Meteorological Post Processing Documentation and Task Lists for 2009/2010

McMurdo Dry Valley Long Term Ecological Research (LTER)

This document compiles the steps taken to post-process raw meteorological data files and notes from station visits. Each numbered output value is identified by column header name, unit of measurement, and post-processing instruction. Station notes document datalogger time adjustments, sensor status, sensor and station maintenance, time of storage module changes, equipment and data problems, and other observations. Files are listed alphabetically by file name.

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Appendix

File description and task list for files:

o1=omit from level 1
ok= no changes to get to level 1
rclow= reverse temperatures to mV and apply clow subroutine to mV values using Steinhart-Hart equation
bad= normally would be included in level 1 but number is suspect or know to be incorrect
flag= reasonable number but needs a note attached concerning its collection
Lowe= see note for relative humidity below

Relative humidity correction note: All of the relative humidity (RH) values were corrected for a systematic error in the measurement created by an instrument manufacturer error. All RH data with air temperatures below freezing were corrected using the vapor pressure over ice (rather than over water which was used initially). The error became quite large for very cold temperatures (the correction could grow to around 30%). The polynomials used for the correction is based on Lowe (1977).

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=[RH3m]*(6.107799961 + [AirT3m] * (0.4436518521 + [AirT3m] * (0.01428945805 + [AirT3m] * (0.0002650648471 + [AirT3m]
*(0.000003031240396 + [AirT3m] * (0.00000002034080948 + 0.0000000006136820929 * [AirT3m])))))) / (6.109177956 + [AirT3m] *
(0.503469897 + [AirT3m] * (0.01886013408 + [AirT3m] * (0.0004176223716 + [AirT3m] * (0.00000582472028 + [AirT3m] *
(0.00000004838803174 + 0.0000000001838826904 * [AirT3m])))))
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Prepared by: Hassan Basagic, 2010 Portland State University, OR

Beacon Valley

Filename:	ben9101.dat
Station:	Beacon Valley
Author of this report:	Hassan Basagic
File Period:	December 16, 2008 at 1500 to November 20, 2009 at 1215
Sampling Frequency:	wind every 4 sec.; others: every 30 sec.
Averaging and Output Interval:	every 15 minutes
Program Name	ben087v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	corrected mean R.H. @ 3 meters (%)	Lowe correction
6	mean solar flux going down (W/m2) –PY45665	ok
7	mean solar flux going up (W/m2) – PY18400	ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	mean P.A.R. (micromols/s/m2)	Q20275 - multiply by 1.18
15	mean soil temperature @ 0 cm in soil (C)	rclow
16	mean soil temperature @ 5 cm in soil (C)	rclow
17	mean soil temperature @ 10 cm in soil (C)	rclow
18	sample of battery voltage	o1

Notes:

1. No missing data.
2. Datalogger time adjusted ahead by 1 min 30 sec on November 20, 2009 at 1137.
3. Input values and wind direction appear correct.
4. Maintenance: November 20, 2009 swapped down facing pyranometer (old#PY18400, new#PY27937) at 12:12. Upward facing pyranometer needs replacement plate as current locknut is stripped.
5. SM swapped on November 20, 2009 at 1217.

Lake Bonney

Filename:	boy9101.dat
Station:	Lake Bonney
Author of this report:	Hassan Basagic
File Period:	January 10, 2009 at 1330 to November 25, 2009 at 1015
Sampling Frequency:	sonic and prec. every 60 minutes, wind speed every 4 sec, other every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name	boy089v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	corrected mean R.H. @ 3 meters (%)	Lowe correction
6	mean solar flux going down (W/m2) – PY41099	ok
7	mean solar flux going up (W/m2) – PY40424	ok
8	mean P.A.R. (micromols/s/m2) – Q33906	divide by 200, multiply by 292.51
9	mean horizontal wind speed (m/s)	ok
10	resultant mean wind speed (m/s)	o1
11	resultant mean wind direction (degrees from north)	ok
12	standard deviation of wind direction (degrees)	ok
13	maximum wind speed (m/s)	ok
14	minimum wind speed (m/s)	ok
15	mean up-facing pyrgeometer, rad. comp. (W/m2)	30831F : divide by 250; multiply by 277.01
16	mean up-facing pyrgeometer hemisphere temp	Eppley
17	mean up-facing pyrgeometer thermopile (W/m2)	Eppley
18	mean up-facing pyrgeometer case temp	Eppley
19	mean down-facing pyrgeometer, rad. comp. (W/m2)	32059F3 - divide by 250; multiply by 227.79
20	mean down-facing pyrgeometer hemisphere temp	Eppley
21	mean down-facing pyrgeometer thermopile (W/m2)	Eppley
22	mean down-facing pyrgeometer case temp	Eppley
23	mean soil temperature @ 0 cm in soil (C)	rclow
24	mean soil temperature @ 5 cm in soil (C)	rclow
25	mean soil temperature @ 10 cm in soil (C)	rclow
26	sample depth from sensor to surface (cm)	Measured depth (0.412) + Value) * 100
27	sample precipitation (mm)	ok
28	sample of battery voltage	o1

Notes:

1. No missing data.
2. Time and adjusted back 5 min and 30 sec on November 25, 2009 at 950.
3. Input values appear out of order. Ultrasonic ranger and voltage inputs are reading zero. Ultrasonic height is 39.8 cm. Sensit height is correct at 20 cm.
4. Maintenance: on November 25, 2009 swapped upfacing pyranometer (old#PY41099, new#PY23269) at 1022 and downfacing pyranometer (old# PY40424, new#PY23250) at 1017.
5. SM swapped on November 25, 2009 at 1047.

Filename:	boy9102.dat
Station:	Lake Bonney
Author of this report:	Hassan Basagic
File Period:	November 25, 2009 at 1030 to December 2, 2009 at 1300
Sampling Frequency:	sonic and prec. every 60 minutes, wind speed every 4 sec, other every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name	boy089v1 and boy910v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	corrected mean R.H. @ 3 meters (%)	Lowe correction
6	mean solar flux going down (W/m^2)	PY23269 ok
7	mean solar flux going up (W/m^2)	PY23250 ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	mean P.A.R. (micromols/s/m2) – Q33906	divide by 200, multiply by 292.51
15	mean soil temperature @ 0 cm in soil (C)	rclow
16	mean soil temperature @ 5 cm in soil (C)	rclow
17	mean soil temperature @ 10 cm in soil (C)	rclow
18	sample depth from sensor to surface (cm)	Measured depth (0.412) + Value) * 100
19	mean up-facing pyrgeometer, rad. comp. (W/m^2)	30831F - divide by 250; multiply by 277.01
20	mean up-facing pyrgeometer hemisphere temp	Eppley
21	mean up-facing pyrgeometer thermopile (W/m^2)	Eppley
22	mean up-facing pyrgeometer case temp	Eppley
23	mean down-facing pyrgeometer, rad. comp. (W/m^2)	32059F3 - divide by 250; multiply by 227.79
24	mean down-facing pyrgeometer hemisphere temp	Eppley
25	mean down-facing pyrgeometer thermopile (W/m^2)	Eppley
26	mean down-facing pyrgeometer case temp	Eppley
27	sample precipitation (mm)	ok
28	sample of battery voltage	o1

Notes:

1. Remote upload of new program (boy910v1.dld) on December 1, 2009 at 2130. New program changes order of input and output locations and repairs problems with ultrasonic ranger and battery voltage.
2. Site visit on December 2, 2009. One line of missing data on December 1, 2009 2145. Time and date are correct.
3. All operating well. Ultrasonic height is 41.0 cm. Sensit height is correct at 20 cm.
4. SM swapped on December 2, 2009 at 1305.

Filename:	boy9103.dat
Station:	Lake Bonney
Author of this report:	Hassan Basagic
File Period:	December 2, 2009 at 1315 to January 15, 2010 at 1000
Sampling Frequency:	sonic and prec. every 60 minutes, wind speed every 4 sec, other every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name	boy910v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	corrected mean R.H. @ 3 meters (%)	Lowe correction
6	mean solar flux going down (W/m^2)	PY23269 ok
7	mean solar flux going up (W/m^2)	PY23250 ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	mean P.A.R. (micromols/s/m2) – Q33906	divide by 200, multiply by 292.51
15	mean soil temperature @ 0 cm in soil (C)	rclow
16	mean soil temperature @ 5 cm in soil (C)	rclow
17	mean soil temperature @ 10 cm in soil (C)	rclow
18	sample depth from sensor to surface (cm)	Measured depth (0.412) + Value) * 100
19	mean up-facing pyrgeometer, rad. comp. (W/m^2)	30831F - divide by 250; multiply by 277.01
20	mean up-facing pyrgeometer hemisphere temp	Eppley
21	mean up-facing pyrgeometer thermopile (W/m^2)	Eppley
22	mean up-facing pyrgeometer case temp	Eppley
23	mean down-facing pyrgeometer, rad. comp. (W/m^2)	32059F3 - divide by 250; multiply by 227.79
24	mean down-facing pyrgeometer hemisphere temp	Eppley
25	mean down-facing pyrgeometer thermopile (W/m^2)	Eppley
26	mean down-facing pyrgeometer case temp	Eppley
27	sample precipitation (mm)	ok
28	sample of battery voltage	o1

Notes:

1. No missing data. Time and date are correct on January 15, 2010 at 1005.
2. All operating well. Ultrasonic height is 40.4 cm. Sensit height is correct at 20 cm.
3. SM swapped on January 15, 2010 at 1003.

Lake Brownworth

Filename:	brh9101.dat
Station:	Lake Brownworth
Author of this report:	Hassan Basagic
File Period:	December 30, 2008 at 1315 to December 1, 2009 at 1215
Sampling Frequency:	sonic every 60 minutes, wind speed every 4 sec, other every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name	brh045v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	corrected mean R.H. @ 3 meters (%)	Lowe correction
6	mean solar flux coming down (W/m^2) – PY25306 (PY40423)	ok
7	mean solar flux going up (W/m^2) – PY28167 (PY27929)	ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	mean P.A.R. (micromols/s/m^2)	Q28265 – multiply by 1.1792 Q32567 – multiply by 1.3960
15	mean soil temperature @ 0 cm in soil (C)	rclow
16	mean soil temperature @ 5 cm in soil (C)	rclow
17	mean soil temperature @ 10 cm in soil (C)	rclow
18	sample depth from sensor to surface (cm)	Measured depth (0.589) + Value) * 100
19	sample of battery voltage	o1

Notes:

1. One line of repeat data on 12/1/2009 at 11:45 caused by clock reset. Deleted second line.
2. Datalogger clock corrected back 9 min on December 1, 2009 at 1140.
3. Check input values and wind alignment on December 1, 2009 at 1145, all values look good. Ultrasonic ranger height was 58.5 cm (bare-ground).
4. Maintenance: on December 1, 2009 swapped upfacing pyranometer (old# PY25306, new# PY40423) at 12:05, downfacing pyranometer (old# PY28167, new# PY27929) at 1203, quantum PAR (old# Q28265, new# Q32567) at 1214, and CR10x datalogger at 1225.
5. Swapped SM on December 1, 2009 at 1236.

Canada Glacier

Filename:	caa9101.dat
Station:	Canada Glacier
Author of this report:	Hassan Basagic
File Period:	January 17, 2009 at 1615 to November 13, 2009 at 1415
Sampling Frequency:	wind speed every 4 sec; all other every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name	caa089v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. (C)	rclow
5	corrected mean relative humidity (%)	Lowe correction
6	mean solar flux coming down (W/m^2)	ok
7	mean solar flux going up (W/m^2)	ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	sample battery voltage	o1

Notes:
1. No missing data.
2. Time ok on November 13, 2009 at 1409.
3. Swapped SM on November 13, 2009 at 1417.

Filename:	caa9102.dat
Station:	Canada Glacier
Author of this report:	Hassan Basagic
File Period:	November 13, 2009 at 1430 to November 29, 2009 at 1515
Sampling Frequency:	wind speed every 4 sec; all other every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name	caa089v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. (C)	rclow
5	corrected mean relative humidity (%)	Lowe correction
6	mean solar flux coming down (W/m^2)	ok
7	mean solar flux going up (W/m^2)	ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	sample battery voltage	o1

Notes:

1. No missing data.
2. Time ok on November 29, 2009 at 1507
3. Maintenance on November 29, 2009 swapped RH, CR10x. Rotated cross bar to allow downward facing Licor a full ice view. Previous measurements may have been affected by old wood from last station move.
4. Swapped SM on November 29, 2009 at 1517.

Filename:	caa9103.dat
Station:	Canada Glacier
Author of this report:	Liz Bagshaw / Hassan Basagic
File Period:	November 29, 2009 at 1545 to January 22, 2010 at 1300
Sampling Frequency:	wind speed every 4 sec; all other every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name	caa089v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. (C)	rclow
5	corrected mean relative humidity (%)	Lowe correction
6	mean solar flux coming down (W/m^2)	ok
7	mean solar flux going up (W/m^2)	ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	sample battery voltage	o1

Notes:

1. No missing data.
2. Time is correct on January 22, 2010 at 1245. Swapped SM on January 22, 2010 at 1310.

Commonwealth Glacier

Filename:	coh9101.dat
Station:	Commonwealth Glacier
Author of this report:	Hassan Basagic
File Period:	January 19, 2009 at 1530 to November 12, 2009 at 1415
Sampling Frequency:	sonic every 60 minutes, wind every 4 secs.; other every 30 secs.
Averaging and Output Interval:	every 15 minutes
Program Name:	coh089v1

1	array I.D.	o1
2	day	Ok
3	time	Ok
4	mean air temp. @ 3 meters (C)	rClow
5	mean R.H. @ 3 meters (%)	Lowe correction
6	mean solar flux coming down (W/m^2) – 31437F3	divide by 100; multiply by 124.7
7	mean solar flux going up (W/m^2) – 32058F3	divide by 100; multiply by 110.4
8	mean horizontal wind speed (m/s)	Ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	Ok
12	maximum wind speed (m/s)	Ok
13	minimum wind speed (m/s)	Ok
14	mean incoming IR pyrgeometer output (pins A-B) (W/m^2)	(29786F3) divide by 250; multiply by 262.47
15	mean incoming IR hemisphere temp. (pins A-C) (mv)	Eppley
16	mean incoming IR thermopile output (pins F-G)(W/m^2)	Eppley
17	mean incoming IR case temp. (pins E-D)(mv)	Eppley
18	mean outgoing IR pyrgeometer output (pins A-B)(W/m^2) –	(29786F3) divide by 250; multiply by 276.24
19	mean outgoing IR hemisphere temp. (pins F-G) (mv)	Eppley
20	mean outgoing IR thermopile (pins A-C) (W/m2)	Eppley
21	mean outgoing IR case temp. (pins E-D) (mv)	Eppley
22	ice temperature @ 50cm (original depth, mV*0.01)	poly (n0=-105.05,n1=232.89,2=-494.81,n3=669.70, n4=-533.67,n5=247.01,n6=-61.29, n7=6.325
23	ice temperature @ 100cm (original depth, mV*0.01)	poly (n0=-106.23,n1=239.65,2=-512.50, n3=693.49 ,n4=-551.71,n5=254.79,n6=-63.07, n7=6.492
24	IRT thermistor (mV)	o1
25	IRT raw ice surface temp mV	o1
26	Surface Temperature (C)	Ok
27	sample depth from sensor to surface (m)	Measured depth (0.60) + Value) * 100
28	sample of battery voltage	o1

Notes:

1. No missing data.
2. All input values appear correct.
3. Swapped storage module on November 12, 2009 at 1418.

Filename:	coh9102.dat
Station:	Commonwealth Glacier
Author of this report:	Hassan Basagic
File Period:	November 12, 2009 at 1430 to November 17, 2009 at 1200
Sampling Frequency:	sonic every 60 minutes, wind every 4 secs.; other every 30 secs.
Averaging and Output Interval:	every 15 minutes
Program Name:	coh089v1

1	array I.D.	o1
2	day	Ok
3	time	Ok
4	mean air temp. @ 3 meters (C)	rClow
5	mean R.H. @ 3 meters (%)	Lowe correction
6	mean solar flux coming down (W/m^2)	31437F3: divide by 100; multiply by 124.7 31437F3: divide by 100; multiply by 119.7
7	mean solar flux going up (W/m^2)	32058F3: divide by 100; multiply by 110.4 31437F3: divide by 100; multiply by 128.4
8	mean horizontal wind speed (m/s)	Ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	Ok
12	maximum wind speed (m/s)	Ok
13	minimum wind speed (m/s)	Ok
14	mean incoming IR pyrgeometer output (pins A-B) (W/m^2)	(29786F3) divide by 250; multiply by 262.47
15	mean incoming IR hemisphere temp. (pins A-C) (mv)	Eppley
16	mean incoming IR thermopile output (pins F-G)(W/m^2)	Eppley
17	mean incoming IR case temp. (pins E-D)(mv)	Eppley
18	mean outgoing IR pyrgeometer output (pins A-B)(W/m^2) –	(29786F3) divide by 250; multiply by 276.24
19	mean outgoing IR hemisphere temp. (pins F-G) (mv)	Eppley
20	mean outgoing IR thermopile (pins A-C) (W/m2)	Eppley
21	mean outgoing IR case temp. (pins E-D) (mv)	Eppley
22	ice temperature @ 50cm (original depth, mV*0.01)	poly (n0=-105.05,n1=232.89,2=-494.81,n3=669.70, n4=-533.67,n5=247.01,n6=-61.29, n7=6.325
23	ice temperature @ 100cm (original depth, mV*0.01)	poly (n0=-106.23,n1=239.65,2=-512.50, n3=693.49 ,n4=-551.71,n5=254.79,n6=-63.07, n7=6.492
24	IRT thermistor (mV)	o1
25	IRT raw ice surface temp mV	o1
26	Surface Temperature (C)	Ok
27	sample depth from sensor to surface (m)	Measured depth (0.60) + Value) * 100
28	sample of battery voltage	o1

Notes:

1. No missing data. Time adjusted back 2 min on November 17, 2009 at 1016. One line of duplicate data at 10:15 caused by time reset, deleted second line.
2. All input values appear correct.
3. Maintenance on November 17, 2009: replaced upfacing pyranometer (old#31437F3, new# 33733F3) at 1050, down facing pyranometer (old#32058F3, new# 31435F3) at 1110, RH at 1038, and wind sensor at 1035. Added 4 resistors to individual L2s on multiplexor and removed group resistor to allow IRT to operate properly.
4. Swapped SM4M at November 17, 2009 at 1206.

Explorers Cove

Filename:	exe9101.dat
Station:	Explorer's Cove
Author of this report:	Hassan Basagic
File Period:	January 9, 2009 at 1130 to November 27, 2009 at 1430
Sampling Frequency:	prec every 60 minutes, wind every 4 secs.; others: every 30 secs.
Averaging and Output Interval:	every 15 minutes
Program Name:	exe089v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	mean RH @ 3 meters	Lowe correction
6	mean solar flux coming up (W/m^2)	ok
7	mean solar flux going down (W/m^2)	ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	o1
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	mean P.A.R. (micromols/s/m^2)	Q23207 : divide by 200, multiply by 319 Q30801 : divide by 200, multiply by
15	mean soil temperature @ 0 cm (C)	rclow
16	mean soil temperature @ 5 cm (C)	rclow
17	mean soil temperature @ 10 cm (C)	rclow
18	sample precipitation (mm)	ok
19	sample battery voltage	o1

Notes:

1. CR10x time was adjusted back 9 min on November 27, 2009 at 1316 created two lines of data at 1315. Deleted second line of data.
2. Checked input values and wind alignment on November 27, 2009 at 1320, everything appears correct.
3. Maintenance: on November 27, 2009 replaced downward facing pyranometer (old#PY25307, new#PY51355), replaced quantum PAR (old#Q23207, new# Q30801) at 1417, RH at 1341, wind sensor at 1413. Upward facing pyranometer has a stripped locknut, baseplate and sensor needs replacement. Battery terminal bolt replaced.
4. Swapped SM on November 27, 2009 at 1432.

Filename:	exe9102.dat
Station:	Explorer's Cove
Author of this report:	Hassan Basagic
File Period:	November 27, 2009 at 1445 to Jan 11, 2010 at 1245
Sampling Frequency:	prec every 60 minutes, wind every 4 secs.; others: every 30 secs.
Averaging and Output Interval:	every 15 minutes
Program Name:	exe089v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	mean RH @ 3 meters	Lowe correction
6	mean solar flux coming up (W/m^2)	ok
7	mean solar flux going down (W/m^2)	ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	o1
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	mean P.A.R. ($micromols/s/m^2$)	Q30801 : divide by 200, multiply by
15	mean soil temperature @ 0 cm (C)	rclow
16	mean soil temperature @ 5 cm (C)	rclow
17	mean soil temperature @ 10 cm (C)	rclow
18	sample precipitation (mm)	ok
19	sample battery voltage	o1

Notes:

1. CR10x time was correct on January 11, 2010 at 1225. Input values and wind alignment appear correct.
2. Swapped SM on January 11, 2010 at 1246.

Lake Fryxell

Filename:	fry9101.dat
Station:	Lake Fryxell
Author of this report:	Hassan Basagic
File Period:	January 9, 2009 at 945 to November 19, 2009 at 1330
Sampling Frequency:	sonic every 60 min, wind every 4 sec; others: every 30 sec
Averaging and Output Interval:	every 15 min
Program Name:	frl089v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	mean RH @ 3 meters	Lowe correction
6	mean solar flux coming down (W/m^2)	PY23276: ok
7	mean solar flux going up (W/m^2)	PY20562: ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	mean P.A.R. (micromols/s/m^2)	Q23199: divide by 200, multiply by 295.12
15	mean soil temperature @ 0 cm in soil (C)	rClow
16	mean soil temperature @ 5 cm in soil (C)	rClow
17	mean soil temperature @ 10 cm in soil (C)	rClow
18	sample depth from sensor to surface (m)	Measured depth * (-1)
19	particle count Sensit (1 min sample: hits per min)	ok
20	sample of battery voltage	o1

Notes:

1. No missing data. Two lines of repeat data created during station visit on November 19, 2009 at 1245 and 1300. Second set of repeat times adjusted by adding 15 min to each timestamp. Checked input values and wind alignment everything appears correct. Wind propeller is missing lock nut but appears to be operating properly.
2. Maintenance on November 29, 2009: swapped upward facing pyranometer (old#PY23276, new# PY20222), downfacing pyranometer (old#PY20562, new#PY23277), replaced quantum PAR (old# Q23199, new#Q29765), and RH.
3. SM swapped on November 19, 2009 at 1336.

Filename:	fry9102.dat
Station:	Lake Fryxell
Author of this report:	Hassan Basagic
File Period:	November 19, 2009 at 1345 to November 28, 2009 at 1230
Sampling Frequency:	sonic every 60 min, wind every 4 sec; others: every 30 sec
Averaging and Output Interval:	every 15 min
Program Name:	frl089v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	mean RH @ 3 meters	Lowe correction
6	mean solar flux coming down (W/m^2)	PY20222: ok
7	mean solar flux going up (W/m^2)	PY23277: ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	mean P.A.R. ($micromols/s/m^2$)	Q29765: divide by 200, multiply by 261.14
15	mean soil temperature @ 0 cm in soil (C)	rClow
16	mean soil temperature @ 5 cm in soil (C)	rClow
17	mean soil temperature @ 10 cm in soil (C)	rClow
18	sample depth from sensor to surface (m)	Measured depth * (-1)
19	particle count Sensit (1 min sample: hits per min)	ok
20	sample of battery voltage	o1

Notes:

1. Added 30 min to each time stamp before on November 29, 2009 at 1200, as a result of last station visit. Missing one line of data on November 29, 2009 at 1215.
2. Checked input values and wind alignment everything appears correct. Replaced Wind propeller lock nut.
3. SM swapped on November 29, 2009 at 1235.

Filename:	fry9103.dat
Station:	Lake Fryxell
Author of this report:	Liz Bagshaw / Hassan Basagic
File Period:	November 28, 2009 at 1245 to January 11, 2010 at 915
Sampling Frequency:	sonic every 60 min, wind every 4 sec; others: every 30 sec
Averaging and Output Interval:	every 15 min
Program Name:	frl089v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	mean RH @ 3 meters	Lowe correction
6	mean solar flux coming down (W/m^2)	PY20222: ok
7	mean solar flux going up (W/m^2)	PY23277: ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	mean P.A.R. ($micromols/s/m^2$)	Q29765: divide by 200, multiply by 261.14
15	mean soil temperature @ 0 cm in soil (C)	rClow
16	mean soil temperature @ 5 cm in soil (C)	rClow
17	mean soil temperature @ 10 cm in soil (C)	rClow
18	sample depth from sensor to surface (m)	Measured depth * (-1)
19	particle count Sensit (1 min sample: hits per min)	ok
20	sample of battery voltage	o1

Notes:

1. No missing data. Time correct on January 11, 2010 at 910
2. Checked input values and wind alignment everything appears correct.
3. SM swapped on January 11, 2010 at 917.

Fryxell Snowfence

Filename:	fsn9101.dat
Station:	Lake Fryxell Snowfence
Author of this report:	Hassan Basagic
File Period:	December 4, 2008 at 1430 to November 27, 2009 at 1645
Sampling Frequency:	sonic every 60 minutes, every 30 sec for all the others
Averaging and Output Interval:	every 15 min
Program Name:	fs067v2.dld

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean soil P.A.R. +3.8 m (east) from snow fence (micromols/s/m^2)	(Q28259) multiply by 1.14
5	mean soil P.A.R. +1.9 m (east) from snow fence (micromols/s/m^2)	(Q20266) multiply by 1.37
6	mean Air P.A.R. @ 1.6 m (micromols/s/m^2)	(Q29764) multiply by 1.18
7	mean air temp. @ 1.3 m (C)	rclow
8	mean soil temperature @ 0 cm in soil -4.5 m (west) of snow fence (C)	rclow
9	mean soil temperature @ 0 cm in soil +1.0 m (east) of snow fence (C)	rclow
10	mean soil temperature @ 0 cm in soil +1.9 m (east) of snow fence (C)	rclow
11	mean soil temperature @ 0 cm in soil +3.8 m (east) of snow fence (C)	rclow
12	Sonic Ranger Depth (cm)	Measured depth (1.01) + Value) * 100
13	mean horizontal wind speed (m/s)	o1
14	resultant mean wind speed (m/s)	o1
15	mean wind direction	o1
16	max wind speed	o1
17	min wind speed	o1
18	sample of battery voltage	o1

Notes:

1. No data missing.
2. Datalogger time correct on November 27, 2009. Input values look good. Large snow drift (>1m) on site. Removed orange fence from site.
3. Maintenance: November 27, 2009 loaded new program (f6m910v1) that disconnects all ground quantum PAR.
4. Storage module swapped on November 27, 2009 at 1649.

Howard Glacier

Filename:	hod9101 and 2.dat
Station:	Howard Glacier
Author of this report:	Hassan Basagic
File Period:	January 15, 2009 at 1430 to November 30, 2009 at 1045
Sampling Frequency:	wind every 4 sec others: every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name:	hod045v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	mean R.H. @ 3 meters (%)	Lowe correction
6	mean solar flux coming down (W/m^2)	divide by 100; multiply by 120.77 (30884F3)
7	mean solar flux going up (W/m^2)	divide by 100; multiply by 114.29 (32057F3)
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	ice temperature @ 50cm (original depth, mV*0.01)	o1
15	ice temperature @ 100cm (original depth, mV*0.01)	o1
16	mean air temp @ 1 meter m (C)	rclow
17	mean rh @ 1 meter (%)	Lowe correction
18	sample depth from sensor to surface (cm)	Measured depth (1.01) + Value) * 100
19	sample of battery voltage	o1

Notes:

1. Missing data between January 15, 2009 at 1430 to October 20, 2009 at 1445. Unknown reason for data loss, not found on storage module or datalogger. Sonic ranger height was 111 cm to ice surface.
2. Maintenance on swapped RH at 1038 and wind sensor at 1030.
3. Swapped SM on January 15, 2009 at 1440.

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Lake Hoare

Filename:	hoe9101.dat
Station:	Lake Hoare
Author of this report:	Hassan Basagic
File Period:	January 23, 2009 at 2045 to November 10, 2009 1445
Sampling Frequency:	every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name:	hoe089v1

1	array I.D.	o1
2	Day	Ok
3	Time	Ok
4	mean air temp. @ 3 meters (C)	Rclow
5	mean RH @ 3 meters	Lowe correction
6	mean solar flux coming down (W/m^2) – PY23275	Ok
7	mean solar flux going up (W/m^2) – PY56364	Ok
8	mean horizontal wind speed (m/s)	Ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	Ok
11	standard deviation of wind direction (degrees)	Ok
12	maximum wind speed (m/s)	Ok
13	minimum wind speed (m/s)	Ok
14	mean P.A.R. (micromols/s/m2) –Q23210	divide by 200, multiply by 300.98
15	sample station barometric pressure (mbar)	Ok
16	mean temperature difference 1&3 m (C)	multiply -1
17	total particle count – Sensit (count min^{-1})	Ol
18	sample of battery voltage	Ol

Notes:

1. No missing data. All channels look good.
2. Datalogger time was corrected ahead +5 min 10 sec on,November 10, 2009 at 1322.
3. Maintenance: Swapped RH at 1341, swapped up facing pyranometer (old: PY23275, new: PY28349) at 1428; swapped down facing pyranometer (old: PY56364; new:PY28347) at 1436, swapped quantum (old:Q23210; new:Q30804) at 1445; and swapped wind monitor at 1413.
4. Swapped SM on November 10, 2009 at 1454.

Filename:	hoe9102.dat
Station:	Lake Hoare
Author of this report:	Hassan Basagic
File Period:	November 10, 2009 at 1445 to December 4, 2009 at 1115
Sampling Frequency:	every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name:	hoe089v1

1	array I.D.	o1
2	Day	Ok
3	Time	Ok
4	mean air temp. @ 3 meters (C)	Rclow
5	mean RH @ 3 meters	Lowe correction
6	mean solar flux coming down (W/m^2) – PY28349	Ok
7	mean solar flux going up (W/m^2) – PY28347	Ok
8	mean horizontal wind speed (m/s)	Ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	Ok
11	standard deviation of wind direction (degrees)	Ok
12	maximum wind speed (m/s)	Ok
13	minimum wind speed (m/s)	Ok
14	mean P.A.R. (micromols/s/m2) –Q30804	divide by 200, multiply by 225.32
15	sample station barometric pressure (mbar)	Ok
16	mean temperature difference 1&3 m (C)	multiply -1
17	total particle count – Sensit (count min^{-1})	ol
18	sample of battery voltage	ol

Notes:

1. No missing data. Time was correct and all channels look good.
2. Swapped SM on December 4, 2009 at 1120..

Filename:	hoe9103.dat
Station:	Lake Hoare
Author of this report:	Elizabeth Bagshaw / Hassan Basagic
File Period:	December 4, 2009 at 1130 to January 26, 2010 at 1245
Sampling Frequency:	every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name:	hoe089v1

1	array I.D.	o1
2	Day	Ok
3	Time	Ok
4	mean air temp. @ 3 meters (C)	Rclow
5	mean RH @ 3 meters	Lowe correction
6	mean solar flux coming down (W/m^2) – PY28349	Ok
7	mean solar flux going up (W/m^2) – PY28347	Ok
8	mean horizontal wind speed (m/s)	Ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	Ok
11	standard deviation of wind direction (degrees)	Ok
12	maximum wind speed (m/s)	Ok
13	minimum wind speed (m/s)	Ok
14	mean P.A.R. (micromols/s/m2) –Q30804	divide by 200, multiply by 225.32
15	sample station barometric pressure (mbar)	Ok
16	mean temperature difference 1&3 m (C)	multiply -1
17	total particle count – Sensit (count min^{-1})	ol
18	sample of battery voltage	ol

Notes:

1. No missing data. All channels look good.
2. Swapped SM on.January 26, 2010 at 2001.

Lake Hoare Precipitation

Filename:	lhp9101.dat
Station:	Lake Hoare Precipitation
Author of this report:	Hassan Basagic
File Period:	January 23, 2009 at 2045 to November 10, 2009 at 13:30
Sampling Frequency:	every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name	lhp078v1

1	array I.D.	o1
2	Day	ok
3	Time	ok
4	total precipitation (mm)	ok
5	mean soil temperature @ 0 cm	rClow
6	mean soil temperature @ 5 cm	rClow
7	mean soil temperature @ 10 cm	rClow
8	distance to surface (m)	ok
9	sample of battery voltage	ol

Notes:
1. No missing data.
2. Time was adjusted ahead 30 seconds on November 10, 2009 at 1324.
3. Snow cover on ground = 2.8 cm.
4. SM swapped on November 10, 2009 at 1335.

Filename:	lhp9102.dat
Station:	Lake Hoare Precipitation
Author of this report:	Hassan Basagic
File Period:	November 10, 2009 at 13:45 to November 15, 2009 at 1545
Sampling Frequency:	every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name	unknown

1	array I.D.	o1
2	Day	ok
3	Time	ok
4	total precipitation (mm)	ok
5	mean soil temperature @ 0 cm	rClow
6	mean soil temperature @ 5 cm	rClow
7	mean soil temperature @ 10 cm	rClow
8	distance to surface (m)	ok
9	sample of battery voltage	ol

Notes:
1. Missing precip and soil data. Inadvertently uploaded wrong program during last station visit.
2. Reloaded correct program and SM swapped on November 10, 2009 at 1548.

Filename:	lhp9103.dat
Station:	Lake Hoare Precipitation
Author of this report:	Hassan Basagic
File Period:	November 15, 2009 at 1600 to December 4, 2009 at 1100
Sampling Frequency:	every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name	unknown

1	array I.D.	o1
2	Day	ok
3	Time	ok
4	total precipitation (mm)	ok
5	mean soil temperature @ 0 cm	rClow
6	mean soil temperature @ 5 cm	rClow
7	mean soil temperature @ 10 cm	rClow
8	distance to surface (m)	ok
9	sample of battery voltage	ol

Notes:
1. No missing data.
2. Removed existing precipitation gage in anticipation of replacing gage. This was delayed until next season. Precipitation will remain offline during this time.
3. SM swapped on December 4, 2009 at 1105.

Filename:	lhp9104.dat
Station:	Lake Hoare Precipitation
Author of this report:	Liz Bagshaw / Hassan Basagic
File Period:	December 4, 2009 at 1100 to January 26, 2010 at 1245
Sampling Frequency:	every 30 sec
Averaging and Output Interval:	every 15 minutes
Program Name	lhp910v1

1	array I.D.	o1
2	Day	ok
3	Time	ok
4	total precipitation (mm)	ok
5	mean soil temperature @ 0 cm	rClow
6	mean soil temperature @ 5 cm	rClow
7	mean soil temperature @ 10 cm	rClow
8	distance to surface (m)	ok
9	sample of battery voltage	ol

Notes:
1. No missing data.
2. Precipitation gage offline.
3. SM swapped on January 26, 2010 at 1250.

Taylor Glacier

Filename:	tar9101.dat
Station:	Taylor Glacier
Author of this report:	Hassan Basagic
File Period:	January 16, 2009 at 1245 to November 18, 2009 at 1200
Sampling Frequency:	depth every 60 minutes, wind every 4 secs.; others: every 30 secs.
Averaging and Output Interval:	every 15 minutes
Program Name	tar078v3

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	mean R.H. @ 3 meters (%)	Lowe correction
6	mean air temp @ 1m (C)	rclow
7	mean RH at 1m (%)	Lowe correction
8	mean solar flux coming down (W/m^2) – (33733F3)	divide by 100; multiply by 117.23
9	mean solar flux going up (W/m^2) - (31435F3)	divide by 100; multiply by 126.58
10	mean horizontal wind speed (m/s)	ok
11	resultant mean wind speed (m/s)	o1
12	resultant mean wind direction (degrees from north)	flag
13	standard deviation of wind direction (degrees)	ok
14	maximum wind speed (m/s)	ok
15	minimum wind speed (m/s)	ok
16	ice temp	o1
17	surface temperature internal thermister output (mV)	o1
18	surface temperature (mV)	o1
19	surface temperature (C)	ok
20	sample depth from sensor to surface (cm)	ok
21	sample of battery voltage	o1

Notes:

1. One line of missing data on October 9, 2009 at 1715. Unknown reason.
2. Dataloagger time is correct on November 18, 2009. Input values and wind alignment appear correct. Ultrasonic height is measured at 87.2 cm.
3. Maintenance: on November 18, 2009 replaced RH at 1m and 3m at 1152.
4. Replaced SM at 1205.

Lake Vanda

Filename:	vaa9101.dat
Station:	Lake Vanda
Author of this report:	Hassan Basagic
File Period:	December 30, 2008 at 1015 to November 20, 2009 at 1515
Sampling Frequency:	wind every 4 secs.; ultrasonic every 1 hr; others every 30 secs.
Averaging and Output Interval:	every 15 minutes
Program Name	vaa045v1

1	array I.D.	o1
2	day	ok
3	time	ok
4	mean air temp. @ 3 meters (C)	rclow
5	mean R.H. @ 3 meters (%)	Lowe correction
6	mean solar flux coming down (W/m^2)	PY41090 : ok
7	mean solar flux going up (W/m^2)	PY20561 : ok
8	mean horizontal wind speed (m/s)	ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	ok
11	standard deviation of wind direction (degrees)	ok
12	maximum wind speed (m/s)	ok
13	minimum wind speed (m/s)	ok
14	mean P.A.R. (micromols/s/m^2)	Q17248 : divide by 200, multiply by 313.57
15	mean soil temperature @ 0 cm in soil (C)	rclow
16	mean soil temperature @ 5 cm in soil (C)	rclow
17	mean soil temperature @ 10 cm in soil (C)	rclow
18	distance to surface (m)	ok
19	sample of battery voltage	o1

Notes:

1. No missing data. Adjusted datalogger back 2 min on November 20, 2009 at 1454.
2. Checked input values and wind alignment at 1456, all appear correct. Sonic sensor depth is 64.8 cm.
3. Maintenance: on November 20, 2009 swapped quantum PAR sensor (old#Q17248, new#Q30794) at 1509, RH at 1448.
4. Station power off to swap CR10x and SM on November 20, 2009 at 1517.

Lake Vida

Filename:	via9101.dat
Station:	Lake Vida
Author of this report:	Hassan Basagic
File Period:	December 30, 2008 at 1215 to December 1, 2009 at 1000
Sampling Frequency:	wind every 4 secs.; ultrasonic every 1 hr; others every 30 secs.
Averaging and Output Interval:	every 15 minutes
Program Name	via045v1

1	array I.D.	o1
2	day	Ok
3	time	Ok
4	mean air temp. @ 3 meters (C)	Rclow
5	mean R.H. @ 3 meters (%)	Lowe correction
6	mean solar flux coming down (W/m^2) –	PY23250 (new#20523) Ok
7	mean solar flux going up (W/m^2)	PY20561: Ok
8	mean horizontal wind speed (m/s)	Ok
9	resultant mean wind speed (m/s)	o1
10	resultant mean wind direction (degrees from north)	Ok
11	standard deviation of wind direction (degrees)	Ok
12	maximum wind speed (m/s)	Ok
13	minimum wind speed (m/s)	Ok
14	mean P.A.R. (micromols/s/m^2)	Q30803 divide by 200, multiply by 237.54 Q30800 divide by 200, multiply by 222.23
15	mean soil temperature @ 0 cm in soil (C)	Rclow
16	mean soil temperature @ 5 cm in soil (C)	Rclow
17	mean soil temperature @ 10 cm in soil (C)	Rclow
18	distance to surface (m)	Ok
19	sample of battery voltage	o1

Notes:

1. No missing data.
2. Time adjusted back 15 minutes on December 1, 2009 at 933.
3. Input values and wind alignment on December 1, 2009 at 935 appear correct.
4. Sonic sensor depth = 36.1 cm (snow present).
5. Maintenance: on December 1, 2009 replaced quantum PAR (old#Q23204, new#Q30800) at 953, RH at 945.
6. SM swapped out at 1010.

Appendix

Array I.D. key:	**Date of Station Establishment**
01 = Lake Hoare	Dec 1, 1993 by Peter Doran
02 = Lake Fryxell	Jan 6, 1994 by Peter Doran
03 = Lake Bonney	November 24, 1993 by Peter Doran
04 = Commonwealth Glacier	November 22, 1993 by Peter Doran
05 = Howard Glacier	November 20, 1993 by Peter Doran
06 = Taylor Glacier	November 21, 1994 by Peter Doran
07 = Lake Vanda	November 24, 1994 by Peter Doran
08 = Lake Brownworth	November 13, 1996 by Peter Doran and DJ Osborne
09 = Explorer's Cove	Nov 21, 1997 by Peter Doran, DJ Osborne and K. Sauter
10 = Canada Glacier (without Eddy Sensors)	Nov 20, 1995 by Karen Lewis; reinstalled Jan 13, 1998
11 = Lake Vida	November 24, 1995 by Peter Doran
12 = RETIRED Hoare Submerged	
13 = RETIRED Fryxell Submerged	
14 = RETIRED Bonney East Submerged	
15 = RETIRED Canada Gl. (w/ Eddy Sensors)	
16 = RETIRED Bonney West Submerged	
17 = Fryxell Snow Fence	
18 = Beacon Valley	
19 = Lake Hoare Precipitation	January 26, 2002 by Thomas Nylen

Data Flags

Definition	Flags	Post-processing	Data Manager
Out of Range	R	None	Flag as R, except flag as "U" when IceT20cm exceeds 0 degrees and "V" when IceT1m exceeds 0 degrees
Negative values zeroed out	Z	Converted to zero	Flag as Z
Bad Value - Value below zeroing value	T	Value omitted	Flag as F
Bad Value - Value is equal to -6999 or known to be questionable	B	None	Flag as B
Bad Value - Raw temp value (-53C and 32.79C) which exceeds the bracketed limited for bisection	F	Value omitted	Flag as B
SwRadOut is greater than a % of SwRadIN	S	None	Flag as S
Wdir and WDirStD zeroed out because WSpd = 0	N	Converted to zero	Flag as N
Value missing	M	None	Flag as M