HOBO temperature/relative humidity data documentation

Percy Link

2012/9/19

Minor additions by Holly Maness (2012/10/15)

Kevin Simonin deployed 12 HOBO temperature/relative humidity sensors in an upslope ground transect – started in Jan 2010.

32 temperature/relative humidity sensors in vertical profiles in large trees – deployed in Flat Top and I-Lean on Feb 7, 2012; deployed in Ursula and three profiles on south side (SMU, SMM, Freddie) on May 7, 2012. Two additional ground sensors were added – one on the road between well 5 and well 6, and one at the top of the hill, near well 15.

Locations and start dates listed in *HoboDeviceProperties.xlsx*.

Cartoon figure *SensorCartoonMap.pptx* shows approximate locations.

New sensors (for vertical profiles) were calibrated against each other (kept in a box together for a couple months) – script *calibrateHOBOs.py* in the Calibration directory calculates linear calibration with all these sensors against the same one of the sensors, sensor 51. These linear coefficients (slope=m, intercept=b) are in file *linregressions.csv* and should be applied to the data before comparing sensors.

Kevin’s old sensors were calibrated with new sensors. A new sensor was collocated with each old sensor for 3 months (Feb 7 – May 7, 2012), and a linear regression equation was calculated between the corrected new sensor values (calibrated to sensor 51) and Kevin’s old sensor values. The script *crosscal\_Kevinsensors.py* calculated this calibration. These linear coefficients are in file *calibrations\_Kevinsensors.csv* and should be applied to the data before comparing sensors.

NOTE: Data from before a sensor’s listed start date (date of deployment in its field location) should not be used, because previous data are from calibration, when sensor was in a box or in a different location at the field site.

ALSO NOTE: The relative humidity sensor for sensor 803 is dead; this data should not be used.

The included process\_data.py script takes this information into account and applies the aforementioned calibrations. The results are saved to a Python pickle file (HOBOdata.p).

Data file inventory by sensor (these directories are all in the “Data” directory):

# 795 = 1-3

files['795'] = ['25 August 2010/station1-3.csv','ShuttleReadout12\_10\_10\_10\_02\_57\_AM\_PST/2373795.csv',\

'ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373795\_0.csv','6 Feb 2012/2373795.csv','ShuttleReadout03\_16\_12\_12\_04\_52\_PM\_GMT-07\_00/2373795.csv',\

'ShuttleReadout05\_07\_12\_02\_07\_41\_PM\_GMT-07\_00/2373795\_0.csv','ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373795.csv']

# 796 = 2-4

files['796'] = ['25 August 2010/station2-4.csv','ShuttleReadout10\_22\_10\_08\_47\_13\_AM\_PDT/2373796\_0.csv',\

'ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373796\_1.csv','ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373796\_2.csv',\

'6 Feb 2012/2373796.csv','ShuttleReadout03\_16\_12\_12\_04\_52\_PM\_GMT-07\_00/2373796.csv','ShuttleReadout05\_07\_12\_04\_56\_23\_PM\_GMT-07\_00/2373796.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373796.csv','ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373796\_0.csv']

# 797 = 2-1

files['797'] = ['25 August 2010/station2-1.csv','ShuttleReadout10\_22\_10\_08\_47\_13\_AM\_PDT/2373797\_0.csv',\

'ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373797\_1.csv','6 Feb 2012/2373797.csv',\

'ShuttleReadout05\_07\_12\_02\_07\_41\_PM\_GMT-07\_00/2373797.csv','ShuttleReadout05\_07\_12\_04\_56\_23\_PM\_GMT-07\_00/2373797.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373797.csv']

# 798 = 1-1

files['798'] = ['25 August 2010/station1-1.csv','ShuttleReadout12\_10\_10\_10\_02\_57\_AM\_PST/2373798.csv',\

'ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373798\_0.csv','6 Feb 2012/2373798.csv',\

'ShuttleReadout03\_16\_12\_12\_04\_52\_PM\_GMT-07\_00/2373798.csv','ShuttleReadout05\_07\_12\_02\_07\_41\_PM\_GMT-07\_00/2373798\_0.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373798.csv']

# 799 = S-1

files['799'] = ['25 August 2010/station3-1.csv','ShuttleReadout10\_22\_10\_08\_47\_13\_AM\_PDT/2373799\_0.csv',\

'ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373799\_1.csv','6 Feb 2012/2373799.csv',\

'ShuttleReadout03\_16\_12\_12\_04\_52\_PM\_GMT-07\_00/2373799.csv','ShuttleReadout05\_07\_12\_04\_22\_10\_PM\_GMT-07\_00/2373799.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373799.csv']

# 800 = 1-4

files['800'] = ['25 August 2010/station1-4.csv','ShuttleReadout12\_10\_10\_10\_02\_57\_AM\_PST/2373800.csv',\

'ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373800\_0.csv','6 Feb 2012/2373800.csv',\

'ShuttleReadout03\_16\_12\_12\_04\_52\_PM\_GMT-07\_00/2373800.csv','ShuttleReadout05\_07\_12\_02\_07\_41\_PM\_GMT-07\_00/2373800\_0.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373800.csv']

# 803 = S-3

files['803'] = ['25 August 2010/station3-3.csv','ShuttleReadout10\_22\_10\_08\_47\_13\_AM\_PDT/2373803\_0.csv',\

'ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373803\_1.csv','6 Feb 2012/2373803.csv',\

'ShuttleReadout03\_16\_12\_12\_04\_52\_PM\_GMT-07\_00/2373803.csv','ShuttleReadout05\_07\_12\_04\_22\_10\_PM\_GMT-07\_00/2373803.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373803.csv']

# 804 = 2-3

files['804'] = ['25 August 2010/station2-3.csv','ShuttleReadout10\_22\_10\_08\_47\_13\_AM\_PDT/2373804\_0.csv',\

'ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373804\_1.csv','ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373804\_2.csv',\

'6 Feb 2012/2373804.csv','ShuttleReadout03\_16\_12\_12\_04\_52\_PM\_GMT-07\_00/2373804.csv',\

'ShuttleReadout05\_07\_12\_04\_56\_23\_PM\_GMT-07\_00/2373804.csv','ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373804.csv']

# 807 = 1-2

files['807'] = ['25 August 2010/station1-2.csv','ShuttleReadout12\_10\_10\_10\_02\_57\_AM\_PST/2373807.csv',\

'ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373807\_0.csv','6 Feb 2012/2373807.csv',\

'ShuttleReadout03\_16\_12\_12\_04\_52\_PM\_GMT-07\_00/2373807.csv','ShuttleReadout05\_07\_12\_02\_07\_41\_PM\_GMT-07\_00/2373807\_0.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373807.csv']

# 808 = S-2

files['808'] = ['25 August 2010/station3-2.csv','ShuttleReadout10\_22\_10\_08\_47\_13\_AM\_PDT/2373808\_0.csv',\

'ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373808\_1.csv','6 Feb 2012/2373808.csv',\

'ShuttleReadout03\_16\_12\_12\_04\_52\_PM\_GMT-07\_00/2373808.csv','ShuttleReadout05\_07\_12\_04\_22\_10\_PM\_GMT-07\_00/2373808.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373808.csv']

# 809 = S-4

files['809'] = ['6 May 2010/Station3-4.csv','25 August 2010/station3-4.csv',\

'ShuttleReadout10\_22\_10\_08\_47\_13\_AM\_PDT/2373809\_0.csv','ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373809\_1.csv',\

'6 Feb 2012/2373809.csv','ShuttleReadout03\_16\_12\_12\_04\_52\_PM\_GMT-07\_00/2373809.csv',\

'ShuttleReadout05\_07\_12\_04\_22\_10\_PM\_GMT-07\_00/2373809.csv','ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373809.csv']

# 810 = 2-2

files['810'] = ['25 August 2010/station2-2.csv','ShuttleReadout10\_22\_10\_08\_47\_13\_AM\_PDT/2373810\_0.csv',\

'ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373810\_1.csv','ShuttleReadout09\_07\_11\_05\_38\_23\_PM\_PDT/2373810\_2.csv',\

'6 Feb 2012/2373810.csv','ShuttleReadout03\_16\_12\_12\_04\_52\_PM\_GMT-07\_00/2373810.csv',\

'ShuttleReadout05\_07\_12\_04\_56\_23\_PM\_GMT-07\_00/2373810.csv','ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/2373810.csv']

# 40 = ILean 30m

files['40'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042540\_0\_mod.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042540.csv']

# 52 = ILean 25m

files['52'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042552\_0.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042552.csv']

# 44 = ILean 20m

files['44'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042544\_0.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042544.csv']

# 45 = ILean 15m

files['45'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042545\_0.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042545.csv']

# 43 = ILean 10m

files['43'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042543\_0.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042543.csv']

# 36 = ILean 5m

files['36'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042536\_0.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042536.csv']

# 47 = FT 28m

files['47'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042547.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042547.csv']

# 56 = FT 22m

files['56'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042556.csv',\

'ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042556\_0.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042556.csv']

# 35 = FT 17m

files['35'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042535.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042535.csv']

# 41 = FT 12m

files['41'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042541.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042541.csv']

# 33 = FT 7m

files['33'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042533.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042533.csv']

# 49 = FT 2m

files['49'] = ['ShuttleReadout05\_07\_12\_03\_45\_25\_PM\_GMT-07\_00/HydroWatch\_10042549.csv',\

'ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042549.csv']

# 62 = Ursula 25 m

files['62'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042562.csv']

# 58 = Ursula 20 m

files['58'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042558.csv']

# 54 = Ursula 15 m

files['54'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042554.csv']

# 61 = Ursula 10 m

files['61'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042561.csv']

# 42 = Ursula 5 m

files['42'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042542.csv']

# 59 = SMM 17.5 m

files['59'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042559.csv']

# 32 = SMM 15 m

files['32'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042532.csv']

# 60 = SMM 10 m

files['60'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042560.csv']

# 48 = SMM 5 m

files['48'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042548.csv']

# 34 = SMM 2.5 m

files['34'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042534.csv']

# 63 = SMU 17.5 m

files['63'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042563.csv']

# 37 = SMU 15 m

files['37'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042537.csv']

# 66 = SMU 10 m

files['66'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042566.csv']

# 65 = SMU 7.5 m

files['65'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042565.csv']

# 64 = SMU 5 m

files['64'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042564.csv']

# 50 = Freddie 30 m

files['50'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042550.csv']

# 51 = Freddie 24 m

files['51'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042551.csv']

# 53 = Freddie 18 m

files['53'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042553.csv']

# 39 = Freddie 12 m

files['39'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042539.csv']

# 46 = Freddie 6 m

files['46'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042546.csv']

# 38 = road between well 6 and well 5

files['38'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042538.csv']

# 57 = near well 15, top of ridge

files['57'] = ['ShuttleReadout09\_16\_12\_01\_13\_41\_AM\_GMT-07\_00/HydroWatch\_10042557.csv']