Electronic Supplementary Material (ESI) for Environmental Science: Advances.

Supplementary Information

Organic matter concentration and characteristic dynamics in surface waters post-bushfires and cyclone: fDOM sensor for environmental monitoring and control

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Table A1 Number of samples collected from each site

State	Site name	Site code	No. of samples	Samples collection period	Extreme climate event	Event date
ACT	Orroral River	P01	25	2020/03/03 to 2021/11/03	Canberra Bushfire	2020/01/27 to 2020/02/27
QLD	Leslie Harrison Dam	P03	3	2019/09/24 to 2020/12/10	Cyclone Uesi, QLD	2020/02/04 to 2020/02/14
	Herring Lagoon	P05	3	2020/02/28 to 2020/12/08	Cyclone Uesi, QLD	2020/02/04 to 2020/02/14
SA	Middle River	P11	20	2020/02/07 to 2021/10/26	Kangaroo Island Bushfire	2019/12/20 to 2020/02/06
		Total	51			

Table A2 The indices extracted from HPSEC data in the case of two sites that experienced a cyclone and a bushfire

Site	P05 site						P11 site					
Parameters	**UVA260**			**Fl-Hu**			**UVA260**			**Fl-Hu**		
Sample	**01**	**03**	**Ratio[1]**	**01**	**03**	**Ratio[1]**	**01**	**03**	**Ratio[1]**	**01**	**03**	**Ratio[1]**
WAMW[2] (kDa)	3.21	2.31	1.4	1.88	1.73	1.1	2.05	2.58	0.8	1.12	1.49	0.8
LMW[3]	0.045	0.002	21.1	21.84	4.81	4.5	0.05	0.02	2.6	207.53	62.05	3.3
Building_blocks[4]	0.100	0.008	12.5	70.48	12.33	5.7	0.16	0.06	2.7	501.03	164.81	3.0
Humics[5]	1.82	0.06	29.9	906.99	41.64	21.8	1.99	1.08	1.8	1989.84	1107.05	1.8
Biopolypers[6]	0.08	0.01	14.1	4.35	5.25	0.8	0.05	0.07	0.7	7.08	5.31	1.3
full_DOM_range[7]	2.17	0.08	27.7	1005.46	65.79	15.3	2.26	1.24	1.8	2706.73	1339.94	2.0
PP-P1[8]	0.0944	0.0064	14.8	55.3	9.7	5.7	0.1524	0.0537	2.8	432	140	3.1
PP-P2	0.1174	0.0099	11.8	36.2	5.1	7.1	0.2177	0.0859	2.5	197	61.1	3.2
PP-P3	0.2435	0.0115	21.2	119	11	10.5	0.3830	0.1841	2.1	527	201	2.6
PP-P4	0.5160	0.0173	29.8	258	10	24.7	0.6100	0.3689	1.7	675	351	1.9
PP-P5	0.5340	0.0173	30.8	451	15	30.1	0.5899	0.3401	1.7	604.66	483.3	1.3
PP-P6	0.3464	0.0050	69.8	41	1.7	24.2	0.1696	0.0933	1.8	41.91	30.73	1.4

Site	P05 site						P11 site					
Parameters	**UVA260**			**Fl-Hu**			**UVA260**			**Fl-Hu**		
Sample	**01**	**03**	**Ratio[1]**	**01**	**03**	**Ratio[1]**	**01**	**03**	**Ratio[1]**	**01**	**03**	**Ratio[1]**
PP-P7	0.0300	0.0014	21.3	0.56	1.05	0.5	0.0351	0.0406	0.9	1.25	1.06	1.2

[1]Ratio of the WAMW (kDa) values of impacted samples to control samples in each studied site

[2]WAMW = $\frac{\sum UVA260 \times MW}{\sum UVA260}$

[3]Low molecular range weight (0.1 to 0.3 kDa)

[4](0.3 to 1 kDa)

[5](1 to 10 kDa)

[6](20 to 100 kDa)

[7](0.100 to 100 kDa)

[8]Peak 1: The decomposed (identified) MW peak (component) area in the studied samples AMW profile using the peak fitting approach

Table A3 Coefficient of variation (CV) values determined using triplication of the selected sample's analyses

Water quality index	Myponga River						Murray River					
	S-1	S-2	S-3	Mean	SD	CV	S-1	S-2	S-3	Mean	SD	CV
A_{254}	1.026	1.044	1.036	**1.035**	**0.007**	**0.7**	0.221	0.224	0.214	**0.220**	**0.004**	**1.9**
True colour (HU)	189	204	206	**199.7**	**7.65**	**3.8**	45	53	40	**46.0**	**5.55**	**12.1**
TOC (mg L^{-1})	23.1	24.2	24.4	**23.9**	**0.7**	**2.9**	8.74	8.05	8.32	**8.4**	**0.3**	**4.2**
DOC (mg L^{-1})	22.3	20.5	20.9	**21.2**	**0.9**	**4.5**	6.21	6.32	6.5	**6.3**	**0.1**	**2.3**
Turbidity (NTU)	8.8	8.6	8.6	**8.7**	**0.1**	**1.1**	86.7	87.8	86.6	**87.0**	**0.5**	**0.6**
pH	6.89	7.17	7.24	**7.10**	**0.15**	**2.1**	7.36	7.38	7.40	**7.38**	**0.02**	**0.2**

S: samples

Table A4 The correlation coefficients (*r*) between $fDOM_s$ and DOC, A_{254} (as benchmark) and colour as well as A_{254} and DOC and colour.

Site	N	$fDOM_s$			$fDOM_{s,III}$			$fDOM_{s,IV}$			A_{254}	
		DOC	A_{254}	Colour	DOC	A_{254}	Colour	DOC	A_{254}	Colour	DOC	Colour
Orroral River (P01)	22	*.978***	*.980***	*.812***	*.983***	*.985***	*.822***	*.987***	*.999***	*.827***	*.995***	*.907***
Middle River (P11)	17	*.700***	*.683***	*.024*	*.920***	*.884***	*.372*	*.952***	*.957***	*.620***	*.954***	*.791***
Leslie Harrison Dam (P03)	3	*.997**	*.996*	*.982*	*.983*	*>.999**	*.996*	*.953*	*.989*	*.999**	*.987*	*.994*
Herring Lagoon (P05)	3	*.978*	*.971*	*.962*	*.967*	*.959*	*.948*	*>.999***	*.999**	*.999**	*.999**	*.999**

*Correlation is significant at the *.05* level (2-tailed).
**Correlation is significant at the *.01* level (2-tailed).

Table A5 The results of the elemental analysis of the samples

Element	P01_01	P11_01	P05_01	P03_02	Element	P01_01	P11_01	P05_01	P03_02
Zinc - Total	0.0006	0.002	0.0018	0.0126	**Lithium - Total**	0.0008	0.0069	0.0008	0.0016
Zinc - Soluble	0.0003<	0.0005	0.0015	0.01	**Lithium - Soluble**	0.0009	0.0053	0.0008	0.0009
Vanadium - Total	0.001	0.0032	0.0001	0.0045	**Lanthanum - Total**	0.0002	0.0011	0.0001<	0.0023
Vanadium - Soluble	0.0006	0.0011	0.0001	0.0004	**Lanthanum - Soluble**	0.0001<	0.0003	0.0001<	0.0008
Uranium - Total	0.0015	0.0004	0.0001<	0.0002	**Potassium**	6.86	17.6	1.08	2.99
Uranium - Soluble	0.0014	0.0003	0.0001<	0.0001<	**Mercury - Total**	0.00003<	0.00006	0.00006	0.00003<
Thallium - Total	0.0001<	0.0001<	0.0001<	0.0001<	**Mercury - Soluble**	0.00003<	0.00003<	0.00003<	0.00003<
Thallium - Soluble	0.0001<	0.0001<	0.0001<	0.0001<	**Iron - Total**	0.5347	1.533	0.9343	3.141
Titanium - Total	0.003	0.0286	0.0011	0.0655	**Iron - Soluble**	0.1213	0.412	0.7194	0.2537
Titanium - Soluble	0.0005	0.0011	0.0008	0.0038	**Copper - Total**	0.0003	0.0027	0.0004	0.0573
Strontium - Total	0.2121	0.3138	0.0182	0.0414	**Copper - Soluble**	0.0002	0.0016	0.0003	0.0366
Strontium - Soluble	0.2194	0.258	0.0163	0.0366	**Chromium (VI)**	0.01<	0.01<	0.01<	0.01
Tin - Total	0.0005<	0.0005<	0.0005<	0.0005<	**Chromium (VI) - Soluble**	0.0002<	0.0011<	0.0004<	0.0019

Element	P01_01	P11_01	P05_01	P03_02	Element	P01_01	P11_01	P05_01	P03_02
Tin - Soluble	0.0005<	0.0005<	0.0005<	0.0005<	**Chromium - Total**	0.0002	0.0011	0.0004	0.0019
Selenium - Total	0.0001<	0.0009	0.0001	0.0006	**Chromium - Soluble**	0.0001<	0.0003	0.0003	0.0006
Selenium - Soluble	0.0001<	0.0005	0.0001<	0.0003	**Cobalt - Total**	0.0005	0.0017	0.0002	0.0042
Antimony - Total	0.0005<	0.0009	0.0011	0.0016	**Cobalt - Soluble**	0.0003	0.0009	0.0002	0.0001
Antimony - Soluble	0.0005<	0.0005<	0.0006	0.0008	**Cadmium - Total**	0.0001<	0.0001<	0.0001<	0.0001
Lead - Total	0.0001<	0.0006	0.0001	0.0059	**Cadmium - Soluble**	0.0001<	0.0001<	0.0001<	0.0001
Lead - Soluble	0.0001<	0.0001<	0.0001<	0.0001<	**Calcium**	39.6	34.3	1.6	4.1
Phosphorus - Total	0.083	0.257	0.028	0.131	**Beryllium - Total**	0.0003<	0.0003<	0.0003<	0.0003
Phosphorus - Soluble	0.029	0.067	0.005<	0.006	**Beryllium - Soluble**	0.0003<	0.0003<	0.0003<	0.0003
Nickel - Total	0.0009	0.0023	0.0002	0.0029	**Barium - Total**	0.0514	0.0561	0.0071	0.0483

Table A4 (continued)

Element	P01_01	P11_01	P05_01	P03_02	Element	P01_01	P11_01	P05_01	P03_02
Nickel - Soluble	0.0008	0.0015	0.0001	0.0016	**Barium - Soluble**	0.0503	0.0418	0.0065	0.0399
Sodium	13.8	137	16.3	18.8	**Boron - Soluble**	0.02<	0.125	0.02<	0.031
Molybdenum - Total	0.0011	0.0013	0.0001<	0.0003	**Arsenic - Total**	0.0006	0.0021	0.0005	0.0028
Molybdenum - Soluble	0.0011	0.001	0.0001<	0.0001	**Arsenic - Soluble**	0.0006	0.0014	0.0005	0.0008
Manganese - Total	0.2044	0.1188	0.0282	1.094	**Aluminium - Total**	0.053	0.714	0.086	2.567
Manganese - Soluble	0.0031	0.0037	0.0255	0.0246	**Aluminium - Soluble**	0.007	0.046	0.067	0.223
Magnesium	10.8	32.9	2.37	3.28	**Silver - Total**	0.00003<	0.00003<	0.00003<	0.00004
					Silver - Soluble	0.00003<	0.00003<	0.00003<	0.00003

Table A5 The indices extracted from fEEM in the case of two sites that experienced cyclone and bushfire

Site	P05			P11												
Sample	**01**	**02**	**03**	**01**	**02**	**03**	**04**	**07**	**09**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
P1*	2.02	15.60	11.70	1.57	2.31	2.17	1.87	1.12	1.40	2.24	2.03	2.26	2.13	2.42	1.73	1.97
P2	6.37	21.06	16.41	18.5	16.2	14.6	14.4	14.4	13.3	14.2	15.5	15.7	14.1	14.3	12.5	13.6
FA	54.67	37.17	43.04	50.3	51.4	51.4	51.1	54.6	53.0	54.7	56.6	52.0	53.8	51.5	54.2	53.2
SMP	4.55	10.33	10.53	7.8	7.5	7.8	7.7	5.9	6.5	6.9	6.2	7.7	7.2	7.2	6.1	7.0
HA	32.39	15.84	18.32	21.8	22.6	24.1	24.9	24.0	25.7	22.0	19.8	22.4	22.8	24.7	25.5	24.2
HIX[2]	0.98	0.86	0.85	0.95	0.95	0.95	0.95	0.97	0.96	0.95	0.96	0.94	0.95	0.96	0.96	0.96
BIX[3]	0.30	0.42	0.48	0.76	0.64	0.62	0.59	0.58	0.56	0.51	0.55	0.58	0.54	0.53	0.47	0.50
Peak T[4]	0.03	0.24	0.04	0.60	0.40	0.33	0.25	0.16	0.17	0.21	0.23	0.32	0.24	0.17	0.13	0.15
Peak A[5]	1.31	0.74	0.23	4.92	4.17	3.31	2.62	2.61	2.49	2.47	2.87	3.10	2.48	1.86	1.97	1.83
Peak M[6]	0.67	0.38	0.11	4.32	3.21	2.35	1.86	1.63	1.63	1.39	1.66	1.99	1.55	1.11	1.09	1.07
Peak C[7]	1.00	0.48	0.14	3.90	3.22	2.63	2.11	1.90	1.87	1.59	1.85	2.16	1.78	1.29	1.36	1.23
A:T[8]	21.70	3.18	4.81	7.3	9.8	9.7	11.1	16.1	14.0	12.4	14.2	10.2	10.2	11.6	16.6	13.3
C:A[9]	0.70	0.59	0.58	0.74	0.71	0.74	0.74	0.69	0.71	0.58	0.58	0.63	0.67	0.67	0.65	0.61
C:M[10]	2.38	1.78	1.76	0.99	1.25	1.35	1.45	1.59	1.55	1.51	1.43	1.34	1.56	1.56	1.81	1.51
C:T[11]	15.20	1.89	2.80	5.4	6.9	7.2	8.2	11.1	10.0	7.2	8.3	6.4	6.8	7.8	10.8	8.1

NI[12]	1.48	1.00	1.00	5.8	4.9	3.8	3.1	3.0	2.9	2.9	3.4	3.6	2.9	2.2	2.3	2.1
EXO fDOM[13]	2.02	15.60	11.70	2.2	1.8	1.4	1.1	1.2	1.1	0.9	1.1	1.2	1.1	0.8	0.9	0.7
PAR_P1[14]	0.47	1.90	1.51	4.70	3.91	3.00	2.46	2.21	2.22	1.82	2.12	2.50	2.06	1.49	1.49	1.38
PAR_P2	0.20	1.21	0.61	1.80	1.45	1.17	0.87	1.18	0.96	0.81	0.95	1.04	0.98	0.73	0.92	0.69
PAR_P3	0.21	0.41	0.49	2.61	1.60	1.12	0.85	0.72	0.66	0.49	0.63	0.87	0.64	0.43	0.38	0.37
PAR_P4	0.28	0.00	0.65	0.00	0.33	0.34	0.25	0.25	0.24	0.69	0.78	0.66	0.35	0.32	0.35	0.42
PAR_P5	0.09	0.03	0.16	0.10	0.16	0.15	0.12	0.06	0.08	0.15	0.15	0.23	0.22	0.10	0.09	0.10

*Weighted average percentage values for P1, P2, FA, SMP and HA indices.

[1]Ratio of the fluorescence index value in the raw sample to a sample treated with >= EnD. [2]Humification index (HIX_250nm): An indicator of humic substance content or extent of humification [1]; [3]Biological index (BIX): An indicator of autotrophic productivity where >1 values correspond to recently produced DOM of autochthonous origin [2]); [4]Peak T: An indicator of tryptophan like part of protein like compounds; [5]Peak A: An indicator of humic Like compounds.; [6]Peak M: An indicator of marine humic Like compounds; [7]Peak C: An indicator of Humic Like compounds [3].[8]Peaks ratios (A:T): Indicator of the amount of humic-like (recalcitrant) vs. fresh-like (labile) fluorescence [4]); [9]Peaks ratio (C:A): An indication of the amount of humic-like vs. fulvic-like compounds; [10]Peaks ratio (C:M): An indication of the amount of diagenetically altered (blue-shifted) fluorescence in a sample [5, 6]; [11]Peaks ratios (C:T): Indicator of the amount of humic-like (recalcitrant) vs. fresh-like (labile) fluorescence [4]); [12]New index: Proposed to be an indicator for humification; [13]EEM_fDOM: Is the normalized signal collected from benchtop machine output EEM spectra at the same ex-em paired wavelength which the EXO_fDOM sensor use.[14]Peak 1: The decomposed (identified) EEM peak (component) area in the studied samples EEM spectra using PARFAC approach.

Figure 2.a1

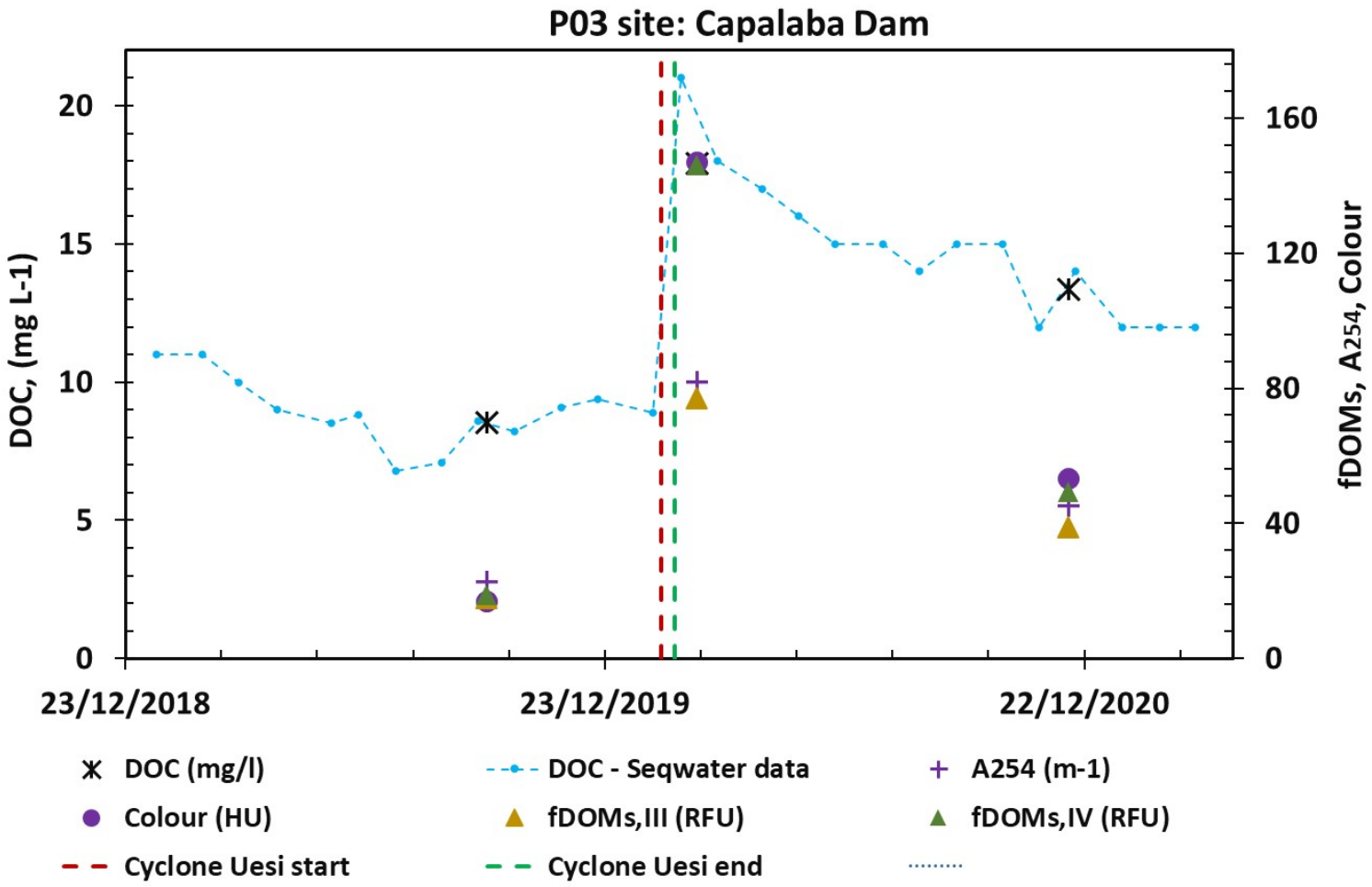

P03 site: Capalaba Dam
DOC, (mg L-1)
fDOMs, A254, Colour
0
5
10
15
20
0
40
80
120
160
23/12/2018
23/12/2019
22/12/2020
DOC (mg/l)
DOC - Seqwater data
A254 (m-1)
Colour (HU)
fDOMs,III (RFU)
fDOMs,IV (RFU)
Cyclone Uesi start
Cyclone Uesi end

Figure 2.a2

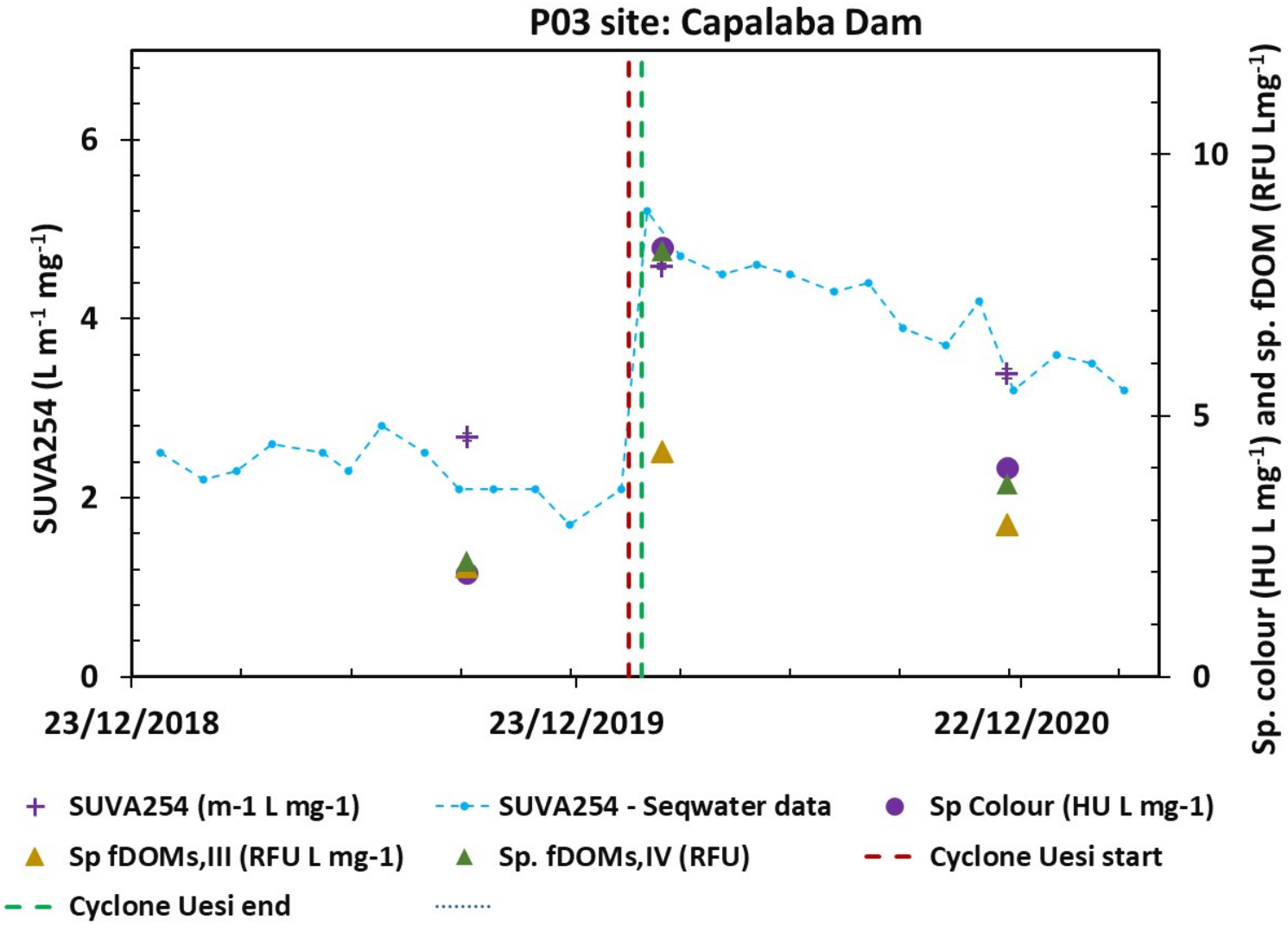

P03 site: Capalaba Dam
SUVA254 (L m-1 mg-1)
Sp. colour (HU L mg-1) and sp. fDOM (RFU Lmg-1)
0
2
4
6
0
5
10
23/12/2018
23/12/2019
22/12/2020
SUVA254 (m-1 L mg-1)
SUVA254 - Seqwater data
Sp Colour (HU L mg-1)
Sp fDOMs,III (RFU L mg-1)
Sp. fDOMs,IV (RFU)
Cyclone Uesi start
Cyclone Uesi end

Figure 2.a3

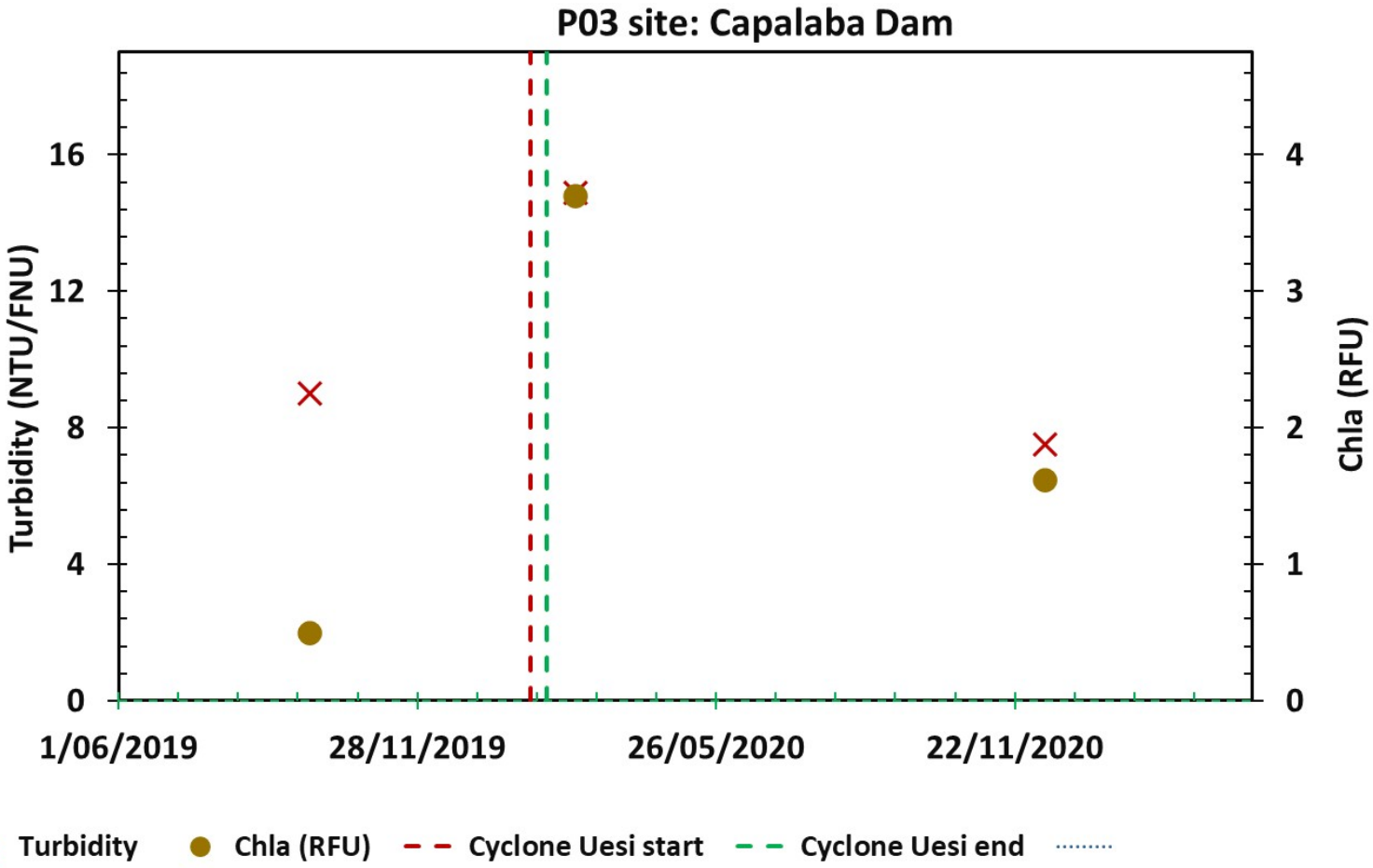

P03 site: Capalaba Dam
Turbidity (NTU/FNU)
Chla (RFU)
16
12
8
4
0
4
3
2
1
0
1/06/2019
28/11/2019
26/05/2020
22/11/2020
Turbidity
Chla (RFU)
Cyclone Uesi start
Cyclone Uesi end

Figure 2.b1

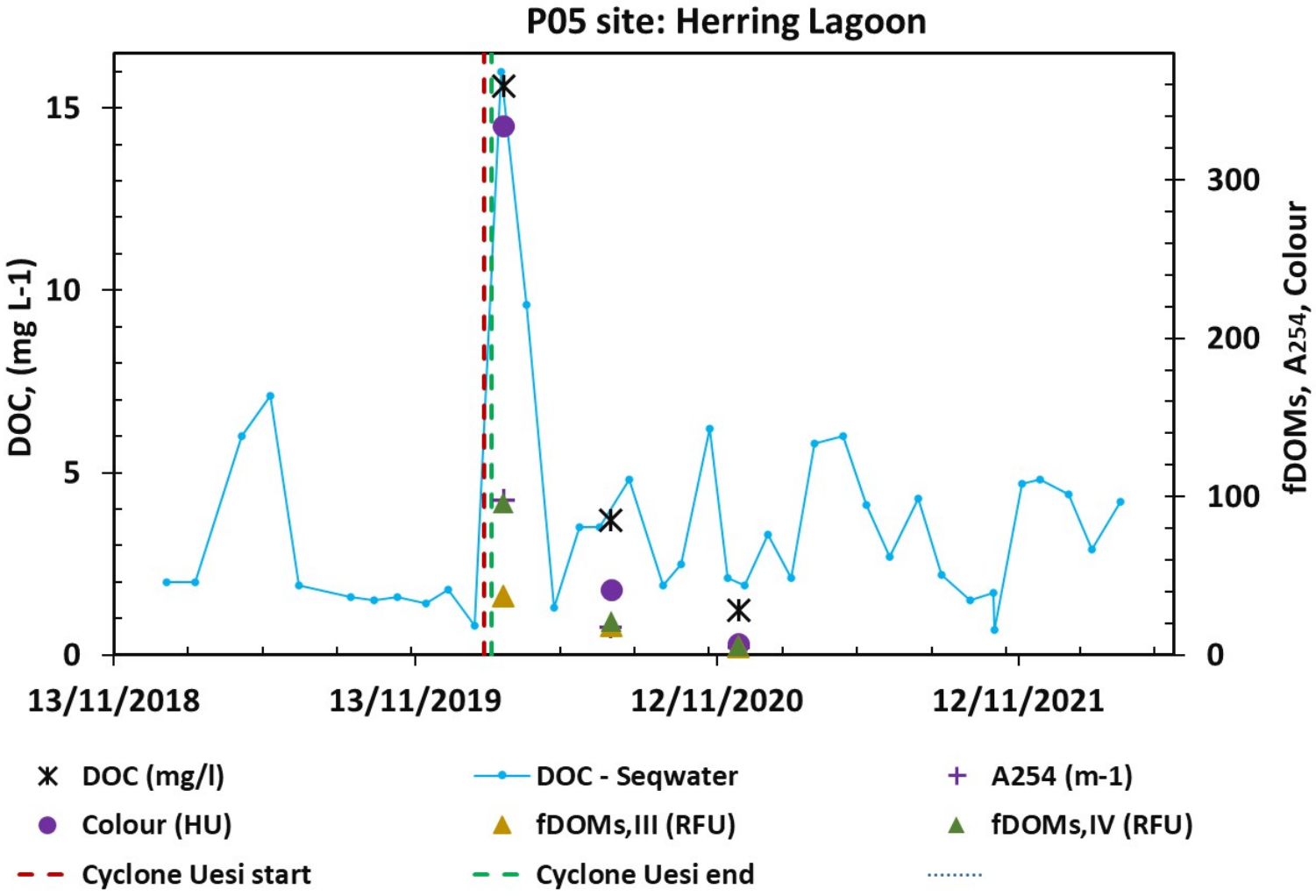

P05 site: Herring Lagoon
DOC, (mg L-1)
fDOMs, A254, Colour
15
10
5
0
300
200
100
0
13/11/2018
13/11/2019
12/11/2020
12/11/2021
DOC (mg/l)
DOC - Seqwater
A254 (m-1)
Colour (HU)
fDOMs,III (RFU)
fDOMs,IV (RFU)
Cyclone Uesi start
Cyclone Uesi end

Figure 2.b2

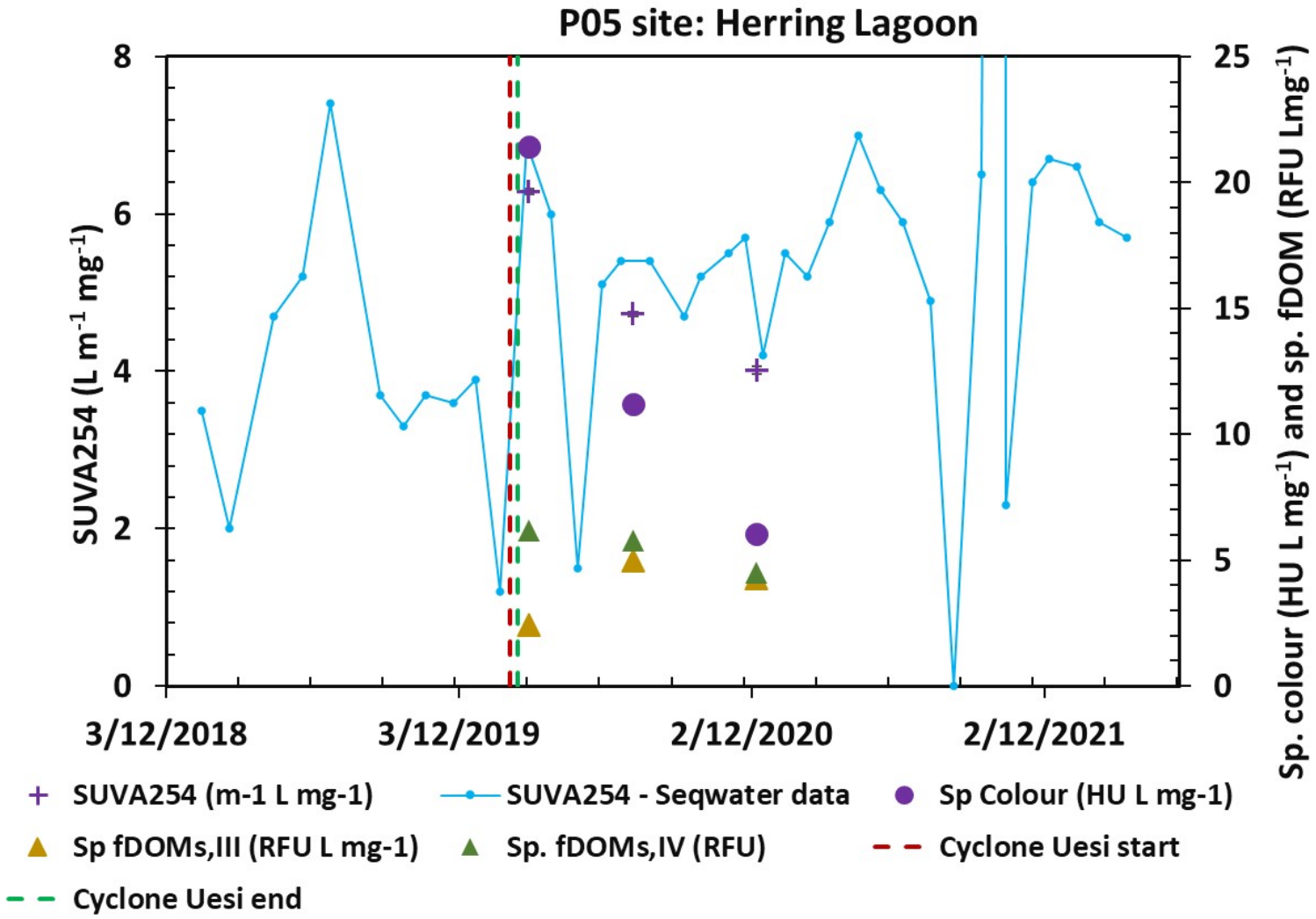

P05 site: Herring Lagoon
SUVA254 (L m-1 mg-1)
Sp. colour (HU L mg-1) and sp. fDOM (RFU Lmg-1)
0
2
4
6
8
0
5
10
15
20
25
3/12/2018
3/12/2019
2/12/2020
2/12/2021
SUVA254 (m-1 L mg-1)
SUVA254 - Seqwater data
Sp Colour (HU L mg-1)
Sp fDOMs,III (RFU L mg-1)
Sp. fDOMs,IV (RFU)
Cyclone Uesi start
Cyclone Uesi end

Figure 2.b3

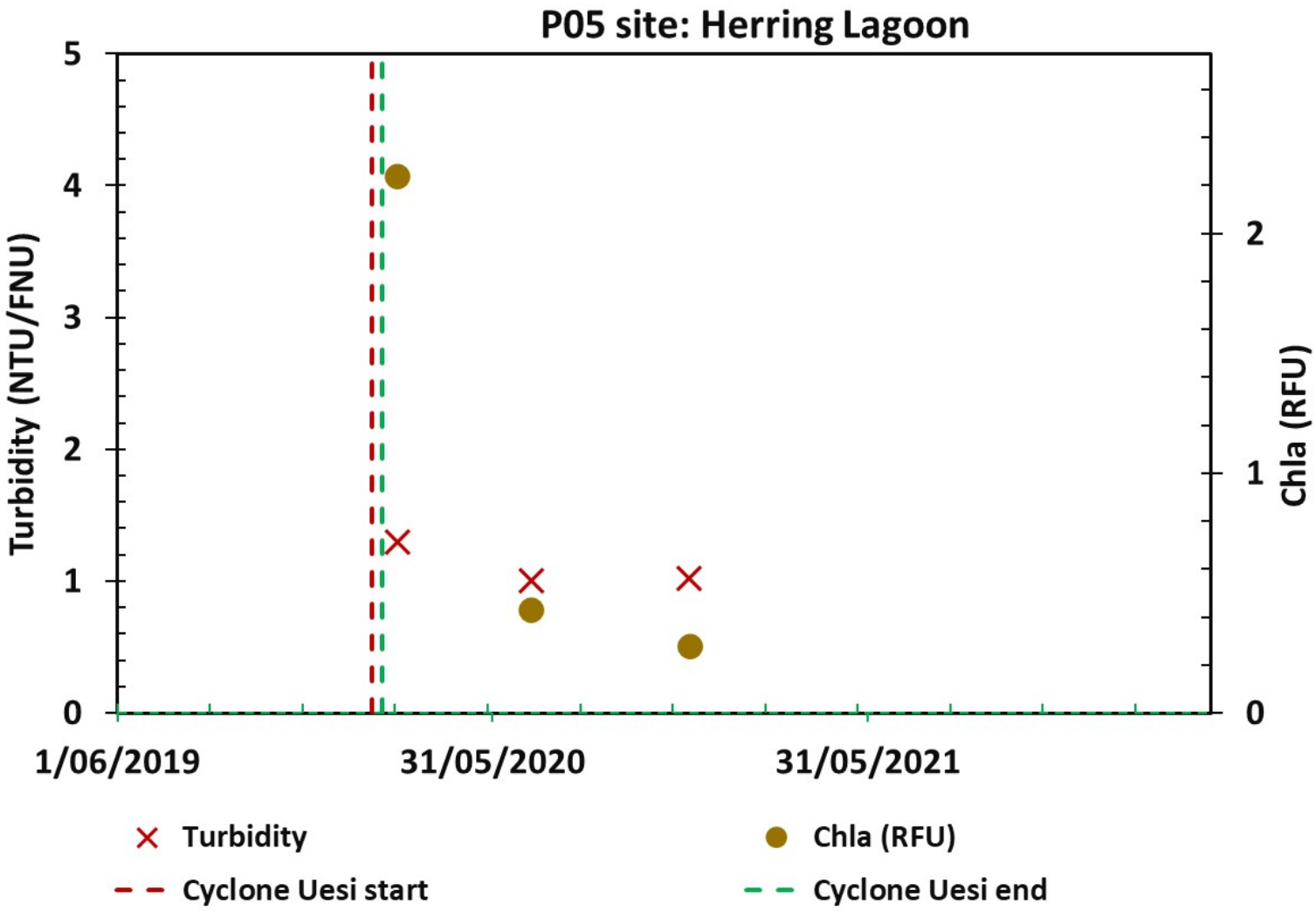

P05 site: Herring Lagoon
Turbidity (NTU/FNU)
Chla (RFU)
0
1
2
3
4
5
0
1
2
1/06/2019
31/05/2020
31/05/2021
Turbidity
Chla (RFU)
Cyclone Uesi start
Cyclone Uesi end

Figure 3.a1

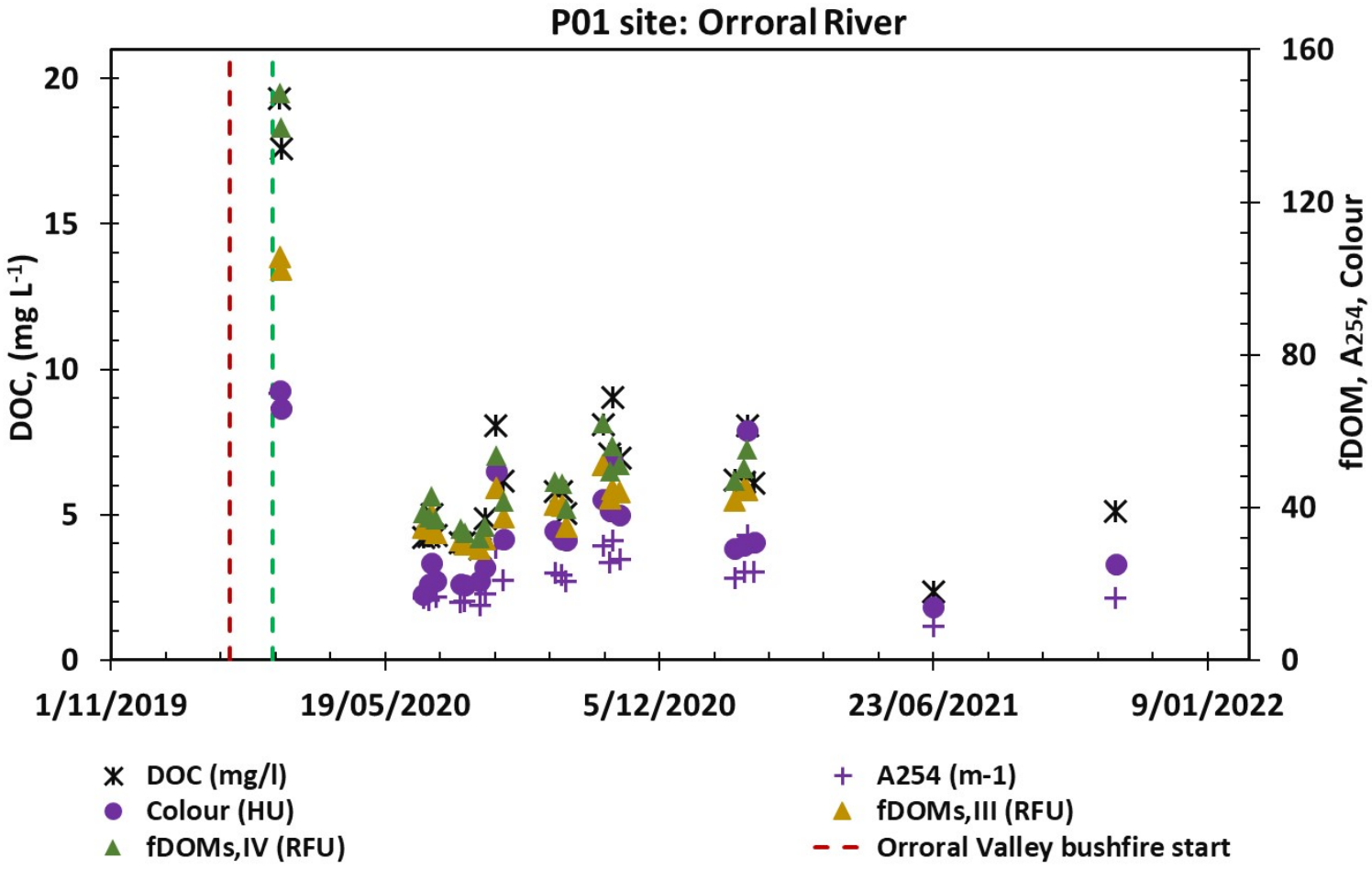

P01 site: Orroral River
DOC, (mg L-1)
fDOM, A254, Colour
0
5
10
15
20
0
40
80
120
160
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
DOC (mg/l)
Colour (HU)
fDOMs,IV (RFU)
A254 (m-1)
fDOMs,III (RFU)
Orroral Valley bushfire start

Figure 3.a2

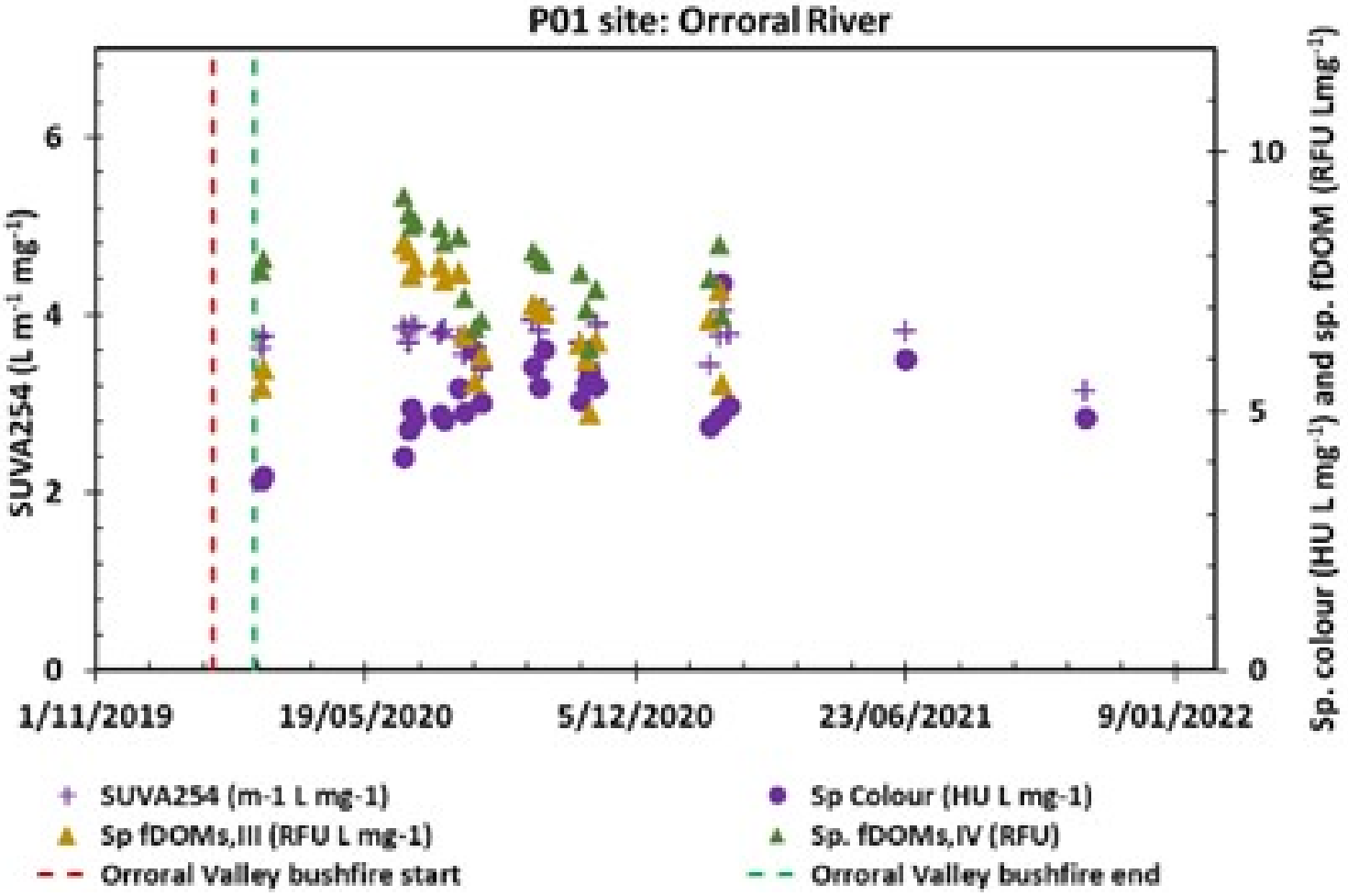

P01 site: Orroral River
SUVA254 (L m-1 mg-1)
Sp. colour (HU L mg-1) and sp. fDOM (RFU Lmg-1)
0
2
4
6
0
5
10
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
SUVA254 (m-1 L mg-1)
Sp Colour (HU L mg-1)
Sp fDOMs,III (RFU L mg-1)
Sp. fDOMs,IV (RFU)
Orroral Valley bushfire start
Orroral Valley bushfire end

Figure 3.a3

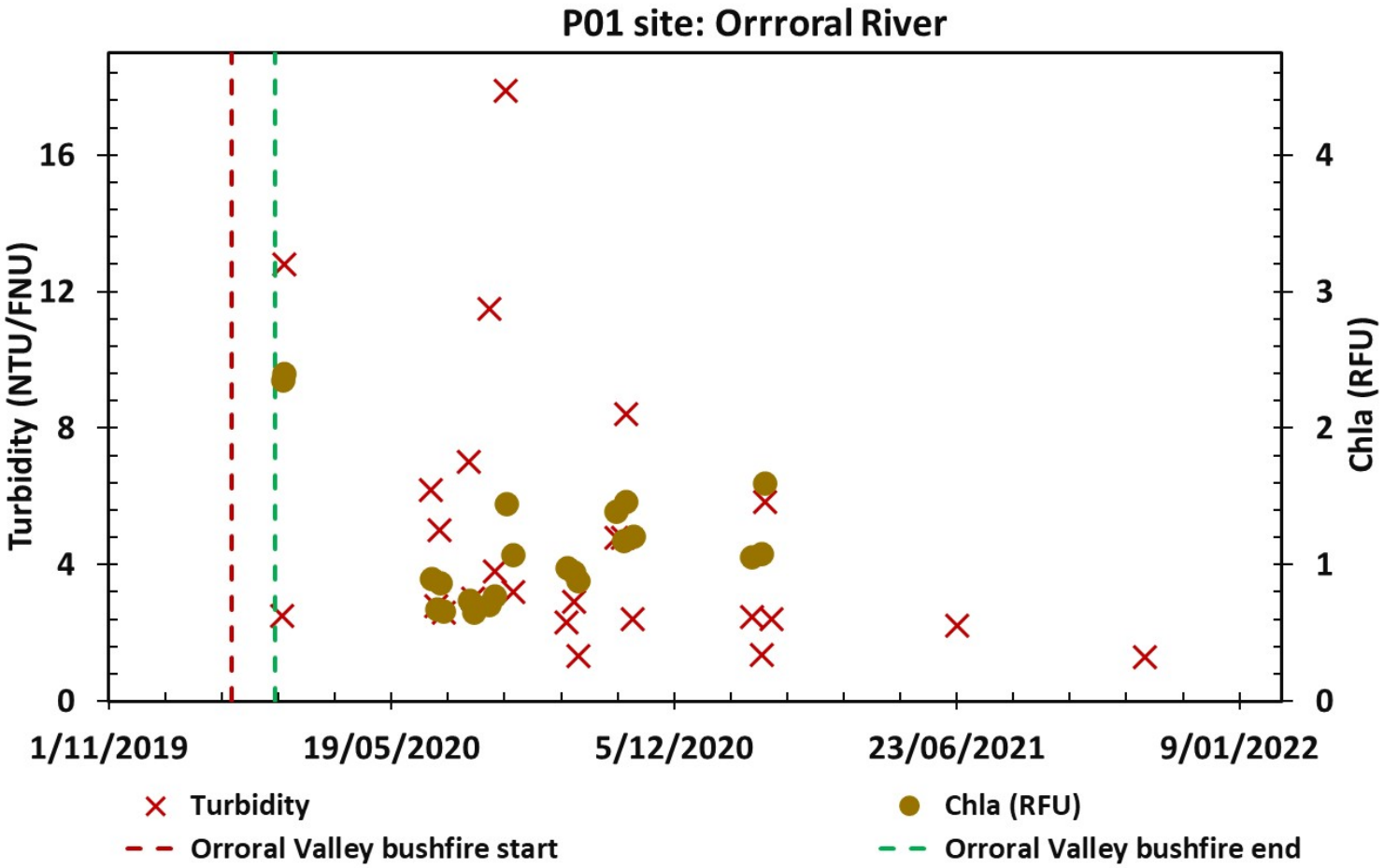

P01 site: Orrroral River
Turbidity (NTU/FNU)
Chla (RFU)
0
4
8
12
16
0
1
2
3
4
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
Turbidity
Chla (RFU)
Orroral Valley bushfire start
Orroral Valley bushfire end

Figure 3.b1

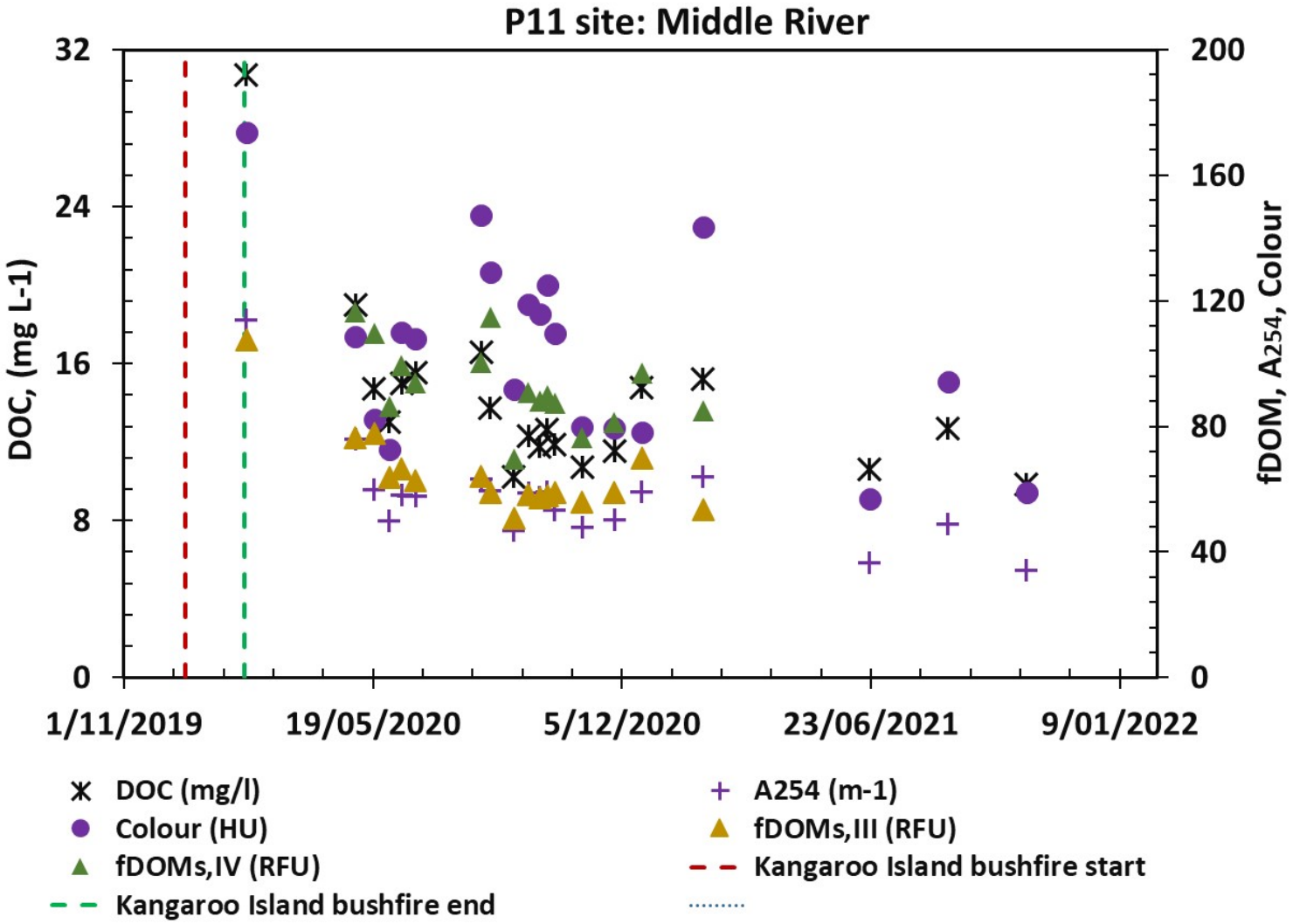

P11 site: Middle River
DOC, (mg L-1)
fDOM, A254, Colour
32
24
16
8
0
200
160
120
80
40
0
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
DOC (mg/l)
Colour (HU)
fDOMs,IV (RFU)
Kangaroo Island bushfire end
A254 (m-1)
fDOMs,III (RFU)
Kangaroo Island bushfire start

Figure 3.b2

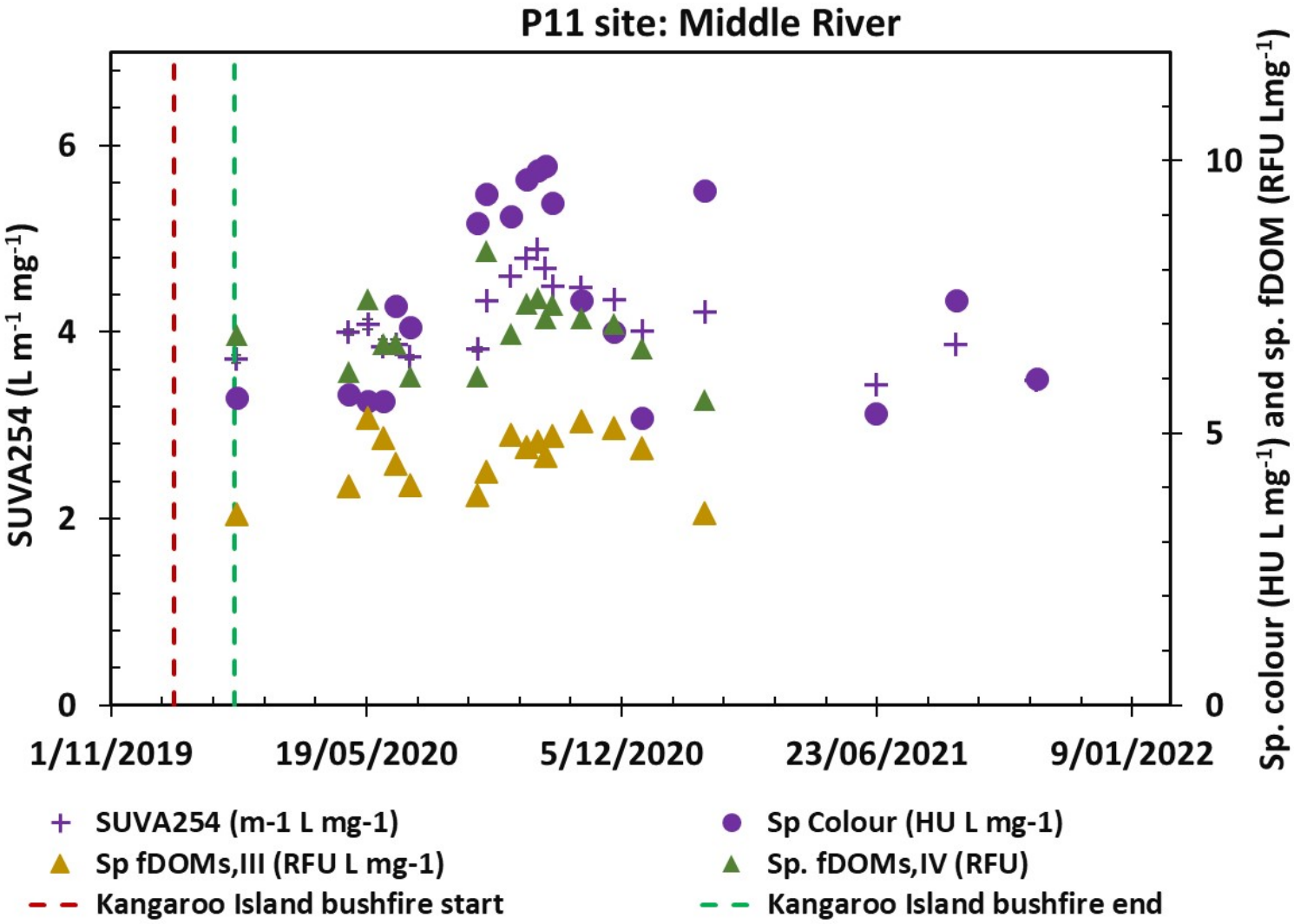

P11 site: Middle River
SUVA254 (L m-1 mg-1)
Sp. colour (HU L mg-1) and sp. fDOM (RFU Lmg-1)
0
2
4
6
0
5
10
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
SUVA254 (m-1 L mg-1)
Sp Colour (HU L mg-1)
Sp fDOMs,III (RFU L mg-1)
Sp. fDOMs,IV (RFU)
Kangaroo Island bushfire start
Kangaroo Island bushfire end

Figure 3.b3

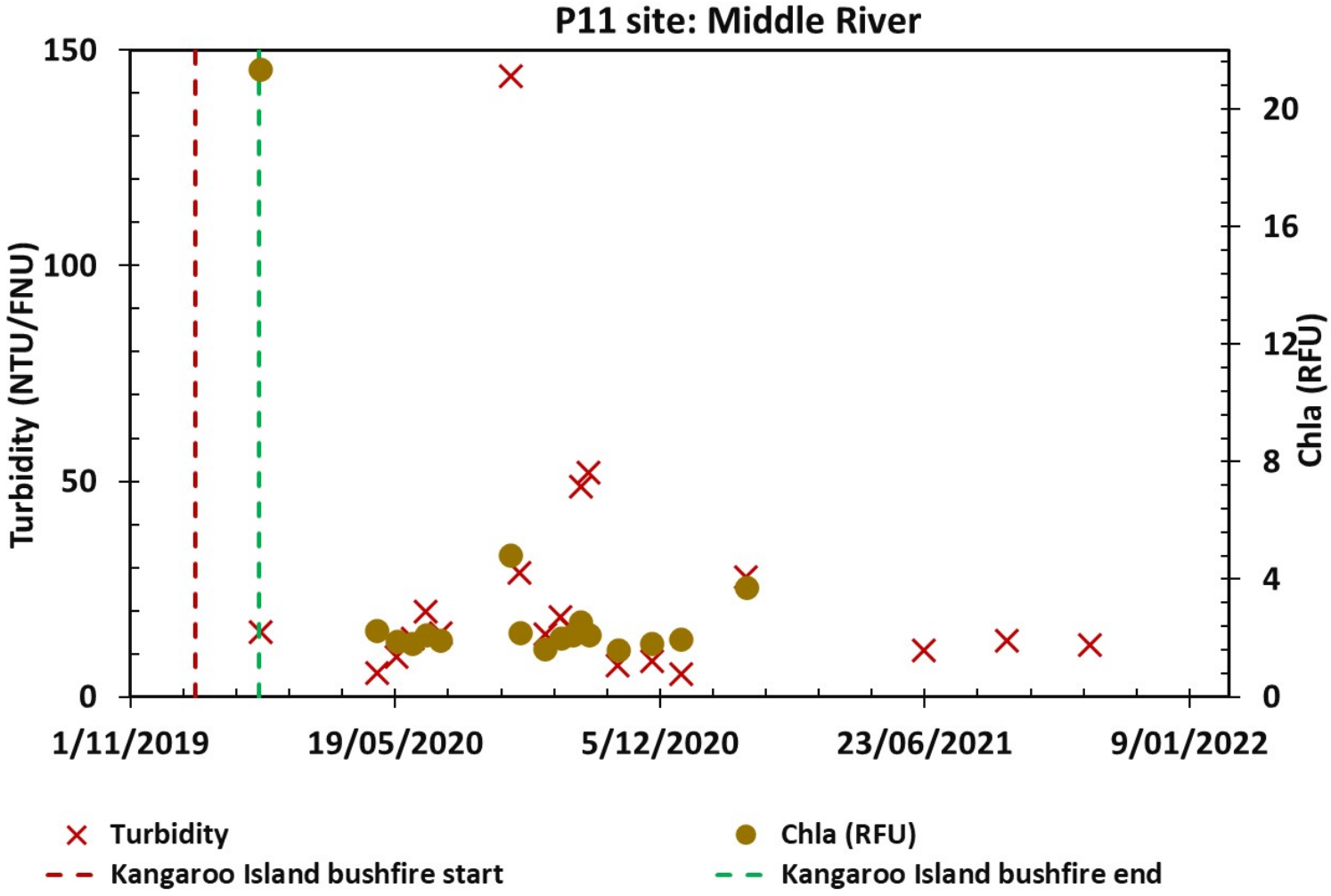

P11 site: Middle River
Turbidity (NTU/FNU)
Chla (RFU)
150
100
50
0
20
16
12
8
4
0
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
Turbidity
Chla (RFU)
Kangaroo Island bushfire start
Kangaroo Island bushfire end

Figure 4.a1

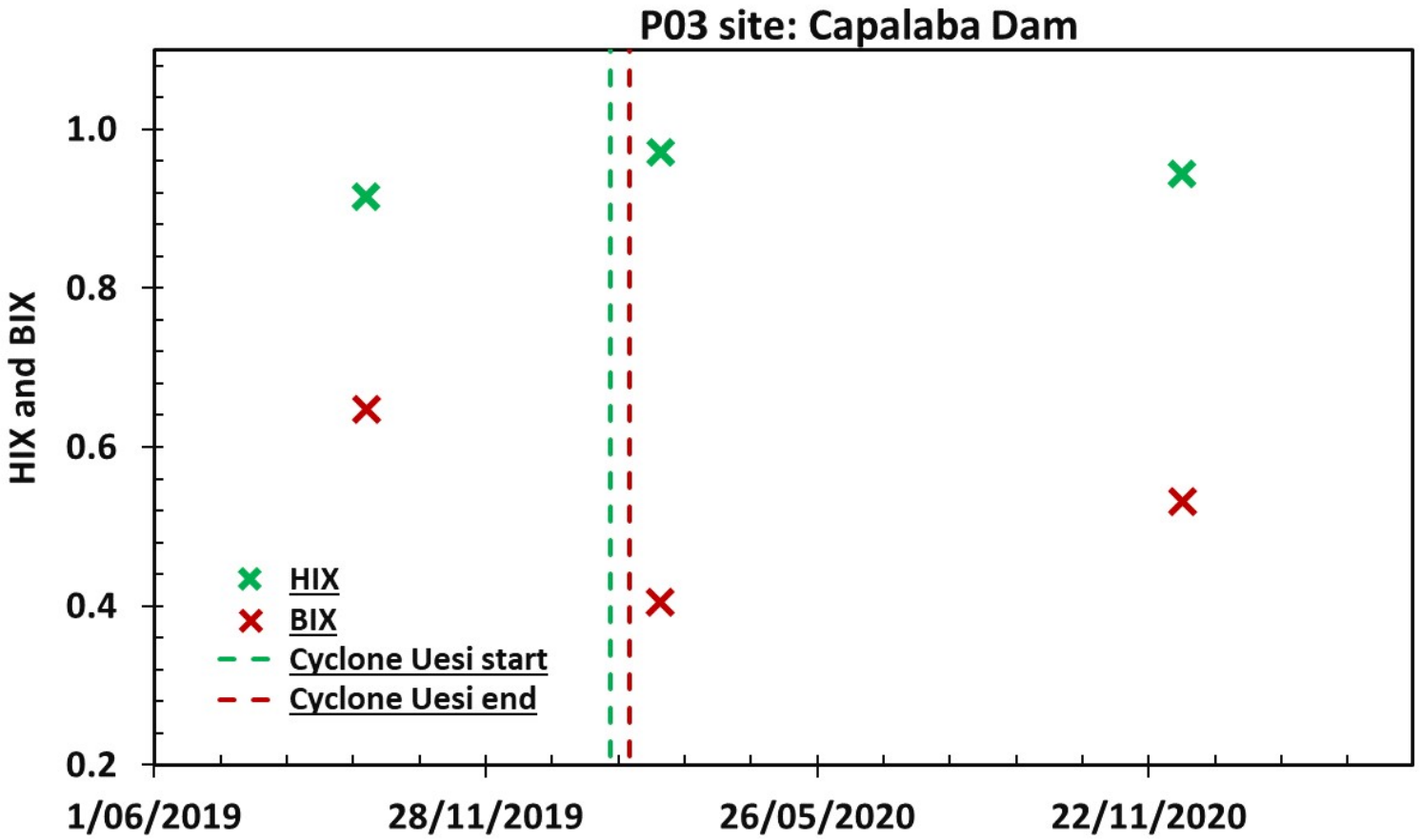

P03 site: Capalaba Dam
HIX and BIX
1.0
0.8
0.6
0.4
0.2
HIX
BIX
Cyclone Uesi start
Cyclone Uesi end
1/06/2019
28/11/2019
26/05/2020
22/11/2020

Figure 4.a2

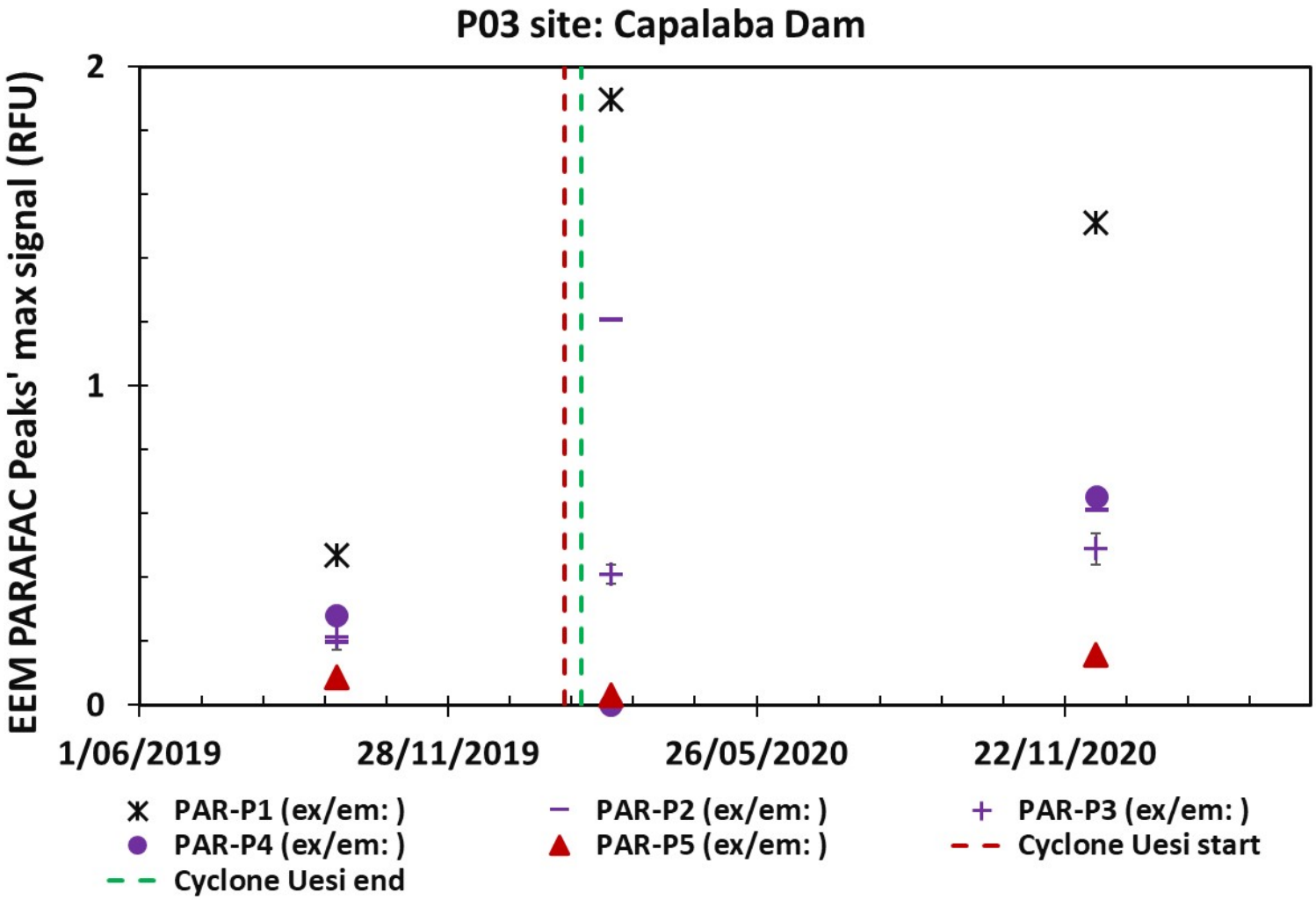

P03 site: Capalaba Dam
EEM PARAFAC Peaks' max signal (RFU)
2
1
0
1/06/2019
28/11/2019
26/05/2020
22/11/2020
PAR-P1 (ex/em:)
PAR-P2 (ex/em:)
PAR-P3 (ex/em:)
PAR-P4 (ex/em:)
PAR-P5 (ex/em:)
Cyclone Uesi start
Cyclone Uesi end

Figure 4.b1

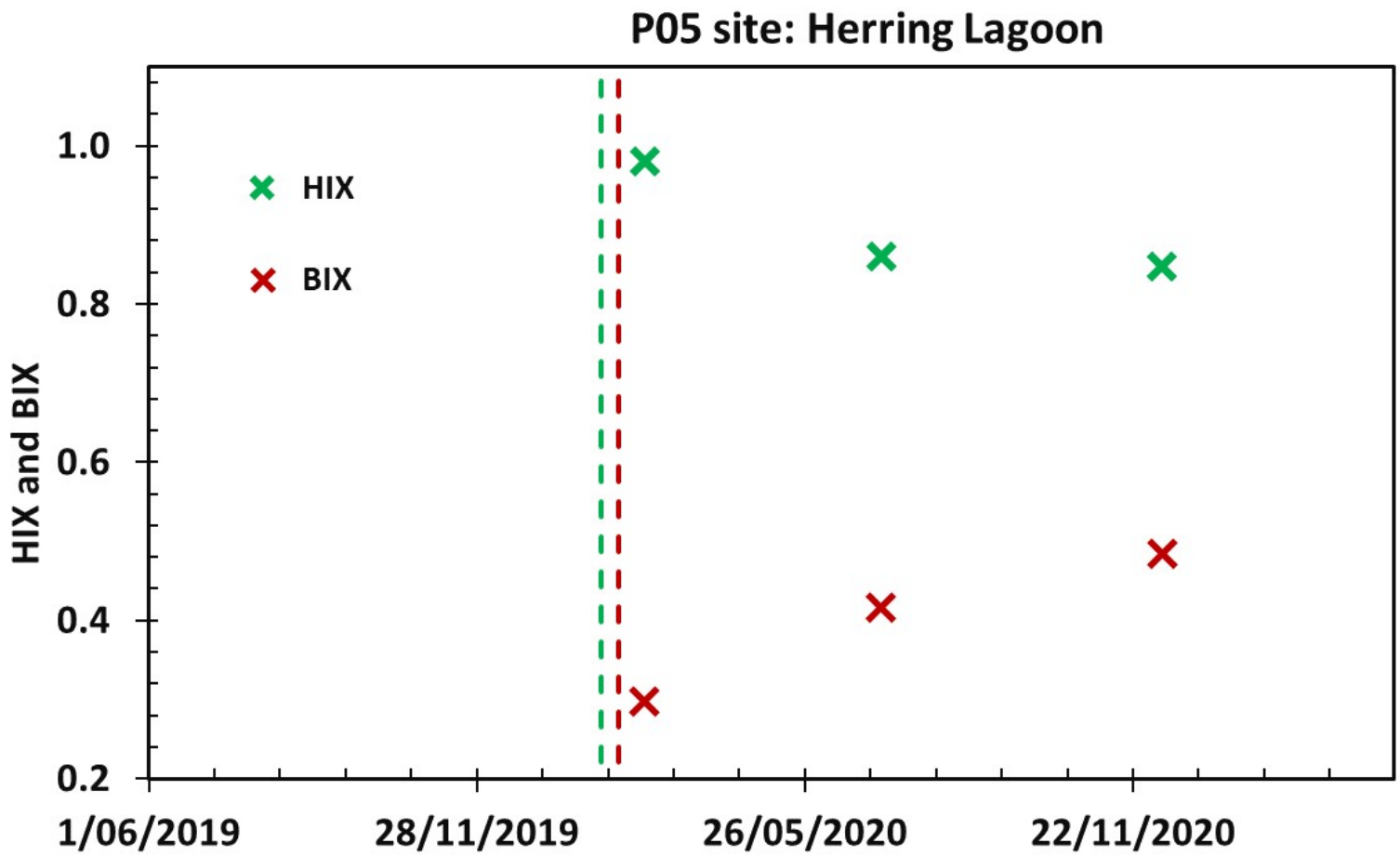

P05 site: Herring Lagoon
HIX
BIX
HIX and BIX
1.0
0.8
0.6
0.4
0.2
1/06/2019
28/11/2019
26/05/2020
22/11/2020

Figure 4.b2

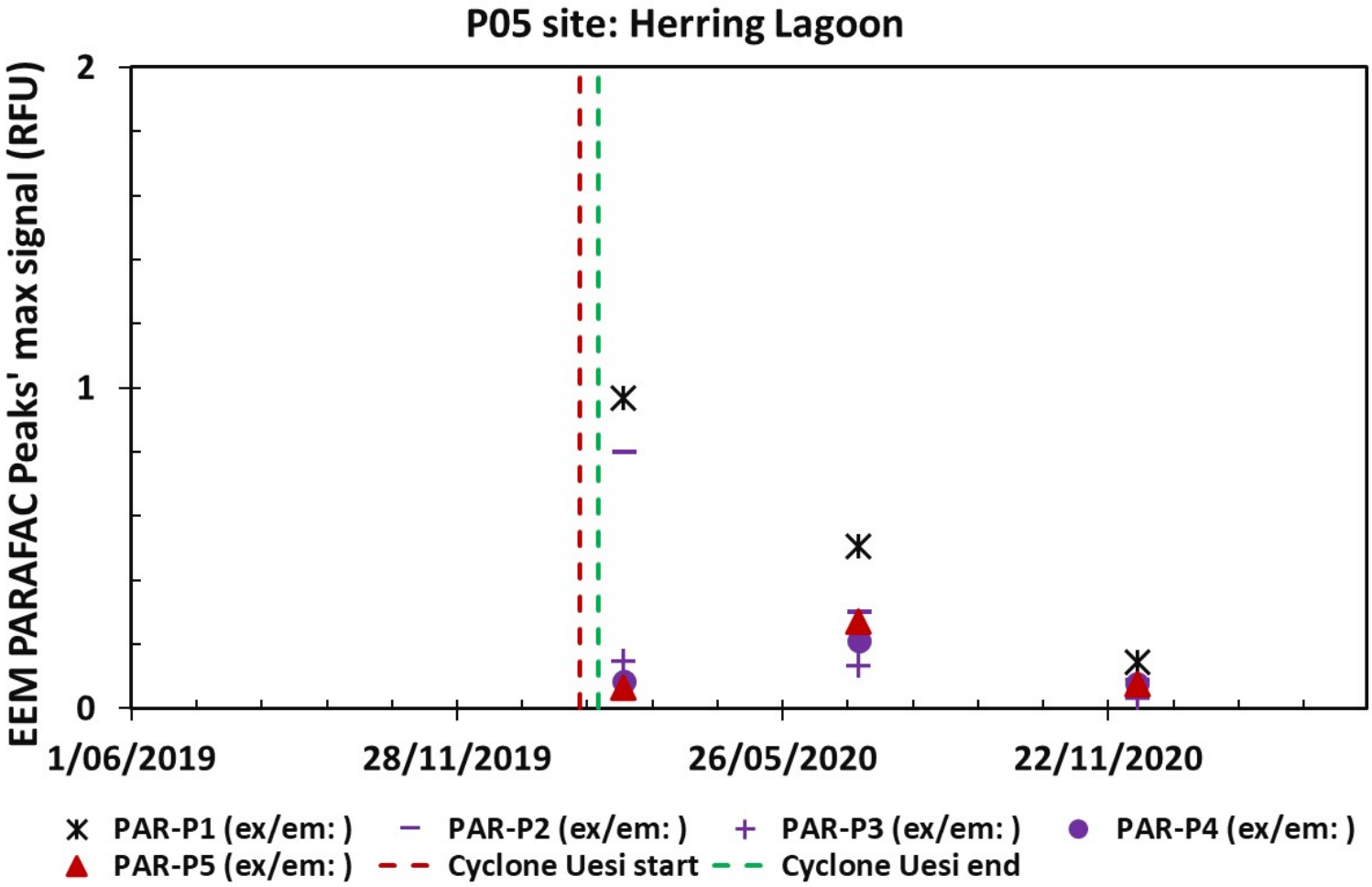

P05 site: Herring Lagoon
EEM PARAFAC Peaks' max signal (RFU)
2
1
0
1/06/2019
28/11/2019
26/05/2020
22/11/2020
PAR-P1 (ex/em:)
PAR-P2 (ex/em:)
PAR-P3 (ex/em:)
PAR-P4 (ex/em:)
PAR-P5 (ex/em:)
Cyclone Uesi start
Cyclone Uesi end

Figure 5.a1

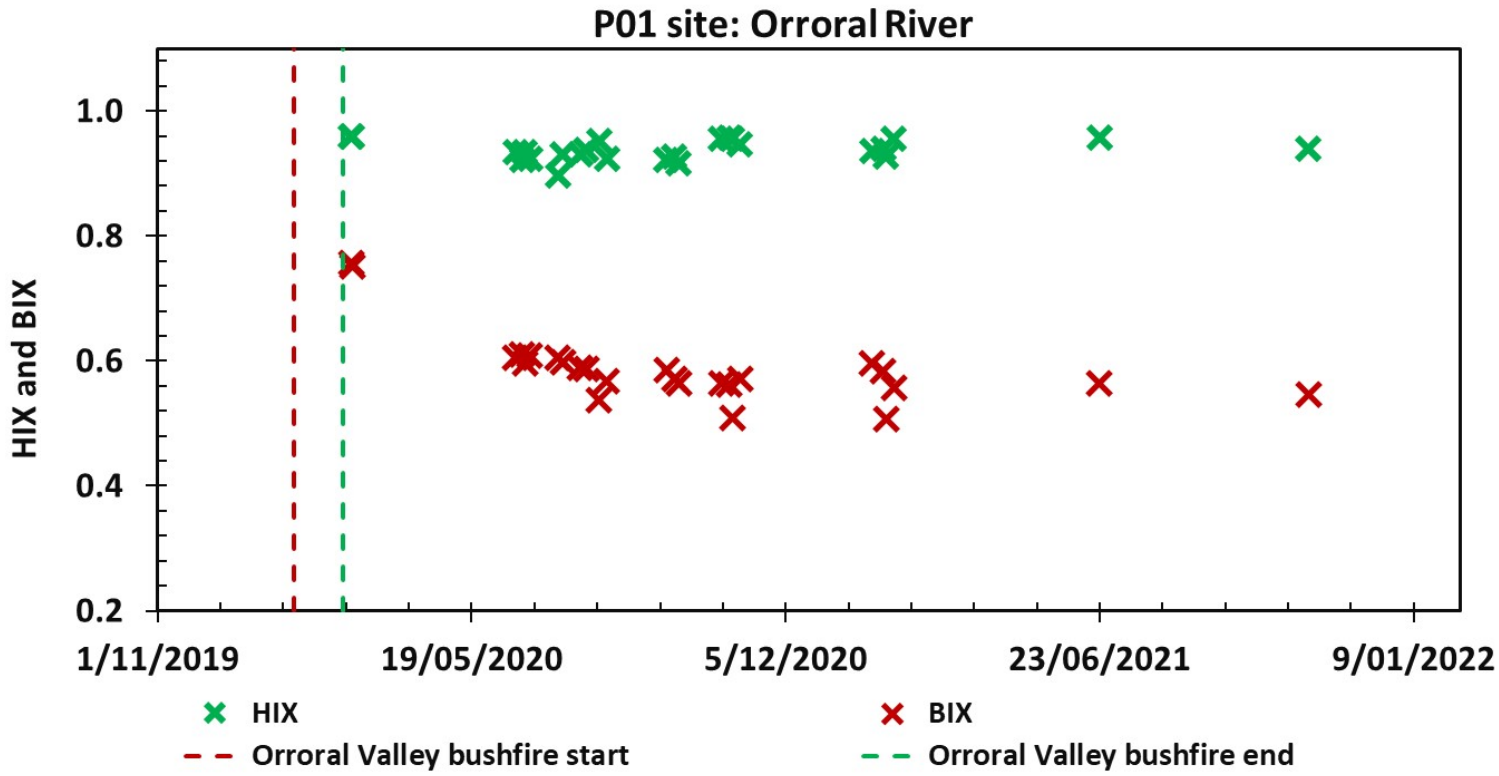

P01 site: Orroral River
HIX and BIX
1.0
0.8
0.6
0.4
0.2
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
HIX
BIX
Orroral Valley bushfire start
Orroral Valley bushfire end

Figure 5.a2

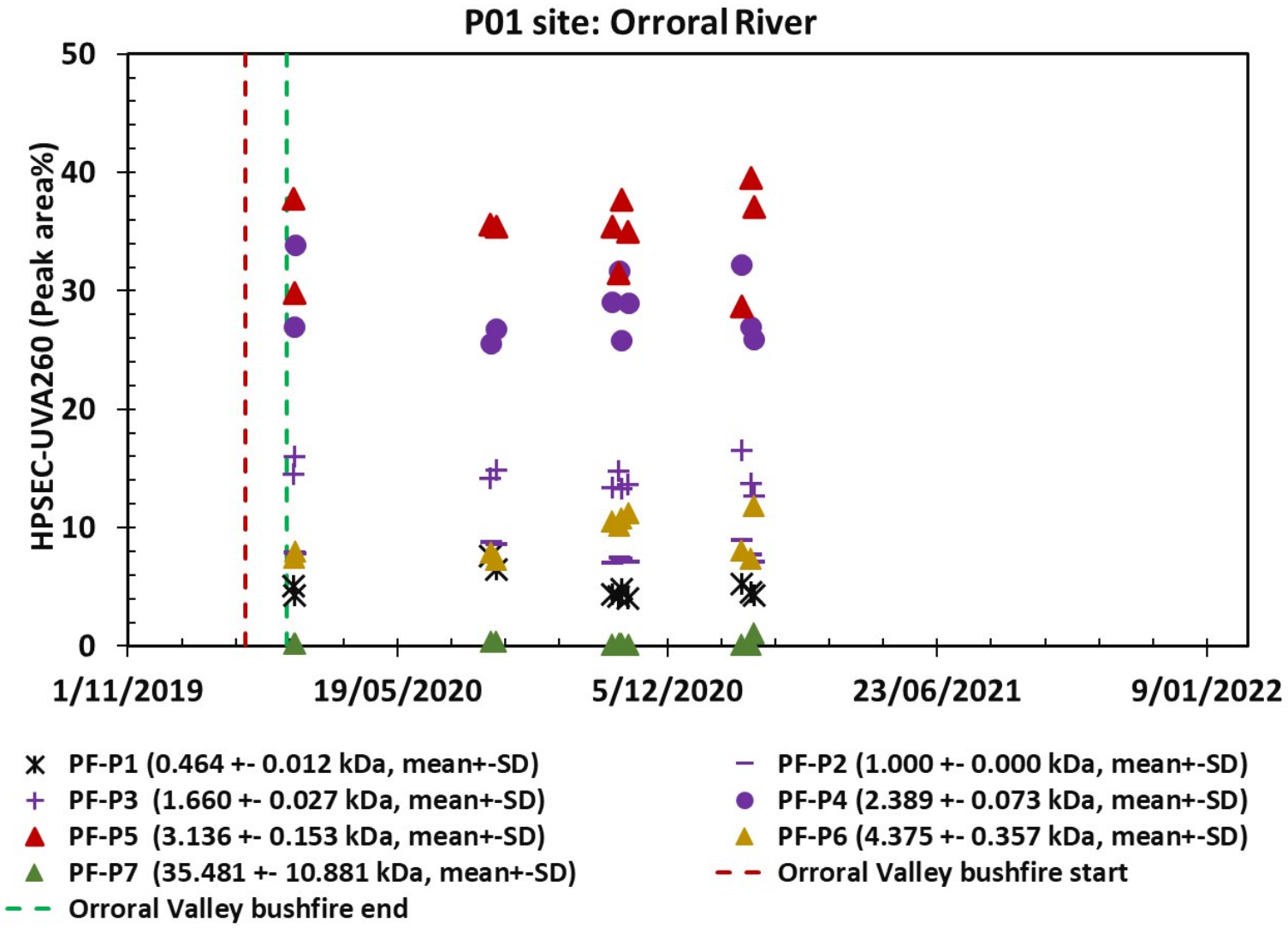

P01 site: Orroral River
HPSEC-UVA260 (Peak area%)
50
40
30
20
10
0
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
PF-P1 (0.464 +- 0.012 kDa, mean+-SD)
PF-P2 (1.000 +- 0.000 kDa, mean+-SD)
PF-P3 (1.660 +- 0.027 kDa, mean+-SD)
PF-P4 (2.389 +- 0.073 kDa, mean+-SD)
PF-P5 (3.136 +- 0.153 kDa, mean+-SD)
PF-P6 (4.375 +- 0.357 kDa, mean+-SD)
PF-P7 (35.481 +- 10.881 kDa, mean+-SD)
Orroral Valley bushfire start
Orroral Valley bushfire end

Figure 5.b1

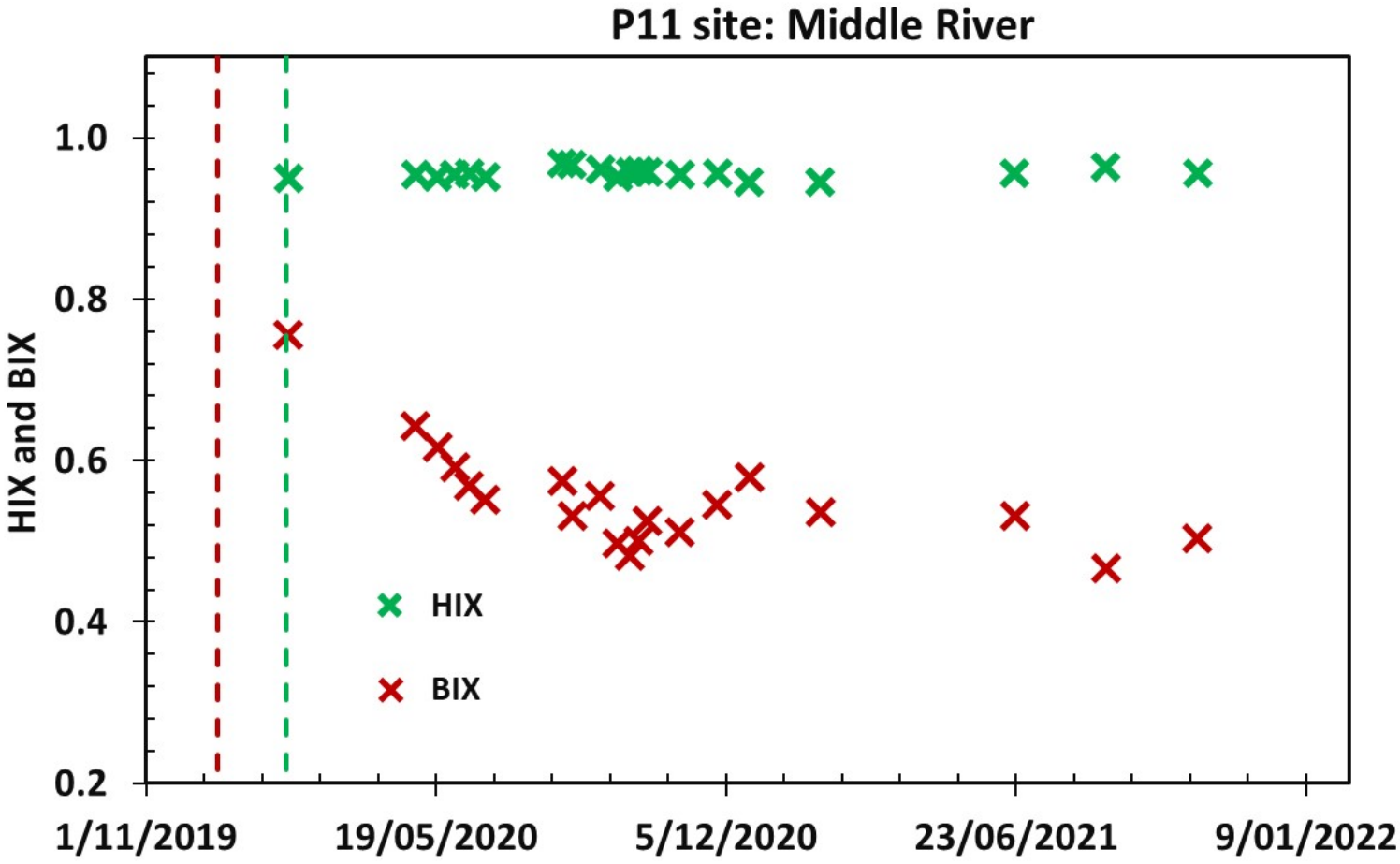

P11 site: Middle River
HIX and BIX
1.0
0.8
0.6
0.4
0.2
HIX
BIX
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022

Figure 5.b2

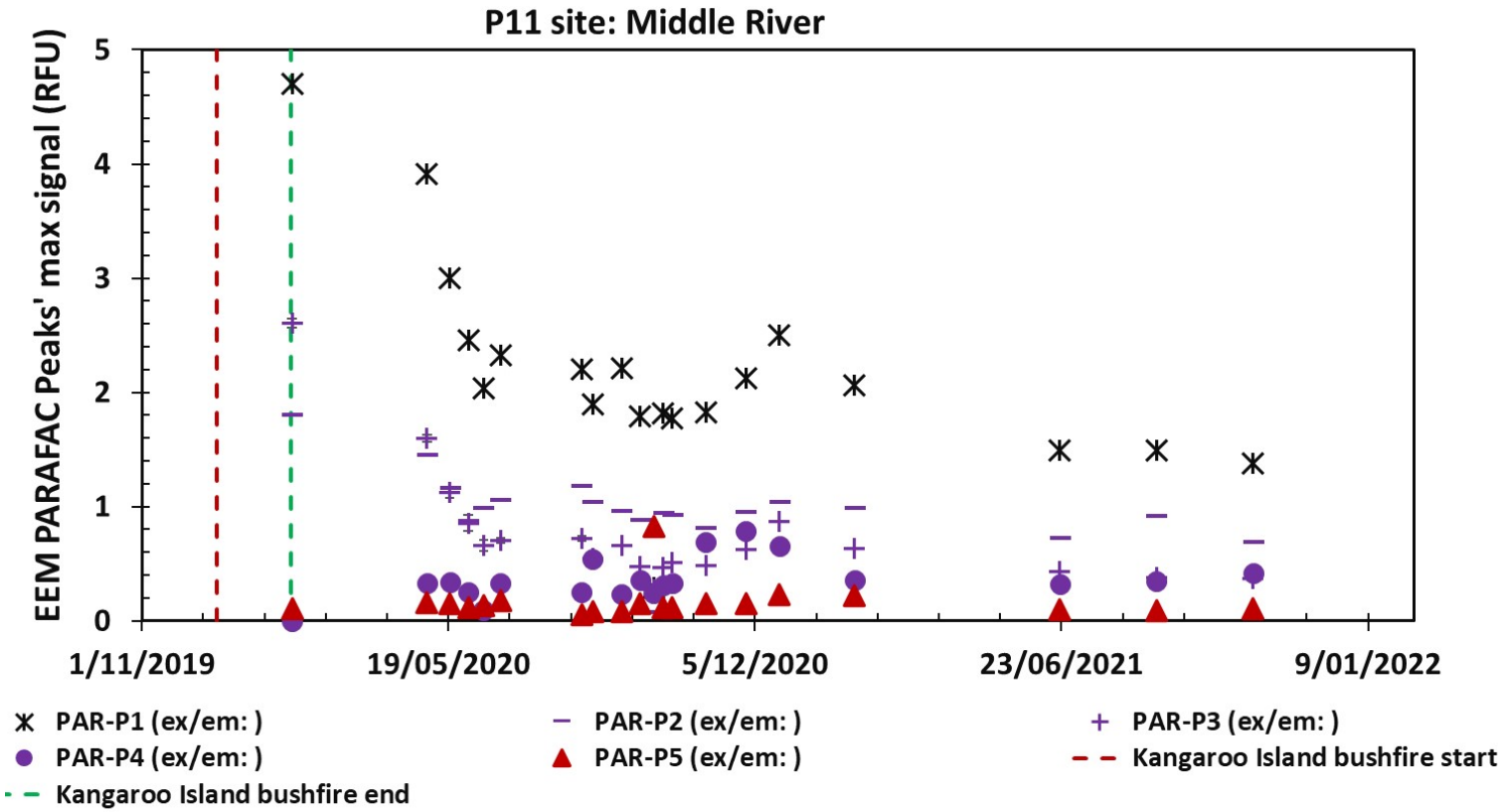

P11 site: Middle River
EEM PARAFAC Peaks' max signal (RFU)
0
1
2
3
4
5
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
PAR-P1 (ex/em:)
PAR-P2 (ex/em:)
PAR-P3 (ex/em:)
PAR-P4 (ex/em:)
PAR-P5 (ex/em:)
Kangaroo Island bushfire start
Kangaroo Island bushfire end

Figure 6.a1

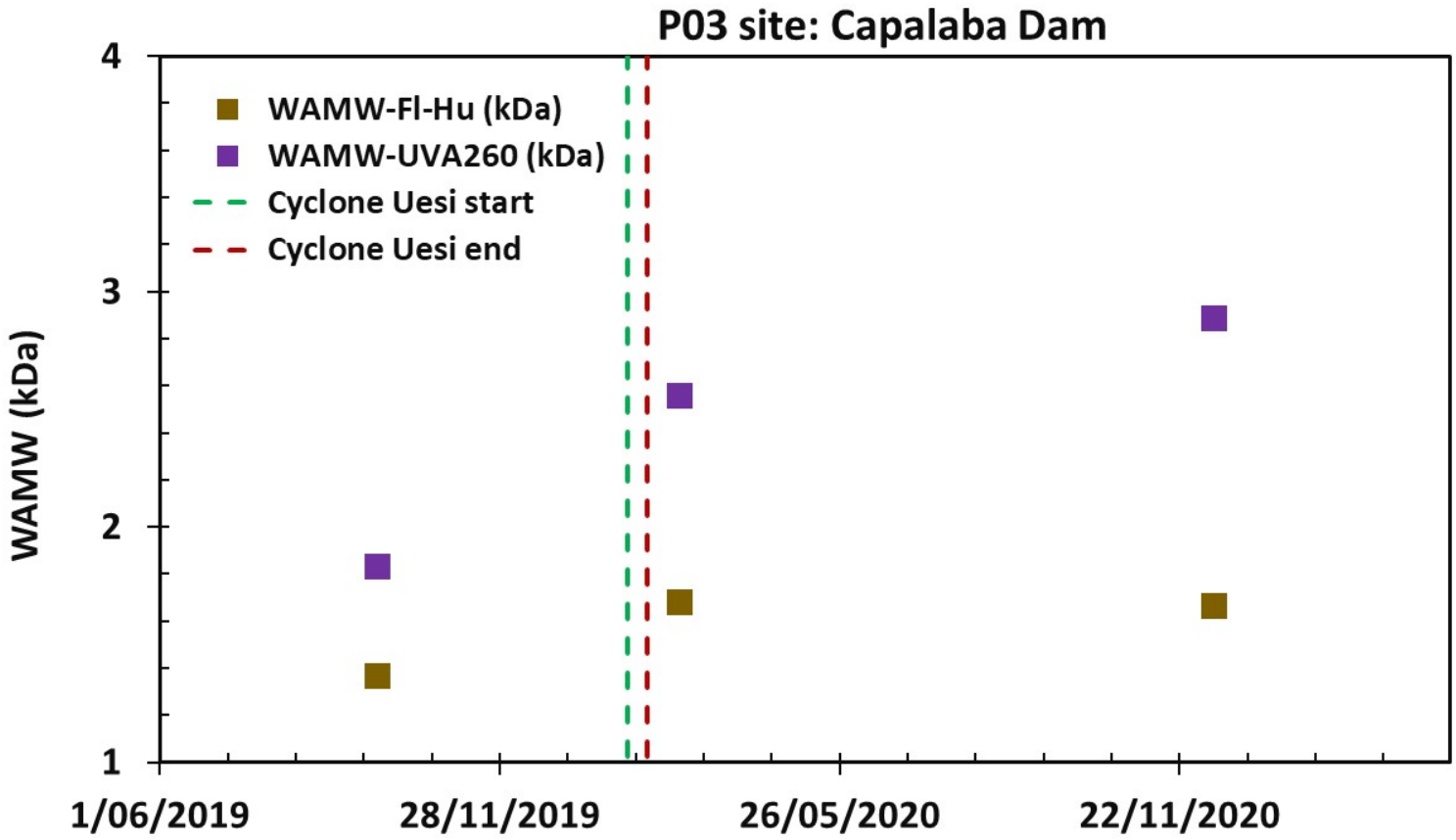

P03 site: Capalaba Dam
WAMW-Fl-Hu (kDa)
WAMW-UVA260 (kDa)
Cyclone Uesi start
Cyclone Uesi end
WAMW (kDa)
4
3
2
1
1/06/2019
28/11/2019
26/05/2020
22/11/2020

Figure 6.a2

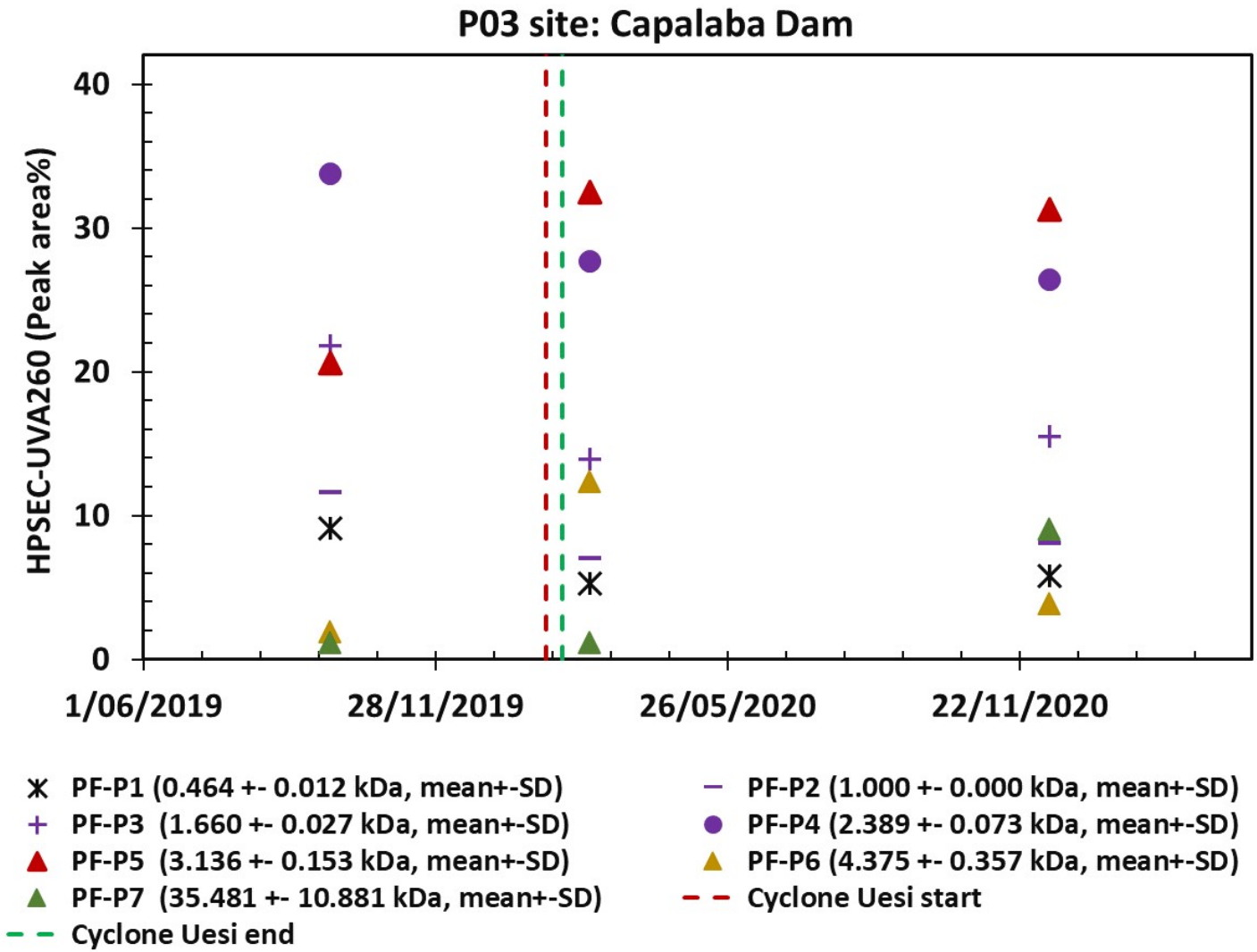

P03 site: Capalaba Dam
HPSEC-UVA260 (Peak area%)
40
30
20
10
0
1/06/2019
28/11/2019
26/05/2020
22/11/2020
PF-P1 (0.464 +- 0.012 kDa, mean+-SD)
PF-P2 (1.000 +- 0.000 kDa, mean+-SD)
PF-P3 (1.660 +- 0.027 kDa, mean+-SD)
PF-P4 (2.389 +- 0.073 kDa, mean+-SD)
PF-P5 (3.136 +- 0.153 kDa, mean+-SD)
PF-P6 (4.375 +- 0.357 kDa, mean+-SD)
PF-P7 (35.481 +- 10.881 kDa, mean+-SD)
Cyclone Uesi start
Cyclone Uesi end

Figure 6.a3

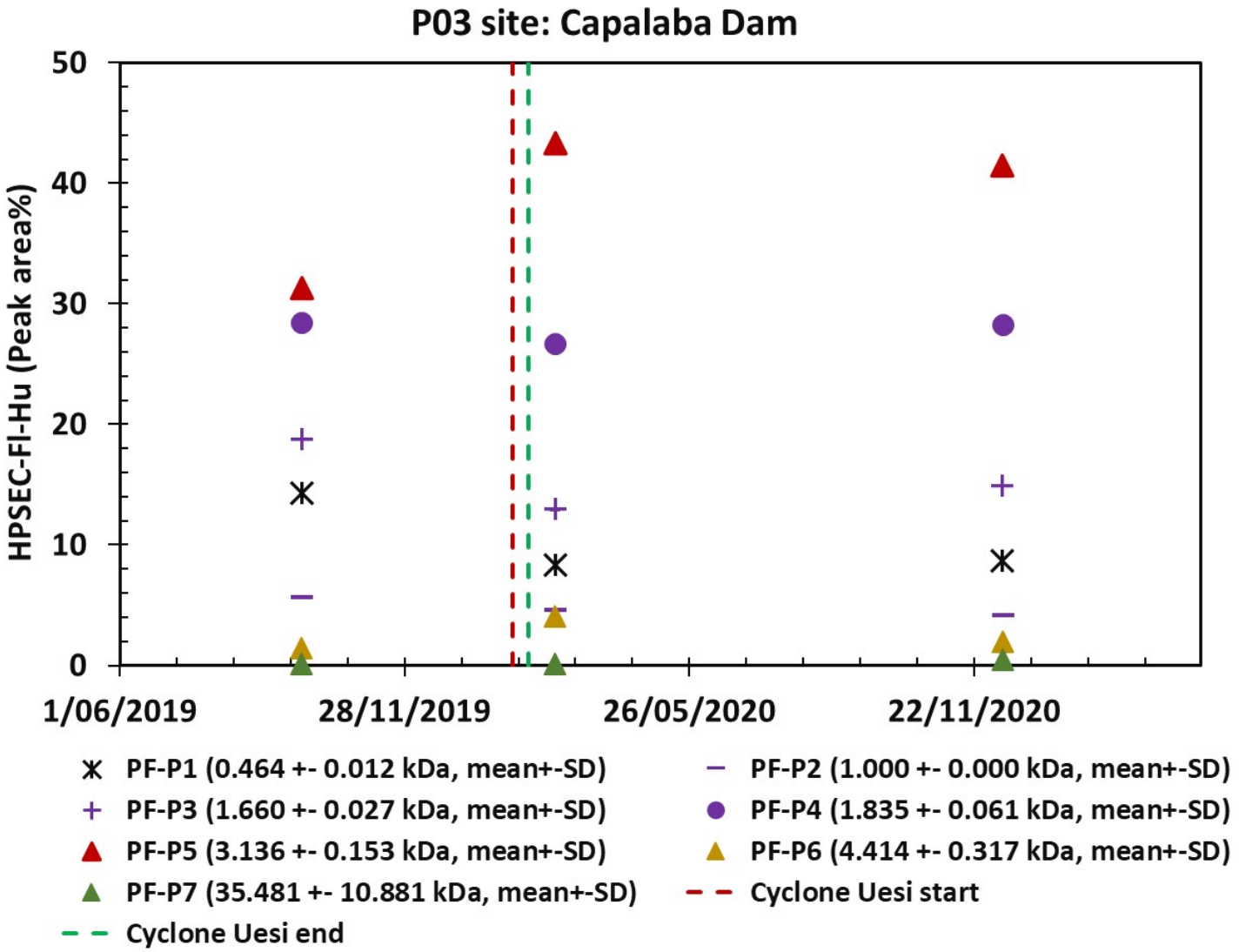

P03 site: Capalaba Dam
HPSEC-FI-Hu (Peak area%)
50
40
30
20
10
0
1/06/2019
28/11/2019
26/05/2020
22/11/2020
PF-P1 (0.464 +- 0.012 kDa, mean+-SD)
PF-P2 (1.000 +- 0.000 kDa, mean+-SD)
PF-P3 (1.660 +- 0.027 kDa, mean+-SD)
PF-P4 (1.835 +- 0.061 kDa, mean+-SD)
PF-P5 (3.136 +- 0.153 kDa, mean+-SD)
PF-P6 (4.414 +- 0.317 kDa, mean+-SD)
PF-P7 (35.481 +- 10.881 kDa, mean+-SD)
Cyclone Uesi start
Cyclone Uesi end

Figure 6.b1

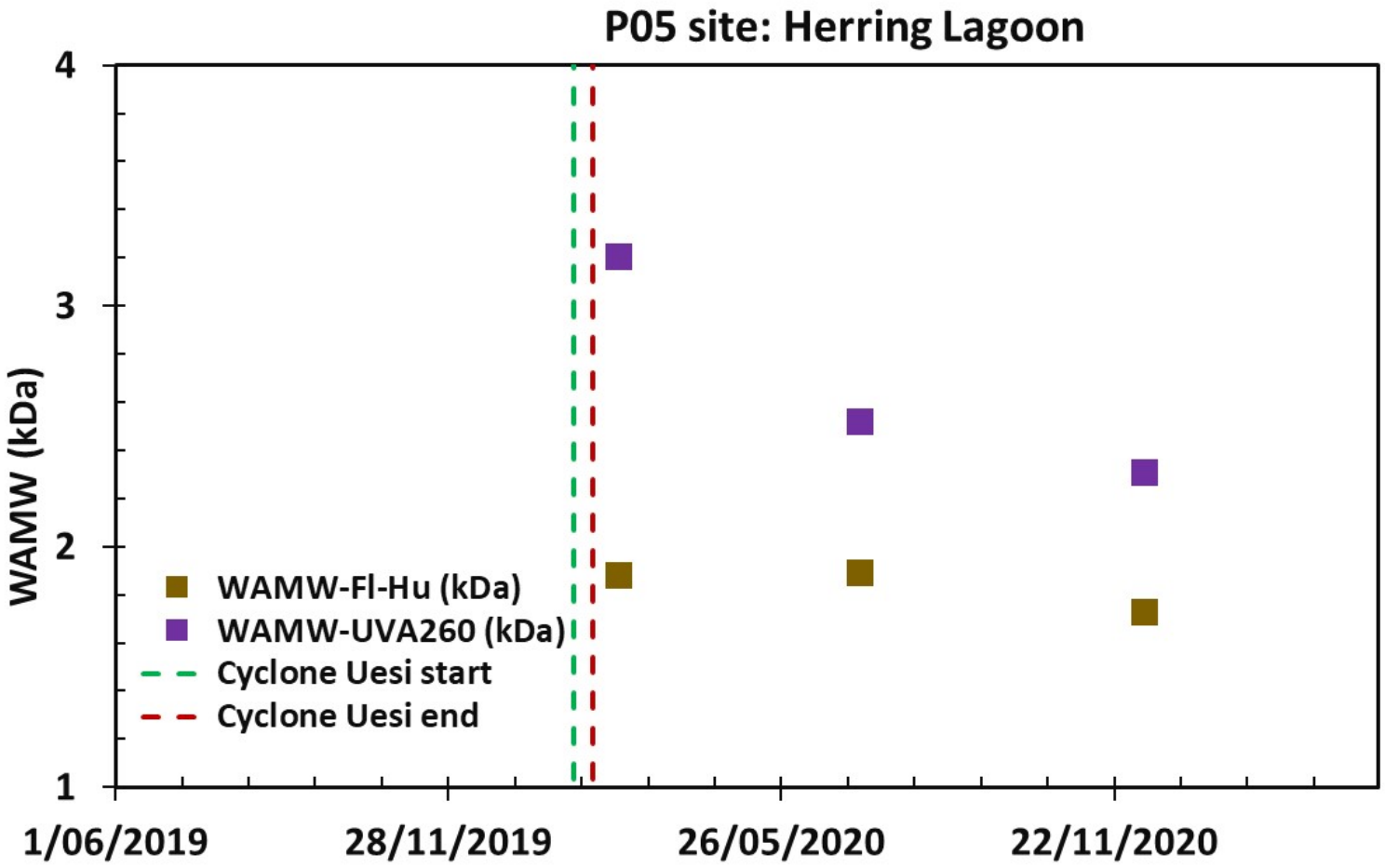

P05 site: Herring Lagoon
WAMW (kDa)
4
3
2
1
WAMW-Fl-Hu (kDa)
WAMW-UVA260 (kDa)
Cyclone Uesi start
Cyclone Uesi end
1/06/2019
28/11/2019
26/05/2020
22/11/2020

Figure 6.b2

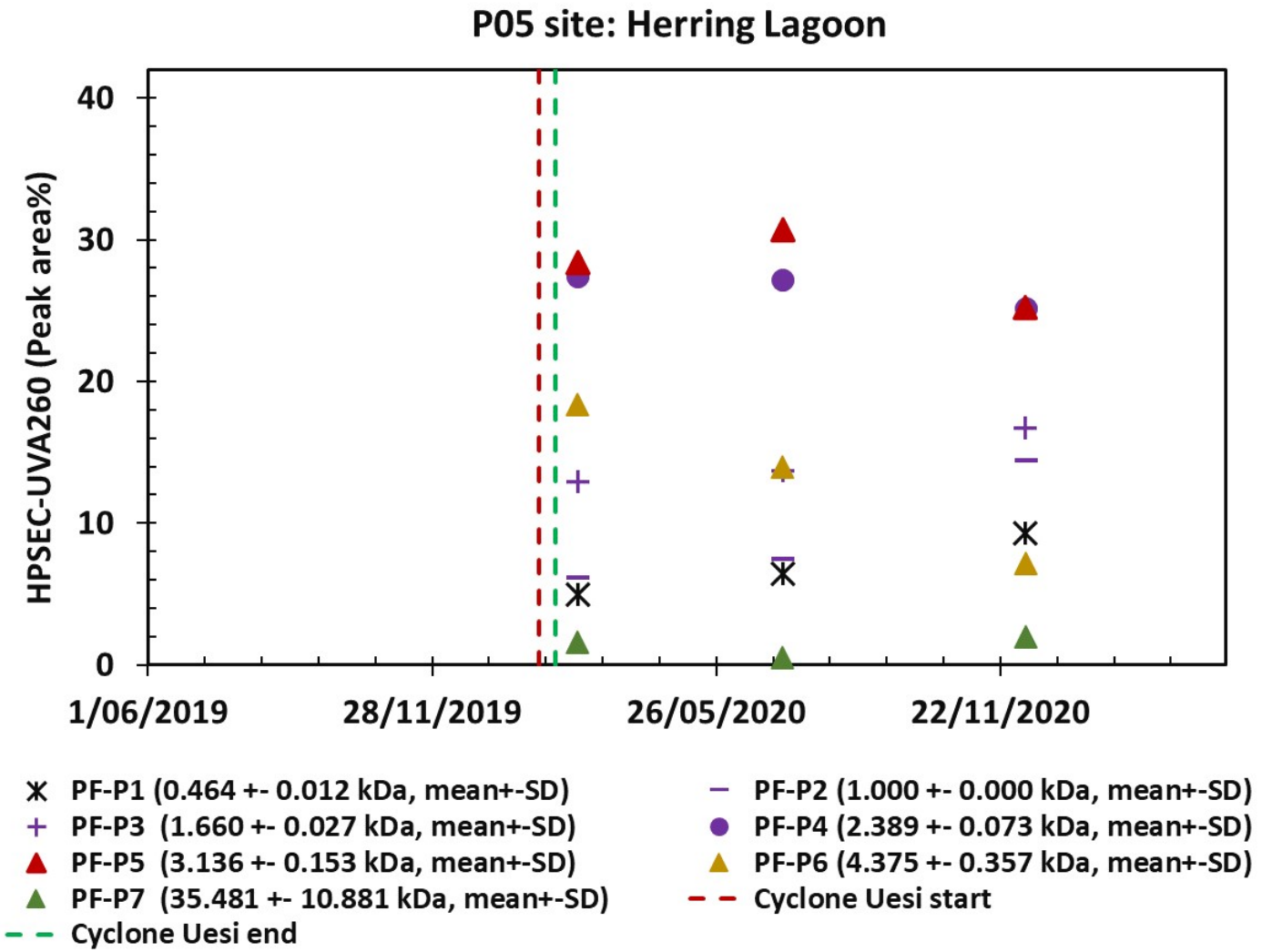

P05 site: Herring Lagoon
HPSEC-UVA260 (Peak area%)
40
30
20
10
0
1/06/2019
28/11/2019
26/05/2020
22/11/2020
PF-P1 (0.464 +- 0.012 kDa, mean+-SD)
PF-P2 (1.000 +- 0.000 kDa, mean+-SD)
PF-P3 (1.660 +- 0.027 kDa, mean+-SD)
PF-P4 (2.389 +- 0.073 kDa, mean+-SD)
PF-P5 (3.136 +- 0.153 kDa, mean+-SD)
PF-P6 (4.375 +- 0.357 kDa, mean+-SD)
PF-P7 (35.481 +- 10.881 kDa, mean+-SD)
Cyclone Uesi start
Cyclone Uesi end

Figure 6.b3

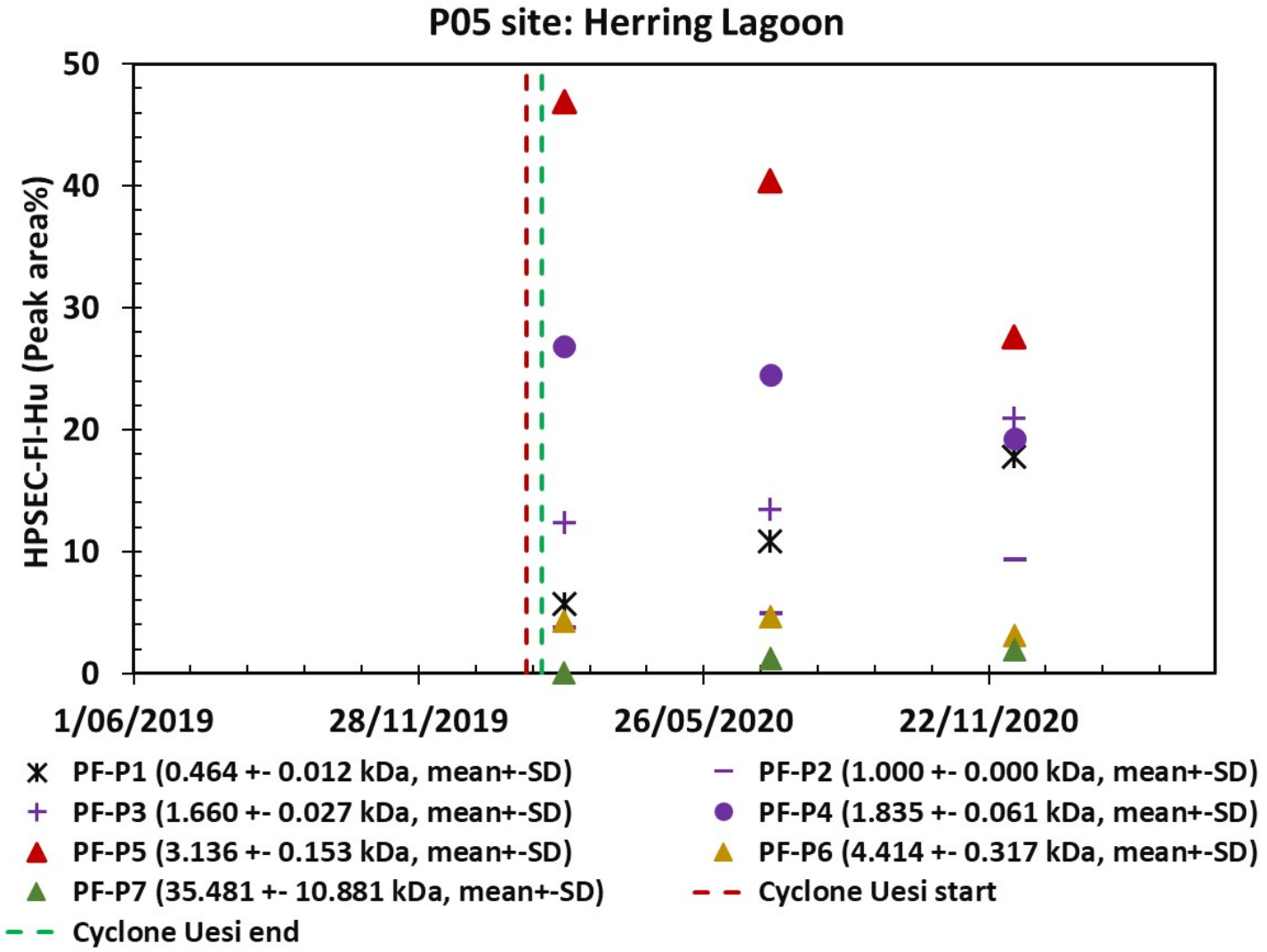

P05 site: Herring Lagoon
HPSEC-FI-Hu (Peak area%)
50
40
30
20
10
0
1/06/2019
28/11/2019
26/05/2020
22/11/2020
PF-P1 (0.464 +- 0.012 kDa, mean+-SD)
PF-P2 (1.000 +- 0.000 kDa, mean+-SD)
PF-P3 (1.660 +- 0.027 kDa, mean+-SD)
PF-P4 (1.835 +- 0.061 kDa, mean+-SD)
PF-P5 (3.136 +- 0.153 kDa, mean+-SD)
PF-P6 (4.414 +- 0.317 kDa, mean+-SD)
PF-P7 (35.481 +- 10.881 kDa, mean+-SD)
Cyclone Uesi start
Cyclone Uesi end

Figure 7.a1

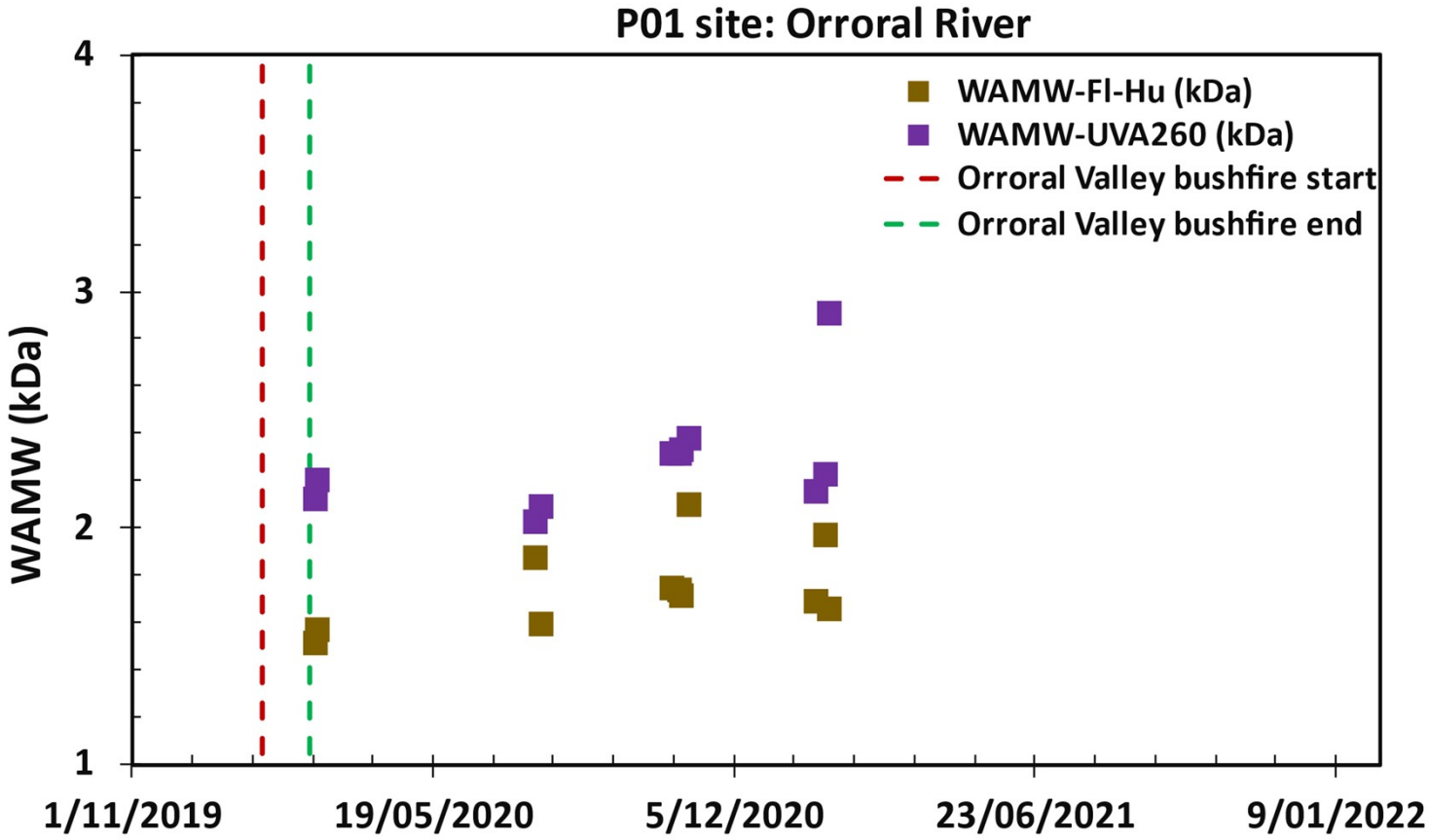

P01 site: Orroral River
WAMW-Fl-Hu (kDa)
WAMW-UVA260 (kDa)
Orroral Valley bushfire start
Orroral Valley bushfire end
WAMW (kDa)
4
3
2
1
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022

Figure 7.a2

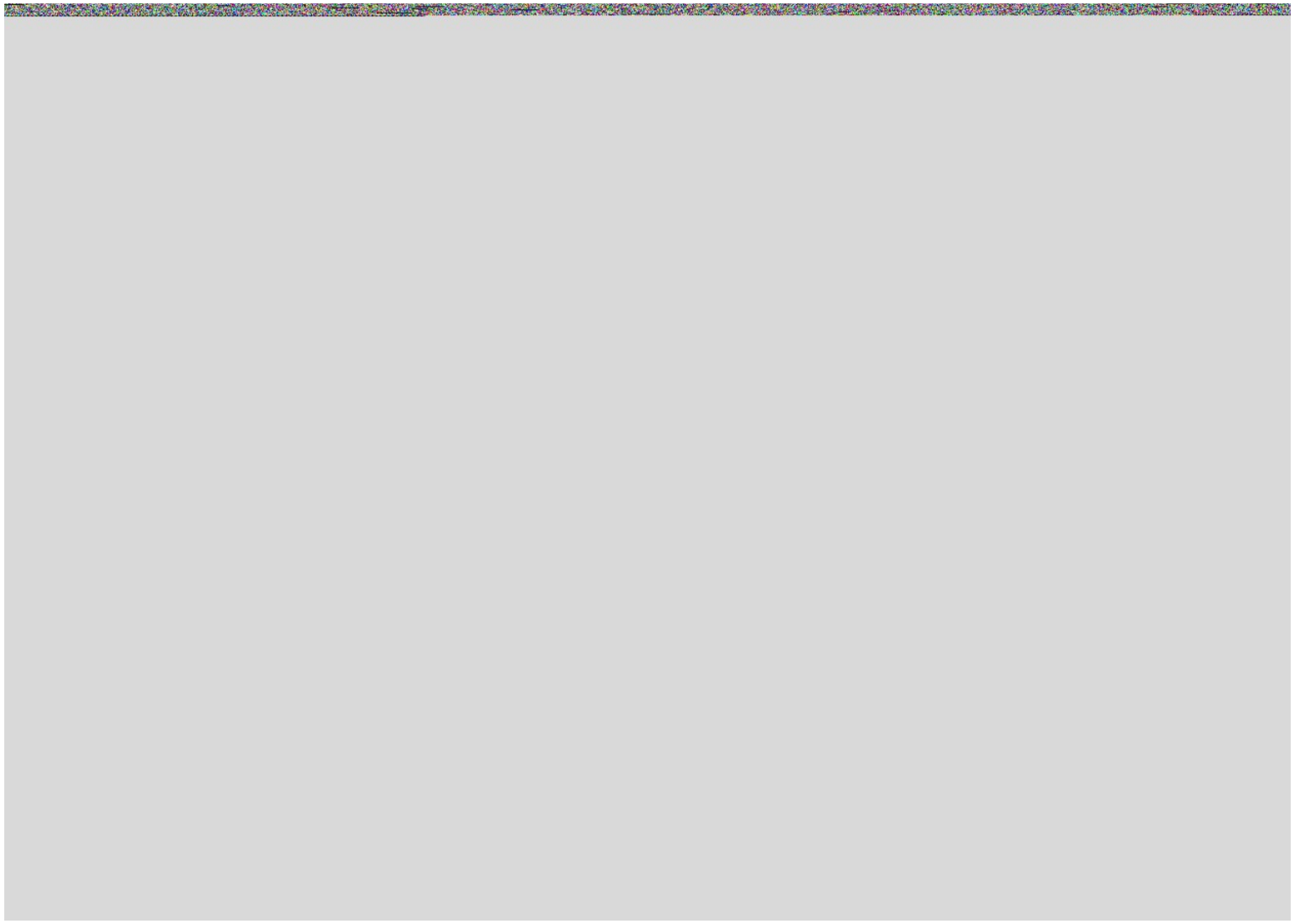


Figure 7.a3

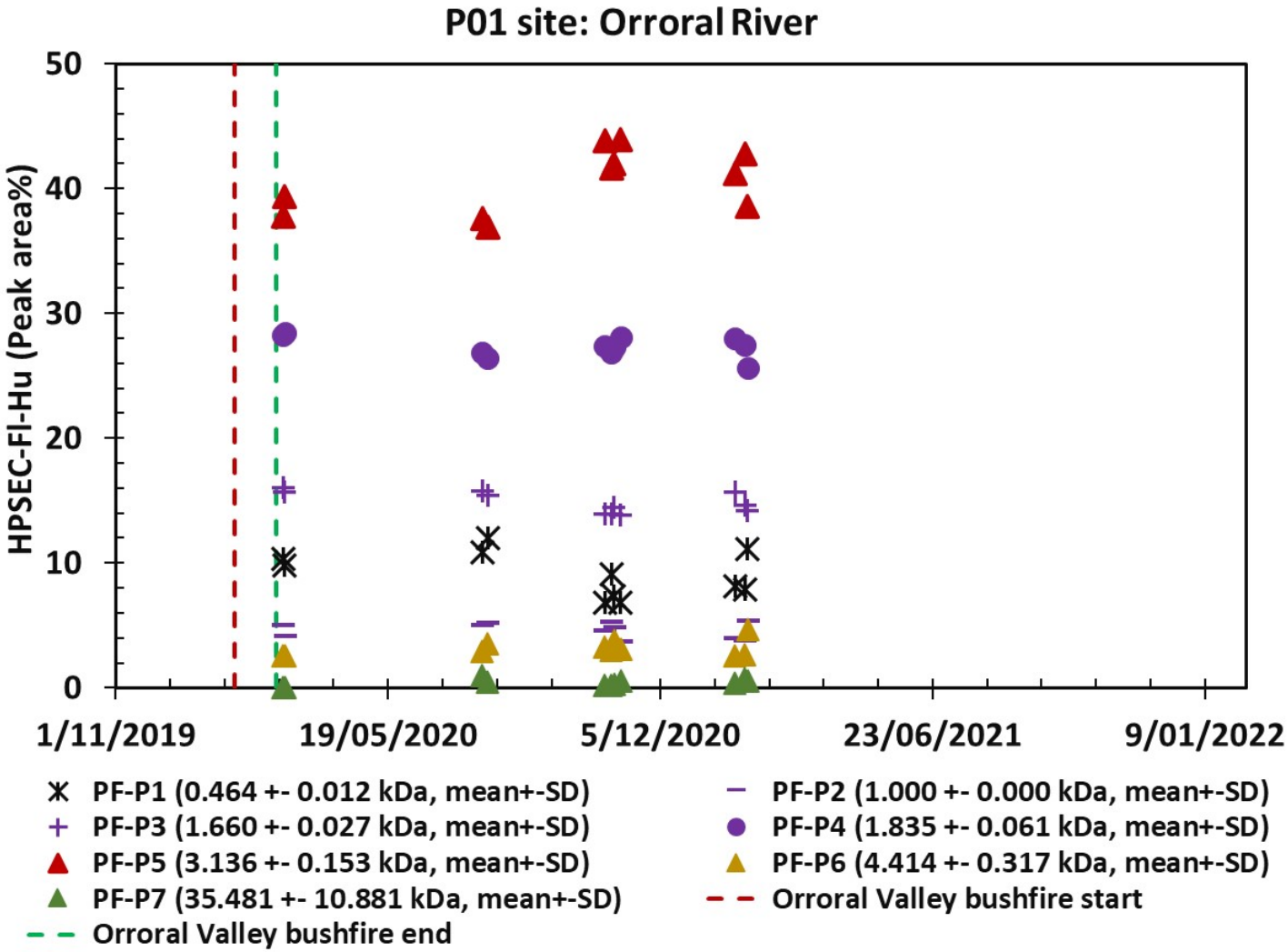

P01 site: Orroral River
HPSEC-FI-Hu (Peak area%)
50
40
30
20
10
0
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
PF-P1 (0.464 +- 0.012 kDa, mean+-SD)
PF-P2 (1.000 +- 0.000 kDa, mean+-SD)
PF-P3 (1.660 +- 0.027 kDa, mean+-SD)
PF-P4 (1.835 +- 0.061 kDa, mean+-SD)
PF-P5 (3.136 +- 0.153 kDa, mean+-SD)
PF-P6 (4.414 +- 0.317 kDa, mean+-SD)
PF-P7 (35.481 +- 10.881 kDa, mean+-SD)
Orroral Valley bushfire start
Orroral Valley bushfire end

Figure 7.b1

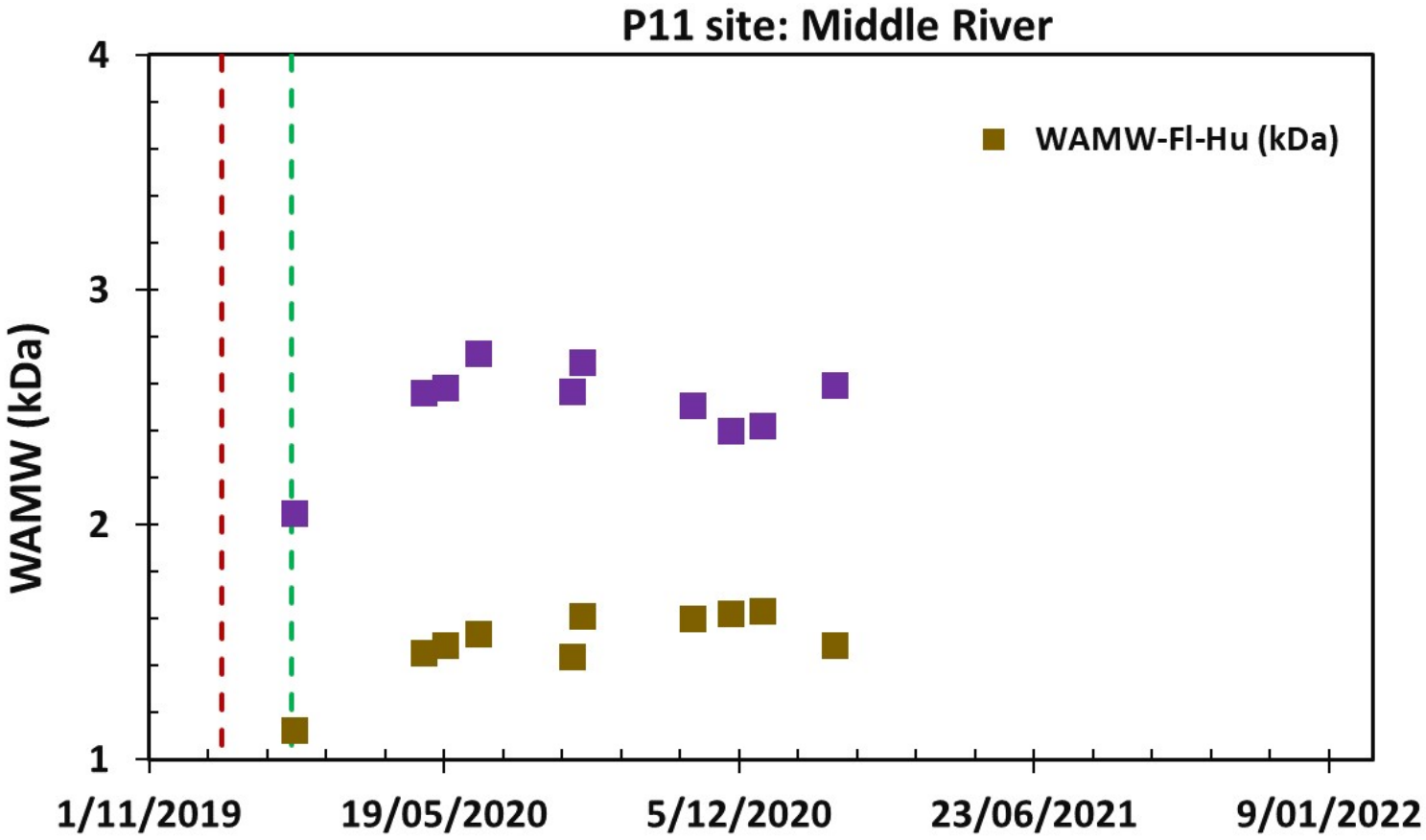

P11 site: Middle River
WAMW-Fl-Hu (kDa)
WAMW (kDa)
4
3
2
1
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022

Figure 7.b2

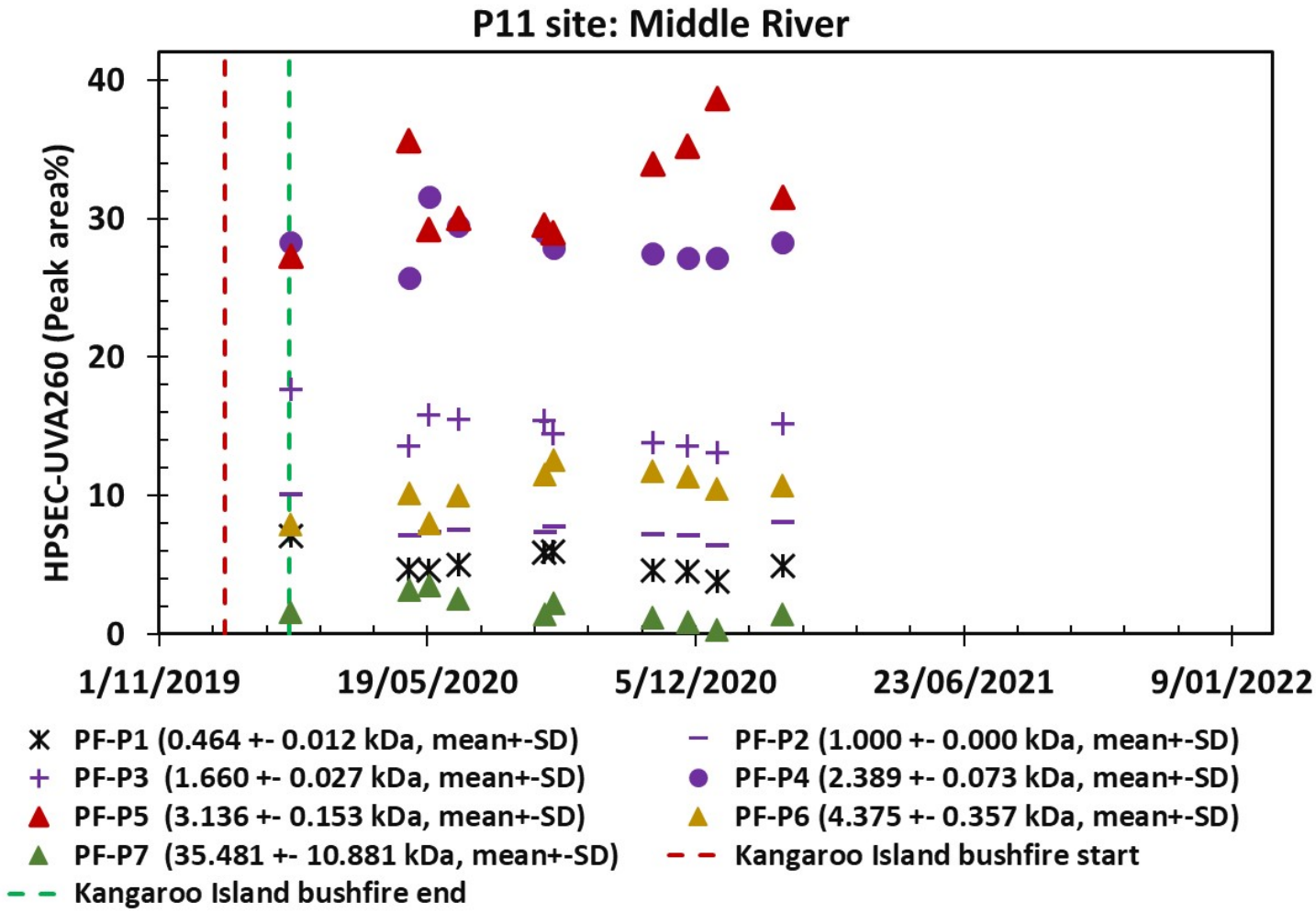
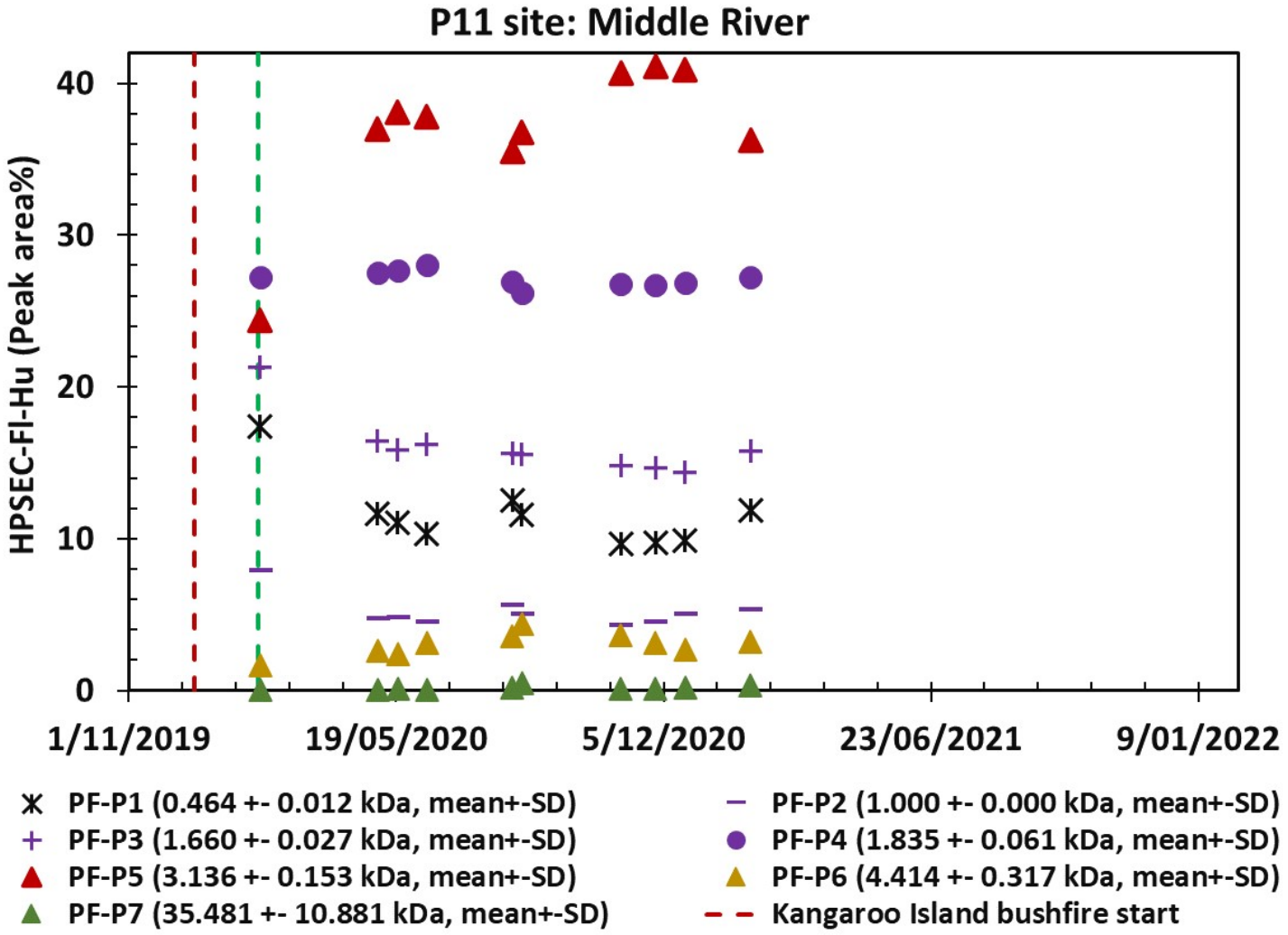

P11 site: Middle River
HPSEC-UVA260 (Peak area%)
40
30
20
10
0
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
PF-P1 (0.464 +- 0.012 kDa, mean+-SD)
PF-P2 (1.000 +- 0.000 kDa, mean+-SD)
PF-P3 (1.660 +- 0.027 kDa, mean+-SD)
PF-P4 (2.389 +- 0.073 kDa, mean+-SD)
PF-P5 (3.136 +- 0.153 kDa, mean+-SD)
PF-P6 (4.375 +- 0.357 kDa, mean+-SD)
PF-P7 (35.481 +- 10.881 kDa, mean+-SD)
Kangaroo Island bushfire start
Kangaroo Island bushfire end

Figure 7.b3


P11 site: Middle River
HPSEC-FI-Hu (Peak area%)
40
30
20
10
0
1/11/2019
19/05/2020
5/12/2020
23/06/2021
9/01/2022
PF-P1 (0.464 +- 0.012 kDa, mean+-SD)
PF-P2 (1.000 +- 0.000 kDa, mean+-SD)
PF-P3 (1.660 +- 0.027 kDa, mean+-SD)
PF-P4 (1.835 +- 0.061 kDa, mean+-SD)
PF-P5 (3.136 +- 0.153 kDa, mean+-SD)
PF-P6 (4.414 +- 0.317 kDa, mean+-SD)
PF-P7 (35.481 +- 10.881 kDa, mean+-SD)
Kangaroo Island bushfire start

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4. A. M. Hansen, T. E. C. Kraus, B. A. Pellerin, J. A. Fleck, B. D. Downing and B. A. Bergamaschi, Optical properties of dissolved organic matter (DOM): Effects of biological and photolytic degradation, *Limnology and Oceanography*, 2016, **61**, 1015-1032.

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