

**Processing temperature data in HOBOWare
so that it can be run through the
ContDataQC HOBOWare Reformat function
without manipulation**

- 1. Water or air temperature only**
- 2. Both water and air temperature data in the same file**

Pendant	Water Temp Pro v2	Tidbit v2
		

Processing water or air temperature files (one at a time, in separate files) in HOBOWare

Note: you do not need HOBOWare Pro to process temperature data; you can use the free version, which can be downloaded online –

<http://www.onsetcomp.com/hoboware-free-download>

Steps

- Set up your **default settings** (see 'HOBOWare_DefaultSettings' file); you should only have to do this once
- **Open the sensor file** in HOBOWare
- **Plot** the data
- **Change the Temp series name** to 'Water Temp' or 'Air Temp'
- **Export as .csv**

File naming scheme



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

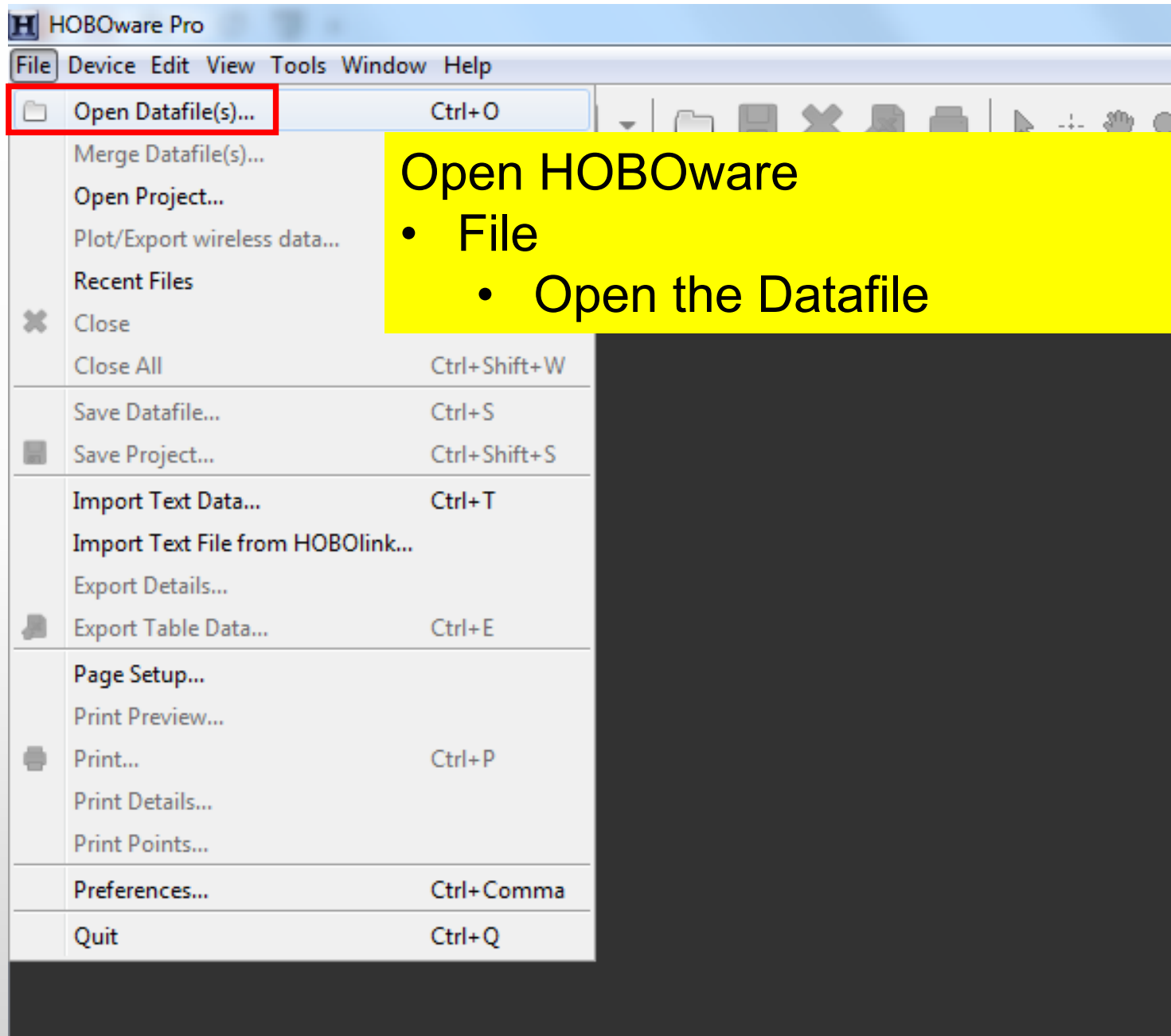
SiteID_SensorType_StartDate_EndDate

- 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 (“_”).

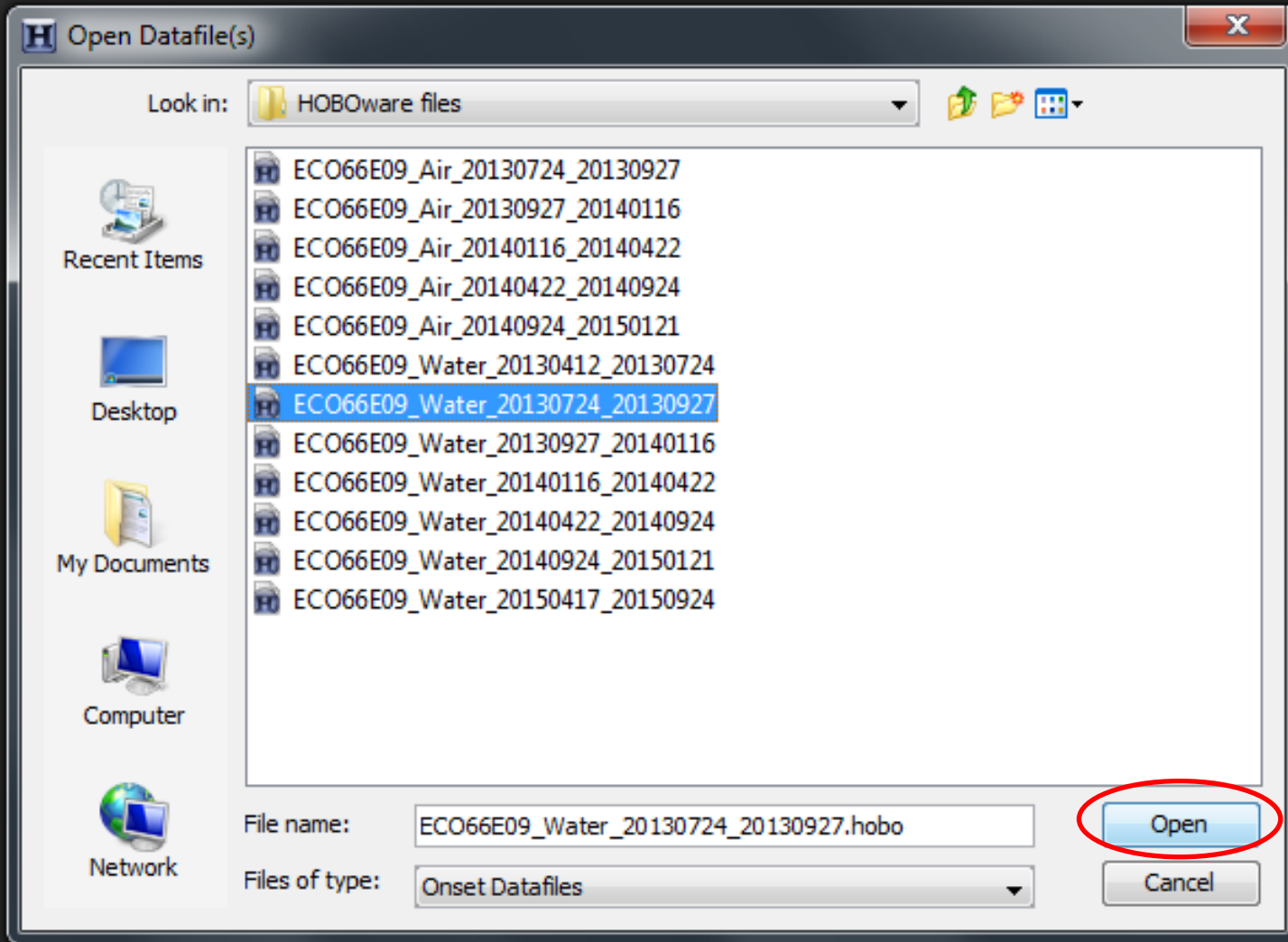
Example:

- **BB01CC_Water_20131022_20140428.csv**

 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



1. Open the HOBOWare Datafile



Browse/select the appropriate water sensor file

Click 'Open'

Open the sensor file in HOBOWare

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 **°C** for **units**
- Clicking '**None**' under Internal Logger Events to Plot
- Making sure the time offset from GMT is appropriate for the site
- Click '**Plot**'

Plot Setup

Description: ECO66E09

Select Series to Plot

☒ All ☐ None

Series	Measurement	Units	Label
<input 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	Host Connected	
<input type="checkbox"/> 4	Stopped	
<input type="checkbox"/> 5	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

Create Plot

Plot Setup

The screenshot shows the 'Plot Setup' dialog box with several fields and buttons highlighted by red boxes and arrows pointing to explanatory text boxes. The 'Description' field contains 'ECO66E09'. The 'Series' table has 'Temp' selected with units '°C'. The 'Internal Logger Events' section has 'None' selected. The 'Offset from GMT' is set to '-4'. The 'Data Assistants' list includes 'Barometric Compensation Assistant' and 'Growing Degree Days Assistant'. The 'Plot' button is highlighted at the bottom right.

Series	Measurement	Units	Label
<input type="checkbox"/> 1	Abs Pres	psi	
<input checked="" type="checkbox"/> 2	Temp	°C	
<input 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	Host Connected	
<input type="checkbox"/> 4	Stopped	
<input type="checkbox"/> 5	End Of File	

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

Data Assistants:

- Barometric Compensation Assistant
- Growing Degree Days Assistant

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

Description: whatever is entered here becomes the Plot title but the R code doesn't pay attention to the plot title so you should be able to leave this as is. What's key is getting the file name correct because the R code reads the first part of the file name (whatever comes before the first underscore) and creates a SiteID column based on that.

Temperature units °C

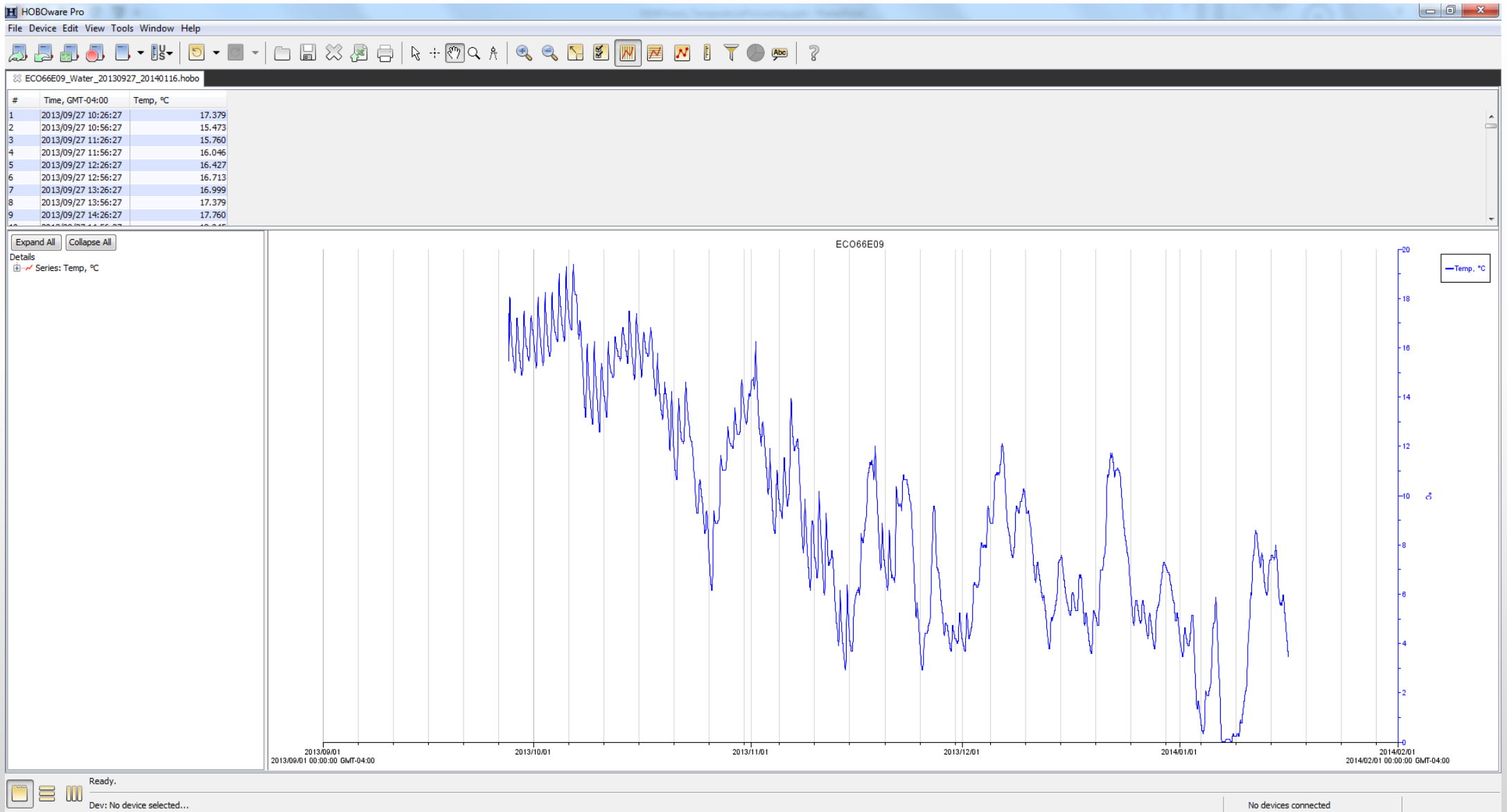
Click 'None' (otherwise you'll get unwanted 'logged' entries in the .csv file that you'll need to delete later)

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)

Click 'Plot'

Create Plot

A time series plot will then appear



Change the Temp series name to 'Water Temp' or 'Air Temp'

The screenshot shows the HOBOware Pro interface. The 'Edit' menu is open, with 'Graph Properties' highlighted. A red arrow points from this menu item to the 'Series Properties' dialog box. In the dialog, the 'Description' field is set to 'Water Temp'. Another red arrow points from the 'Series: Temp, °C' entry in the 'Details' pane to the 'Description' field. A third red arrow points from the 'Done' button in the dialog to the 'Graph Properties' menu item. A yellow box contains the following instructions:

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

The 'Series Properties' dialog box includes the following sections:

- Description:** Water Temp
- Unit:** °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 at the bottom: Cancel, Apply, Done.

Export the .csv file

The screenshot shows the HOBOWare Pro software interface. The 'File' menu is open, and the 'Export Table Data...' option is highlighted with a red rectangle. A yellow box with a list of steps is overlaid on the menu. In the background, a data table is visible with columns for time, temperature, and humidity. The 'Export' dialog box is also open, showing a table of data with columns for 'Select', 'Measurement', 'Units', 'S/N', and 'Label'. The 'Water Temp' row is selected, and the 'Export...' button is circled in red. A yellow box with instructions is overlaid on the dialog box.

- File
- Export Table Data

Select	Measurement	Units	S/N	Label
<input checked="" type="checkbox"/>	Water Temp	°C	10229558	
<input checked="" type="checkbox"/>	Air Temp	°C	10229565	

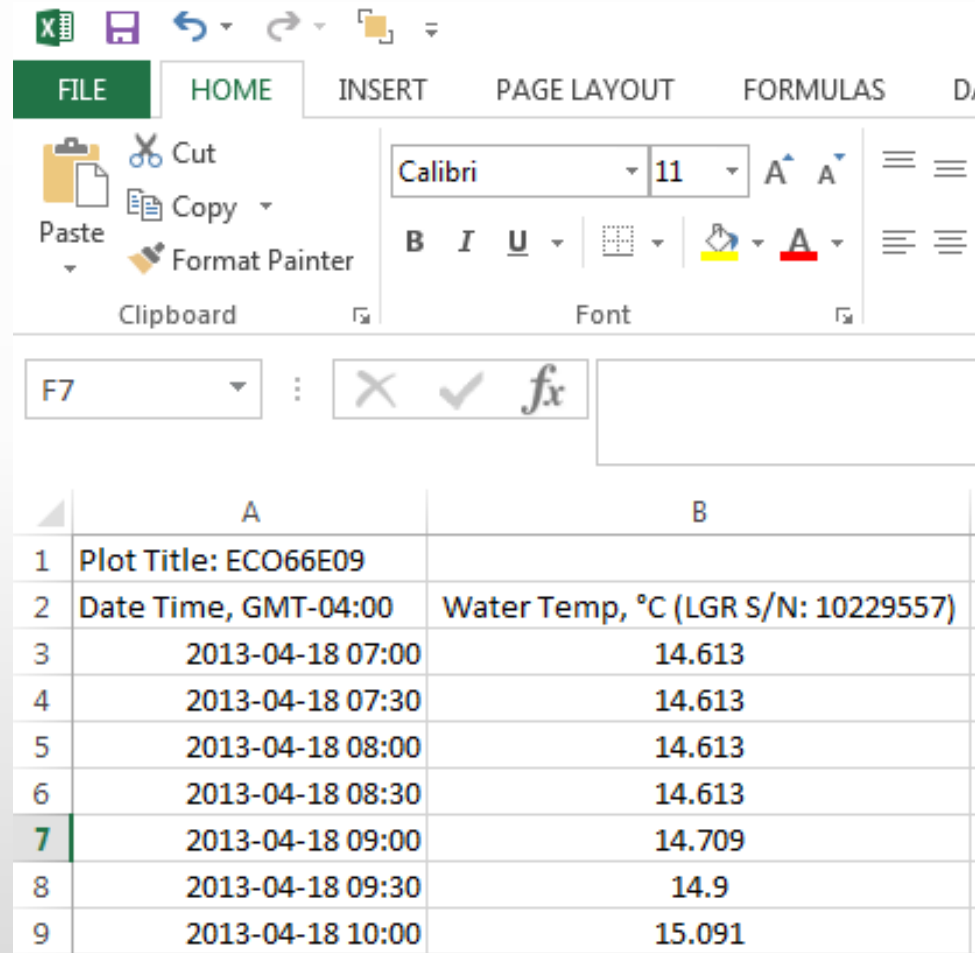
Select Water Temp
Click 'Export'

This is a close-up of the 'Export' dialog box. It features a table with two rows of data. The 'Water Temp' row is selected. The 'Export...' button at the bottom right is circled in red. A yellow box with instructions is overlaid on the dialog box.

Select	Measurement	Units	S/N	Label
<input checked="" type="checkbox"/>	Water Temp	°C	10229558	
<input checked="" type="checkbox"/>	Air Temp	°C	10229565	

Select Water Temp
Click 'Export'

Save the .csv file in the Data0_Original folder.
The file should look like this...



The screenshot shows the Microsoft Excel interface. The ribbon includes FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, and DATA. The HOME ribbon is active, showing the Clipboard group (Cut, Copy, Paste, Format Painter) and the Font group (Calibri font, size 11, Bold, Italic, Underline, text color, background color, and bullet points). The formula bar shows 'F7' and a function icon. The spreadsheet has two columns, A and B, and nine rows. Row 1 contains the plot title, and row 2 contains the date and temperature description. Rows 3 through 9 contain time and temperature data.

	A	B
1	Plot Title: ECO66E09	
2	Date Time, GMT-04:00	Water Temp, °C (LGR S/N: 10229557)
3	2013-04-18 07:00	14.613
4	2013-04-18 07:30	14.613
5	2013-04-18 08:00	14.613
6	2013-04-18 08:30	14.613
7	2013-04-18 09:00	14.709
8	2013-04-18 09:30	14.9
9	2013-04-18 10:00	15.091

Processing air and water temperature data so that they are merged into the same file in HOBOWare

Pendant	Water Temp Pro v2	Tidbit v2
		

Note: you do not need HOBOWare Pro to process temperature data; you can use the free version, which can be downloaded online –
<http://www.onsetcomp.com/hoboware-free-download>

Steps

- Set up your **default settings** (see 'HOBOWare_DefaultSettings' file); you should only have to do this once
- **Open the air or water sensor file** in HOBOWare
- **Plot** the data
- Change the **Temp series name** to either 'Water Temp' or 'Air Temp'
- **Open the other sensor file – change the Temp series name** to either 'Water Temp' or '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:

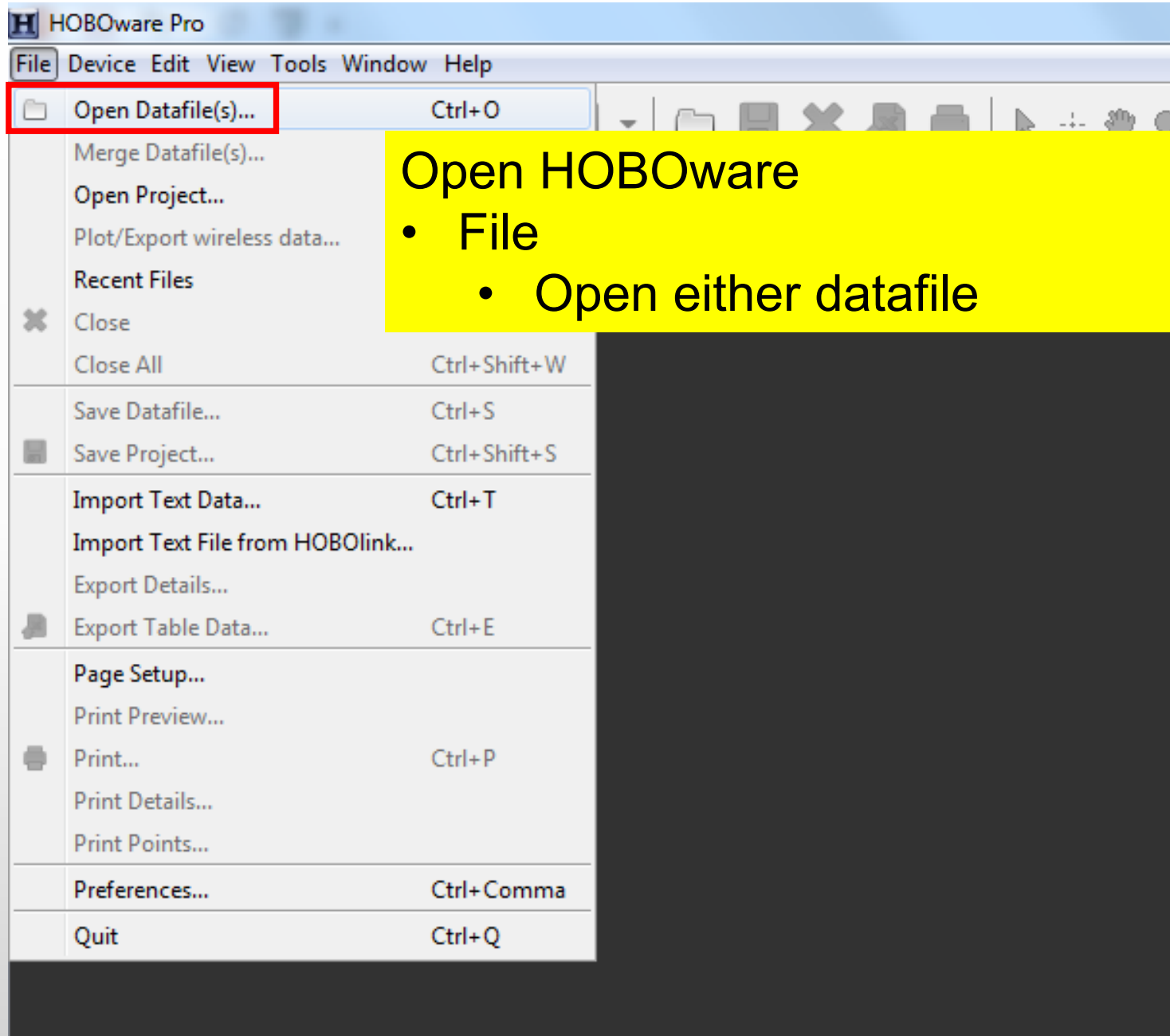
SiteID_SensorType_StartDate_EndDate

- 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 (“_”).

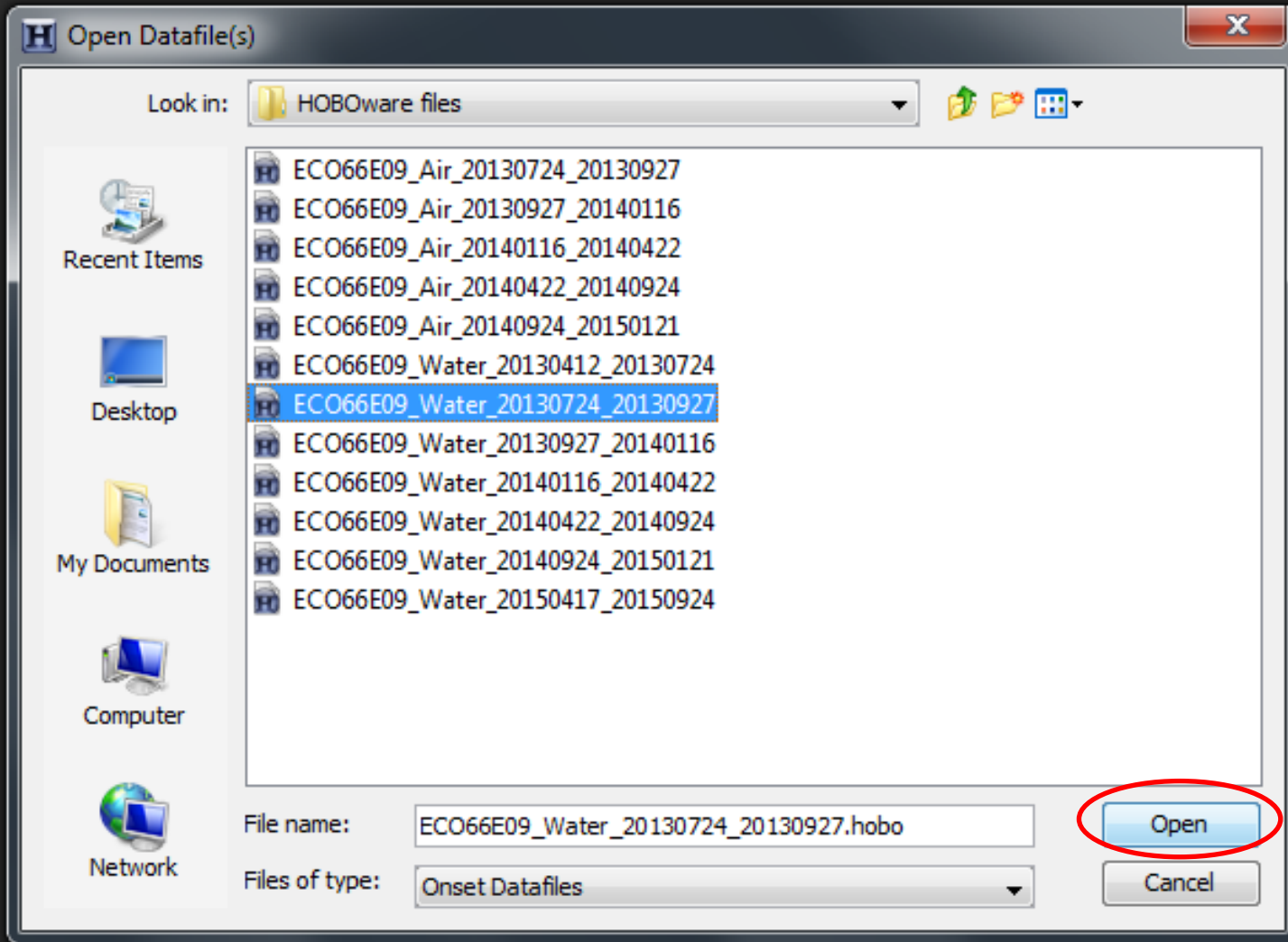
Example:

- **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



**1. Open the
HOBOWare Datafile
(in this example,
we start with the
for the **water
sensor**)**



Browse/select the appropriate water sensor file

Click 'Open'

Open the water sensor file in HOBOWare

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 **°C** for **units**
- Clicking '**None**' under Internal Logger Events to Plot
- Making sure the time offset from GMT is appropriate for the site
- Click '**Plot**'

Plot Setup

Description: ECO66E09

Select Series to Plot

☒ All ☐ None

Series	Measurement	Units	Label
<input 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	Host Connected	
<input type="checkbox"/> 4	Stopped	
<input type="checkbox"/> 5	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

Create Plot

Plot Setup

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

- Description:** A text field containing 'ECO66E09'.
- Select Series to Plot:** A section with 'All' and 'None' buttons, and a table of series.
- Series Table:**

Series	Measurement	Units	Label
<input 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:** A section with 'All' and 'None' buttons, and a table of events.
- Event Table:**

Event	Event Type	Units
<input type="checkbox"/> 1	Coupler Detached	
<input type="checkbox"/> 2	Coupler Attached	
<input type="checkbox"/> 3	Host Connected	
<input type="checkbox"/> 4	Stopped	
<input type="checkbox"/> 5	End Of File	
- Offset from GMT:** A spinner box set to '-4' with the text '(+/- 18.0 hours, 0 = GMT)'.
- Data Assistants:** A list containing 'Barometric Compensation Assistant' and 'Growing Degree Days Assistant'.
- Buttons:** 'Process...', 'What's This?', 'Manage...', 'Load...', 'Help', 'Cancel', and 'Plot'.

At the bottom right, there is a small button labeled 'Create Plot'.

Description: whatever is entered here becomes the Plot title but the R code doesn't pay attention to the plot title so you should be able to leave this as is. What's key is getting the file name correct because the R code reads the first part of the file name (whatever comes before the first underscore) and creates a SiteID column based on that.

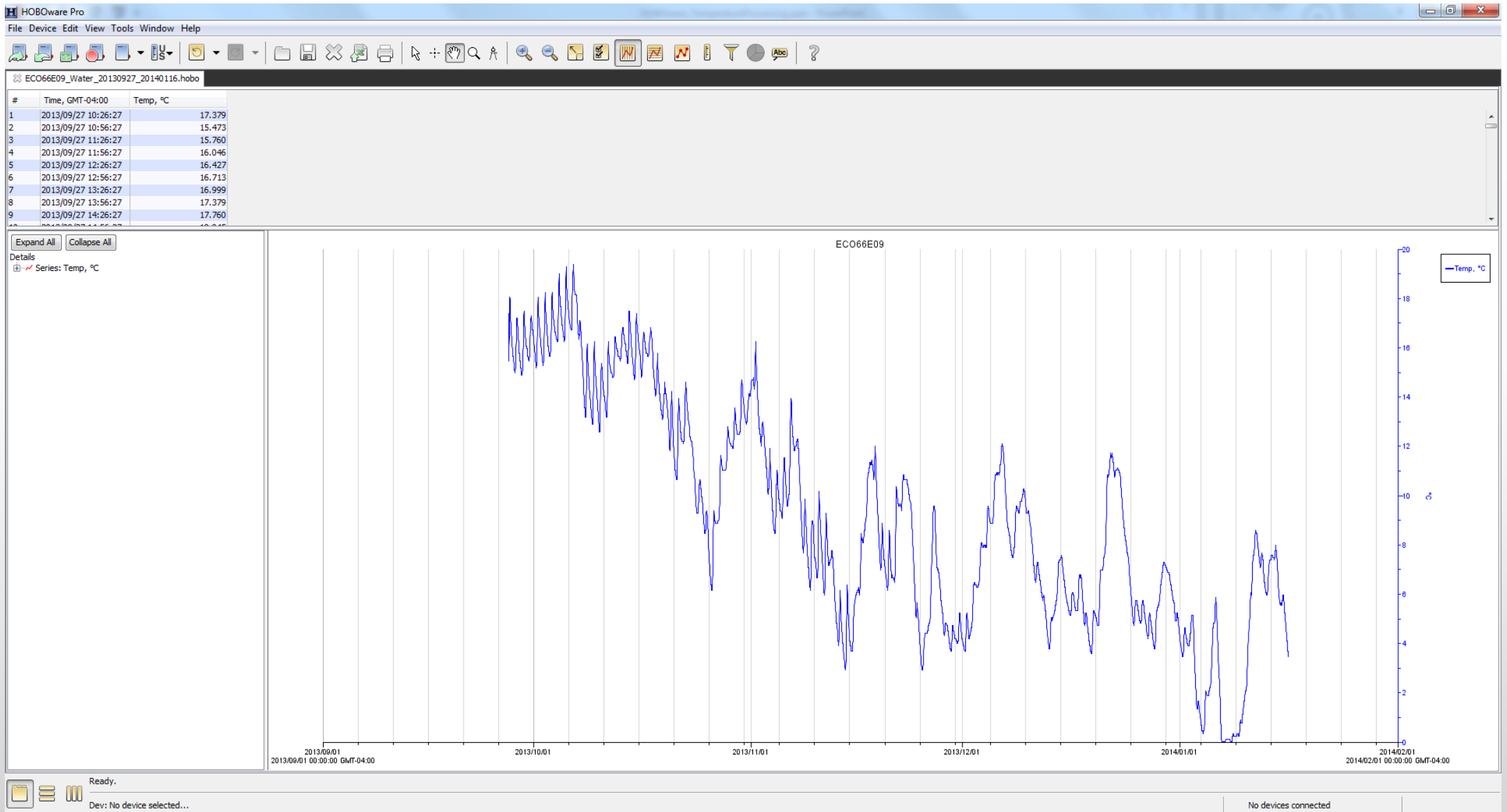
Temperature units °C

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)

Click 'Plot'

A time series plot will then appear



Change the Temp series name to 'Water Temp'

The screenshot shows the HOBOWare Pro interface. The 'Edit' menu is open, with 'Graph Properties' highlighted. A red arrow points from this menu item to the 'Series Properties' dialog box. In the dialog, the 'Description' field is set to 'Water Temp'. Another red arrow points from the 'Series: Temp, °C' entry in the 'Details' pane to the 'Graph Properties' menu item. A yellow box contains a four-step instruction list. The 'Done' button in the 'Series Properties' dialog is circled in red.

Series Properties Dialog:

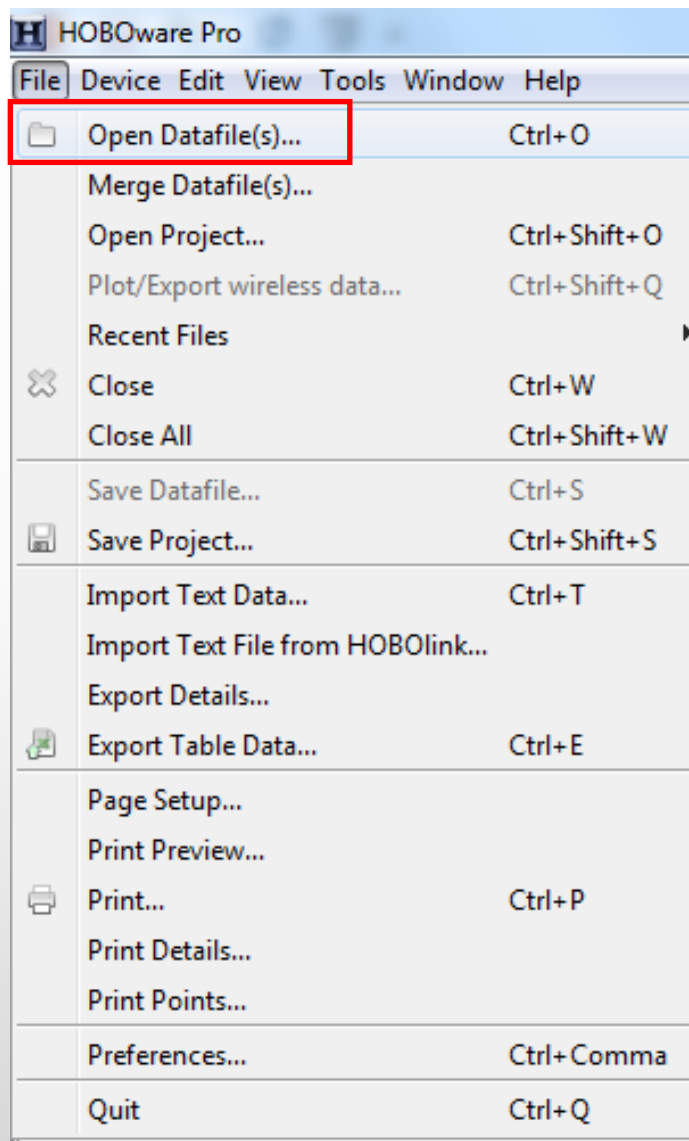
- Description: Water Temp
- Unit: °C
- Lines: ☒ Connect Points, Style: Solid, Width: 1, ☐ Connect As Steps
- Points: ☐ Mark Points, Marker: Rectangle, Point Size: 3
- Alarms: Max: 50.000, Min: -20.000, Enable Alarms: ☐ High Alarm, ☐ Low Alarm
- Misc: Time Axis: Time Axis, Value Axis: °C, Color: [Blue], Choose...
- Buttons: Cancel, Apply, Done

Details Pane:

Series: Temp, °C

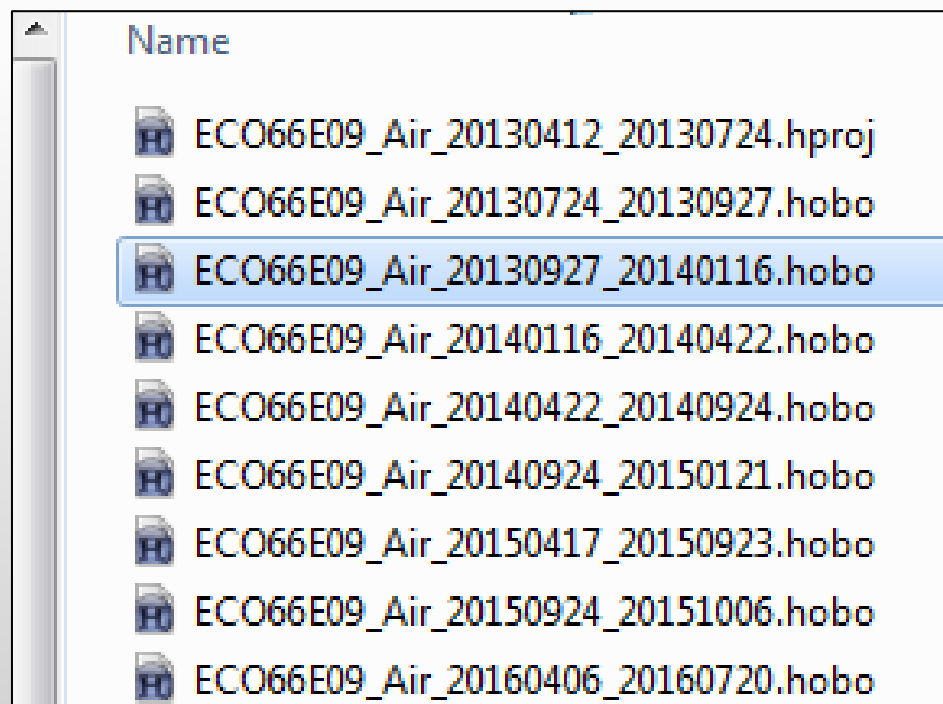
Yellow Box Instructions:

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)**.



Air sensor file – Plot Setup

The screenshot shows the HOBOWare Pro software interface. The main window displays a table of data and a corresponding line plot. The table has columns for Time (GMT-04:00) and Air Temp, °C. The plot shows a fluctuating line representing temperature over time.

The Plot Setup dialog is open, showing the following settings:

- Description: ECO66E09
- Select Series to Plot: ☒ All, ☐ None
- Series List:

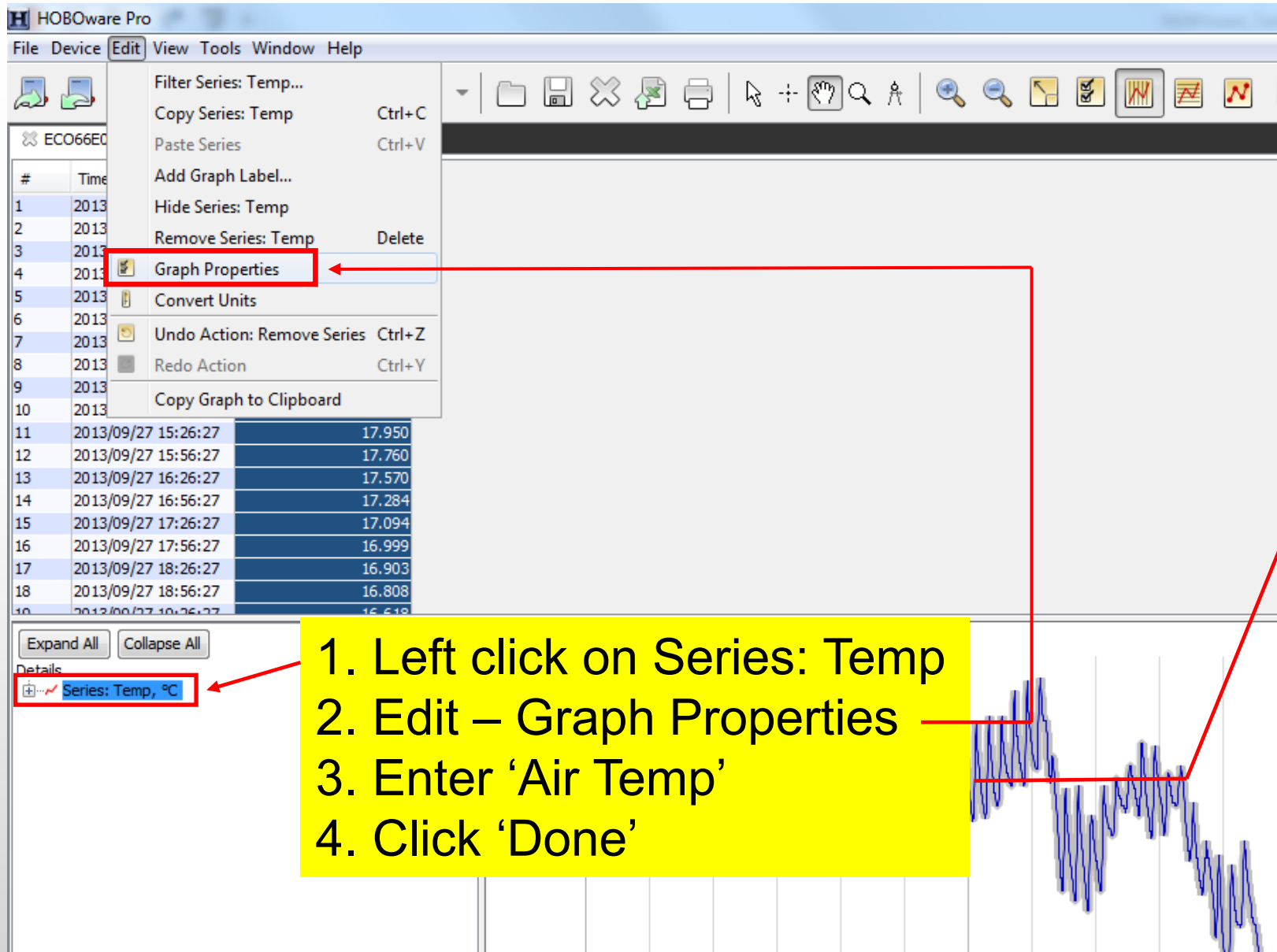
Series	Measurement	Units	Label
<input type="checkbox"/> 1	Abs Pres	psi	
<input checked="" type="checkbox"/> 2	Temp	°C	
<input type="checkbox"/> 3	Batt	V	
- Select Internal Logger Events to Plot: ☒ All, ☒ None
- Event List:

Event	Event Type	Units
<input type="checkbox"/> 1	Coupler Detached	
<input type="checkbox"/> 2	Coupler Attached	
<input type="checkbox"/> 3	Host Connected	
<input type="checkbox"/> 4	Stopped	
<input type="checkbox"/> 5	End Of File	
- Offset from GMT: -4 (GMT-04:00)
- Data Assistants: Barometric Compensation Assistant, Growing Degree Days Assistant
- Buttons: Process..., What's This?, Manage..., Load..., Help, Cancel, Plot

Yellow callout boxes highlight the following settings:

- Temperature units °C (points to the units dropdown for the Temp series)
- Click 'None' (points to the 'None' button for internal logger events)
- Check time zone (should match with water temperature) (points to the Offset from GMT field)
- Click 'Plot' (points to the Plot button)

Change the Temp series name to 'Air Temp'



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

The 'Series Properties' dialog box is shown. The 'Description' field is set to 'Air Temp' and is highlighted with a red box. The 'Units' field is set to '°C'. The 'Lines' section has 'Connect Points' checked, 'Style' set to 'Solid', and 'Width' set to '1'. The 'Points' section has 'Mark Points' unchecked, 'Marker' set to 'Oval', and 'Point Size' set to '3'. The 'Alarms' section has 'Enable Alarms' unchecked, with 'High Alarm' and 'Low Alarm' fields. The 'Misc.' section has 'Time Axis' set to 'Time Axis', 'Value Axis' set to '°C', and 'Color' set to black. The 'Done' button is highlighted with a red circle.

Copy the air temperature series

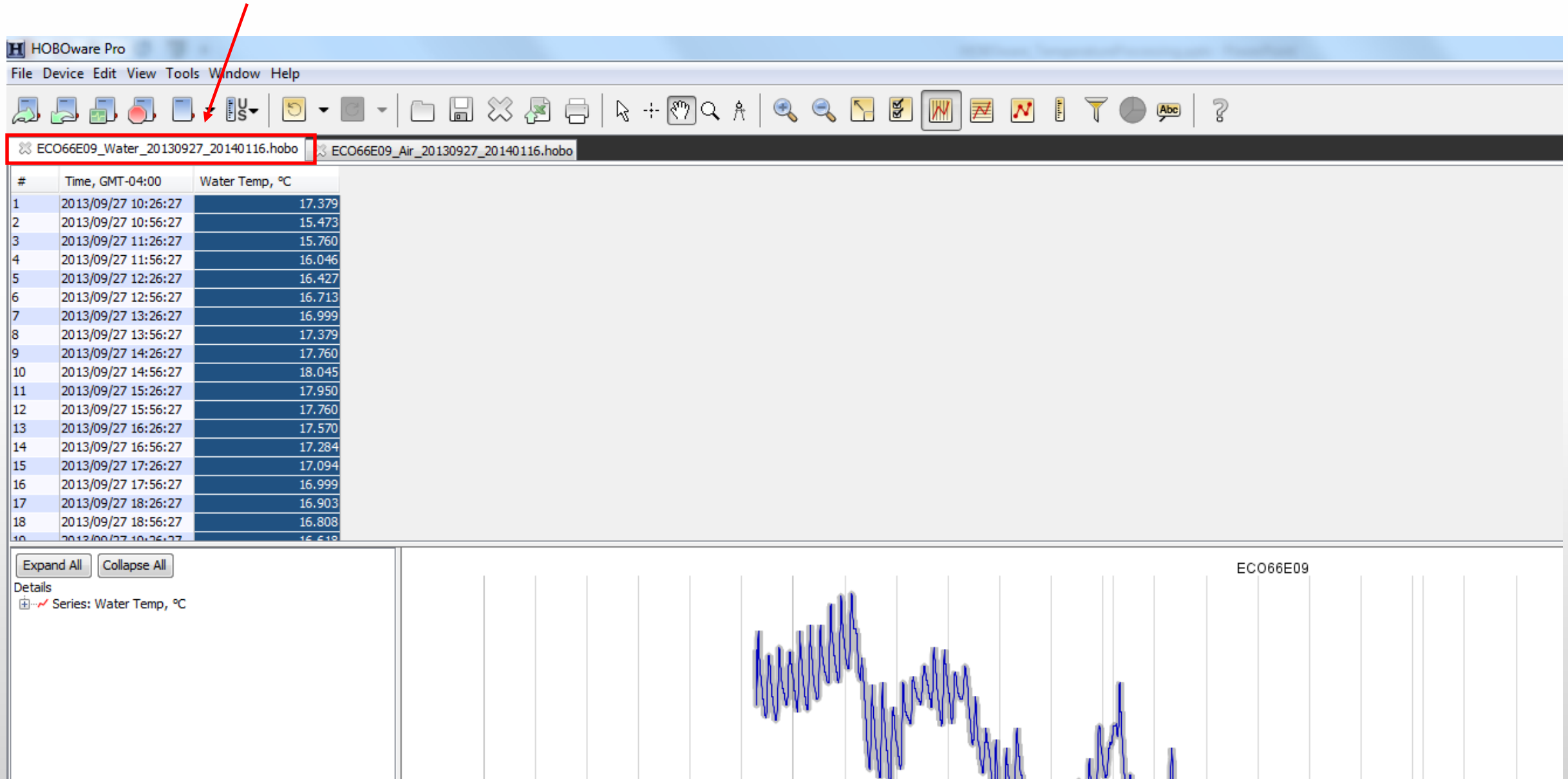
The screenshot shows the HOBOWare Pro interface. The 'Edit' menu is open, and 'Copy Series: Air Temp' is selected. A yellow box in the center contains the following steps:

- Edit
 - Copy Series: Temp

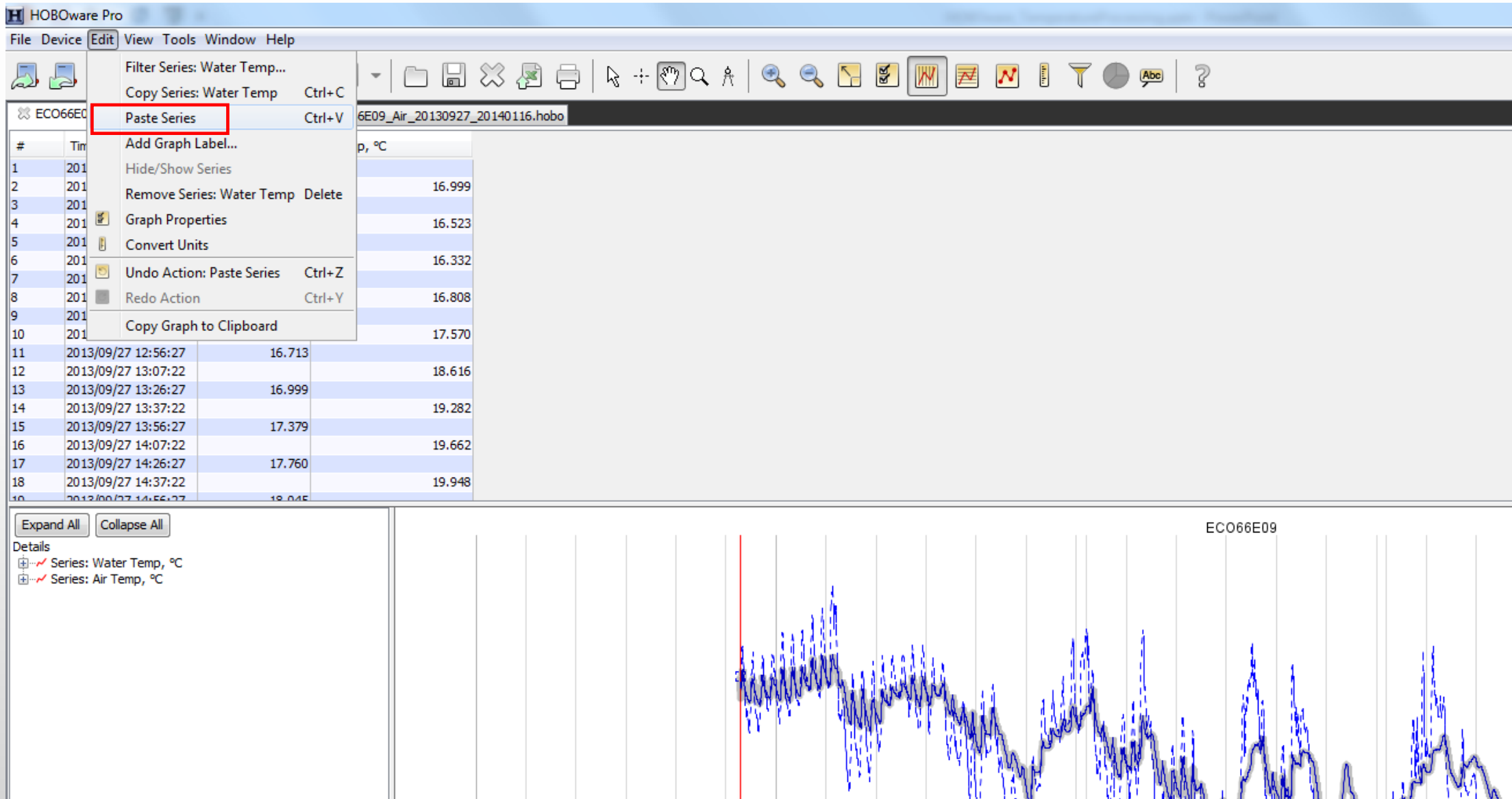
A red arrow points from the 'Series: Air Temp, °C' entry in the 'Details' panel to the yellow box at the bottom, which contains the note:

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

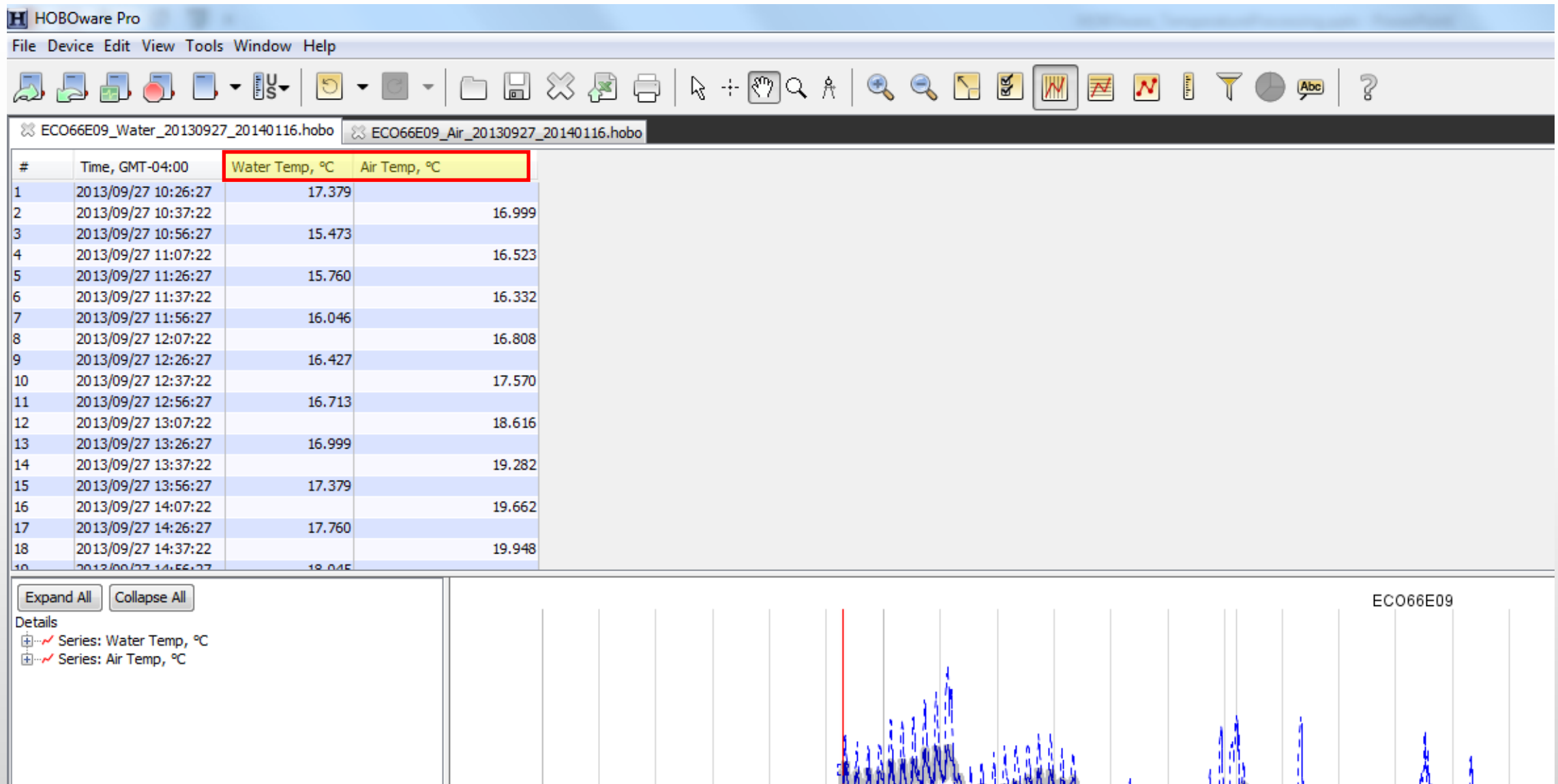
While keeping the air sensor file open, reopen the water sensor file



Paste the air temperature series into the water sensor file



Both air + water temperature data are now in one file, ready for export!



Export the .csv file

The screenshot shows the HOBOWare Pro software interface. The 'File' menu is open, and the 'Export Table Data...' option is highlighted with a red rectangle. A yellow box with a bulleted list is overlaid on the menu. The 'Export' dialog box is also open, showing a table with two rows: 'Water Temp' and 'Air Temp'. Both rows have their 'Select' checkboxes checked. A yellow box with text is overlaid on the dialog box. The 'Export...' button at the bottom right of the dialog box is circled in red.

- File
 - Export Table Data

Select	Measurement	Units	S/N	Label
<input checked="" type="checkbox"/>	Water Temp	°C	10229558	
<input checked="" type="checkbox"/>	Air Temp	°C	10229565	

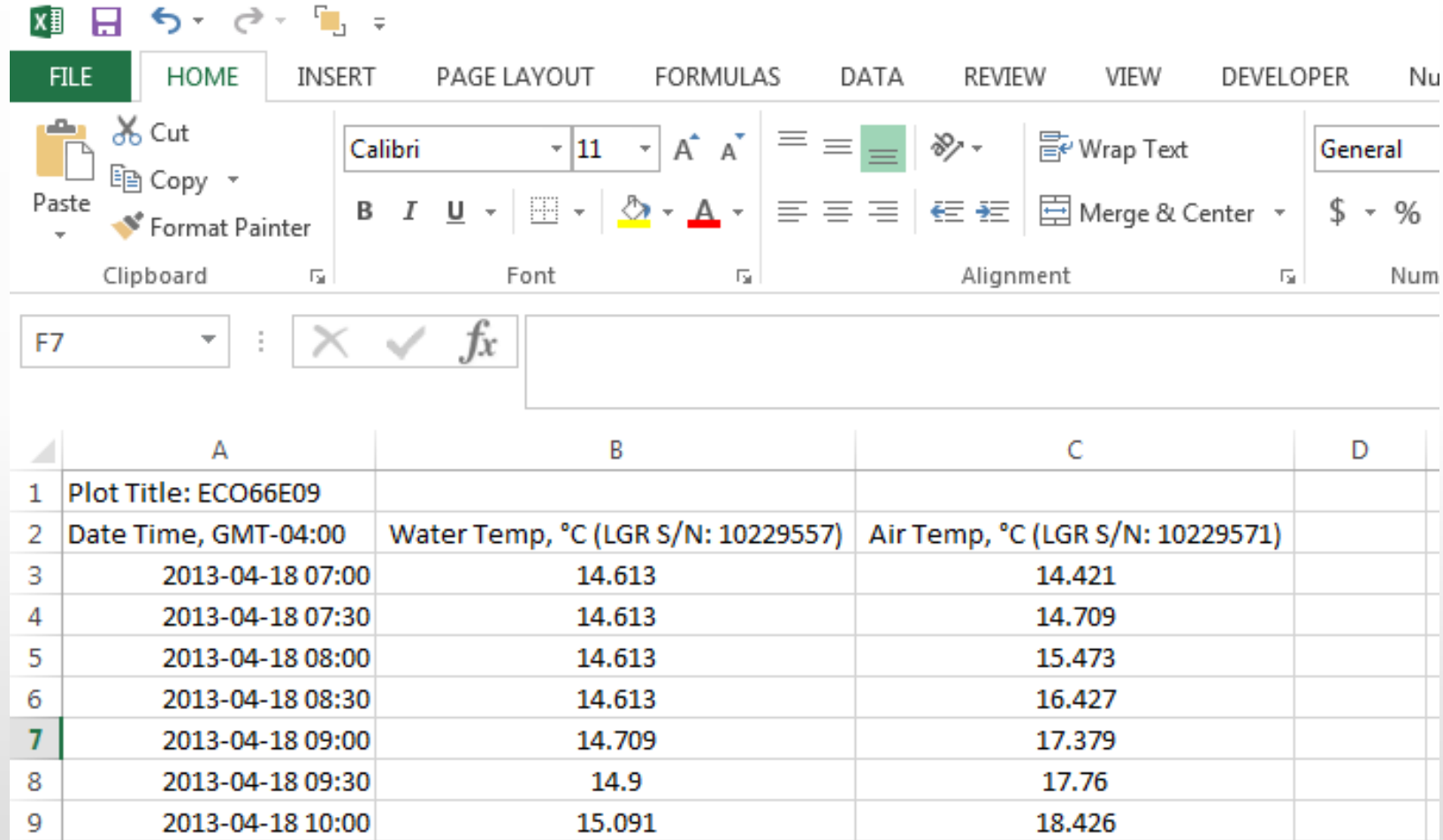
Select Both Parameters
Click 'Export'

Help

Cancel

Export...

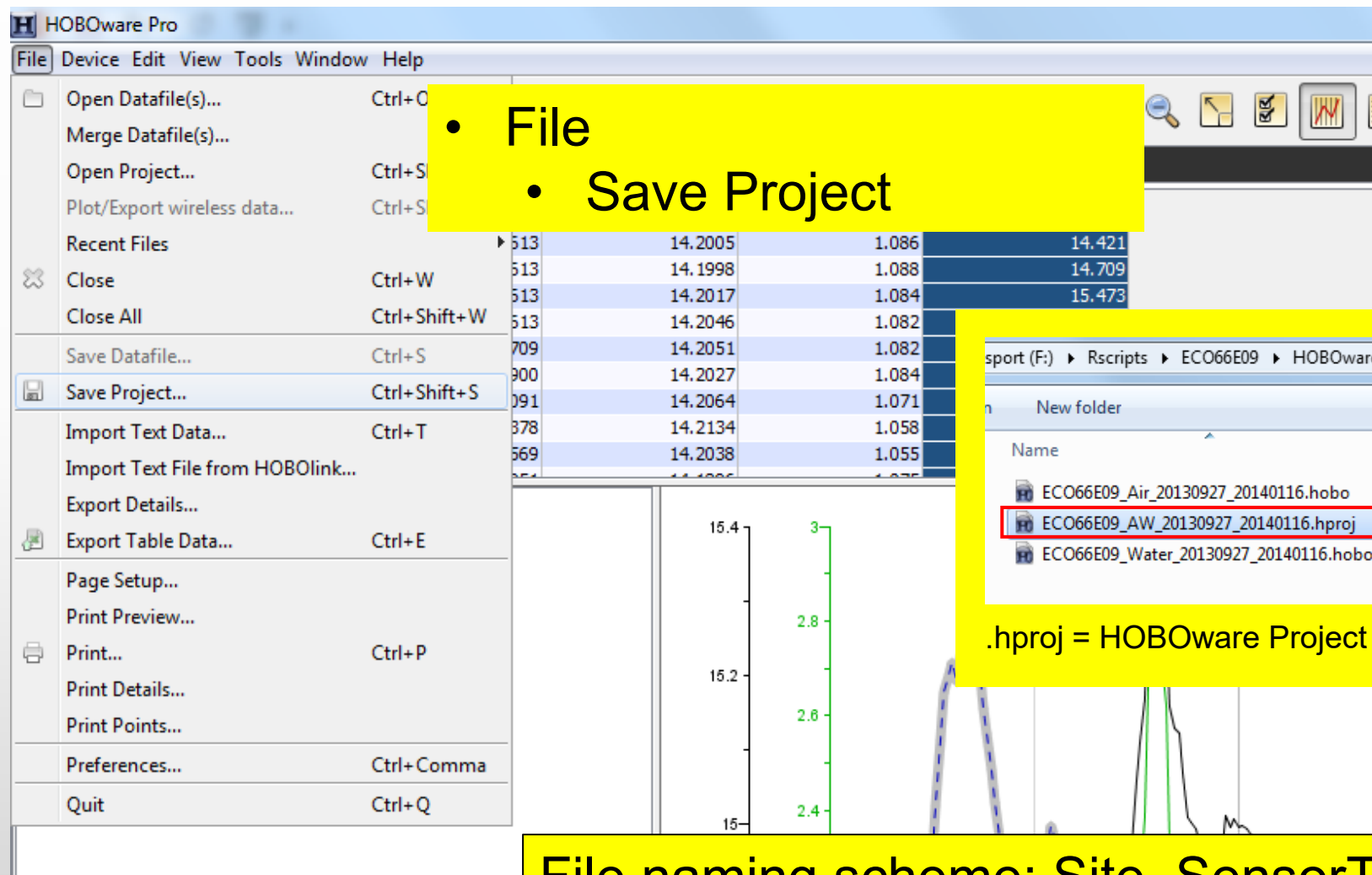
Save the .csv file in the Data0_Original folder.
The file should look like this...



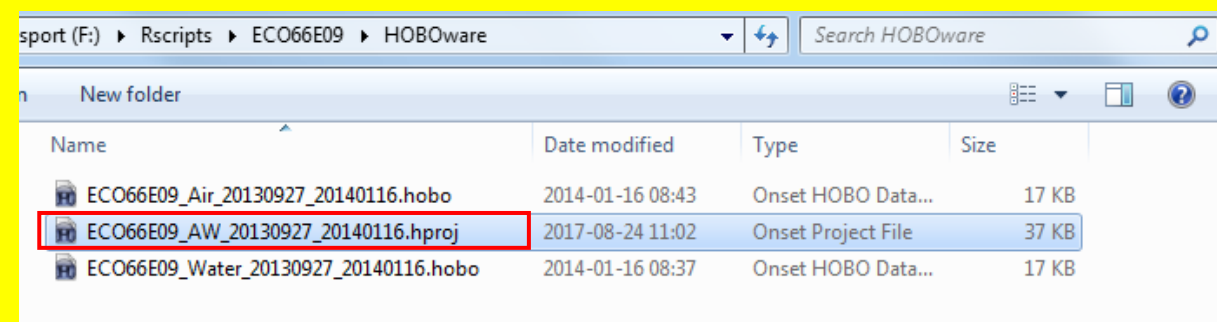
The screenshot shows the Microsoft Excel interface with the 'HOME' tab selected. The ribbon includes options for Clipboard, Font, Alignment, and Number. The active cell is F7. The data is organized in a table with columns A, B, and C, and rows 1 through 9. Row 1 contains the plot title, row 2 contains the headers for date time, water temperature, and air temperature, and rows 3 through 9 contain the corresponding data values.

	A	B	C	D
1	Plot Title: ECO66E09			
2	Date Time, GMT-04:00	Water Temp, °C (LGR S/N: 10229557)	Air Temp, °C (LGR S/N: 10229571)	
3	2013-04-18 07:00	14.613	14.421	
4	2013-04-18 07:30	14.613	14.709	
5	2013-04-18 08:00	14.613	15.473	
6	2013-04-18 08:30	14.613	16.427	
7	2013-04-18 09:00	14.709	17.379	
8	2013-04-18 09:30	14.9	17.76	
9	2013-04-18 10:00	15.091	18.426	

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



- File
 - Save Project

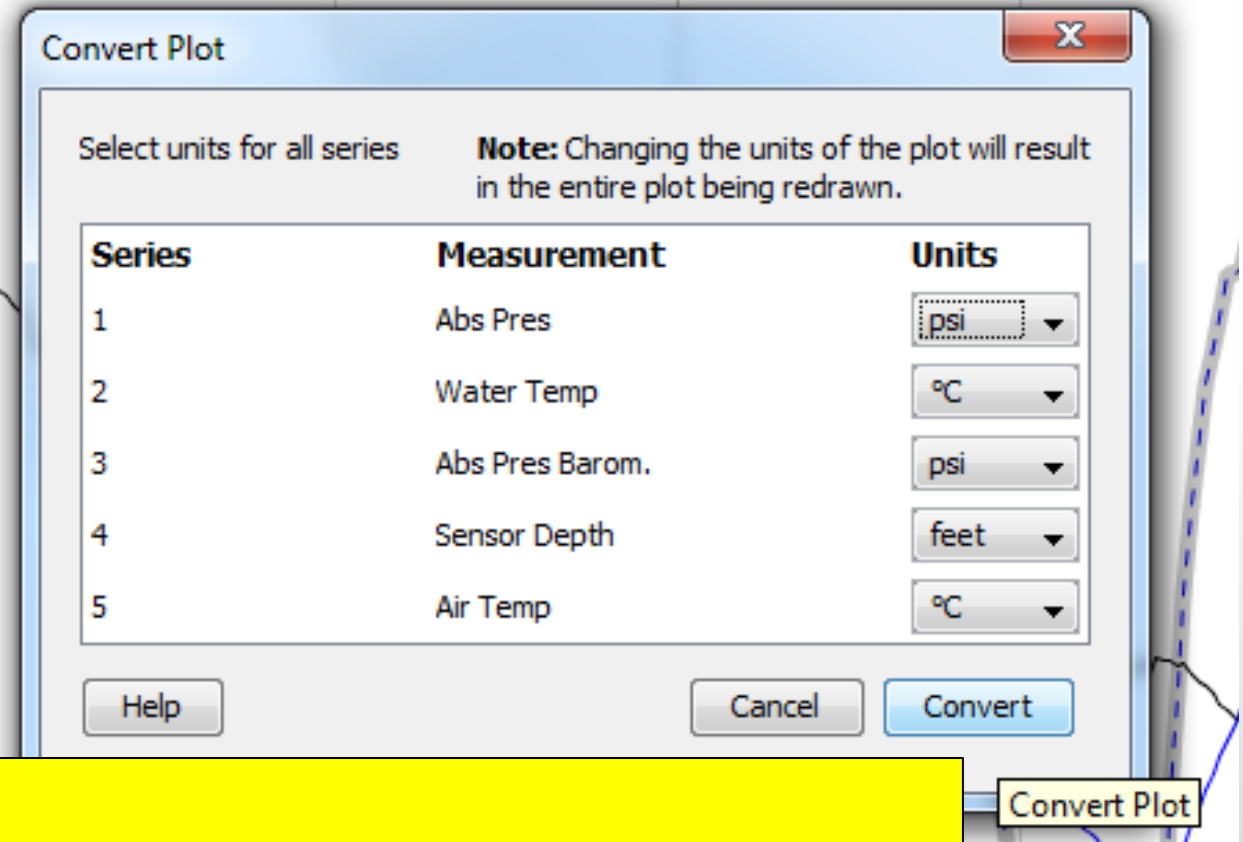
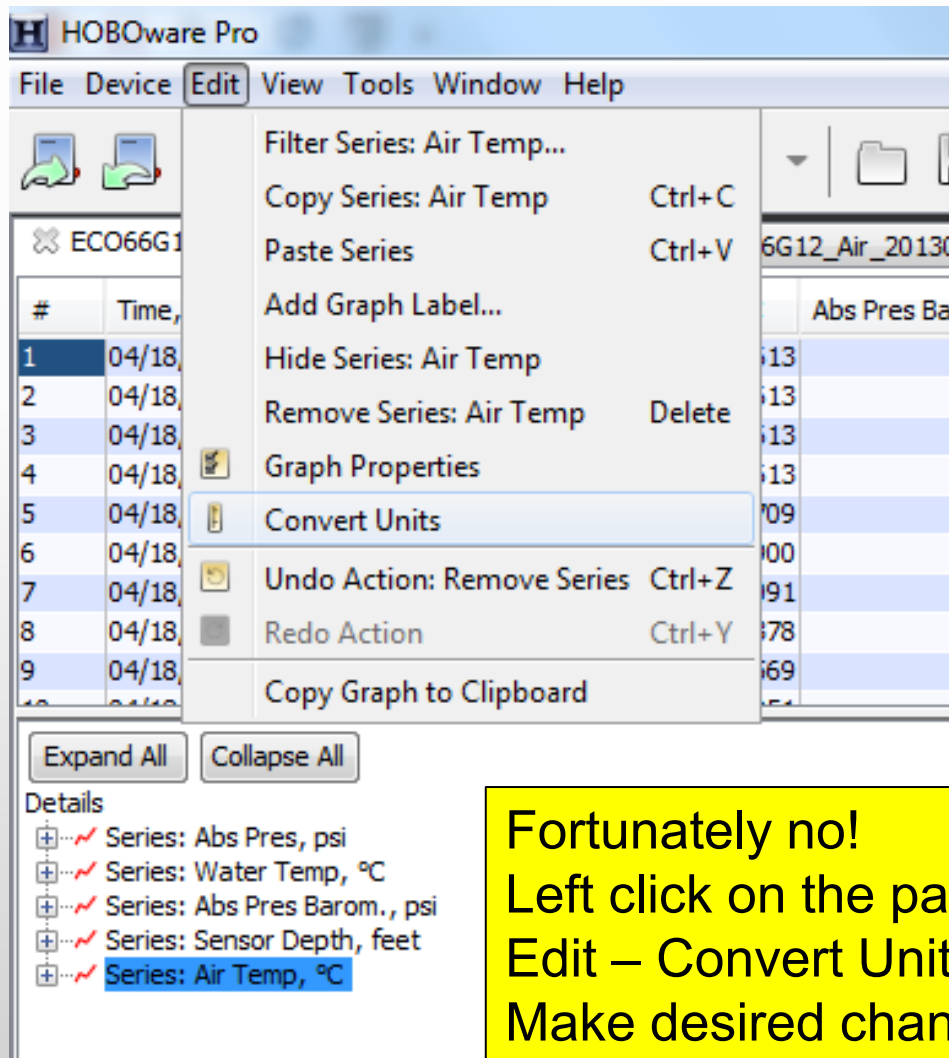


.hproj = HOBOWare Project files; retain the original HOBOWare Data files too!

File naming scheme: Site_SensorType_StartDate_EndDate
Example – ECO66E09_AW_20130927_20140116

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. 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 data is for station ECO66G12. A 'Title Properties' dialog box is open, showing the 'Name' field set to 'ECO66G12'. The 'Location' is set to 'Top'. The 'Font' is set to 'Dialog', size '12', and style 'Plain'. The 'Done' button is highlighted.

#	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	14.2027	1.084	17.760
8	04/18/13 11:30:00	14.6714	15.378	14.2027	1.084	17.760
9	04/18/13 12:00:00	14.6607	15.569	14.2027	1.084	17.760

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

Double click on the Plot Title

Update the name to the StationID

Acknowledgements

Development of these instructional materials was funded by EPA ORD/NCEA (contact: Britta Bierwagen - Bierwagen.Britta@epa.gov), Red Lake Band of Chippewa Indians (contact: Shane Bowe - shane.bowe.redlake@gmail.com) and grants from the Bureau of Indian Affairs (BIA).

Tetra Tech developed the materials with assistance from David Gibbs (EPA ORISE fellow: gibbs.david@epa.gov), Paul Gannett (Onset: Paul_Gannett@onsetcomp.com), Michelle Craddock (MA RIFLS), Nick Murray (WV DEP) and other RMN partners.

Questions can be directed to Jen Stamp (Jen.Stamp@tetrattech.com).