Real Time Water Quality (RTWQ) Deployment Report
NF02YL0012 – Humber River at Humber Village Bridge
April 2009 – June 2009

General

- The Water Resources Management Division staff monitors the real-time web page on a daily basis.
- This monthly report interprets the data from the Humber River at Humber Village Bridge RTWQ station for the period of April 30th, 2009 to June 30th, 2009.

Maintenance and Calibration of Instrumentation

- The instrument was deployed from April 30th, 2009 to June 30th, 2009 (61 day deployment period) at which point it was removed for maintenance and calibration. This was a fairly long deployment period, however the instrument appears to have kept a reasonable calibration for the duration of the deployment period.
- The results from comparing the Minisonde values to the Datasonde values can be seen in **Table 1.** Collection of QA/QC readings involves a second set of data readings being collected at the time of removal & installation, using a similar, freshly calibrated instrument. Data readings from both instruments were compared and their variability was ranked, as part of QA/QC protocol.
- For installation a ranking of excellent was achieved for temperature, while pH and dissolved oxygen both had a good rating and conductivity had a marginal rating. This marginal rating for conductivity is unusual given both instruments were freshly calibrated. For removal rankings of excellent were achieved for temperature, pH and conductivity while dissolved oxygen had a poor rating indicating that it had drifted off calibration.

Table 1: QA/QC Data Comparison Rankings for installation – April 30th & removal – June 30th

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Humber River at Humber Village Bridge	April 30th, 2009	Installation	Excellent	Good	Marginal	Good
	June 30th, 2009	Removal	Excellent	Excellent	Excellent	Poor

Data Interpretation

- During the deployment period of April 30th, 2009 to June 30th, 2009 the water quality showed a typical trend for the spring season. Most notably there was a consistent rising trend for temperature while oxygen showed a gradual declining trend which is related to the temperature rise, i.e. as the temperature of water rises it can carry less oxygen.
- Water temperature values **(Figure 1)** for the deployment period ranged from 2 °c to 16.4 °c with a clear rising trend, most notably during the month of June.

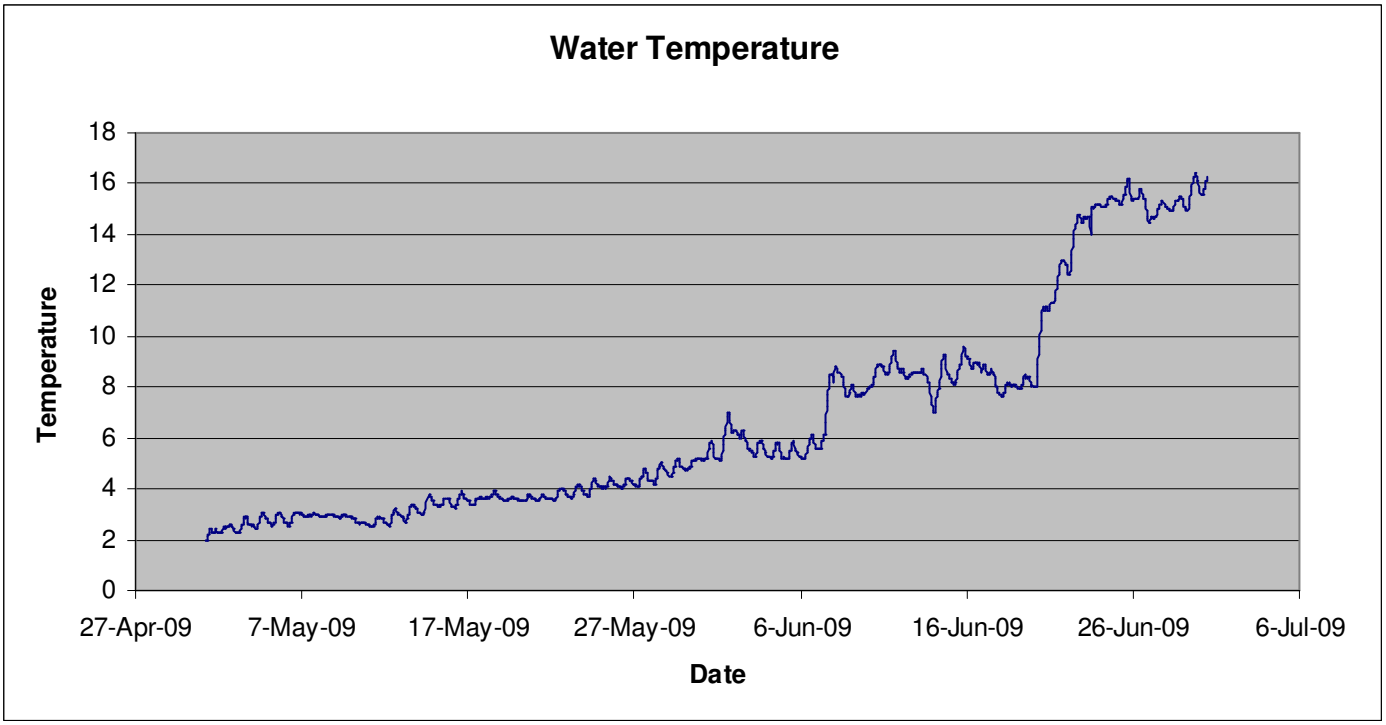

Figure 1

- Dissolved oxygen (DO) values (**Figure 2**) for the deployment period were relatively constant throughout the month of May and then showed a gradual declining trend for the first part of June. A more rapid drop in the latter half of June appears to correspond with a rapid rise in temperature during the same period. During the deployment period oxygen ranged from a high of 12.98 mg/l to a low of 8.08 mg/l.

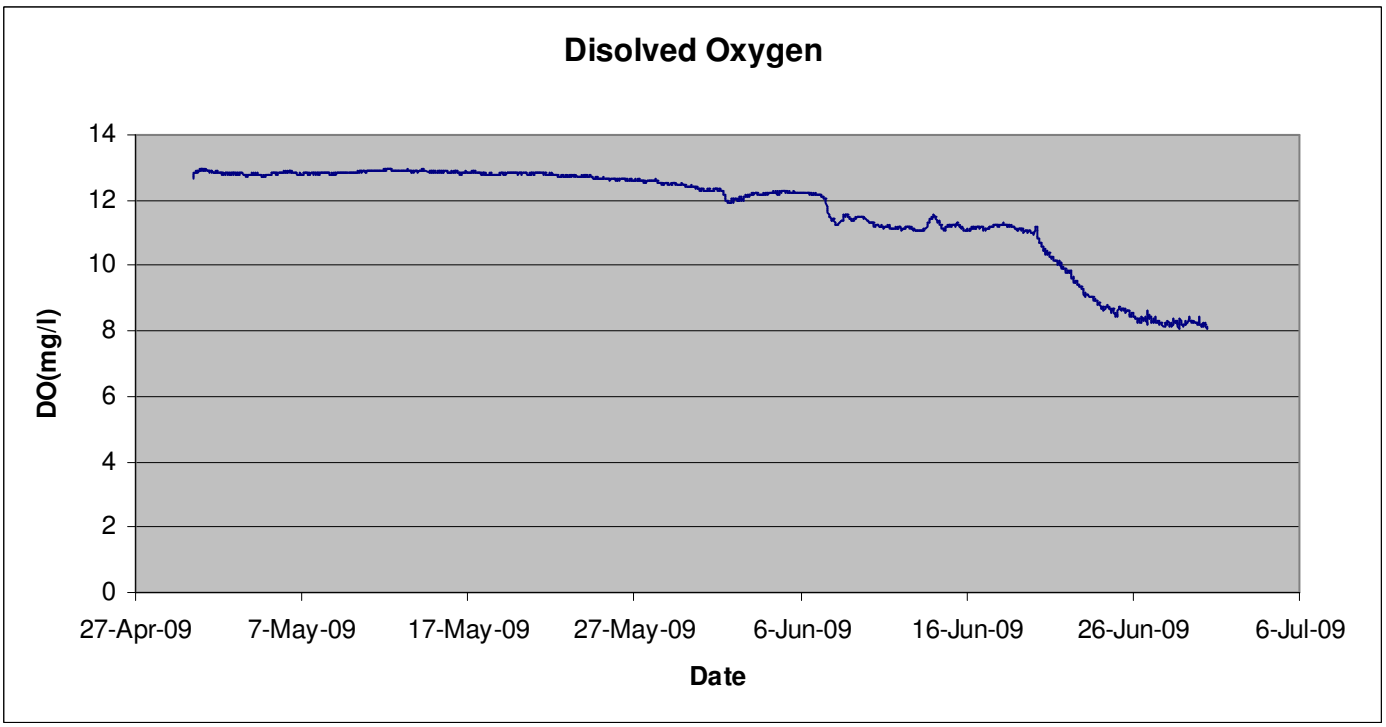

Figure 2

- There are 4 different guidelines for DO depending on the life cycle stage and water temperature (cold water/other life stages – above 6.5 mg/L; warm water/other life stages – above 5.5 mg/L; warm water/early life stages – above 6 mg/L; cold water/early life stages – 9.5 mg/L). All guidelines were met during this deployment period. It should be noted that some levels were below the 9.5 mg/l limit prescribed for the cold water/early life stages, however at this time water temperature was above 10^{o}c which is relatively warm.

- pH values **(Figure 3)** ranged from 6.42 to 7.09 over the deployment period which is a typical range of values for this station. The CCME Guidelines for the Protection of Freshwater Aquatic Life for pH is a range of 6.5 – 9.0 and a small portions of the readings were slightly below this limit. Due to the underlying geology and ecosystem characteristics it is quite common for Newfoundland surface waters to have a pH lower than the range recommended by the CCME Guidelines.

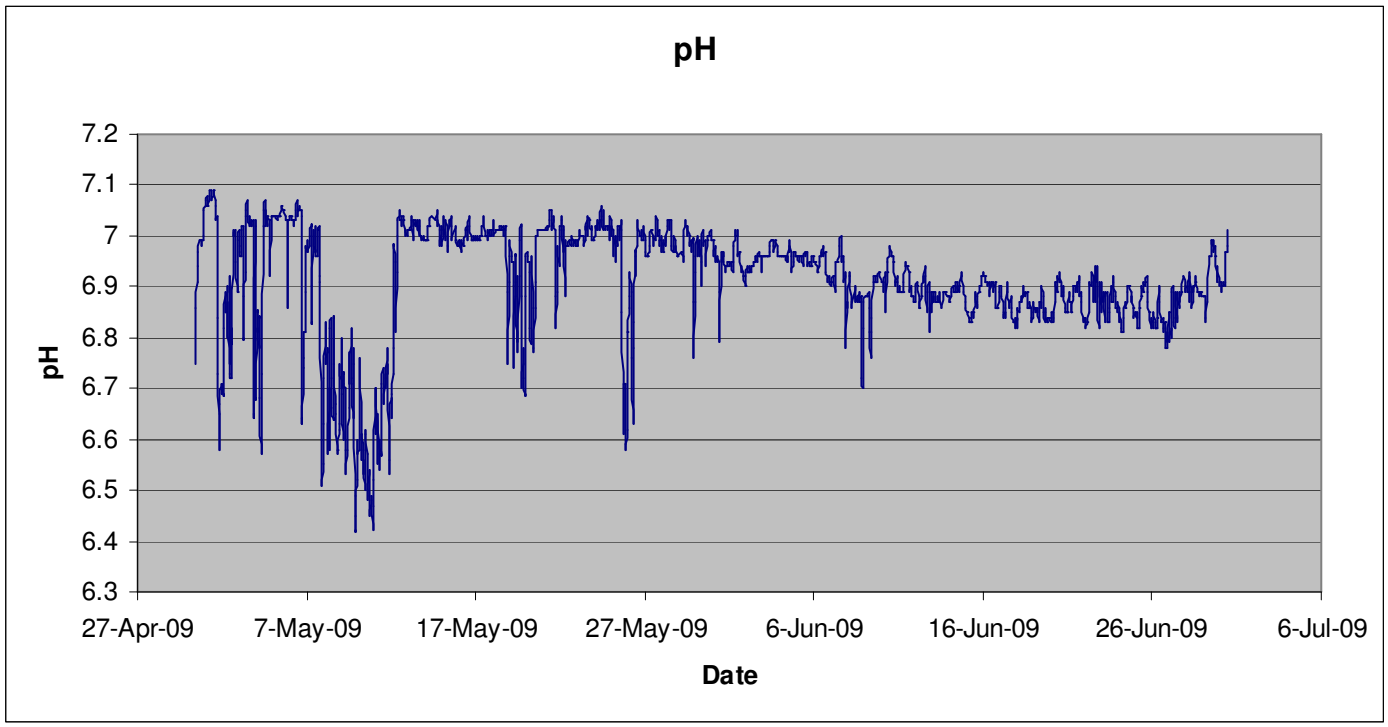

Figure 3

- Specific conductance values **(Figure 4)** were relatively consistent over the deployment period with several significant sudden drops around June 1st and June 8th . Both these drops seem to correspond with significant jumps in temperature which makes sense as conductivity is temperature dependant. Values ranged from 31.6 µS/cm to 36.8 µS/cm, which is typical for this station.

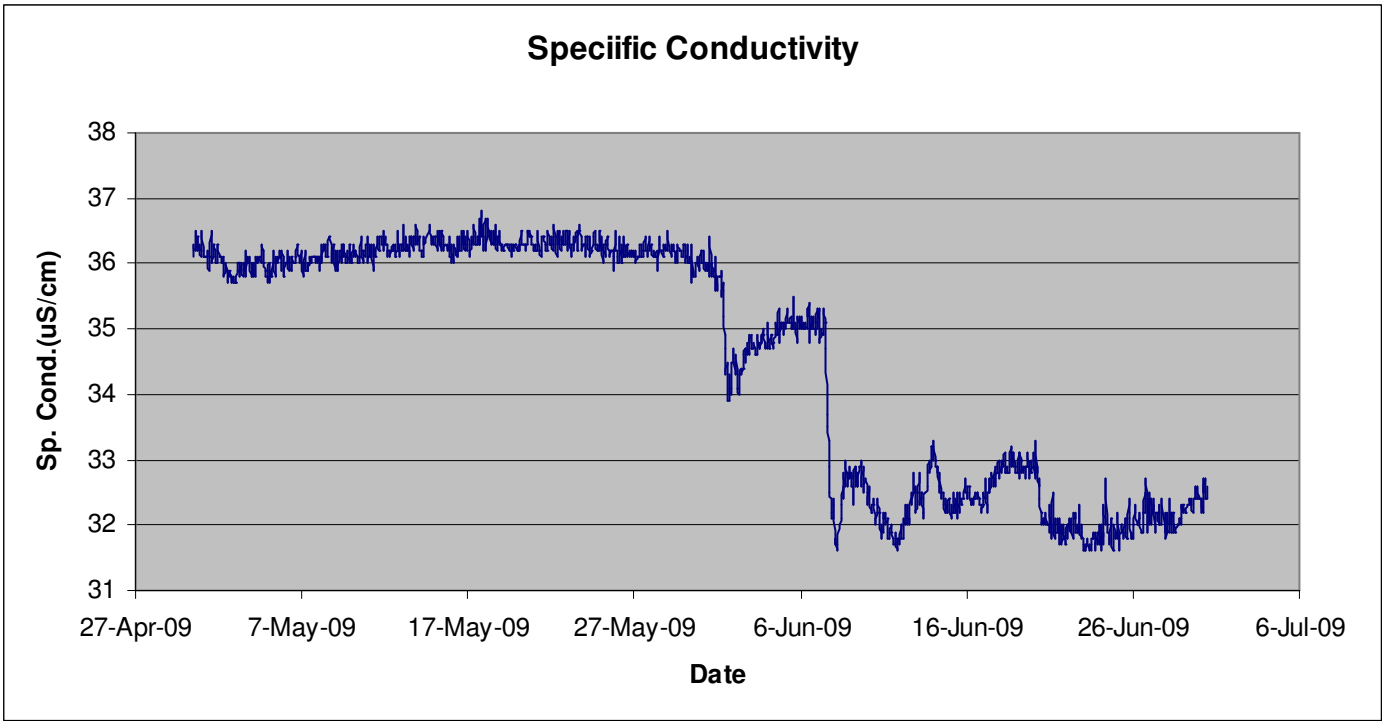

Figure 4

- Turbidity values were consistently at zero throughout the deployment period and therefore no graph was prepared for this parameter.

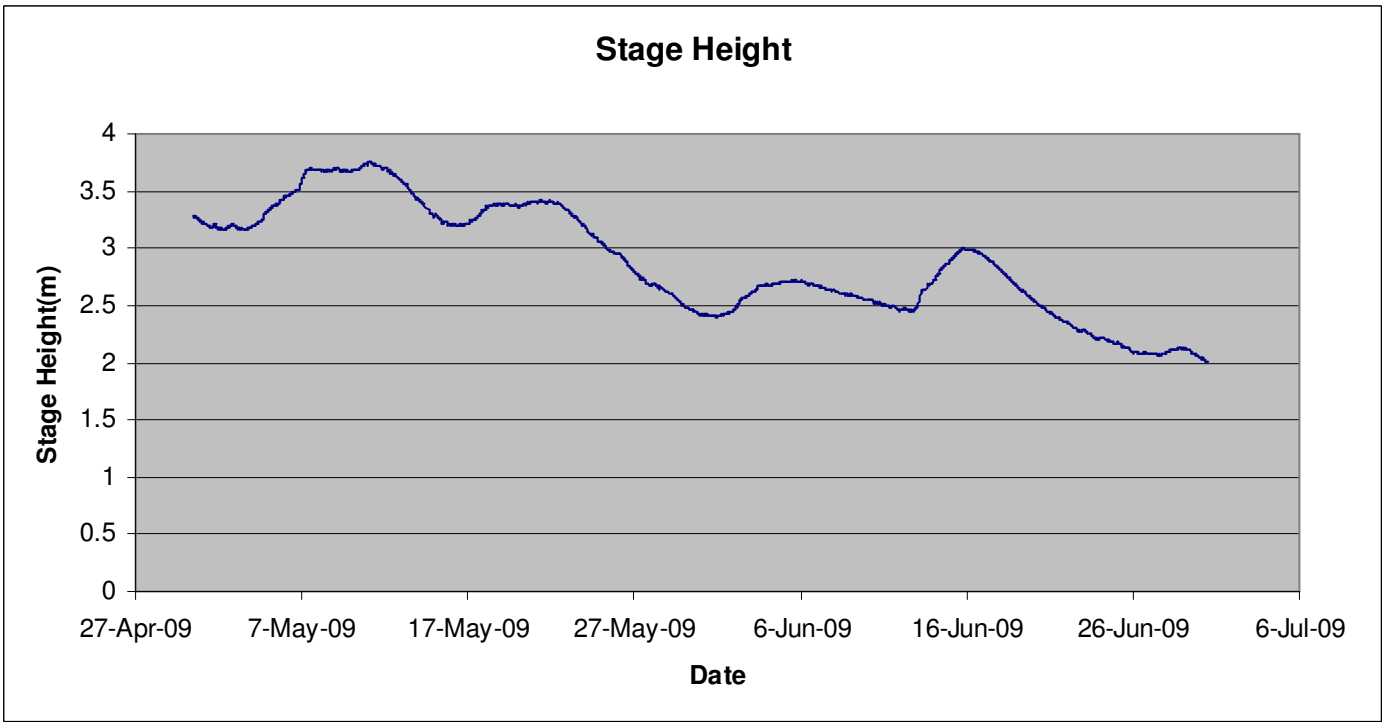

Figure 5

- Stage height readings **(Figure 5)** showed a general declining trend over the deployment period with a number of gentle rise and falls. The height of the river ranged from 2.003 m to 3.761 m, which translates to a range of 224 m^3/s to 568 m^3/s.

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Appendix 1 – Climate Data

Daily Data Report for April 2009

Day	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days °C	Cool Deg Days °C	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's Deg	Spd of Max Gust km/h
01†	3.5	-4.0	-0.3	18.3	0.0	M	M	0.0			<31
02†	3.6	-2.5	0.6	17.4	0.0	M	M	0.0		20	44
03†	9.4	1.6	5.5	12.5	0.0	M	M	0.0		22	33
04†	3.6	1.2	2.4	15.6	0.0	M	M	0.0		7	46
05†	6.1	0.8	3.5	14.5	0.0	M	M	0.0		7	37
06†	2.7	-1.6	0.6	17.4	0.0	M	M	0.0		8	35
07†	6.0	-1.6	2.2	15.8	0.0	M	M	0.0		11	43
08†	12.5	1.7	7.1	10.9	0.0	M	M	0.0		23	35
09†	7.2	1.2	4.2	13.8	0.0	M	M	0.0		23	56
10†	9.1	-1.0	4.1	13.9	0.0	M	M	0.0		20	41
11†	7.2	-2.5	2.4	15.6	0.0	M	M	0.0			<31
12†	1.6	-2.1	-0.3	18.3	0.0	M	M	0.0		8	56
13†	6.3	0.7	3.5	14.5	0.0	M	M	0.6		20	41
14†	3.6	-3.3	0.2	17.8	0.0	M	M	0.0		30	37
15†	-2.1	-6.2	-4.2	22.2	0.0	M	M	0.0		30	44
16†	-5.0	-12.0	-8.5	26.5	0.0	M	M	0.0		29	37
17†	-3.8	-10.7	-7.3	25.3	0.0	M	M	0.0		29	37
18†	-1.2	-7.5	-4.4	22.4	0.0	M	M	0.0		29	32
19†	0.0	-8.4	-4.2	22.2	0.0	M	M	0.0		31	35
20†	4.9	-9.6	-2.4	20.4	0.0	M	M	0.0		30	32
21†	8.7	-4.5	2.1	15.9	0.0	M	M	0.6			<31
22†	11.2	1.7	6.5	11.5	0.0	M	M	0.0		23	39
23†	13.5	3.8	8.7	9.3	0.0	M	M	0.0		14	43
24†	5.3	1.2	3.3	14.7	0.0	M	M	0.0		20	48
25†	17.5	0.2	8.9	9.1	0.0	M	M	0.0		18	33
26†	17.2	-2.7	7.3	10.7	0.0	M	M	0.0		21	44
27†	4.8	-4.4	0.2	17.8	0.0	M	M	0.0		31	39
28†	6.5	0.3	3.4	14.6	0.0	M	M	0.0		28	37
29†	2.7	-3.8	-0.6	18.6	0.0	M	M	0.0		28	50
30†	4.5	-5.4	-0.5	18.5	0.0	M	M	0.0		28	48
Sum				**496.0**	**0.0**	**M**	**M**	**1.2**			
Avg	**5.6**	**-2.6**	**1.46**								
Xtrm	**17.5**	**-12.0**								**23**	**56**

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01†	11.2	-1.7	4.8	13.2	0.0	M	M	0.0		20	54
02†	11.5	2.3	6.9	11.1	0.0	M	M	0.0		23	44
03†	14.0	1.8	7.9	10.1	0.0	M	M	0.0		22	37
04†	16.9	2.7	9.8	8.2	0.0	M	M	0.0		23	56
05†	8.6	0.2	4.4	13.6	0.0	M	M	0.0		29	32
06†	18.4	0.7	9.6	8.4	0.0	M	M	0.0			<31
07†	9.2	3.0	6.1	11.9	0.0	M	M	0.0			<31
08†	8.1	3.8	6.0	12.0	0.0	M	M	0.0		20	33
09†	9.1	2.8	6.0	12.0	0.0	M	M	0.0		27	46
10†	3.5	-0.6	1.5	16.5	0.0	M	M	0.0		7	52
11†	2.7	-3.1	-0.2	18.2	0.0	M	M	0.0		26	35
12†	10.7	-4.1	3.3	14.7	0.0	M	M	0.0			<31
13†	17.1	-0.2	8.5	9.5	0.0	M	M	0.0		24	46
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26†	6.7	1.1	3.9	14.1	0.0	M	M	0.0		30	44
27†	8.5	0.7	4.6	13.4	0.0	M	M	0.0		29	44
28†	14.5	1.3	7.9	10.1	0.0	M	M	0.0		31	35
29†	18.2	3.4	10.8	7.2	0.0	M	M	0.0			<31
30†	15.0	8.2	11.6	6.4	0.0	M	M	0.0		16	32
31†	20.2	6.3	13.3	4.7	0.0	M	M	0.0		23	37
Sum				**346.3**	**0.0**	**M**	**M**	**0.0**			
Avg	**12.2**	**1.4**	**6.81**								
Xtrm	**20.2**	**-4.1**								**23**	**56**