

Processing U20 series water level data in HOBOWare Pro

U20 water level



HOBOWare Pro

(Need the Barometric Compensation Assistant)

8/24/2017

Steps

- Set up your **default settings** (see 'HOBOWare_DefaultSettings' file); you should only have to do this once
- **Open the water sensor file** in HOBOWare Pro
- **Barometric Compensation Assistant**
 - Check 'Derived from Temp.Channel, assuming fresh water'
 - 'Use Barometric Datafile' – browse/select the matching air sensor file
 - Enter reference level measurement (if available) – only one entry at a time; if no measurement was taken, leave box unchecked
 - Create New Series
- **Change the Temp series name** to 'Water Temp'
- **Open air sensor file – change the Temp series name** to 'Air Temp'; then **copy the temperature data series and paste into the first file**; both air and water temperature data are now in one file*
- **Export as .csv**
- **Save as an Onset Project File**; retain original Onset HOBOWare Data files too!

*We recommend doing this! It is easy and saves you time later on.

File naming scheme





If you're going to use the ContDataQC R package, you need to use the following file naming scheme:

SiteID_SensorType_StartDate_EndDate

- Site ID (no spaces or underscores) = BB01CC
- Data Type (Water/Air/AW) (AW = Air + Water sensor data in same file)
- Date, Start (YYYYMMDD)
- Date, End (YYYYMMDD)
- Each element separated by underscore (“_”).

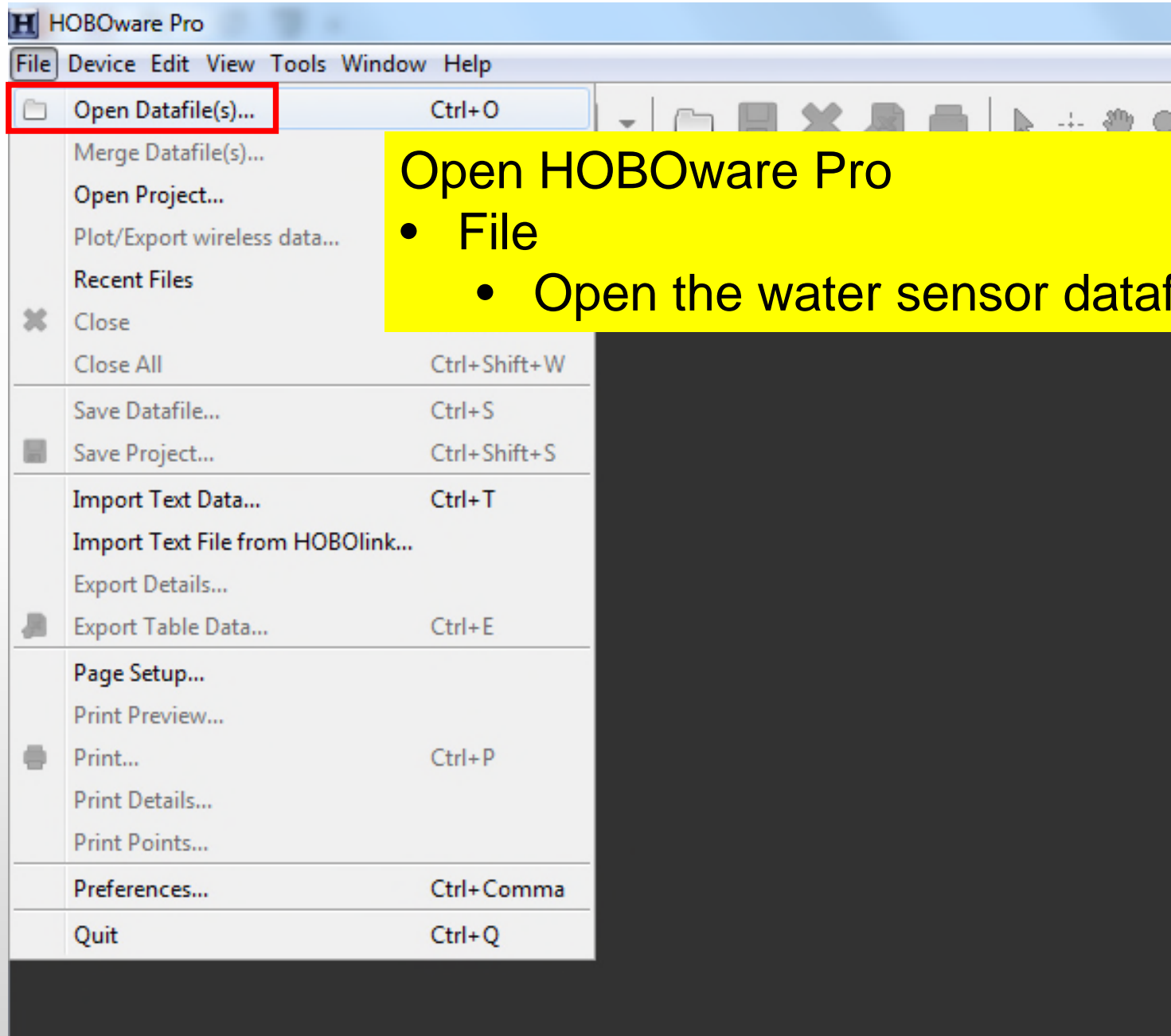
Example:

- **BB01CC_Air_20131022_20140428.csv**

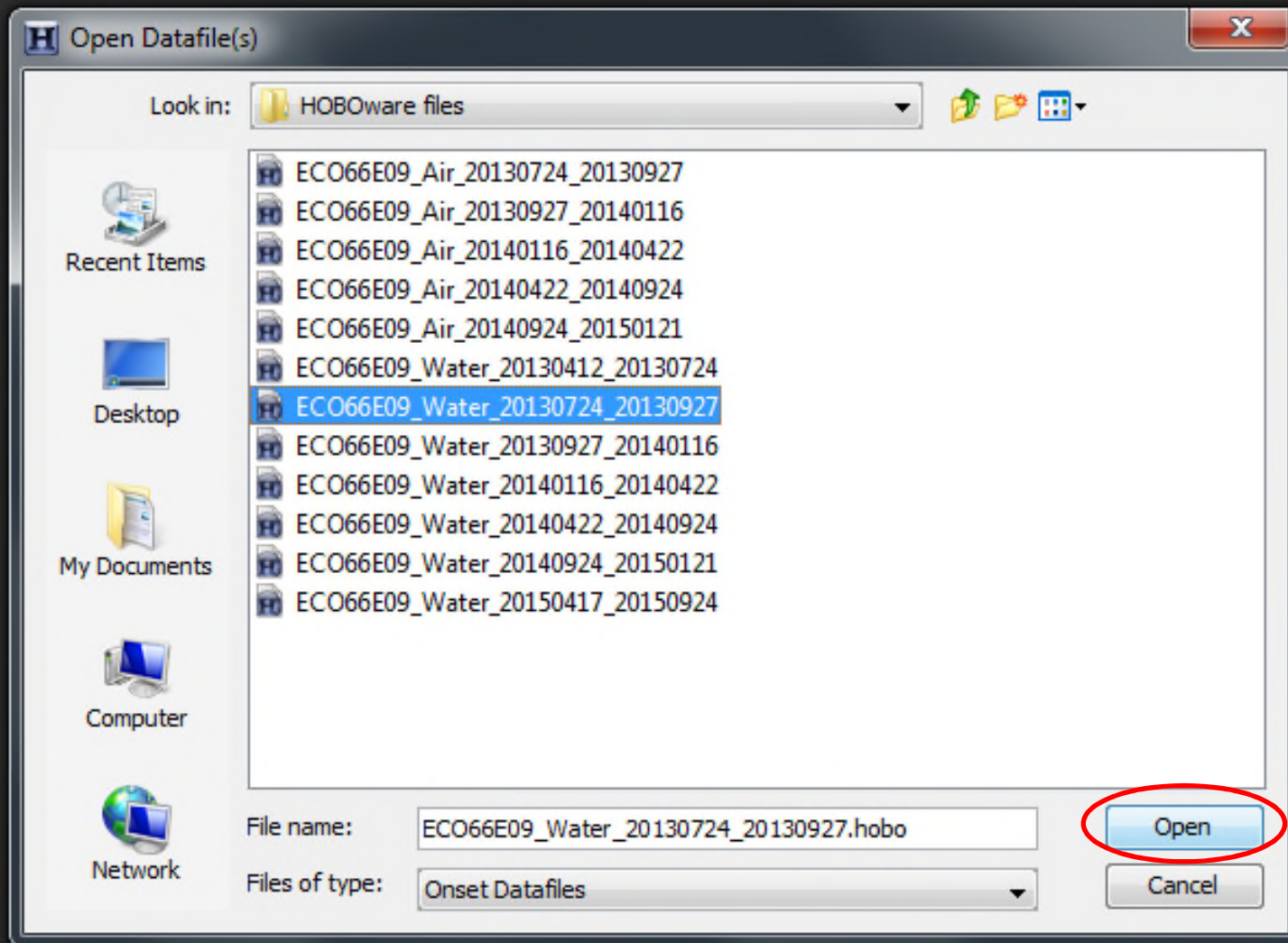
Name	Date modified	Type
 BB01CC_Air_20131022_20140428.csv	2017-08-23 20:07	Microsoft Excel Comma Separated Values File
 BB01CC_Air_20140428_20140924.csv	2017-08-23 20:12	Microsoft Excel Comma Separated Values File
 BB01CC_Water_20131022_20140428.csv	2017-08-23 20:08	Microsoft Excel Comma Separated Values File
 BB01CC_Water_20140428_20140924.csv	2017-08-23 20:15	Microsoft Excel Comma Separated Values File

Other tips

- **StationIDs** – after you come up with a name, stick with it!
- Consider setting up a **folder for each long-term monitoring site**.
- Within each site folder, consider setting up the folder structure described in the '**DataManagementTips**' PowerPoint



**1. Open the
HOBO Datafile
for the **water**
sensor**



Browse/select the appropriate water sensor file

Click 'Open'

Open the water sensor file in HOBOWare Pro

Tip: if you want to use the ContDataQC R package, you can reduce the data preparation time by making the following entries –

- Description: enter **SiteID**
- Selecting the following **units**:
 - Abs Pres – **psi**
 - Temp – **C**
- Clicking '**None**' under Internal Logger Events to Plot
- Making sure the time offset from GMT is appropriate for the site
- **Barometric Compensation Assistant** should be highlighted.
- Click '**Process**'

Plot Setup

Description: ECO66G12 Water

Select Series to Plot

☒ All ☐ None

Series	Measurement	Units	Label
<input checked="" type="checkbox"/> 1	Abs Pres	psi	Abs Pres
<input checked="" type="checkbox"/> 2	Temp	°C	Water temp
<input type="checkbox"/> 3	Batt	V	

Select Internal Logger Events to Plot

☒ All ☒ None

Event	Event Type	Units
<input type="checkbox"/> 1	Coupler Detached	
<input type="checkbox"/> 2	Coupler Attached	
<input type="checkbox"/> 3	Stopped	
<input type="checkbox"/> 4	End Of File	

Offset from GMT: -4 (+/- 18.0 hours, 0 = GMT)

Data Assistants

- Barometric Compensation Assistant
- Growing Degree Days Assistant

Process... What's This? Manage... Load...

Help Cancel Plot

Plot Setup

The screenshot shows the 'Plot Setup' dialog box with several elements highlighted by red boxes and arrows pointing to yellow callout boxes:

- Description:** A text field containing 'ECO66G12'.
- Select Series to Plot:** A section with 'All' and 'None' buttons, and a table of series.
- Units:** A dropdown menu for the 'Temp' series, currently set to '°C'.
- Select Internal Logger Events to Plot:** A section with 'All' and 'None' buttons.
- Offset from GMT:** A spinner box set to '-4'.
- Data Assistants:** A list box containing 'Barometric Compensation Assistant' and 'Growing Degree Days Assistant'.
- Buttons:** 'Process...', 'What's This?', 'Manage...', 'Load...', 'Help', 'Cancel', and 'Plot'.

Series	Measurement	Units	Label
<input checked="" type="checkbox"/> 1	Abs Pres	psi	
<input checked="" type="checkbox"/> 2	Temp	°C	
<input checked="" type="checkbox"/> 3	Batt	V	

Event	Event Type	Units
<input type="checkbox"/> 1	Coupler Detached	
<input type="checkbox"/> 2	Coupler Attached	
<input type="checkbox"/> 3	Stopped	
<input type="checkbox"/> 4	End Of File	

Description: **StationID** (in this example, ECO66G12)

Change temperature units to °C
(you won't need to change the default units for the other parameters)

Click '**None**' (otherwise you'll get unwanted 'logged' entries in the .csv file that you'll need to delete later)

If the time zone for the site is incorrect, you can change that here (when you open the file, it goes to the default, which is the time zone of the computer that launched the sensor)

Select Barometric Compensation Assistant

Click 'Process'

Barometric Compensation Assistant

Barometric Compensation Assistant

Fluid Density

- ☐ Fresh Water (1,000.000 kg/m³)
- ☐ Salt Water (1,025.000 kg/m³)
- ☐ Brackish Water (1,010.000 kg/m³)
- ☐ Manual Input lb/ft³
- ☒ Derived From Temp. Channel, assuming fresh water

Barometric Compensation Parameters

☐ Use a Reference Water Level

Reference Water Level:

Reference Time:

Barometric Datafile:

Constant Barometric Pressure:

Resultant Series Name:

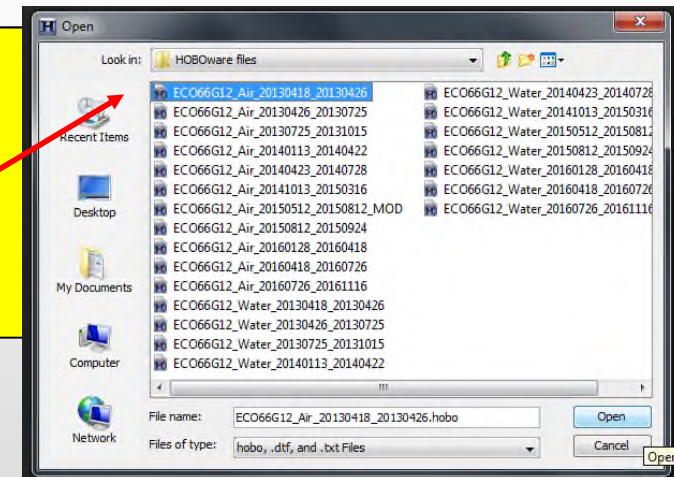
User Notes:

Select 'Derived from Temp.Channel, assuming fresh water'

If appropriate, check 'Use a reference water level' and enter the value (only one entry at a time); if no measurement was taken, leave box unchecked

Use Barometric Datafile

- Click on 'Choose'
- Browse to the appropriate folder
- Select the matching air sensor file



Click 'Create New Series'

Side note: if you *don't* enter a Reference Water Level, the Resultant Series Name will say 'Sensor Depth'; if you *do* make an entry, it will say 'Water Level' (like in the screenshot above)

You may or may not see this message...

Barometric Datafile Offset

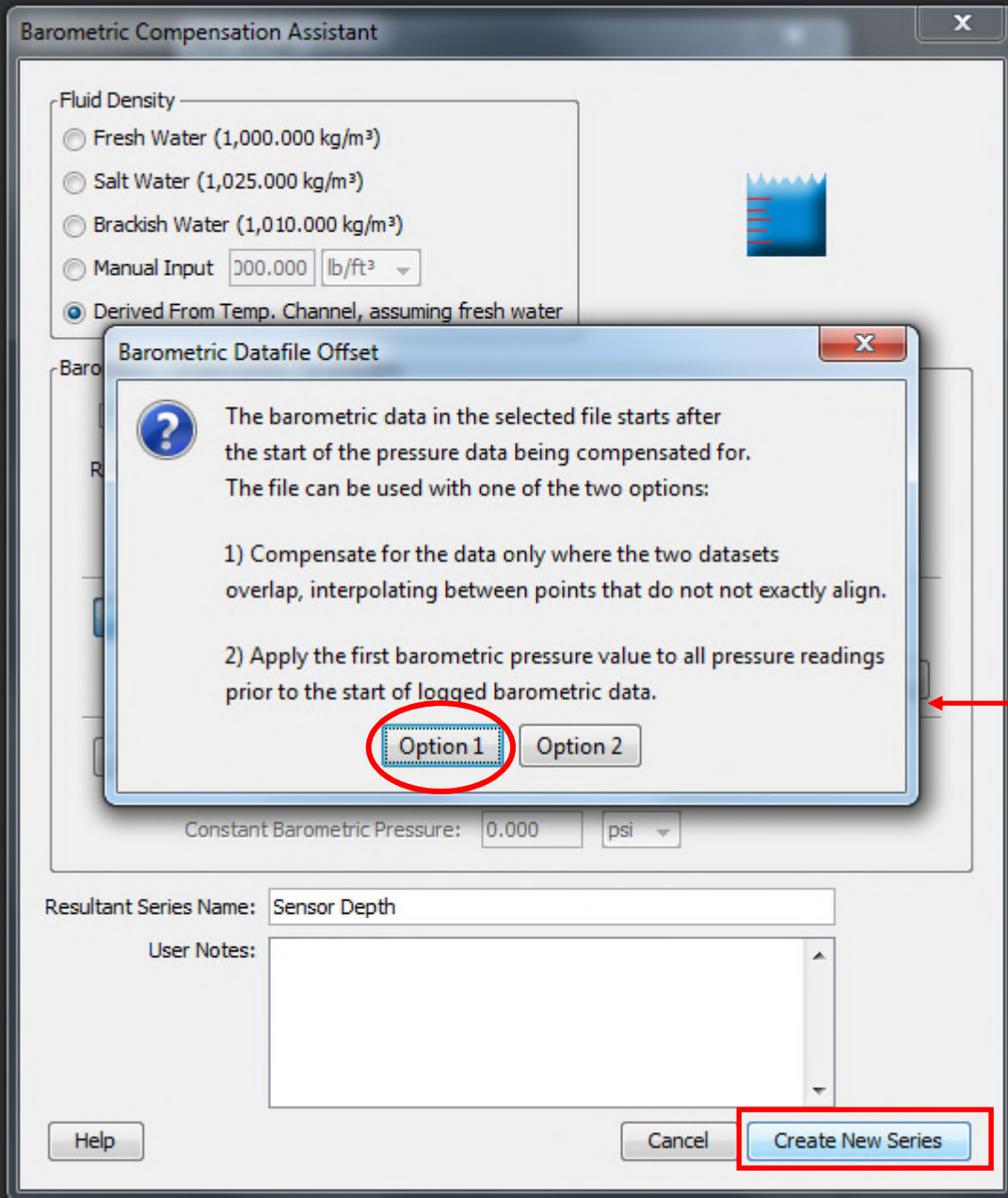
With some files, air and water sensors are out of sync (e.g., one records at 11:03 and the other records at 11:18). This happens when the user selects 'Start Logging: Now' and then deploys one sensor and then the other (at that point, recording times are usually spaced about 10-15 minutes apart).

If the air and water times are out of sync, you will receive this prompt. For our purposes -

Select Option 1— compensate for the data only where the two datasets overlap, interpolating between points that do not exactly align.

Click '**Create New Series**'

See 'ConfigLaunch_HOBO_20170803' file for ways to avoid this!



Plot Setup

Description: ECO66G12

Select Series to Plot

☒ All ☐ None

Series	Measurement	Units	Label
<input checked="" type="checkbox"/> 1	Abs Pres	psi	
<input checked="" type="checkbox"/> 2	Temp	°C	
<input checked="" type="checkbox"/> 3	Abs Pres Barom.	psi	
<input checked="" type="checkbox"/> 4	Sensor Depth	feet	
<input type="checkbox"/> 5	Batt	V	

Select Internal Logger Events to Plot

☒ All ☐ None

Event	Event Type	Units
<input type="checkbox"/> 1	Coupler Detached	
<input type="checkbox"/> 2	Coupler Attached	
<input type="checkbox"/> 3	Stopped	
<input type="checkbox"/> 4	End Of File	

Offset from GMT -4 (+/- 18.0 hours, 0 = GMT)

▼ Data Assistants

Barometric Compensation Assistant

Growing Degree Days Assistant

Process...

What's This?

Manage...

Load...

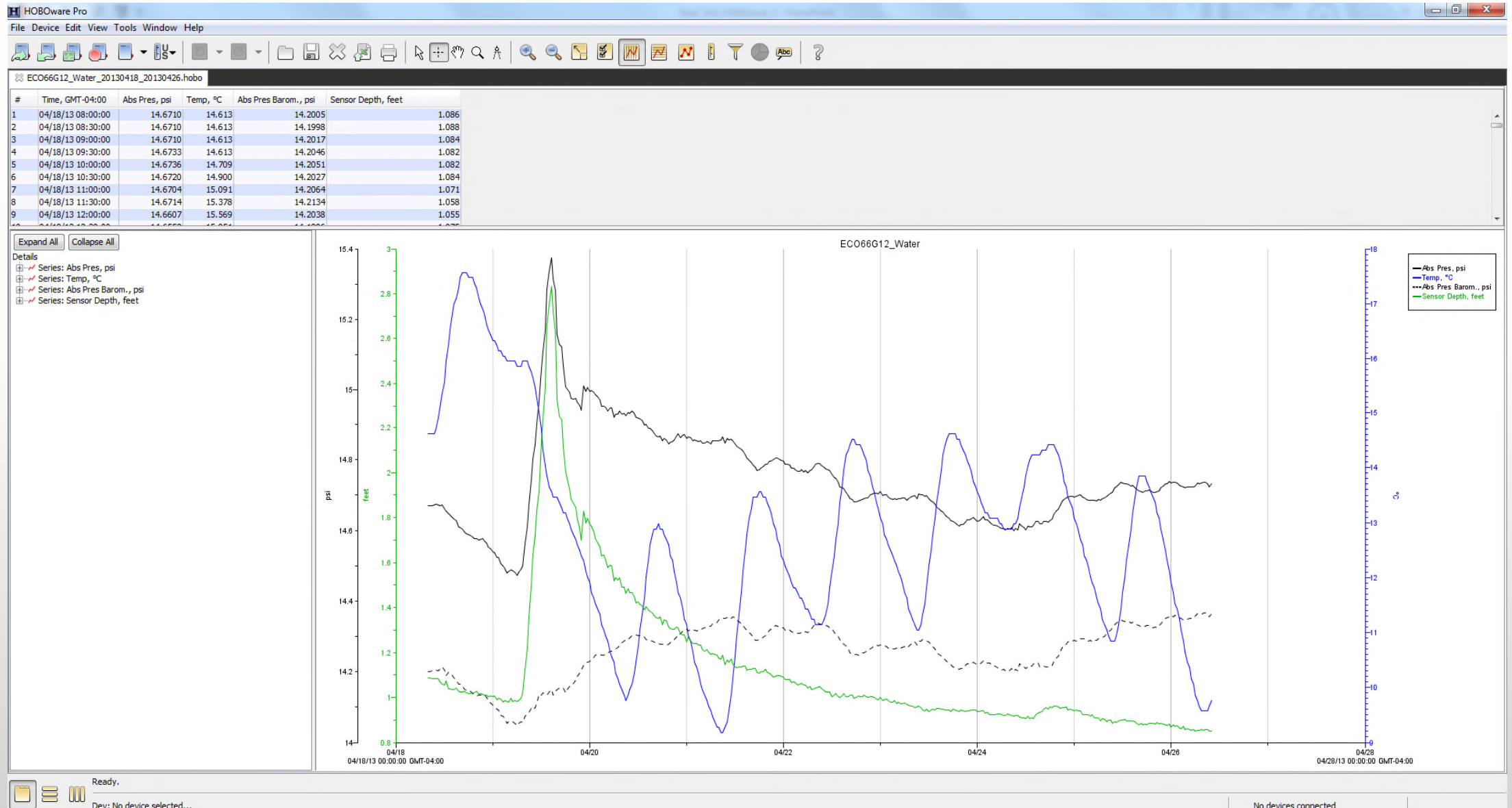
Help Cancel Plot

This screen will then appear

Sensor Depth has been added to the parameter list

Click 'Plot'

A time series plot will then appear



Change the Temp series name to 'Water Temp'

The screenshot shows the HOBOWare Pro interface. On the left, a list of series includes 'Series: Temp, °C', which is highlighted with a red arrow. The 'Edit' menu is open, and 'Graph Properties' is selected, also indicated by a red arrow. A yellow box with four numbered steps is overlaid on the bottom left: 1. Left click on Series: Temp, 2. Edit – Graph Properties, 3. Enter 'Water Temp', and 4. Click 'Done'. A red arrow points from the third step to the 'Description' field in the 'Series Properties' dialog, which now contains 'Water Temp'. Another red arrow points from the fourth step to the 'Done' button in the same dialog. The background shows a data table with columns for time, barometric pressure, and sensor depth.

#	Time	Barom., psi	Sensor Depth, feet
1	04/18	14.2005	1.086
2	04/18	14.1998	1.088
3	04/18	14.2017	1.084
4	04/18	14.2046	1.082
5	04/18	14.2051	1.082
6	04/18	14.2027	1.084
7	04/18	14.2064	1.071
8	04/18	14.2134	1.058
9	04/18	14.2038	1.055

Series Properties

Description: **Water Temp**

Units: °C

Lines: ☒ Connect Points, Style: Solid, Width: 1, ☐ Connect As Steps

Points: ☐ Mark Points, Marker: Rectangle, Point Size: 3

Alarms: Max: 50.000, Min: -20.000, Enable Alarms: ☐ High Alarm, ☐ Low Alarm

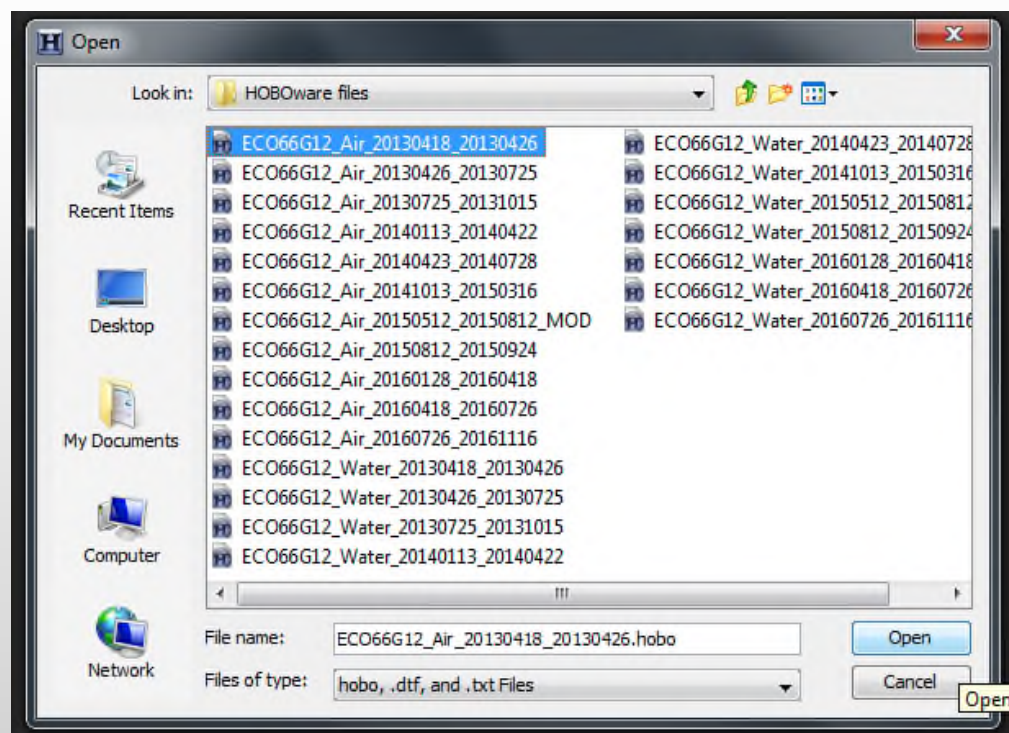
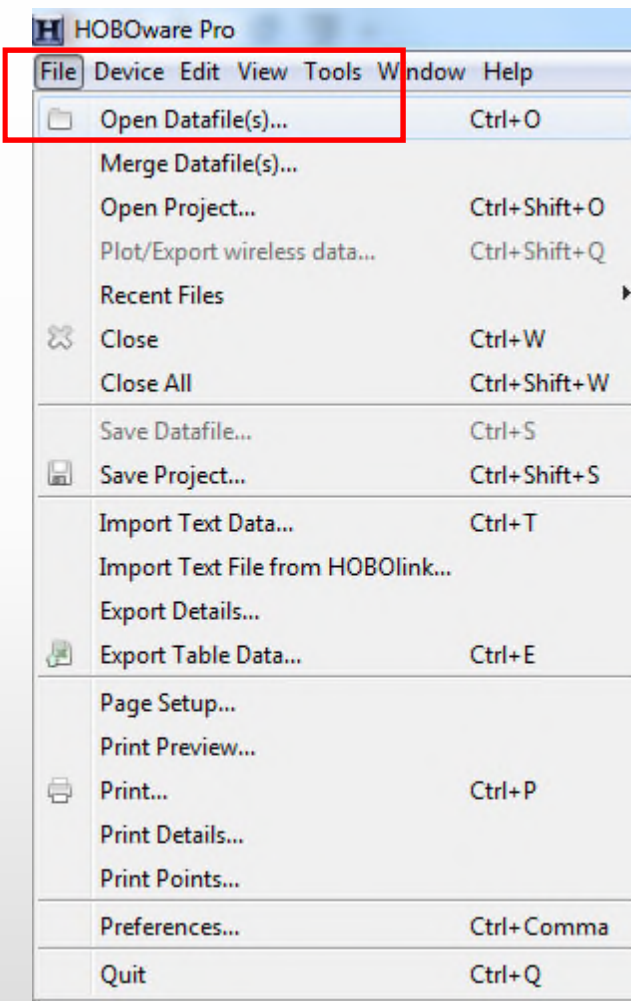
Misc.: Time Axis: Time Axis, Value Axis: °C, Color: [Blue] Choose...

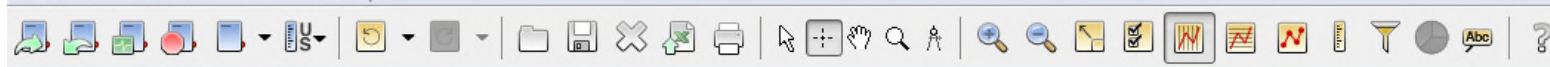
Buttons: Cancel, Apply, **Done**

1. Left click on Series: Temp
2. Edit – Graph Properties
3. Enter 'Water Temp'
4. Click 'Done'

Now bring in the air temperature data.

While keeping the water sensor file open in HOBOWare, **open the air sensor file (File – Open Datafile).**

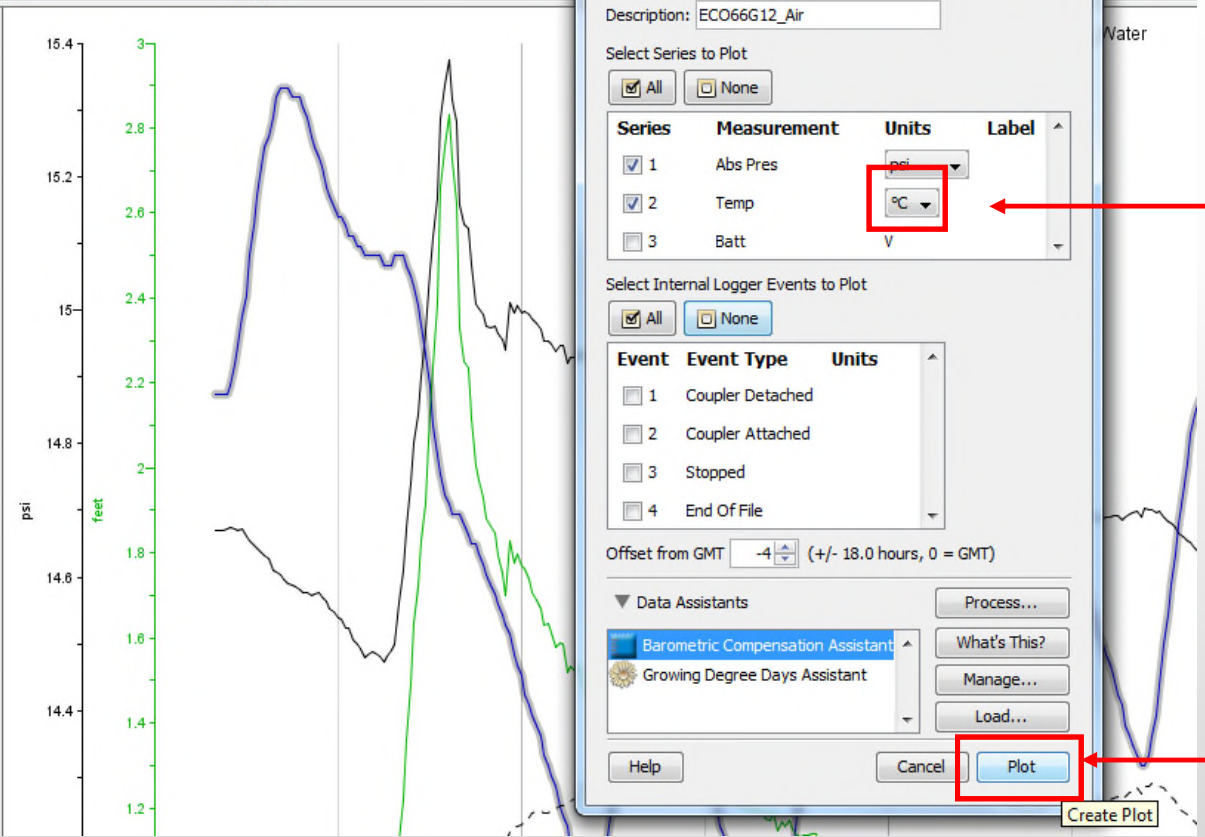




ECO66G12_Water_20130418_20130426.hobo

#	Time, GMT-04:00	Abs Pres, psi	Water T...	Abs Pres Barom., psi	Sensor Depth, feet
1	04/18/13 08:00:00	14.6710	14.613	14.2005	1.086
2	04/18/13 08:30:00	14.6710	14.613	14.1998	1.088
3	04/18/13 09:00:00	14.6710	14.613	14.2017	1.084
4	04/18/13 09:30:00	14.6733	14.613	14.2046	1.082
5	04/18/13 10:00:00	14.6736	14.709	14.2051	1.082
6	04/18/13 10:30:00	14.6720	14.900	14.2027	1.084
7	04/18/13 11:00:00	14.6704	15.091	14.2064	1.071
8	04/18/13 11:30:00	14.6714	15.378	14.2134	1.058
9	04/18/13 12:00:00	14.6607	15.569	14.2038	1.055

- Expand All Collapse All
- Details
- Series: Abs Pres, psi
 - Series: Water Temp, °C
 - Series: Abs Pres Barom., psi
 - Series: Sensor Depth, feet



Plot Setup

Description: ECO66G12_Air

Select Series to Plot

☒ All ☐ None

Series	Measurement	Units	Label
<input checked="" type="checkbox"/> 1	Abs Pres	psi	
<input checked="" type="checkbox"/> 2	Temp	°C	
<input type="checkbox"/> 3	Batt	V	

Select Internal Logger Events to Plot

☒ All ☐ None

Event	Event Type	Units
<input type="checkbox"/> 1	Coupler Detached	
<input type="checkbox"/> 2	Coupler Attached	
<input type="checkbox"/> 3	Stopped	
<input type="checkbox"/> 4	End Of File	

Offset from GMT: -4 (+/- 18.0 hours, 0 = GMT)

Data Assistants

- Barometric Compensation Assistant
- Growing Degree Days Assistant

Buttons: Process... What's This? Manage... Load... Help Cancel Plot

Air sensor file

Change temperature units to °C

Click 'Plot'

Change the Temp series name to 'Air Temp'

The screenshot shows the HOBOWare Pro interface. On the left, a list of series includes 'Series: Temp, °C', which is highlighted with a red arrow. The 'Edit' menu is open, and 'Graph Properties' is selected, also indicated by a red arrow. A yellow box with four numbered steps is overlaid on the bottom left: 1. Left click on Series: Temp, 2. Edit – Graph Properties, 3. Enter 'Air Temp', and 4. Click 'Done'. A red line connects the 'Air Temp' text in the 'Description' field of the 'Series Properties' dialog to the third step. The 'Series Properties' dialog is open on the right, showing 'Air Temp' in the Description field and '°C' in the Units field. The 'Done' button at the bottom right of the dialog is circled in red.

Series Properties

Description: **Air Temp**

Units: °C

Lines: ☒ Connect Points, Style: Solid, Width: 1, ☐ Connect As Steps

Points: ☐ Mark Points, Marker: Rectangle, Point Size: 3

Alarms: Max: 50.000, Min: -20.000, Enable Alarms: ☐ High Alarm, ☐ Low Alarm

Misc: Time Axis: Time Axis, Value Axis: °C, Color: Blue, Choose...

Cancel Apply **Done**

1. Left click on Series: Temp
2. Edit – Graph Properties
3. Enter 'Air Temp'
4. Click 'Done'

Copy the air temperature series

• Edit

- Copy Series: Temp

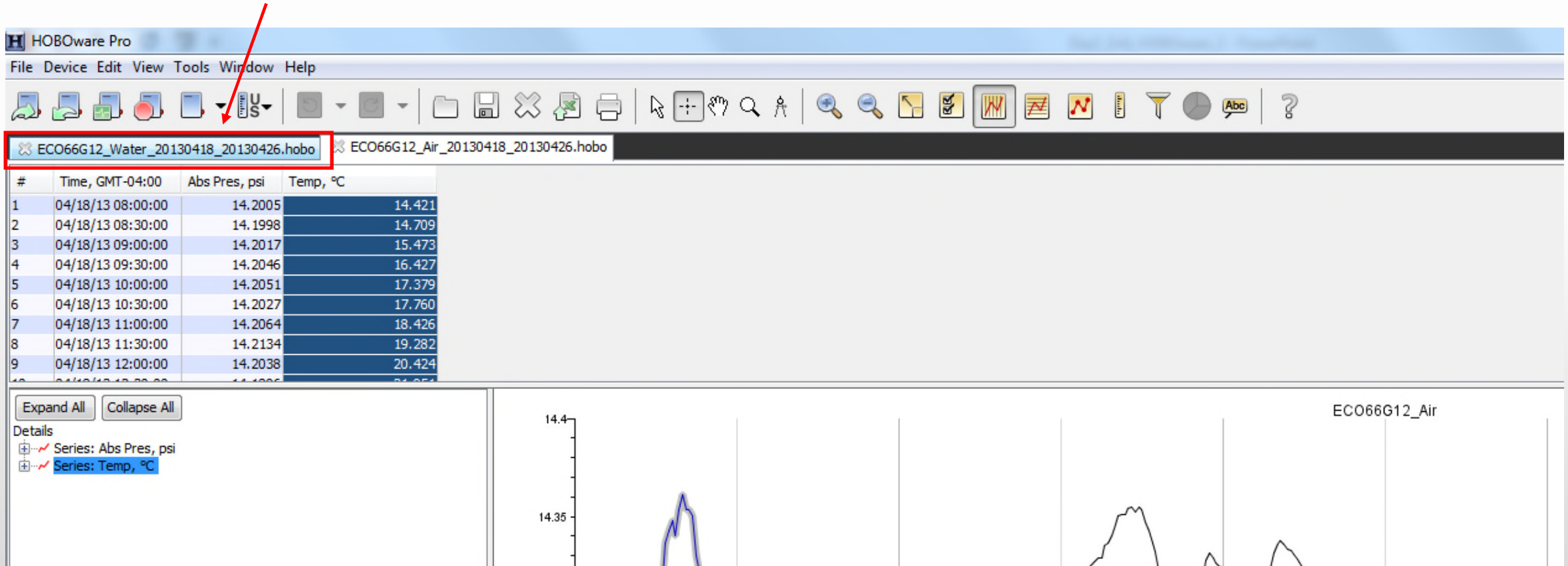
Note: the Temp Series needs to be highlighted in order for this to work

ECO66G12_Air

#	Time	Value
1	04/18	14.421
2	04/18	14.709
3	04/18	15.473
4	04/18	16.427
5	04/18	17.379
6	04/18	17.760
7	04/18	18.426
8	04/18	19.282
9	04/18	20.424

While keeping the air sensor file open, reopen the water sensor file

Click on the tab for the water sensor file



Paste the air temperature series into the water sensor file

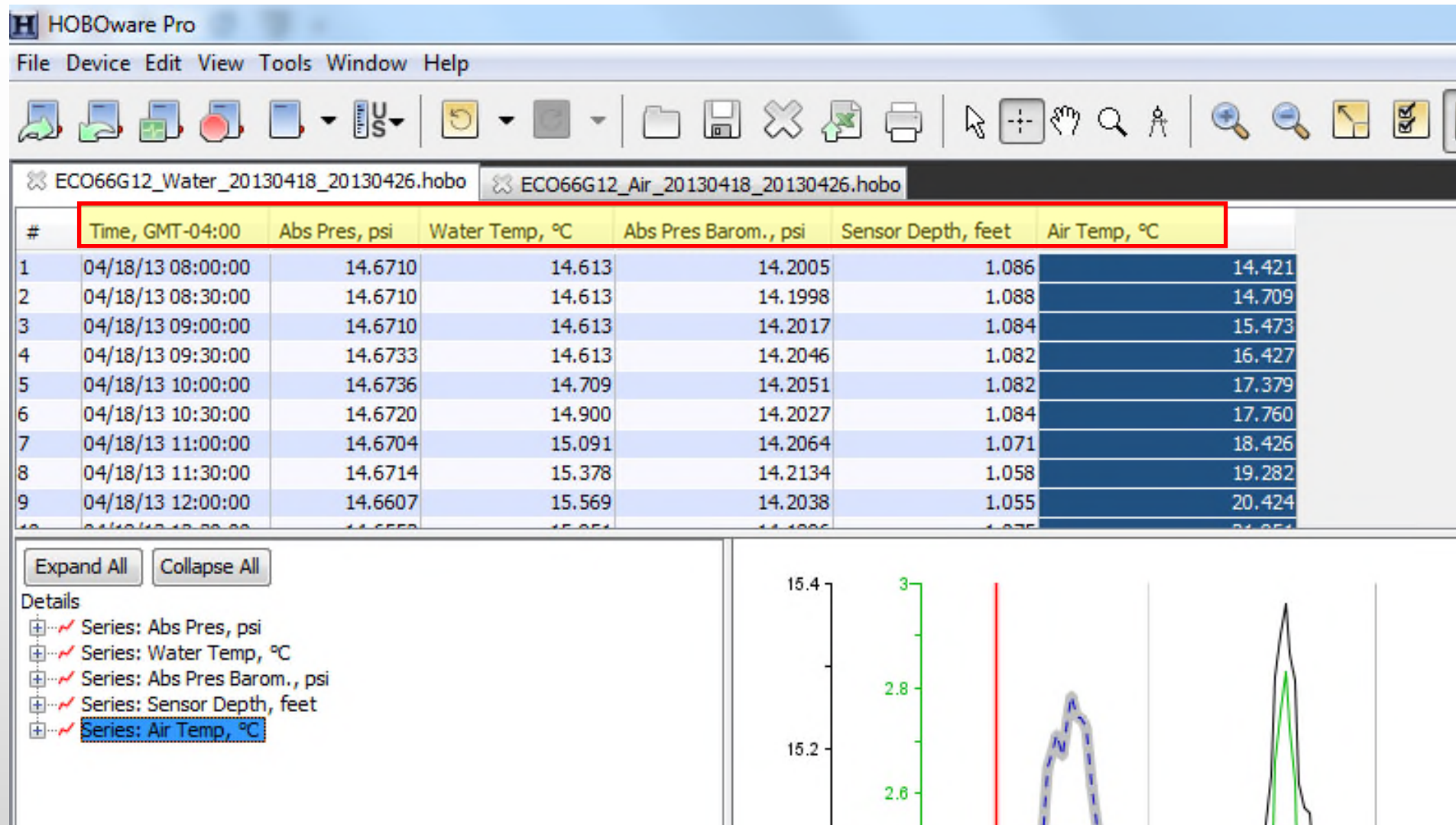
The screenshot shows the HOBOWare Pro software interface. The 'Edit' menu is open, and the 'Paste Series' option is highlighted with a red rectangle. The menu also includes options like 'Filter Series: Water Temp...', 'Copy Series: Water Temp' (Ctrl+C), 'Add Graph Label...', 'Hide/Show Series', 'Remove Series: Water Temp' (Delete), 'Graph Properties', 'Convert Units', 'Undo Action: Edit Series Properties' (Ctrl+Z), 'Redo Action' (Ctrl+Y), and 'Copy Graph to Clipboard'.

The main data table displays two columns: 'Barom., psi' and 'Sensor Depth, feet'. The data is as follows:

Barom., psi	Sensor Depth, feet
14.2005	1.086
14.1998	1.088
14.2017	1.084
14.2046	1.082
14.2051	1.082
14.2027	1.084
14.2064	1.071
14.2134	1.058
14.2038	1.055

The bottom section of the interface shows a graph with two data series: 'Series: Abs Pres, psi' (blue line) and 'Series: Water Temp, °C' (green line). The graph also includes 'Series: Abs Pres Barom., psi' and 'Series: Sensor Depth, feet'. The graph is titled 'ECO66G12'.

All the parameters are now in one file, ready for export!



Now you're ready to export the .csv file

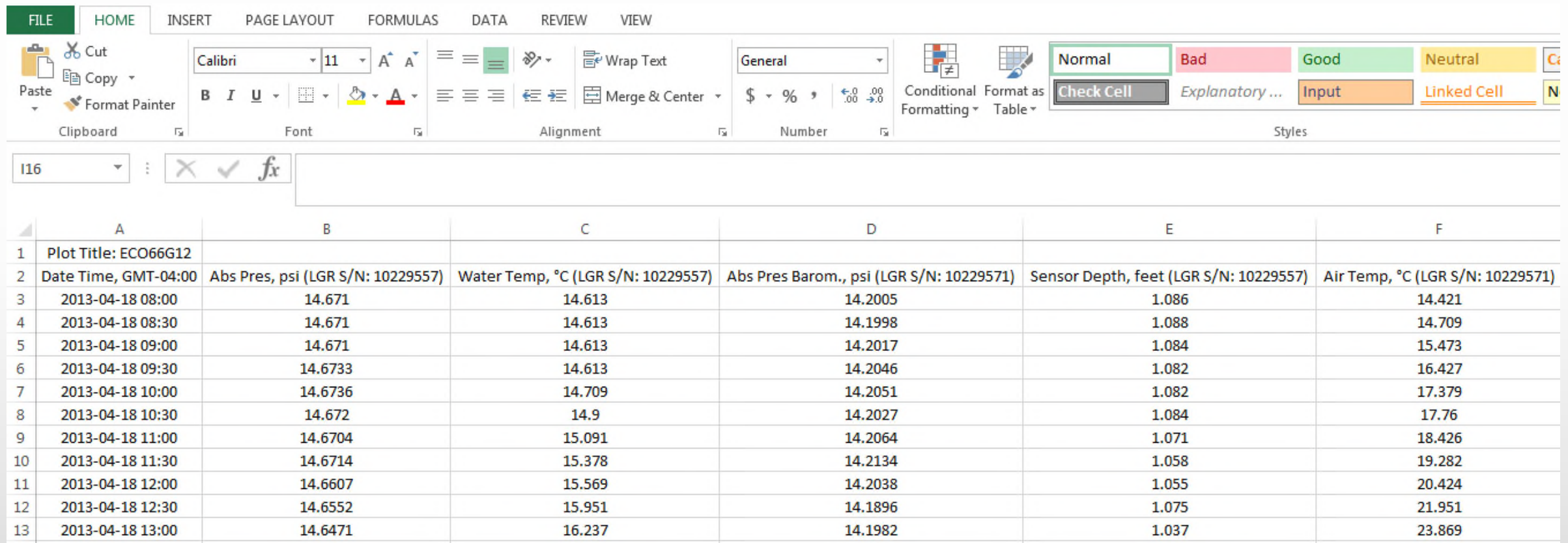
The screenshot shows the HOBOWare Pro interface. The 'File' menu is open, and 'Export Table Data...' is highlighted. A yellow box contains the following list:

- File
- Export Table Data

The 'Export' dialog box is open, showing a table of parameters to export. A yellow box with the text 'Select All Parameters Click 'Export'' points to the 'Export...' button, which is circled in red.

Select	Measurement	Units	S/N	Label
<input checked="" type="checkbox"/>	Abs Pres	psi	10229557	
<input checked="" type="checkbox"/>	Water Temp	°C	10229557	
<input checked="" type="checkbox"/>	Abs Pres Barom.	psi	10229571	
<input checked="" type="checkbox"/>	Sensor Depth	feet	10229557-4	
<input checked="" type="checkbox"/>	Air Temp	°C	10229571	

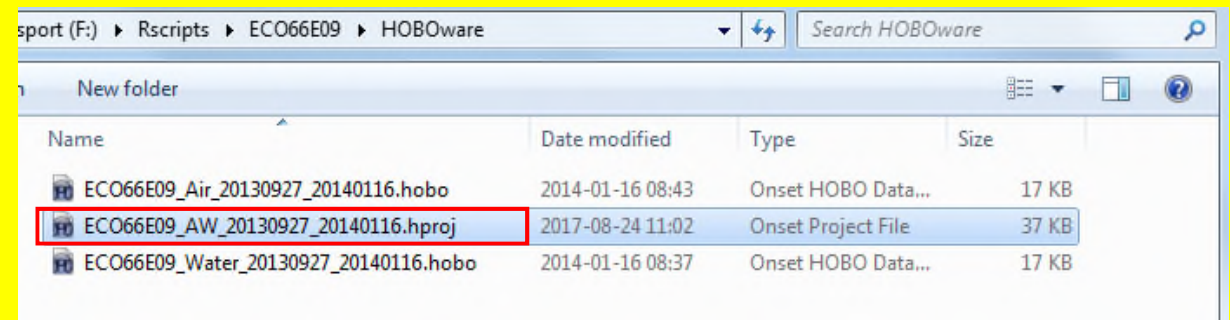
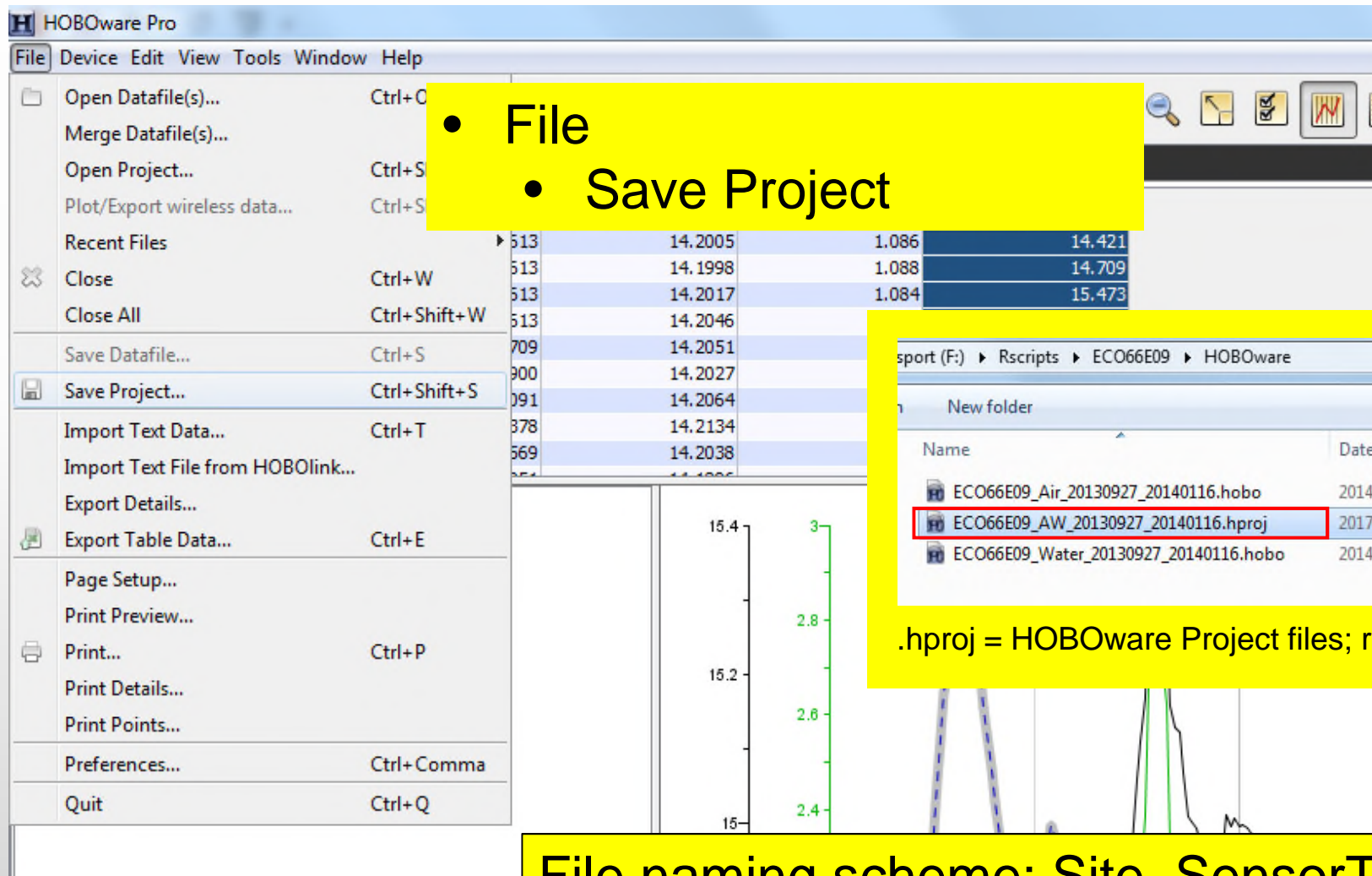
Save the .csv file in the appropriate site folder.
If you followed these instructions, the file should look like this.



	A	B	C	D	E	F
1	Plot Title: ECO66G12					
2	Date Time, GMT-04:00	Abs Pres, psi (LGR S/N: 10229557)	Water Temp, °C (LGR S/N: 10229557)	Abs Pres Barom., psi (LGR S/N: 10229571)	Sensor Depth, feet (LGR S/N: 10229557)	Air Temp, °C (LGR S/N: 10229571)
3	2013-04-18 08:00	14.671	14.613	14.2005	1.086	14.421
4	2013-04-18 08:30	14.671	14.613	14.1998	1.088	14.709
5	2013-04-18 09:00	14.671	14.613	14.2017	1.084	15.473
6	2013-04-18 09:30	14.6733	14.613	14.2046	1.082	16.427
7	2013-04-18 10:00	14.6736	14.709	14.2051	1.082	17.379
8	2013-04-18 10:30	14.672	14.9	14.2027	1.084	17.76
9	2013-04-18 11:00	14.6704	15.091	14.2064	1.071	18.426
10	2013-04-18 11:30	14.6714	15.378	14.2134	1.058	19.282
11	2013-04-18 12:00	14.6607	15.569	14.2038	1.055	20.424
12	2013-04-18 12:30	14.6552	15.951	14.1896	1.075	21.951
13	2013-04-18 13:00	14.6471	16.237	14.1982	1.037	23.869

For instructions on how to format the file for the ContDataQC R package, see the 'Formatting_ContDataQCR' file.

Before you close HOBOWare, save the file with the combined air and water sensor data as a HOBOWare Project File.

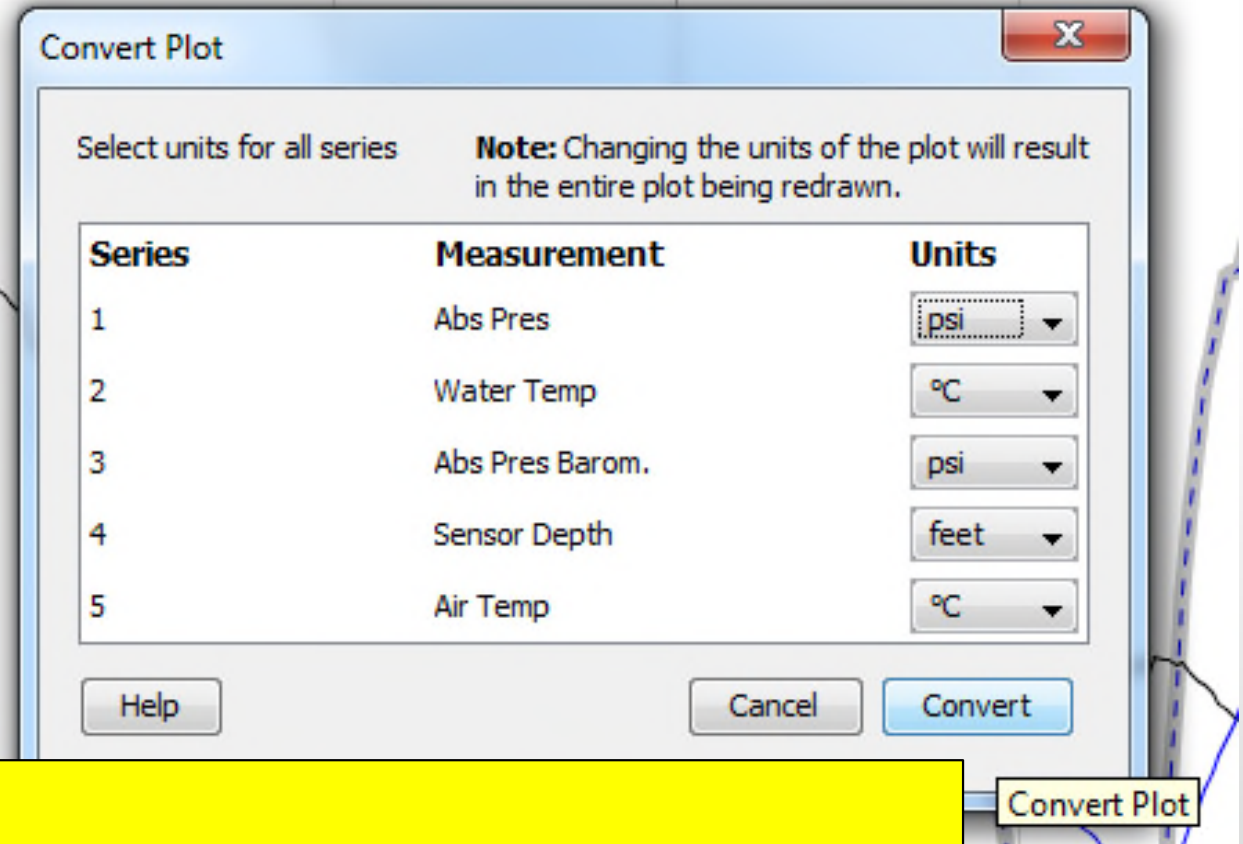
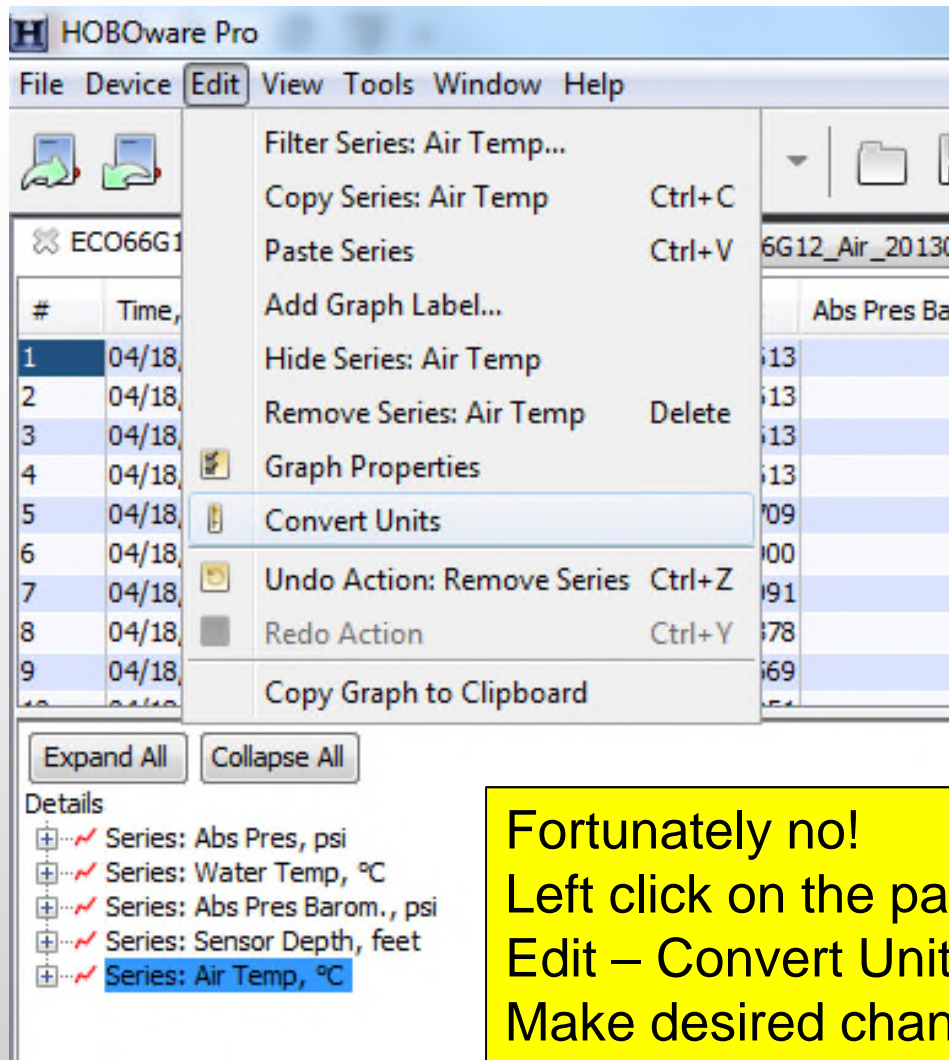


.hproj = HOBOWare Project files; retain the original HOBOWare Data files too!

File naming scheme: Site_SensorType_StartDate_EndDate
Example – ECO66G12_AW_20130418_20130426

Extra tips

What if you forget to convert temperature to °C during the initial upload? Do you have to go back and do this all over again?



Fortunately no!
Left click on the parameter you want to change the units on
Edit – Convert Units
Make desired changes

What if I forgot to remove sensor type (air/water) from the Plot Title?
(e.g., 'ECO66G12_Water' instead of 'ECO66G12')
You can change it by doing this...

Click this arrow

The screenshot shows the HOBOWare Pro interface. At the top, a menu bar includes File, Device, Edit, View, Tools, Window, and Help. Below it is a toolbar with various icons. A red circle highlights a right-pointing arrow icon in the toolbar, with a yellow box labeled 'Click this arrow' pointing to it. The main window displays a data table with columns: #, Time, GMT-04:00, Abs Pres, psi, Water Temp, °C, Abs Pres Barom., psi, Sensor Depth, feet, and Air Temp, °C. The table contains 9 rows of data. Below the table are buttons for 'Expand All' and 'Collapse All', and a 'Details' section with a list of series: Abs Pres, psi; Water Temp, °C; Abs Pres Barom., psi; Sensor Depth, feet; and Air Temp, °C. A 'Title Properties' dialog box is open in the foreground. It has a 'Name' field containing 'ECO66G12', which is circled in red. A yellow box labeled 'Update the name to the StationID' points to this field. The dialog also has a 'Location' section with 'Top' selected, and a 'Font' section with 'Dialog', '12', and 'Plain' options. At the bottom are 'Cancel', 'Apply', and 'Done' buttons. In the background, the plot title 'ECO66G12' is circled in red, with a yellow box labeled 'Double click on the Plot Title' pointing to it.

#	Time, GMT-04:00	Abs Pres, psi	Water Temp, °C	Abs Pres Barom., psi	Sensor Depth, feet	Air Temp, °C
1	04/18/13 08:00:00	14.6710	14.613	14.2005	1.086	14.421
2	04/18/13 08:30:00	14.6710	14.613	14.1998	1.088	14.709
3	04/18/13 09:00:00	14.6710	14.613	14.2017	1.084	15.473
4	04/18/13 09:30:00	14.6733	14.613	14.2046	1.082	16.427
5	04/18/13 10:00:00	14.6736	14.709	14.2051	1.082	17.379
6	04/18/13 10:30:00	14.6720	14.900	14.2027	1.084	17.760
7	04/18/13 11:00:00	14.6704	15.091			
8	04/18/13 11:30:00	14.6714	15.378			
9	04/18/13 12:00:00	14.6607	15.569			

Details

- Series: Abs Pres, psi
- Series: Water Temp, °C
- Series: Abs Pres Barom., psi
- Series: Sensor Depth, feet
- Series: Air Temp, °C

Title Properties

Name: ECO66G12

Location

☒ Top

☐ Bottom

Font: Dialog 12 Plain

Cancel Apply Done

Acknowledgements

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Additional materials are available on the RMN Sharepoint site and the Tetra Tech FTP site.