Electronic Supplementary Material (ESI) for Environmental Science: Water Research & Technology.

On-line monitoring of organic matter concentrations and character in drinking water treatment systems using fluorescence spectroscopy

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Supporting information

Table S1 Concentration and character of organic matter in raw and treated water samples as determined via a one year sampling study by Shutova et al.[1] Fluorescence component data based on the site specific Model B for Capalaba Water Treatment Plant (WTP) and Model G for Yarra Glen WTP (RU = Raman Units).

	Capalaba WTP				Yarra Glen WTP			
	Raw water		Treated water		Raw water		Treated water	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
DOC (mgC/L)	12.1	1.4	5.8	1.2	3.0	0.5	1.6	0.8
UV_{254} (/cm)	0.62	0.08	0.09	0.01	0.11	0.02	0.03	0.03
SUVA ($m^{-1}Lmg^{-1}$)	5.1	0.4	1.7	0.3	3.8	0.9	2.1	0.9
C1 (RU)	2.82	0.54	0.63	0.13	0.36	0.07	0.11	0.12
C2 (RU)	1.81	0.20	0.72	0.16	0.37	0.06	0.19	0.17
C3 (RU)	1.23	0.63	0.23	0.17				
C4 (RU)					0.11	0.04	0.07	0.03
C5 (RU)					0.11	0.03	0.05	0.01
C6 (RU)					0.09	0.03	0.07	0.02
Sum fluorescence components intensity (RU)	23.7	3.2	9.1	2.0	8.0	1.7	4.2	2.1

[1] Y. Shutova, A. Baker, J. Bridgeman and R. K. Henderson, *Water Research*, 2014, **54**, 159-169.

Table S2 Summary of the optical properties of the various fluorescence probes

Name of probe/ data logger	Supplier	Excitation	Emission	Corresponding monitoring point
EXO C: fDOM (CDOM) probe/ EXO sonde	YSI	365±5 nm	480±40 nm	P1 λex/λem = 380/488 nm
Cyclops C: CDOM/FDOM probe/ Cyclops 7 data logger	Turner Designs	368±17 nm	470±30 nm	P1 λex/λem = 380/488 nm
Cyclops T: Tryptophan probe/ Cyclops 7 data logger	Turner Designs	285 nm	350±27.5nm	P4 λex/λem = 280/328 nm

Table S3 Summary of temperature, turbidity, pH and conductivity observed in Capalaba Water Treatment Plant

		Temperature (°C)		Turbidity (FNU)		pH		Conductivity (µS/cm)	
		Raw water	Treated water	Raw water	Treated water	Raw water	Treated water	Raw water	Treated water
Mean		24.23	22.93	4.11	1.01			206.52	254.47
95% Confidence Interval for Mean	Lower Bound	24.15	22.90	4.09	0.97	6.85	5.55	206.11	254.33
	Upper Bound	24.31	22.96	4.13	1.05	6.86	5.57	206.92	254.60
5% Trimmed Mean		24.33	22.94	4.10	0.93	6.86	5.57	206.85	254.47
Median		24.52	22.93	4.00	0.80	6.87	5.59	208.00	255.00
Variance		1.95	0.35	0.12	0.43	0.01	0.02	50.33	5.47
Std. Deviation		1.40	0.59	0.34	0.65	0.09	0.14	7.09	2.34
Minimum		17.76	21.16	3.50	0.30	6.47	4.73	178.00	249.00
Maximum		27.02	24.07	5.90	10.20	7.11	5.90	239.00	260.00

Table S4 Summary of temperature, turbidity, pH and conductivity observed in Yarra Glen WTP

		Temperature (°C)		Turbidity (FNU)		pH		Conductivity (µS/cm)	
		Raw water	Treated water	Raw water	Treated water	Raw water	Treated water	Raw water	Treated water
Mean		20.11	20.74	5.18	1.19			184.91	249.36
95% Confidence Interval for Mean	Lower Bound	20.00	20.71	5.16	1.16	6.79	5.58	184.48	249.22
	Upper Bound	20.22	20.77	5.21	1.21	6.81	5.59	185.34	249.50
5% Trimmed Mean		20.01	20.76	5.17	1.15	6.80	5.59	184.47	249.33
Median		19.63	20.93	5.10	1.10	6.80	5.62	183.00	249.00
Variance		4.56	0.39	0.20	0.21	0.02	0.01	69.75	6.78
Std. Deviation		2.14	0.63	0.45	0.46	0.14	0.11	8.35	2.60
Minimum		16.38	19.23	4.50	0.50	6.40	5.03	173.00	243.00
Maximum		25.80	21.94	11.00	4.4	7.12	5.84	209.00	259.00

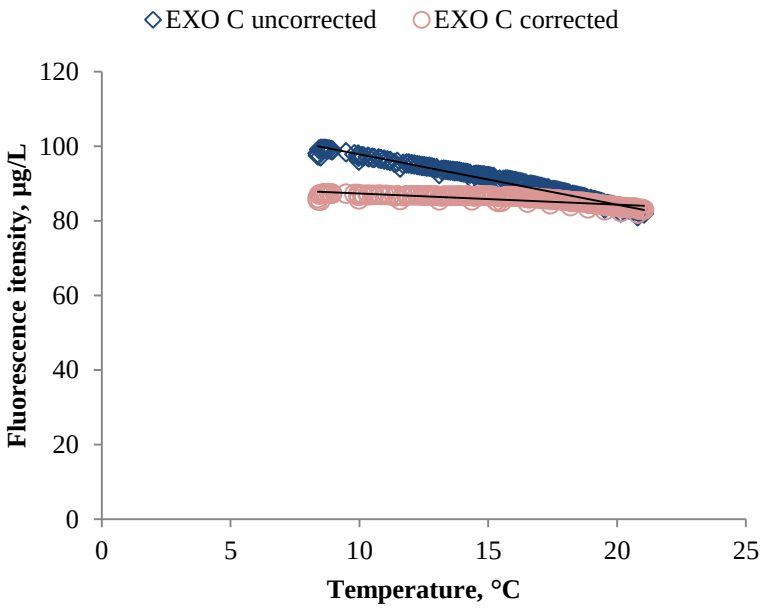

Fig. S1 Example of the correlation between water temperature and uncorrected and corrected fluorescence intensity measured by EXO C probe in Capalaba raw water

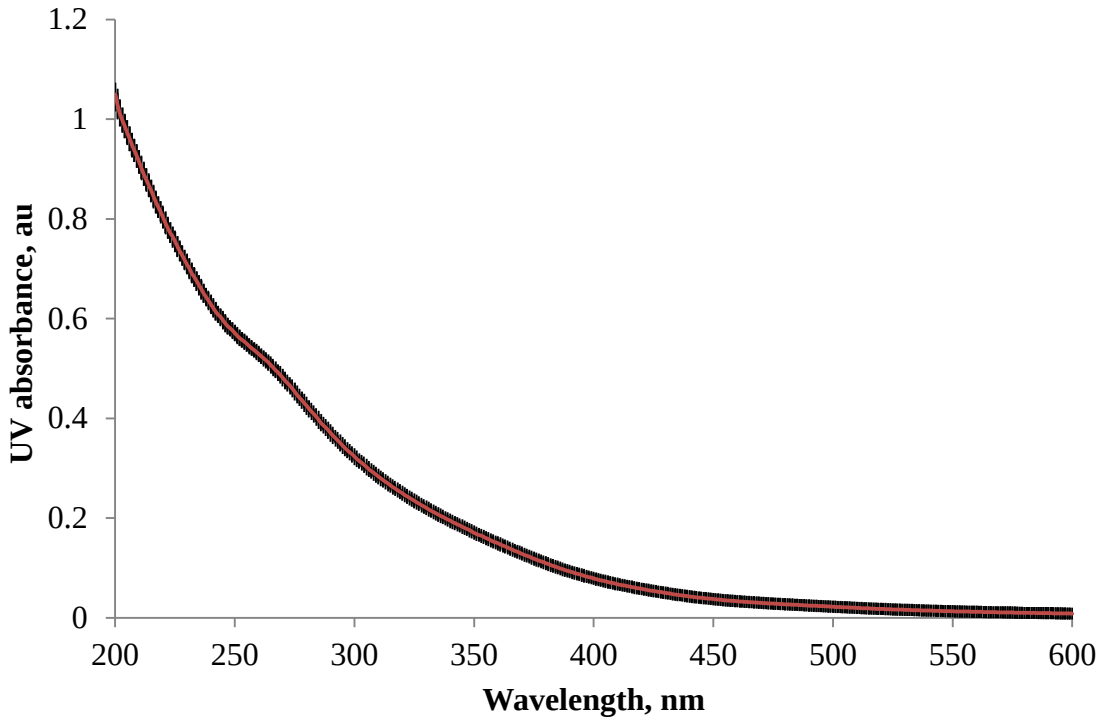

Fig. S2 Average Capalaba WTP raw water sample UV absorbance signal (red line). Vertical lines represent the standard deviation of the UV absorbance during the on-line monitoring study based on the grab samples.

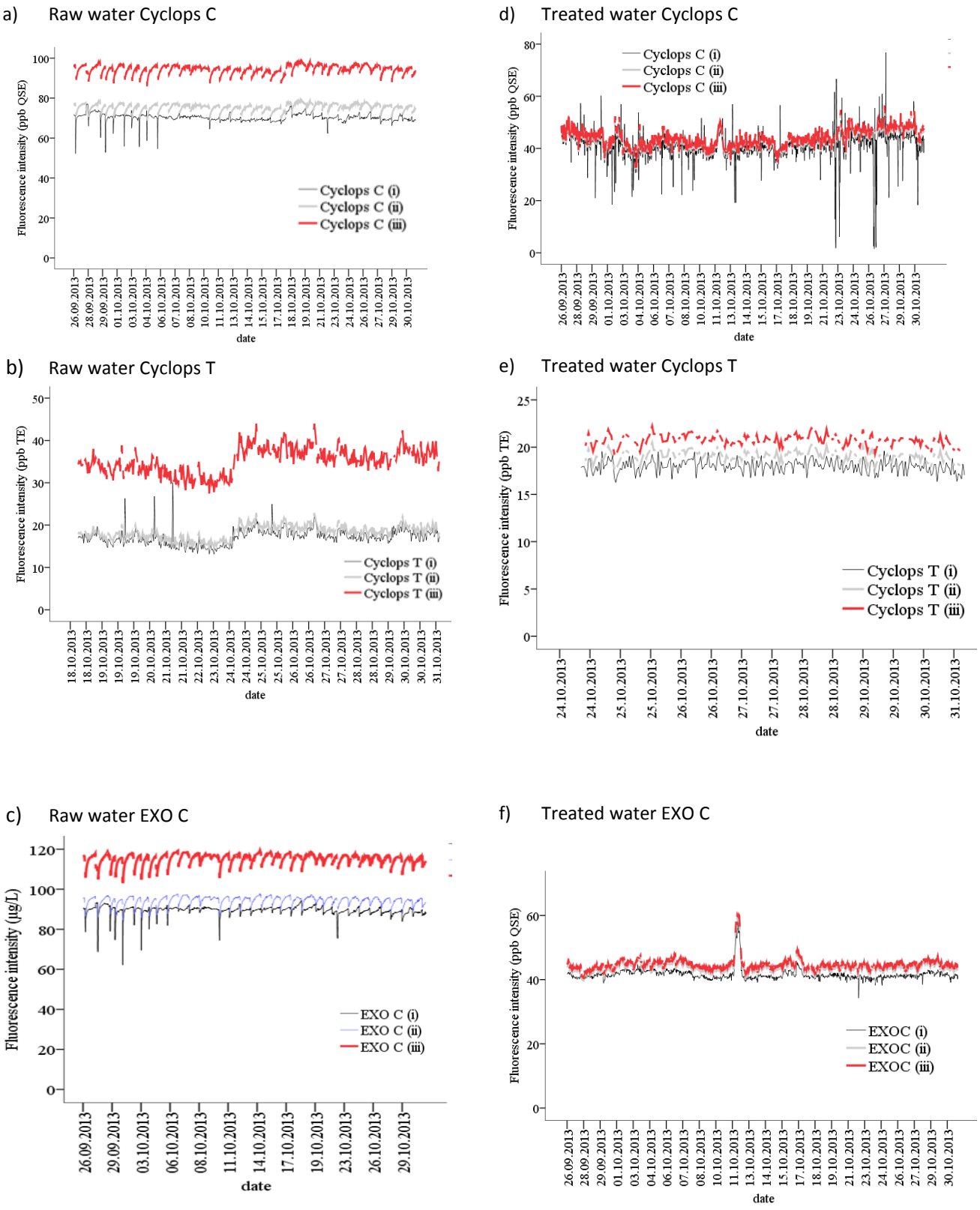

Fig. S3 Capalaba Water Treatment Plant raw water signal correction where (i) original signal, (ii) temperature corrected signal and (iii) temperature and IFE corrected signal, outliers removed for a) raw water Cyclops C, b) raw water Cyclops T, c) raw water EXO C, d) treated water Cyclops C, e) treated water Cyclops T and f) treated water EXO C.

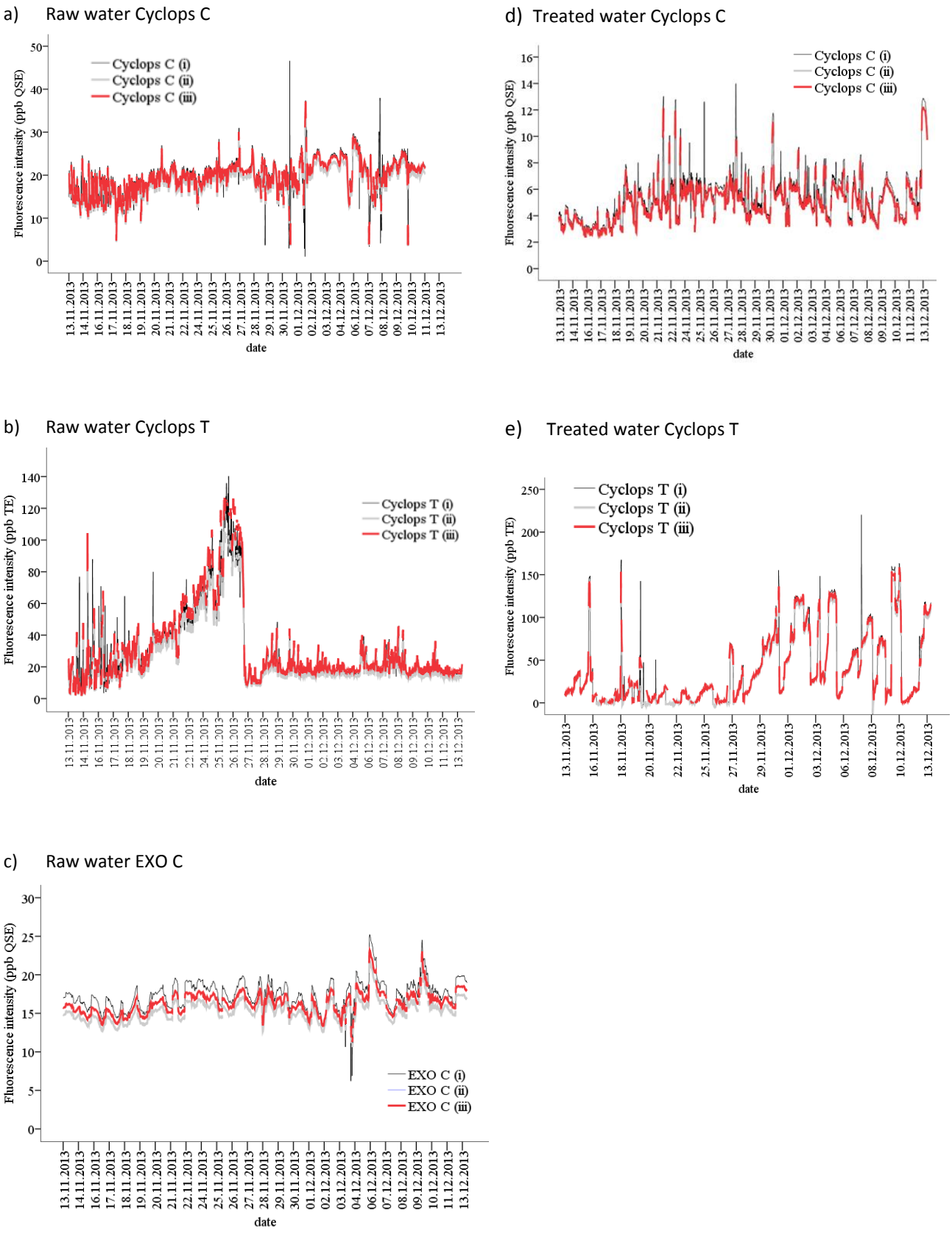

Fig. S4 Yarra Glen Water Treatment Plant (WTP) treated water signal correction. (i) is original signal, (ii) temperature corrected signal and (iii) temperature and IFE corrected signal, outliers removed for a) raw water Cyclops C, b) raw water Cyclops T, c) raw water EXO C, d) treated water Cyclops C and e) treated water Cyclops T. Note that the EXO C was not sufficiently sensitive to analyse Yarra Valley WTP treated water.

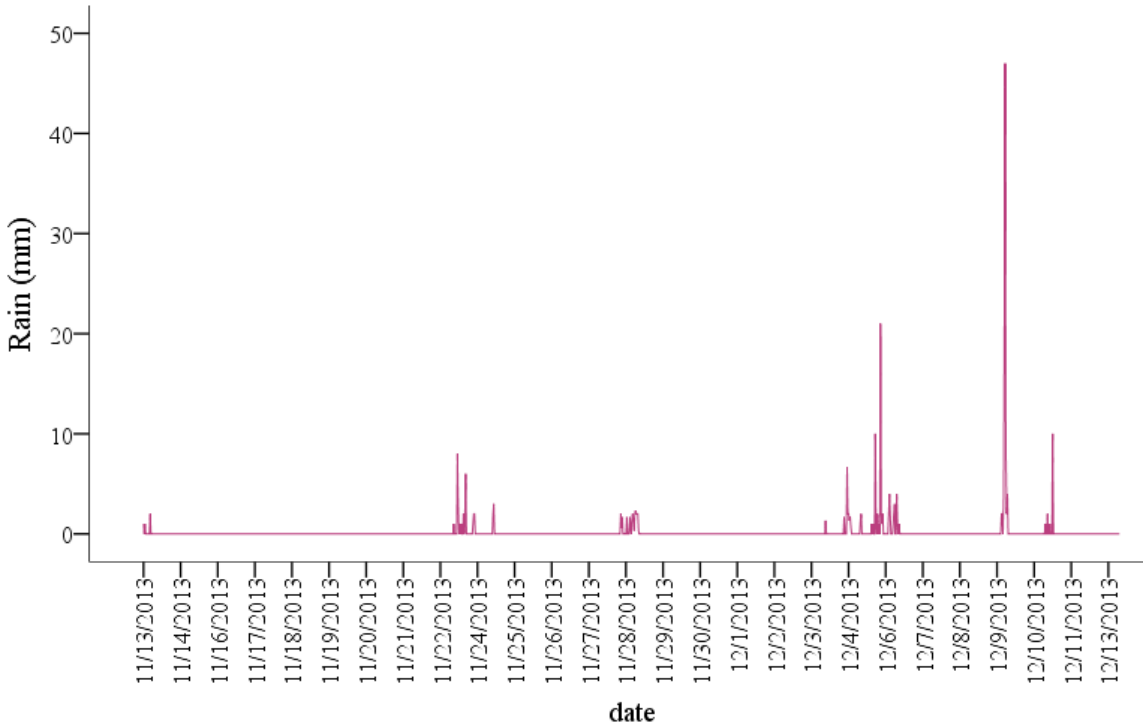

Fig. S5 Rain events during the on-line monitoring study at Yarra Glen WTP