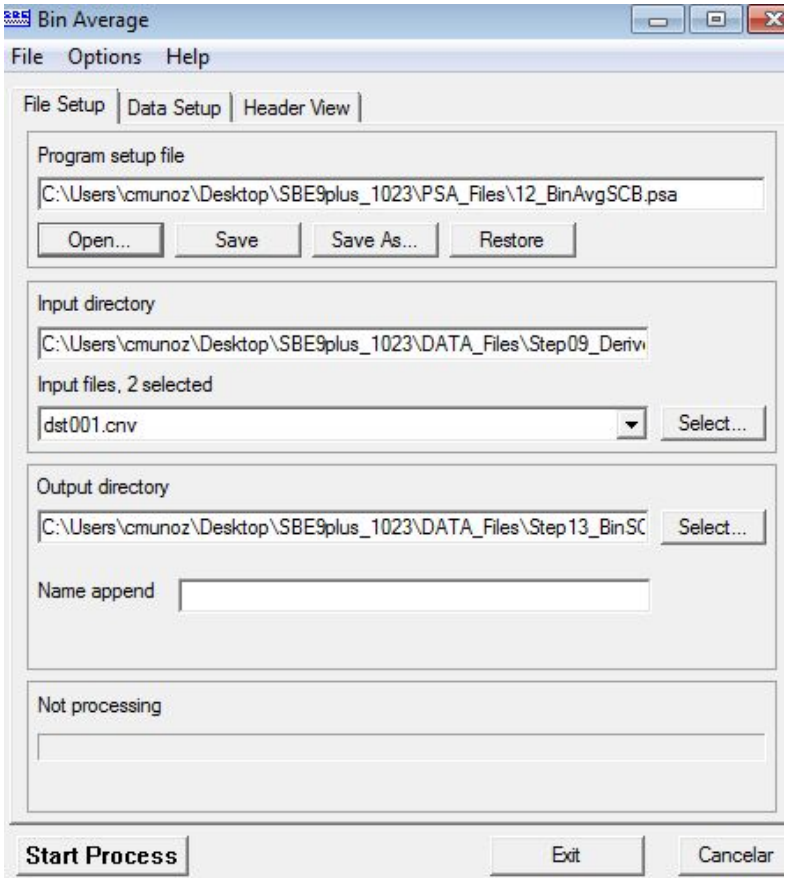
  - Salinity, Practical (PSU)
  - Salinity, Practical, 2 (PSU)



3.11. 12_BinAvgSCB

FILE SETUP

- **Program Setup File:** Save as 12_BinAvgSCB.psa. Must be contained in PSA_Files directory.
- **Input Directory:** Set it in Step09_Derive directory.
- **Output Directory:** Set it in Step13_BinSCB directory.



DATA SETUP

- **Bin type:** pressure
- **Bin size:** 5
- **Include number of scans per bin:** TRUE
- **Exclude scans marked bad:** TRUE
- **Scans to skip over:** 0

- **Cast to process:** upcast and downcast
- **Include surface bin:** FALSE
- **Surface bin minimum value:** 0
- **Surface bin maximum value:** 0
- **Surface bin value:** 0